



# **Install appliance hardware**

StorageGRID 11.7

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# Install appliance hardware

## Quick start for hardware installation

Follow these high-level steps to install and set up a StorageGRID appliance and deploy it as a node in your StorageGRID system.

### 1

#### Prepare for installation

1. Work with your NetApp Professional Services consultant to automate installation and configuration. See [Automate appliance installation and configuration](#).

This step is optional. However, streamlining and automating configuration steps can save time and provide consistency in the configuration of multiple appliances.

2. [Prepare site](#)
3. [Unpack boxes](#)
4. [Obtain additional equipment and tools](#)
5. [Review web browser requirements](#)
6. [Review appliance network connections](#)
7. [Gather installation information](#)

### 2

#### Install hardware

1. [Register hardware](#)
2. Install into cabinet or rack
  - [SGF6112](#)
  - [SG6000](#)
  - [SG5700](#)
  - [SG100 and SG1000](#)
3. Cable appliance
  - [SGF6112](#)
  - [SG6000](#)
  - [SG5700](#)
  - [SG100 and SG1000](#)
4. Connect power cords and apply power
  - [SGF6112](#)
  - [SG6000](#)
  - [SG5700](#)
  - [SG100 and SG1000](#)
5. [View status indicators and codes](#)

### 3

#### Set up hardware

If you are configuring and deploying more than one appliance, use the NetApp ConfigBuilder tool to automate the following configuration and deployment steps. For guidance, contact your NetApp Professional Services consultant. See [Automate appliance installation and configuration](#).

1. Configure StorageGRID connections
  - [Access StorageGRID Appliance Installer](#) and verify you are running most recent version
  - [Configure network links](#)
  - [Configure StorageGRID IP addresses](#)
  - [Verify network connections](#)
  - [Verify port-level network connections](#)
2. [Access and configure SANtricity System Manager](#) (SG6000 and SG5700)
3. [Configure the BMC interface](#) (SGF6112, SG6000, SG100, and SG1000)
4. Perform optional setup steps
  - [Enable node encryption](#)
  - [Change RAID mode \(SG6000 and SG5700\)](#)
  - [Remap network ports](#)

### 4

#### Deploy appliance node

Deploy the appliance as a new node in your StorageGRID system.

- [Deploy appliance Storage Node](#)
- [Deploy services appliance node](#)

## Hardware overviews

### SGF6112 appliance: Overview

The StorageGRID SGF6112 appliance operates as a Storage Node in a StorageGRID system. The appliance can be used in a hybrid grid environment that combines appliance Storage Nodes and virtual (software-based) Storage Nodes.

The SGF6112 appliance provides the following features:

- 12 NVMe (nonvolatile memory express) SSD drives with integrated compute and storage controllers.
- Integrates the storage and computing elements for a StorageGRID Storage Node.
- Includes the StorageGRID Appliance Installer to simplify Storage Node deployment and configuration.
- Includes a baseboard management controller (BMC) for monitoring and diagnosing the hardware in the compute controller.
- Supports up to four 10-GbE or 25-GbE connections to the StorageGRID Grid Network and Client Network.

**SGF6112 hardware description**

The StorageGRID SGF6112 is an all-flash appliance that features a compact design with compute controller and storage controller integrated into a 1U chassis. The appliance supports 12 SSD NVMe drives with a storage capacity of up to 15.3 TB per drive.

**Resilient object storage**

The SGF6112 is designed with SSDs in a RAID that provides the following data protection features:

- Ability to function after the failure of a single SSD with no impact on object availability.
- Ability to function after multiple SSD failures with a minimum necessary reduction in object availability (based on the design of the underlying RAID scheme).
- Fully recoverable, while in service, from SSD failures that don't result in extreme damage to the RAID housing the node's root volume (the StorageGRID operating system).

**SGF6112 hardware components**

The SGF6112 appliance includes the following components:

Component	Description
Compute and storage platform	<div>A one-rack unit (1U) server that includes:<ul style="list-style-type: none"><li>• Two 2.1/2.6 GHz 165 W processors providing 48 cores</li><li>• 256 GB RAM</li><li>• 2 × 1/10 GBase-T ports</li><li>• 4 × 10/25 GbE Ethernet ports</li><li>• 1 × 256 GB Internal Boot drive (includes StorageGRID software)</li><li>• Baseboard management controller (BMC) that simplifies hardware management</li><li>• Redundant power supplies and fans</li></ul></div>

**SGF6112 diagrams**

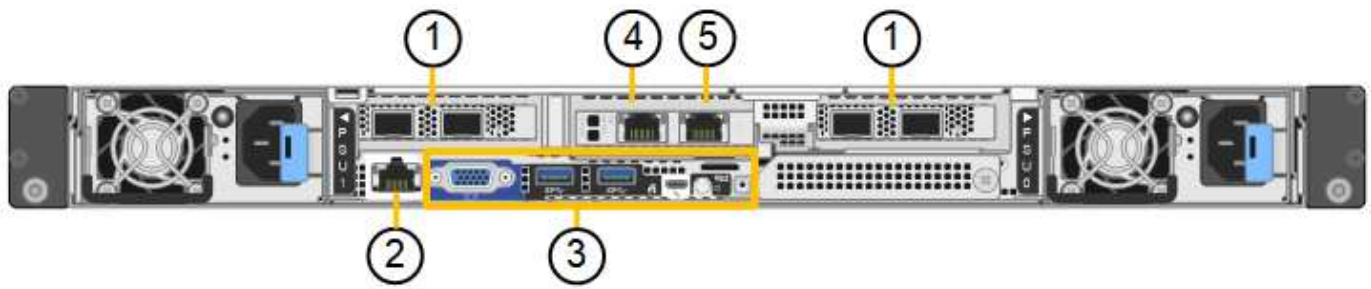
**SGF6112 front view**

This figure shows the front of the SGF6112 without the bezel. The appliance includes a 1U compute and storage platform that contains 12 SSD drives.



**SGF6112 rear view**

This figure shows the back of the SGF6112, including the ports, fans, and power supplies.



Callout	Port	Type	Use
1	Network ports 1-4	10/25-GbE, based on cable or SFP transceiver type (SFP28 and SFP+ modules are supported), switch speed, and configured link speed.	Connect to the Grid Network and the Client Network for StorageGRID.
2	BMC management port	1-GbE (RJ-45)	Connect to the appliance baseboard management controller.
3	Diagnostic and support ports	<ul style="list-style-type: none"> <li>• VGA</li> <li>• USB</li> <li>• Micro-USB console port</li> <li>• Micro-SD slot module</li> </ul>	Reserved for technical support use.
4	Admin Network port 1	1/10-GbE (RJ-45)	Connect the appliance to the Admin Network for StorageGRID.
5	Admin Network port 2	1/10-GbE (RJ-45)	Options: <ul style="list-style-type: none"> <li>• Bond with Admin Network port 1 for a redundant connection to the Admin Network for StorageGRID.</li> <li>• Leave disconnected and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, use port 2 for IP configuration if DHCP-assigned IP addresses aren't available.</li> </ul>

## SG6060 and SG6060X appliances: Overview

The StorageGRID SG6060 and SG6060X appliances each include a compute controller and a storage controller shelf that contains two storage controllers and 60 drives.

Optionally, 60-drive expansion shelves can be added to both appliances. There are no specification or functional differences between the SG6060 and SG6060X except for the location of the interconnect ports on the storage controller.

### SG6060 and SG6060X components

The SG6060 and SG6060X appliances include the following components:

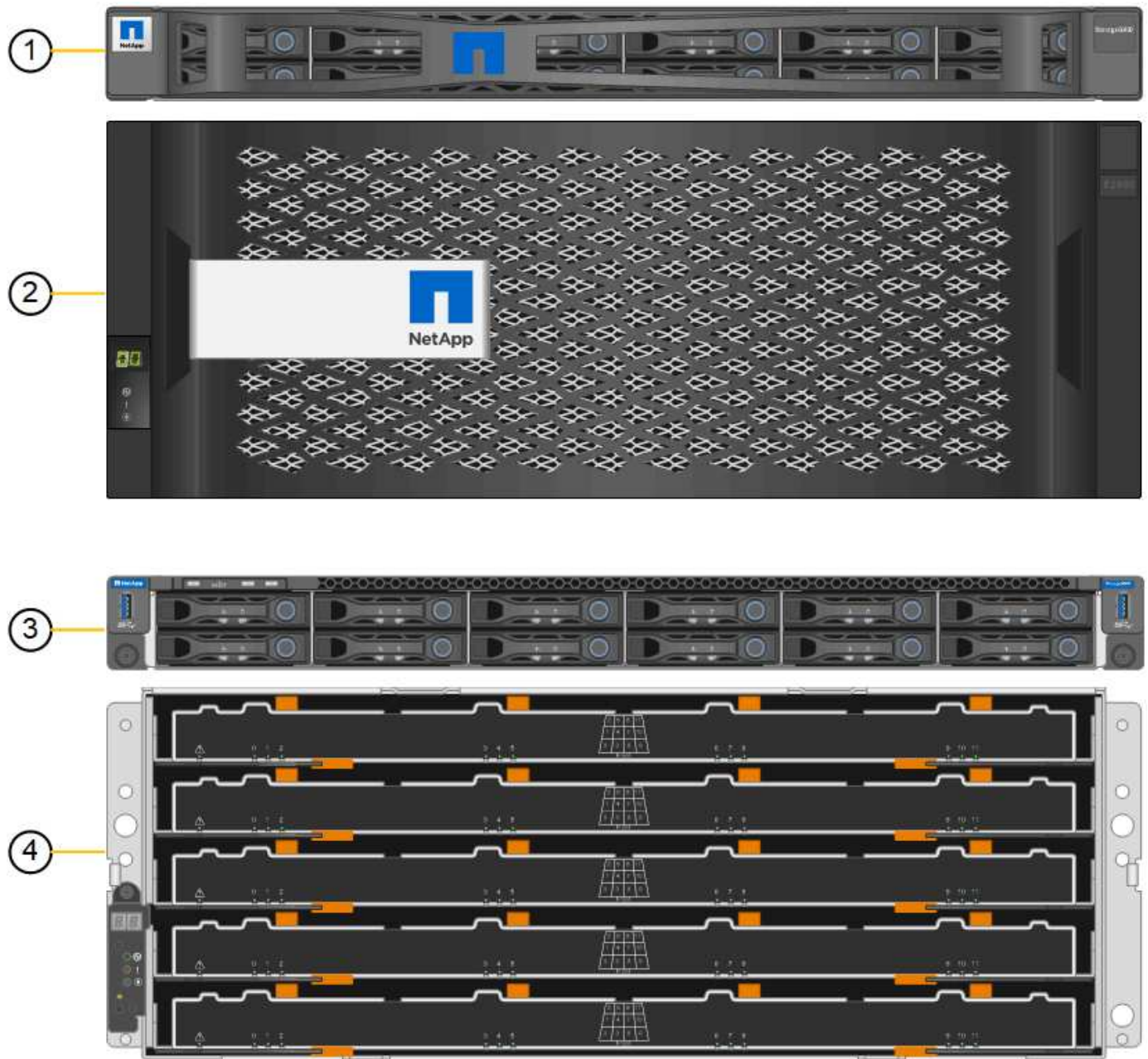
Component	Description
Compute controller	<p>SG6000-CN controller, a one-rack unit (1U) server that includes:</p> <ul style="list-style-type: none"><li>• 40 cores (80 threads)</li><li>• 192 GB RAM</li><li>• Up to 4 × 25 Gbps aggregate Ethernet bandwidth</li><li>• 4 × 16 Gbps Fibre Channel (FC) interconnect</li><li>• Baseboard management controller (BMC) that simplifies hardware management</li><li>• Redundant power supplies</li></ul>
Storage controller shelf	<p>E-Series E2860 controller shelf (storage array), a 4U shelf that includes:</p> <ul style="list-style-type: none"><li>• Two E2800 series controllers (duplex configuration) to provide storage controller failover support<ul style="list-style-type: none"><li>◦ The SG6060 contains E2800A storage controllers</li><li>◦ The SG6060X contains E2800B storage controllers</li></ul></li><li>• Five-drawer drive shelf that holds sixty 3.5-inch drives (2 solid-state drives, or SSDs, and 58 NL-SAS drives)</li><li>• Redundant power supplies and fans</li></ul>
<p>Optional: Storage expansion shelves</p> <p><b>Note:</b> Expansion shelves can be installed during initial deployment or added later.</p>	<p>E-Series DE460C enclosure, a 4U shelf that includes:</p> <ul style="list-style-type: none"><li>• Two input/output modules (IOMs)</li><li>• Five drawers, each holding 12 NL-SAS drives, for a total of 60 drives</li><li>• Redundant power supplies and fans</li></ul> <p>Each SG6060 and SG6060X appliance can have one or two expansion shelves for a total of 180 drives (two of these drives are reserved for E-Series read cache).</p>

## SG6060 and SG6060X diagrams

The fronts of the SG6060 and SG6060X are identical.

### SG6060 or SG6060X front view

This figure shows the front of the SG6060 or SG6060X, which includes a 1U compute controller and a 4U shelf containing two storage controllers and 60 drives in five drive drawers.



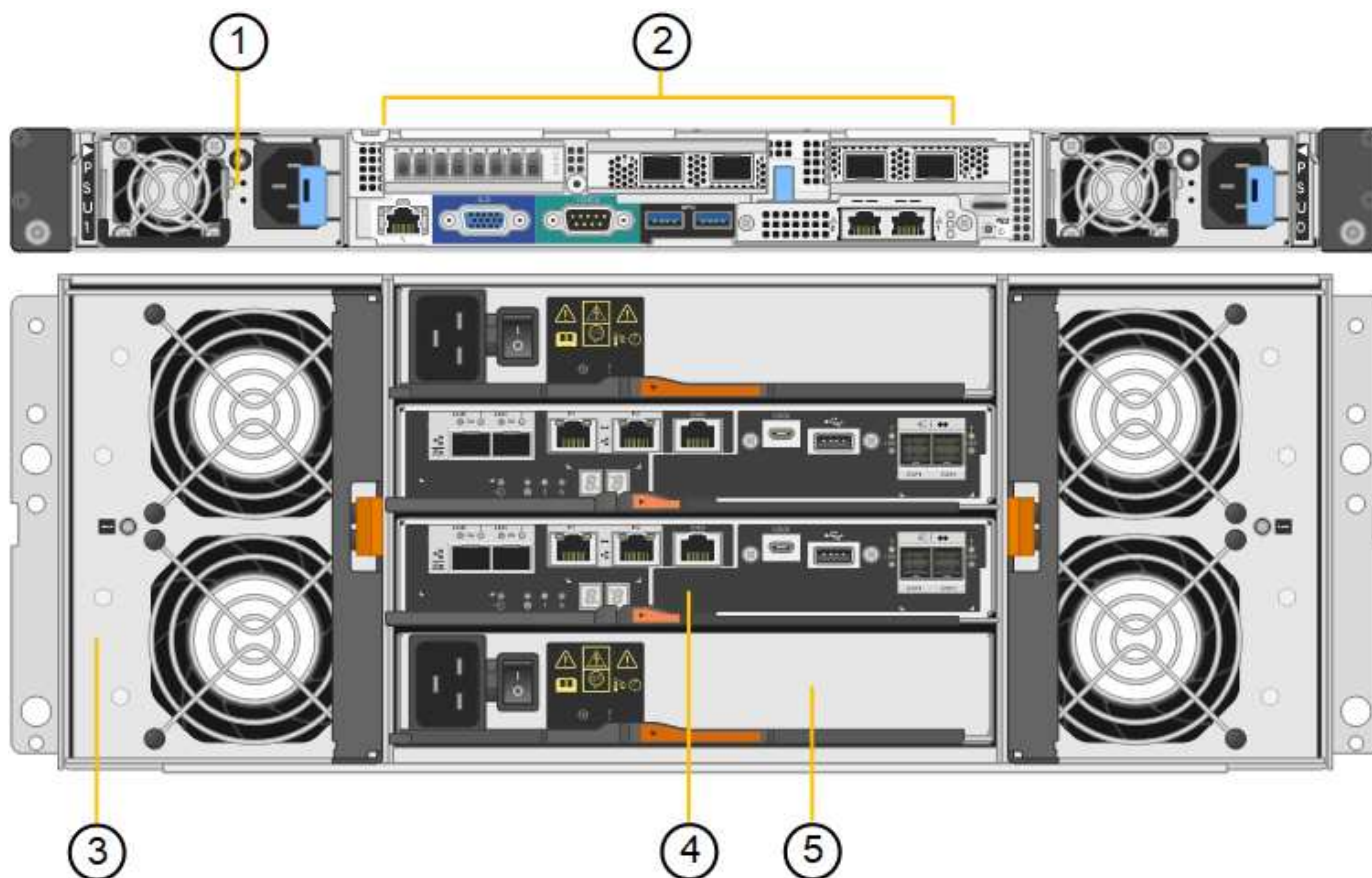
Callout	Description
1	SG6000-CN compute controller with front bezel
2	E2860 controller shelf with front bezel (optional expansion shelf appears identical)



Callout	Description
3	SG6000-CN compute controller with front bezel removed
4	E2860 controller shelf with front bezel removed (optional expansion shelf appears identical)

#### SG6060 rear view

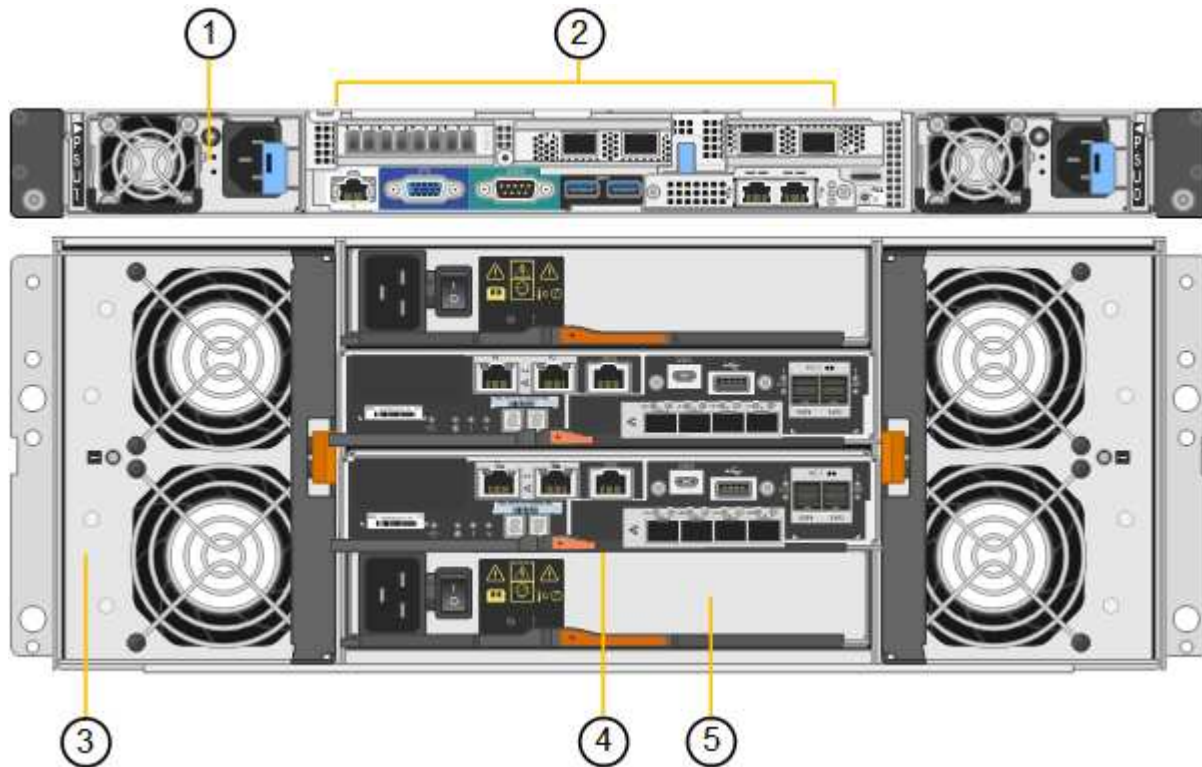
This figure shows the back of the SG6060, including the compute and storage controllers, fans, and power supplies.



Callout	Description
1	Power supply (1 of 2) for SG6000-CN compute controller
2	Connectors for SG6000-CN compute controller
3	Fan (1 of 2) for E2860 controller shelf
4	E-Series E2800A storage controller (1 of 2) and connectors
5	Power supply (1 of 2) for E2860 controller shelf

## SG6060X rear view

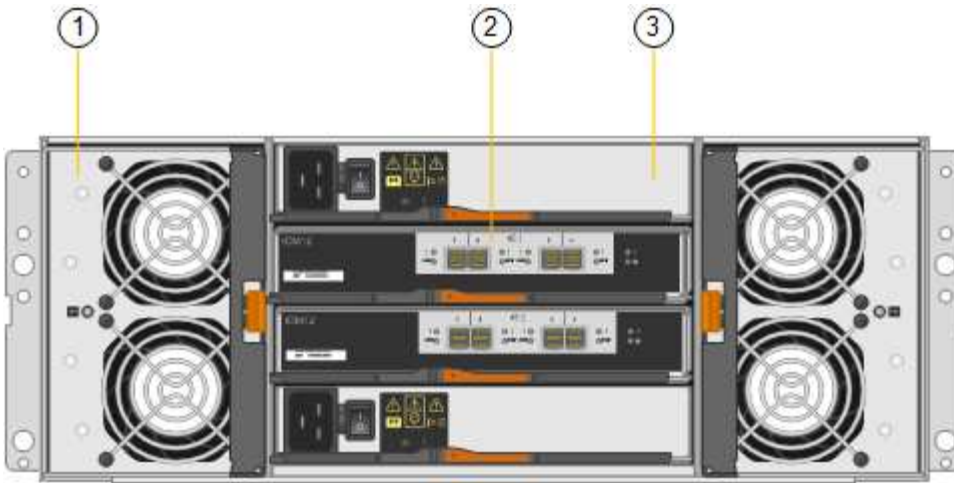
This figure shows the back of the SG6060X.



Callout	Description
1	Power supply (1 of 2) for SG6000-CN compute controller
2	Connectors for SG6000-CN compute controller
3	Fan (1 of 2) for E2860 controller shelf
4	E-Series E2800B storage controller (1 of 2) and connectors
5	Power supply (1 of 2) for E2860 controller shelf

## Expansion shelf

This figure shows the back of the optional expansion shelf for the SG6060 and SG6060X, including the input/output modules (IOMs), fans, and power supplies. Each SG6060 can be installed with one or two expansion shelves, which can be included in the initial installation or added later.



Callout	Description
1	Fan (1 of 2) for expansion shelf
2	IOM (1 of 2) for expansion shelf
3	Power supply (1 of 2) for expansion shelf

## SG6000 controllers

Each model of the StorageGRID SG6000 appliance includes an SG6000-CN compute controller in a 1U enclosure and duplex E-Series storage controllers in a 2U or 4U enclosure, depending on the model. Review the diagrams to learn more about each type of controller.

### SG6000-CN compute controller

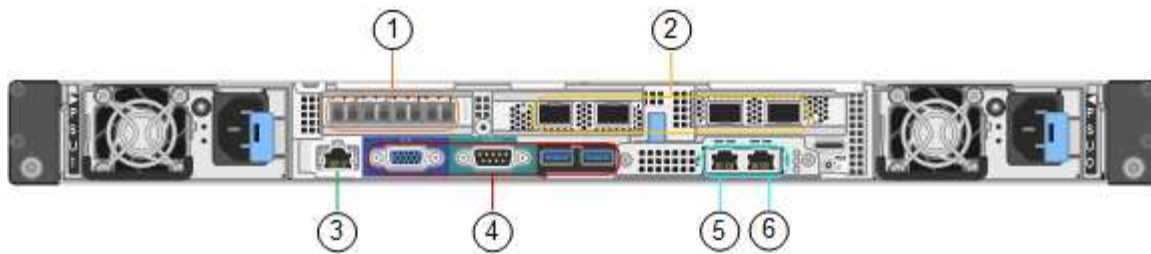
- Provides compute resources for the appliance.
- Includes the StorageGRID Appliance Installer.



StorageGRID software is not preinstalled on the appliance. This software is retrieved from the Admin Node when you deploy the appliance.

- Can connect to all three StorageGRID networks, including the Grid Network, the Admin Network, and the Client Network.
- Connects to the E-Series storage controllers and operates as the initiator.

### SG6000-CN connectors



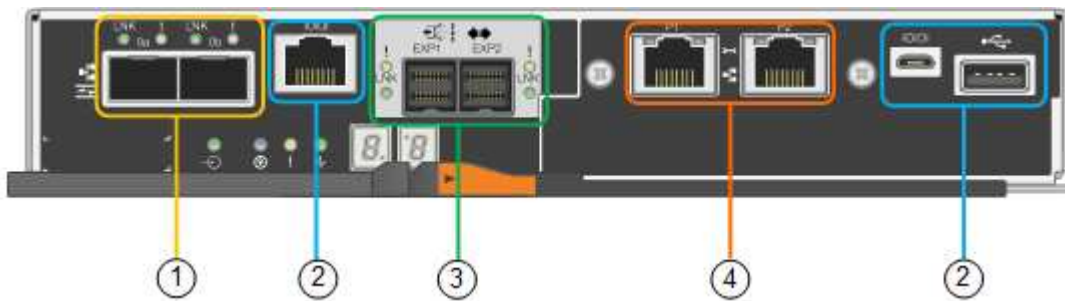
Callout	Port	Type	Use
1	Interconnect ports 1-4	16-Gb/s Fibre Channel (FC), with integrated optics	Connect the SG6000-CN controller to the E2800 controllers (two connections to each E2800).
2	Network ports 1-4	10-GbE or 25-GbE, based on cable or SFP transceiver type, switch speed, and configured link speed	Connect to the Grid Network and the Client Network for StorageGRID.
3	BMC management port	1-GbE (RJ-45)	Connect to the SG6000-CN baseboard management controller.
4	Diagnostic and support ports	<ul style="list-style-type: none"> <li>• VGA</li> <li>• Serial, 115200 8-N-1</li> <li>• USB</li> </ul>	Reserved for technical support use.
5	Admin Network port 1	1-GbE (RJ-45)	Connect the SG6000-CN to the Admin Network for StorageGRID.
6	Admin Network port 2	1-GbE (RJ-45)	Options: <ul style="list-style-type: none"> <li>• Bond with management port 1 for a redundant connection to the Admin Network for StorageGRID.</li> <li>• Leave unwired and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, use port 2 for IP configuration if DHCP-assigned IP addresses aren't available.</li> </ul>

### SGF6024: EF570 storage controllers

- Two controllers for failover support.
- Manage the storage of data on the drives.
- Function as standard E-Series controllers in a duplex configuration.
- Include SANtricity OS Software (controller firmware).

- Include SANtricity System Manager for monitoring storage hardware and for managing alerts, the AutoSupport feature, and the Drive Security feature.
- Connect to the SG6000-CN controller and provide access to the flash storage.

#### EF570 connectors



Callout	Port	Type	Use
1	Interconnect ports 1 and 2	16-Gb/s FC optical SFP	Connect each of the EF570 controllers to the SG6000-CN controller.  There are four connections to the SG6000-CN controller (two from each EF570).
2	Diagnostic and support ports	<ul style="list-style-type: none"> <li>• RJ-45 serial port</li> <li>• Micro USB serial port</li> <li>• USB port</li> </ul>	Reserved for technical support use.
3	Drive expansion ports	12Gb/s SAS	Not used. The SGF6024 appliance does not support expansion drive shelves.
4	Management ports 1 and 2	1-Gb (RJ-45) Ethernet	<ul style="list-style-type: none"> <li>• Port 1 connects to the network where you access SANtricity System Manager on a browser.</li> <li>• Port 2 is reserved for technical support use.</li> </ul>

#### SG6060 and SG6060X: E2800 storage controllers

- Two controllers for failover support.
- Manage the storage of data on the drives.
- Function as standard E-Series controllers in a duplex configuration.
- Include SANtricity OS Software (controller firmware).
- Include SANtricity System Manager for monitoring storage hardware and for managing alerts, the AutoSupport feature, and the Drive Security feature.
- Connect to the SG6000-CN controller and provide access to the storage.

The SG6060 and SG6060X use E2800 storage controllers.

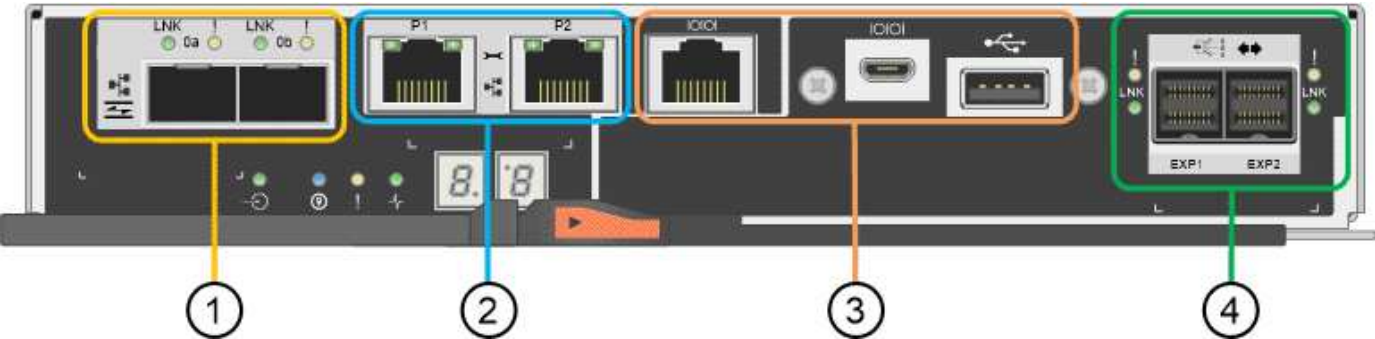
Appliance	Controller	Controller HIC
SG6060	Two E2800A storage controllers	None
SG6060X	Two E2800B storage controllers	Four-port HIC

The E2800A and the E2800B storage controllers are identical in specifications and function except for the location of the interconnect ports.

!

Don't use an E2800A and an E2800B in the same appliance.

E2800A connectors

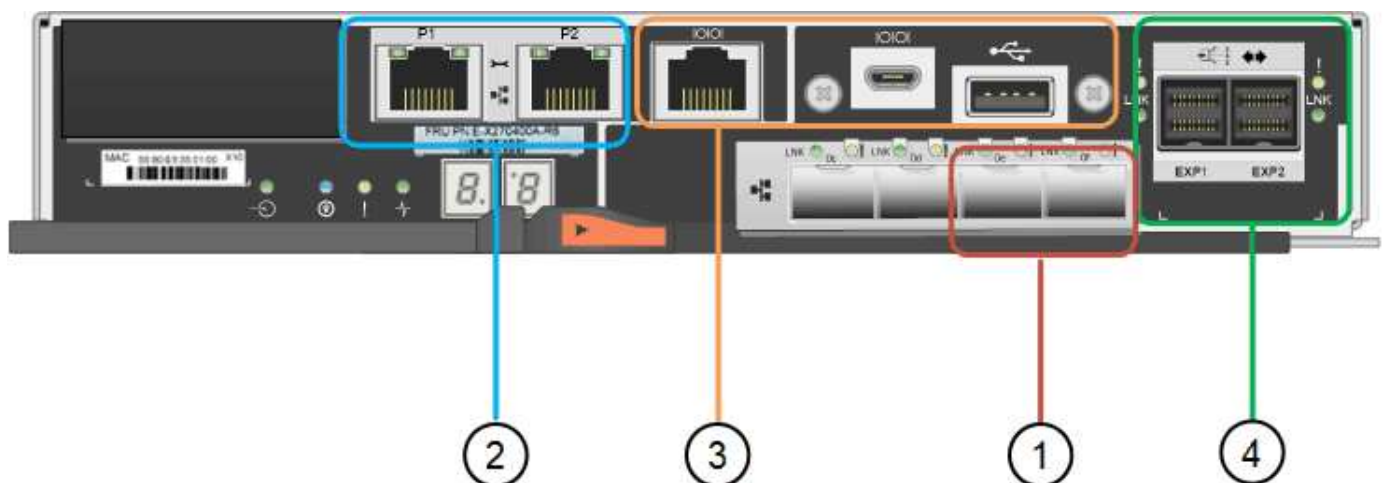


Callout	Port	Type	Use
1	Interconnect ports 1 and 2	16-Gb/s FC optical SFP	Connect each of the E2800A controllers to the SG6000-CN controller.  There are four connections to the SG6000-CN controller (two from each E2800A).



Callout	Port	Type	Use
2	Management ports 1 and 2	1-Gb (RJ-45) Ethernet	<ul style="list-style-type: none"> <li>• Port 1 Options: <ul style="list-style-type: none"> <li>◦ Connect to a management network to enable direct TCP/IP access to SANtricity System Manager</li> <li>◦ Leave unwired to save a switch port and IP address. Access SANtricity System Manager using the Grid Manager or Storage Grid Appliance Installer UIs.</li> </ul> </li> </ul> <p><b>Note:</b> some optional SANtricity functionality, such as NTP sync for accurate log timestamps, is not available when you choose to leave Port 1 unwired.</p> <p><b>Note:</b> StorageGRID 11.5 or greater, and SANtricity 11.70 or greater, are required when you leave Port 1 unwired.</p> <ul style="list-style-type: none"> <li>• Port 2 is reserved for technical support use.</li> </ul>
3	Diagnostic and support ports	<ul style="list-style-type: none"> <li>• RJ-45 serial port</li> <li>• Micro USB serial port</li> <li>• USB port</li> </ul>	Reserved for technical support use.
4	Drive expansion ports 1 and 2	12Gb/s SAS	Connect the ports to the drive expansion ports on the IOMs in the expansion shelf.

#### E2800B connectors



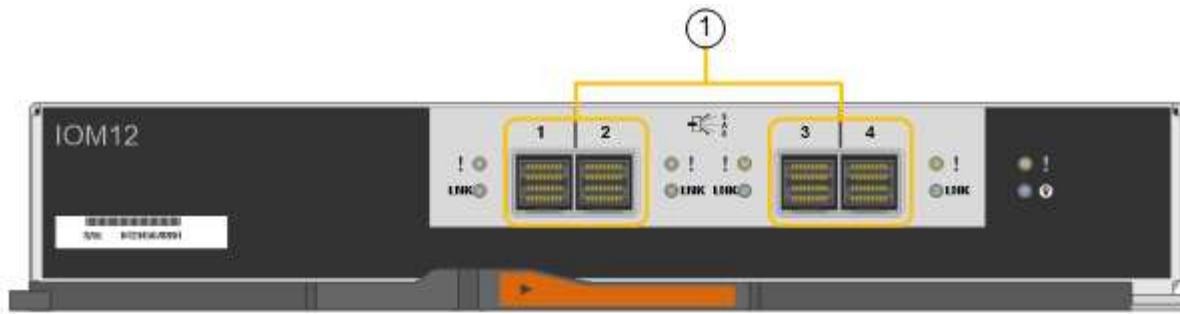
Callout	Port	Type	Use
1	Interconnect ports 1 and 2	16-Gb/s FC optical SFP	<p>Connect each of the E2800B controllers to the SG6000-CN controller.</p> <p>There are four connections to the SG6000-CN controller (two from each E2800B).</p>
2	Management ports 1 and 2	1-Gb (RJ-45) Ethernet	<ul style="list-style-type: none"> <li>Port 1 Options: <ul style="list-style-type: none"> <li>Connect to a management network to enable direct TCP/IP access to SANtricity System Manager</li> <li>Leave unwired to save a switch port and IP address. Access SANtricity System Manager using the Grid Manager or Storage Grid Appliance Installer UIs.</li> </ul> </li> </ul> <p><b>Note:</b> some optional SANtricity functionality, such as NTP sync for accurate log timestamps, is not available when you choose to leave Port 1 unwired.</p> <p><b>Note:</b> StorageGRID 11.5 or greater, and SANtricity 11.70 or greater, are required when you leave Port 1 unwired.</p> <ul style="list-style-type: none"> <li>Port 2 is reserved for technical support use.</li> </ul>
3	Diagnostic and support ports	<ul style="list-style-type: none"> <li>RJ-45 serial port</li> <li>Micro USB serial port</li> <li>USB port</li> </ul>	Reserved for technical support use.
4	Drive expansion ports 1 and 2	12Gb/s SAS	Connect the ports to the drive expansion ports on the IOMs in the expansion shelf.

## SG6060 and SG6060X: IOMs for optional expansion shelves

The expansion shelf contains two input/output modules (IOMs) that connect to the storage controllers or to other expansion shelves.

### IOM connectors





Callout	Port	Type	Use
1	Drive expansion ports 1-4	12Gb/s SAS	Connect each port to the storage controllers or additional expansion shelf (if any).

## SG5700 appliance: Overview

The SG5700 StorageGRID appliance is an integrated storage and computing platform that operates as a Storage Node in a StorageGRID grid. The appliance can be used in a hybrid grid environment that combines appliance Storage Nodes and virtual (software-based) Storage Nodes.

StorageGRID SG5700 series appliance provides the following features:

- Integrate the storage and computing elements for a StorageGRID Storage Node.
- Include the StorageGRID Appliance Installer to simplify Storage Node deployment and configuration.
- Includes E-Series SANtricity System Manager for hardware management and monitoring.
- Support up to four 10-GbE or 25-GbE connections to the StorageGRID Grid Network and Client Network.
- Support Full Disk Encryption (FDE) drives or FIPS drives. When these drives are used with the Drive Security feature in SANtricity System Manager, unauthorized access to data is prevented.

The SG5700 appliance is available in four models: the SG5712 and SG5712X, and the SG5760 and SG5760X. There are no specification or functional differences between the SG5712 and SG5712X except for the location of the interconnect ports on the storage controller. Similarly, there are no specification or functional differences between the SG5760 and SG5760X except for the location of the interconnect ports on the storage controller.

## SG5700 components

The SG5700 models include the following components:

Component	SG5712	SG5712X	SG5760	SG5760X
Compute controller	E5700SG controller	E5700SG controller	E5700SG controller	E5700SG controller
Storage controller	E2800A controller	E2800B controller	E2800A controller	E2800B controller

Component	SG5712	SG5712X	SG5760	SG5760X
Chassis	E-Series DE212C enclosure, a two rack-unit (2U) enclosure	E-Series DE212C enclosure, a two rack-unit (2U) enclosure	E-Series DE460C enclosure, a four rack-unit (4U) enclosure	E-Series DE460C enclosure, a four rack-unit (4U) enclosure
Drives	12 NL-SAS drives (3.5-inch)	12 NL-SAS drives (3.5-inch)	60 NL-SAS drives (3.5-inch)	60 NL-SAS drives (3.5-inch)
Redundant power supplies and fans	Two power-fan canisters	Two power-fan canisters	Two power canisters and two fan canisters	Two power canisters and two fan canisters

The maximum raw storage available in the StorageGRID appliance is fixed, based on the number of drives in each enclosure. You can't expand the available storage by adding a shelf with additional drives.

## SG5700 diagrams

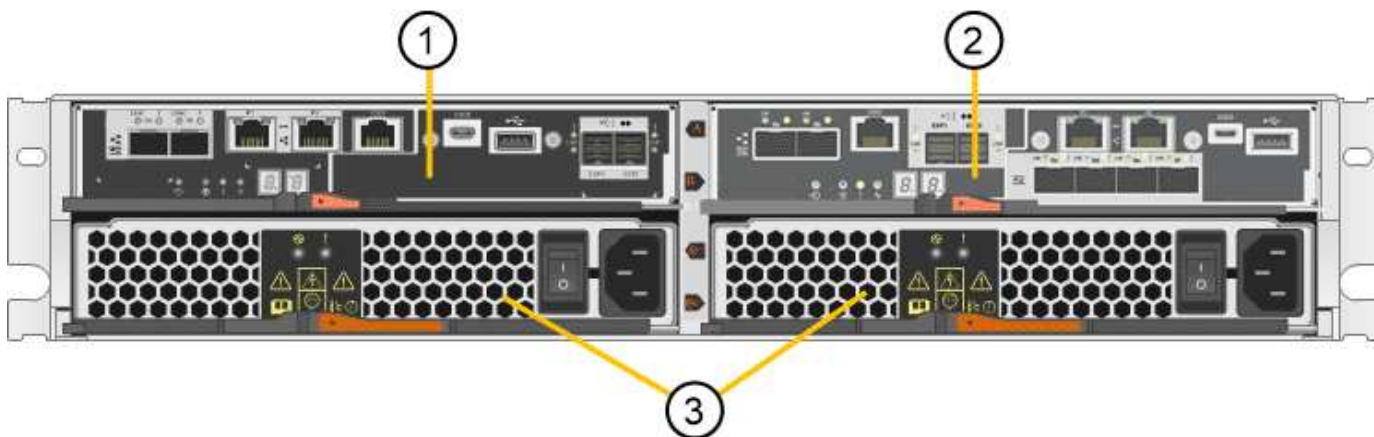
### SG5712 front and rear views

The figures show the front and back of the SG5712, a 2U enclosure that holds 12 drives.



### SG5712 components

The SG5712 includes two controllers and two power-fan canisters.



Callout	Description
1	E2800A controller (storage controller)
2	E5700SG controller (compute controller)
3	Power-fan canisters

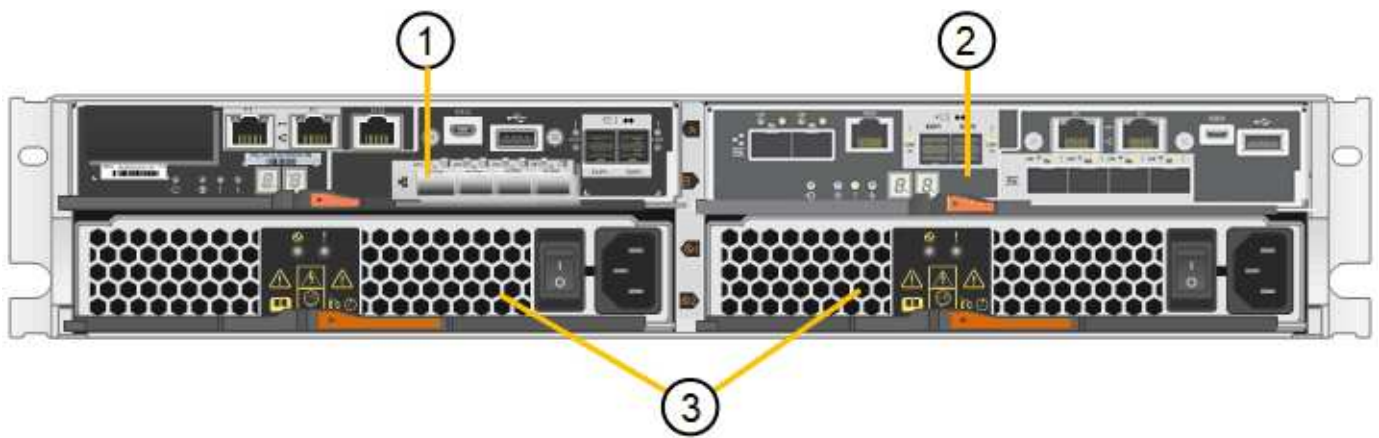
**SG5712X front and rear views**

The figures show the front and back of the SG5712X, a 2U enclosure that holds 12 drives.



**SG5712X components**

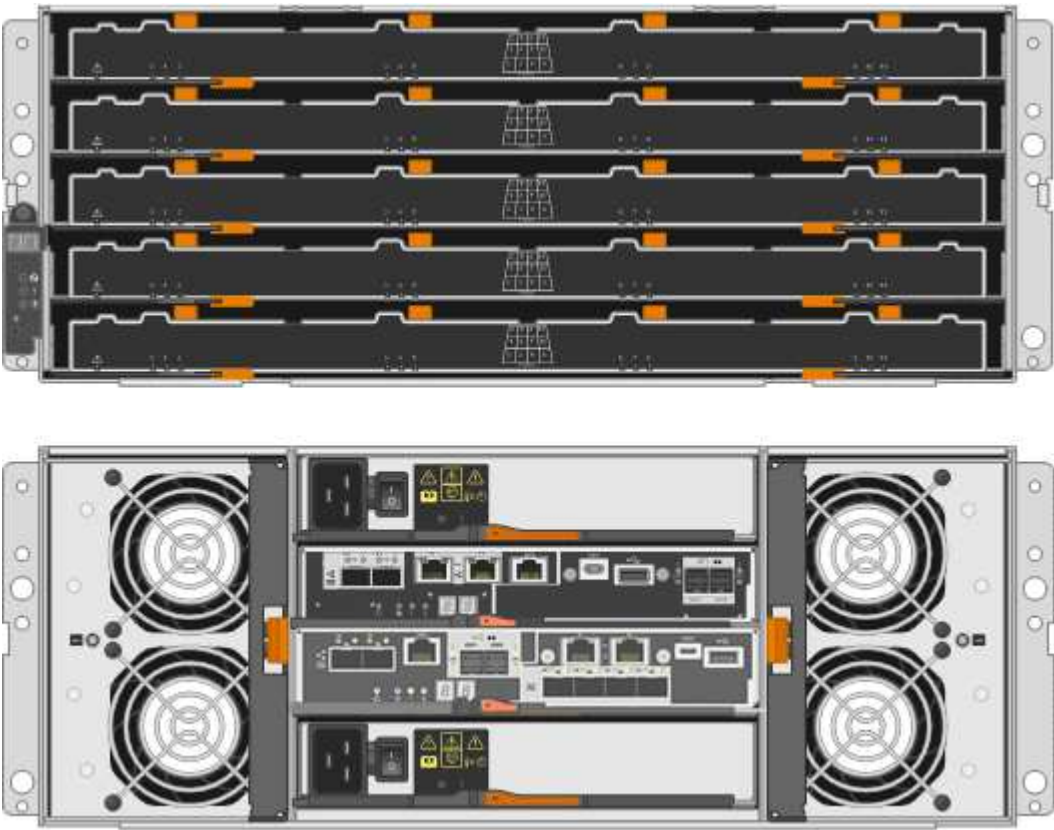
The SG5712X includes two controllers and two power-fan canisters.



Callout	Description
1	E2800B controller (storage controller)
2	E5700SG controller (compute controller)
3	Power-fan canisters

**SG5760 front and rear views**

The figures show the front and back of the SG5760 model, a 4U enclosure that holds 60 drives in 5 drive drawers.



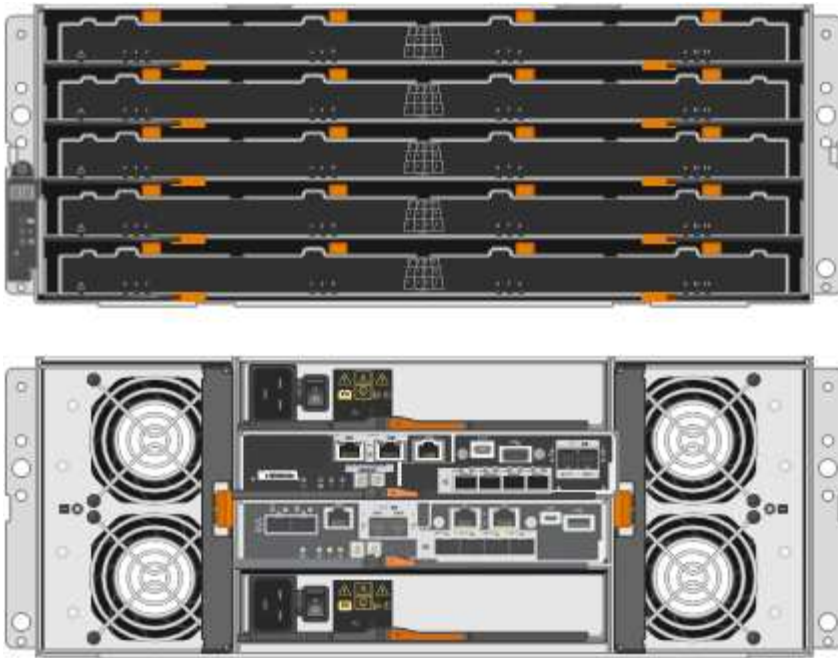
**SG5760 components**

The SG5760 includes two controllers, two fan canisters, and two power canisters.

Callout	Description
1	E2800A controller (storage controller)
2	E5700SG controller (compute controller)
3	Fan canister (1 of 2)
4	Power canister (1 of 2)

**SG5760X front and rear views**

The figures show the front and back of the SG5760X model, a 4U enclosure that holds 60 drives in 5 drive drawers.



### SG5760X components

The SG5760X includes two controllers, two fan canisters, and two power canisters.

Callout	Description
1	E2800B controller (storage controller)
2	E5700SG controller (compute controller)
3	Fan canister (1 of 2)
4	Power canister (1 of 2)

### Related information

[NetApp E-Series Systems Documentation Site](#)

## SG5700 controllers

Both the 12-drive SG5712 and SG5712X and the 60-drive SG5760 and SG5760X models of the StorageGRID appliance include an E5700SG compute controller and an E-Series E2800 storage controller.

- The SG5712 and SG5760 use a E2800A controller.
- The SG5712X and the SG5760X use a E2800B controller.

The E2800A and E2800B controllers are identical in specification and function except for the location of the interconnect ports.

## E5700SG compute controller

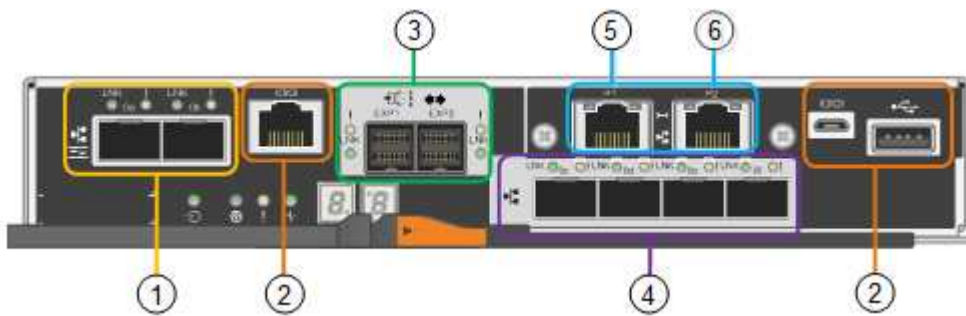
- Operates as the compute server for the appliance.
- Includes the StorageGRID Appliance Installer.



StorageGRID software is not preinstalled on the appliance. This software is accessed from the Admin Node when you deploy the appliance.

- Can connect to all three StorageGRID networks, including the Grid Network, the Admin Network, and the Client Network.
- Connects to the E2800 controller and operates as the initiator.

## E5700SG connectors



Callout	Port	Type	Use
1	Interconnect ports 1 and 2	16Gb/s Fibre Channel (FC), optical SFP	Connect the E5700SG controller to the E2800 controller.
2	Diagnostic and support ports	<ul style="list-style-type: none"><li>• RJ-45 serial port</li><li>• Micro USB serial port</li><li>• USB port</li></ul>	Reserved for technical support.
3	Drive expansion ports	12Gb/s SAS	Not used. StorageGRID appliances don't support expansion drive shelves.
4	Network ports 1-4	10-GbE or 25-GbE, based on SFP transceiver type, switch speed, and configured link speed	Connect to the Grid Network and the Client Network for StorageGRID.
5	Management port 1	1-Gb (RJ-45) Ethernet	Connect to the Admin Network for StorageGRID.



Callout	Port	Type	Use
6	Management port 2	1-Gb (RJ-45) Ethernet	Options: <ul style="list-style-type: none"> <li>• Bond with management port 1 for a redundant connection to the Admin Network for StorageGRID.</li> <li>• Leave unwired and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, use port 2 for IP configuration if DHCP-assigned IP addresses aren't available.</li> </ul>

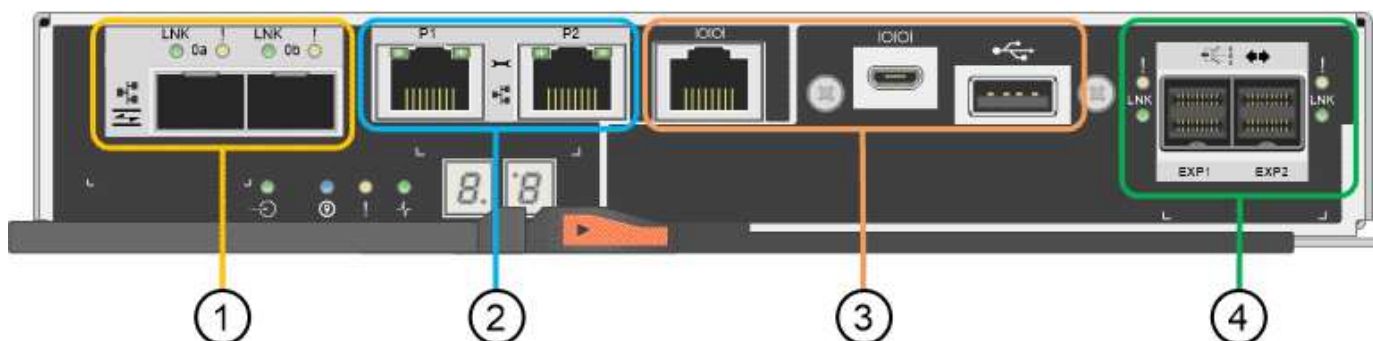
## E2800 storage controller

There are two versions of the E2800 storage controller used in the SG5700 appliances: E2800A and E2800B. The E2800A does not have a HIC, and the E2800B has a four-port HIC. The two controller versions have identical specifications and function except for the location of the interconnect ports.

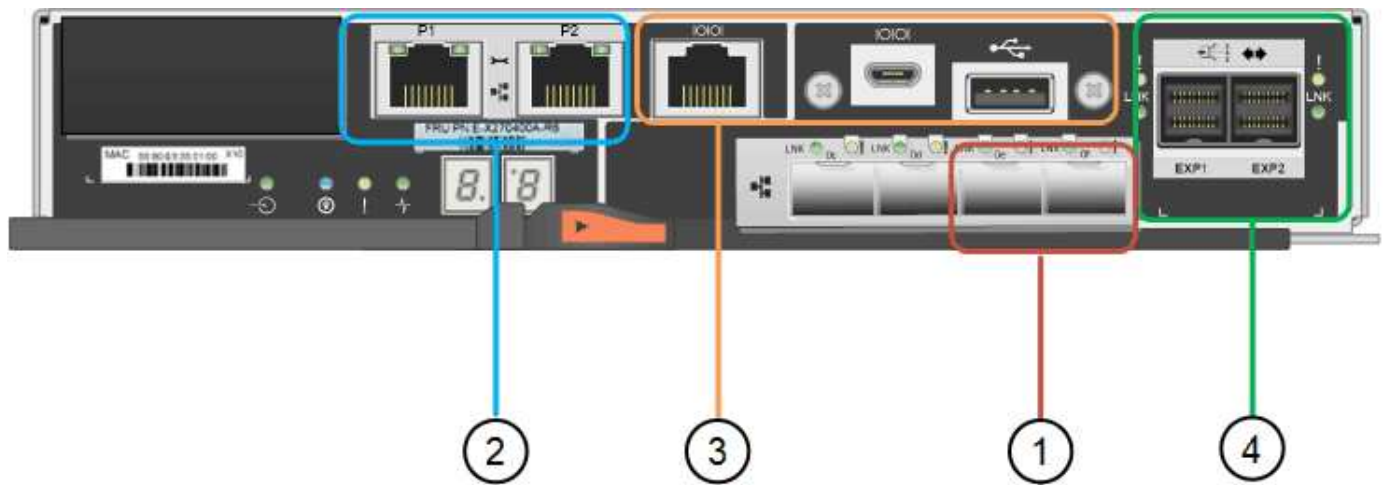
The E2800 series storage controller has the following specifications:

- Operates as the storage controller for the appliance.
- Manages the storage of data on the drives.
- Functions as a standard E-Series controller in simplex mode.
- Includes SANtricity OS Software (controller firmware).
- Includes SANtricity System Manager for monitoring appliance hardware and for managing alerts, the AutoSupport feature, and the Drive Security feature.
- Connects to the E5700SG controller and operates as the target.

### E2800A connectors



### E2800B connectors



Callout	Port	Type	Use
1	Interconnect ports 1 and 2	16Gb/s FC optical SFP	Connect the E2800 controller to the E5700SG controller.
2	Management ports 1 and 2	1-Gb (RJ-45) Ethernet	<ul style="list-style-type: none"> <li>• Port 1 Options: <ul style="list-style-type: none"> <li>◦ Connect to a management network to enable direct TCP/IP access to SANtricity System Manager</li> <li>◦ Leave unwired to save a switch port and IP address. Access SANtricity System Manager using the Grid Manager or Storage Grid Appliance Installer UIs.</li> </ul> </li> </ul> <p><b>Note:</b> some optional SANtricity functionality, such as NTP sync for accurate log timestamps, is not available when you choose to leave Port 1 unwired.</p> <p><b>Note:</b> StorageGRID 11.5 or greater, and SANtricity 11.70 or greater, are required when you leave Port 1 unwired.</p> <ul style="list-style-type: none"> <li>• Port 2 is reserved for technical support use.</li> </ul>



Callout	Port	Type	Use
3	Diagnostic and support ports	<ul style="list-style-type: none"> <li>• RJ-45 serial port</li> <li>• Micro USB serial port</li> <li>• USB port</li> </ul>	Reserved for technical support use.
4	Drive expansion ports.	12Gb/s SAS	Not used.

## SG100 and SG1000 appliances: Overview

The StorageGRID SG100 services appliance and the SG1000 services appliance can operate as a Gateway Node and as an Admin Node to provide high availability load balancing services in a StorageGRID system. Both appliances can operate as Gateway Nodes and Admin Nodes (primary or non-primary) at the same time.

### Appliance features

Both models of the services appliance provide the following features:

- Gateway Node or Admin Node functions for a StorageGRID system.
- The StorageGRID Appliance Installer to simplify node deployment and configuration.
- When deployed, can access StorageGRID software from an existing Admin Node or from software downloaded to a local drive. To further simplify the deployment process, a recent version of the software is preloaded onto the appliance during manufacturing.
- A baseboard management controller (BMC) for monitoring and diagnosing some of the appliance hardware.
- The ability to connect to all three StorageGRID networks, including the Grid Network, the Admin Network, and the Client Network:
  - The SG100 supports up to four 10- or 25-GbE connections to the Grid Network and Client Network.
  - The SG1000 supports up to four 10-, 25-, 40-, or 100-GbE connections to the Grid Network and Client Network.

### SG100 and SG1000 diagrams

This figure shows the front of the SG100 and the SG1000 with the bezel removed. From the front, the two appliances are identical except for the product name on the bezel.

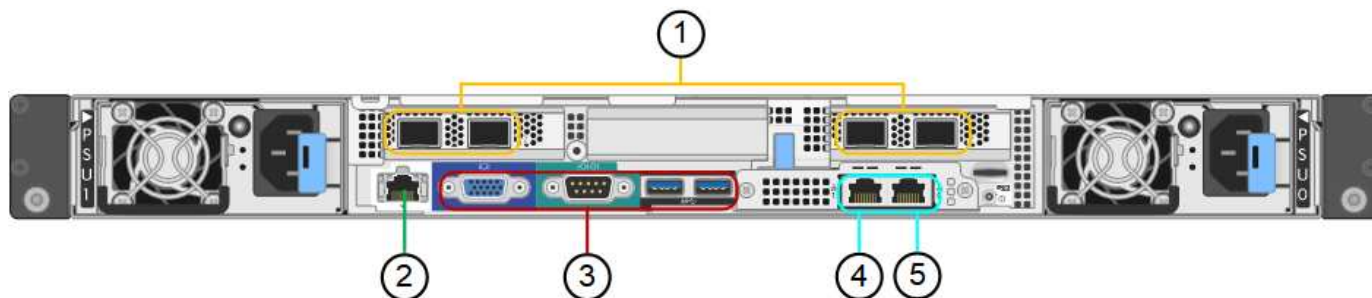


The two solid-state drives (SSDs), indicated by the orange outline, are used for storing the StorageGRID operating system and are mirrored using RAID 1 for redundancy. When the SG100 or SG1000 services appliance is configured as an Admin Node, these drives are used to store audit logs, metrics, and database tables.

The remaining drive slots are blank.

## SG100 connectors

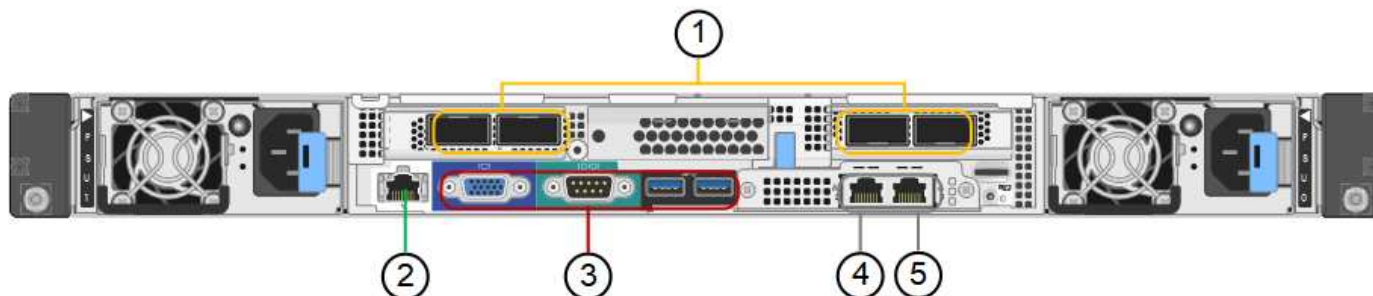
This figure shows the connectors on the back of the SG100.



Callout	Port	Type	Use
1	Network ports 1-4	10/25-GbE, based on cable or SFP transceiver type (SFP28 and SFP+ modules are supported), switch speed, and configured link speed	Connect to the Grid Network and the Client Network for StorageGRID.
2	BMC management port	1-GbE (RJ-45)	Connect to the appliance baseboard management controller.
3	Diagnostic and support ports	<ul style="list-style-type: none"> <li>• VGA</li> <li>• Serial, 115200 8-N-1</li> <li>• USB</li> </ul>	Reserved for technical support use.
4	Admin Network port 1	1-GbE (RJ-45)	Connect the appliance to the Admin Network for StorageGRID.
5	Admin Network port 2	1-GbE (RJ-45)	Options: <ul style="list-style-type: none"> <li>• Bond with management port 1 for a redundant connection to the Admin Network for StorageGRID.</li> <li>• Leave disconnected and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, use port 2 for IP configuration if DHCP-assigned IP addresses aren't available.</li> </ul>

## SG1000 connectors

This figure shows the connectors on the back of the SG1000.



Callout	Port	Type	Use
1	Network ports 1-4	10/25/40/100-GbE, based on cable or transceiver type, switch speed, and configured link speed. QSFP28 and QSFP+ (40/100GbE) are supported natively and SFP28/SFP+ transceivers can be used with a QSA (sold separately) to use 10/25GbE speeds.	Connect to the Grid Network and the Client Network for StorageGRID.
2	BMC management port	1-GbE (RJ-45)	Connect to the appliance baseboard management controller.
3	Diagnostic and support ports	<ul style="list-style-type: none"><li>• VGA</li><li>• Serial, 115200 8-N-1</li><li>• USB</li></ul>	Reserved for technical support use.
4	Admin Network port 1	1-GbE (RJ-45)	Connect the appliance to the Admin Network for StorageGRID.

Callout	Port	Type	Use
5	Admin Network port 2	1-GbE (RJ-45)	Options: <ul style="list-style-type: none"> <li>• Bond with management port 1 for a redundant connection to the Admin Network for StorageGRID.</li> <li>• Leave disconnected and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, use port 2 for IP configuration if DHCP-assigned IP addresses aren't available.</li> </ul>

## SG100 and SG1000 applications

You can configure the StorageGRID services appliances in various ways to provide gateway services as well as redundancy of some grid administration services.

Appliances can be deployed in the following ways:

- Add to a new or existing grid as a Gateway Node
- Add to a new grid as a primary or non-primary Admin Node, or to an existing grid as a non-primary Admin Node
- Operate as a Gateway Node and Admin Node (primary or non-primary) at the same time

The appliance facilitates the use of high availability (HA) groups and intelligent load balancing for S3 or Swift data path connections.

The following examples describe how you can maximize the capabilities of the appliance:

- Use two SG100 or two SG1000 appliances to provide gateway services by configuring them as Gateway Nodes.



Don't deploy the SG100 and SG1000 service appliances in the same site. Unpredictable performance might result.

- Use two SG100 or two SG1000 appliances to provide redundancy of some grid administration services. Do this by configuring each appliance as Admin Nodes.
- Use two SG100 or two SG1000 appliances to provide highly available load balancing and traffic shaping services accessed through one or more virtual IP addresses. Do this by configuring the appliances as any combination of Admin Nodes or Gateway Nodes and adding both nodes to the same HA group.



If you use Admin Nodes and Gateway Nodes in the same HA group, Admin Node-only port will not fail over. See the instructions for [configuring HA groups](#).

When used with StorageGRID storage appliances, both the SG100 and the SG1000 services appliances enable deployment of appliance-only grids with no dependencies on external hypervisors or compute hardware.

# Prepare for installation

## Prepare site

Before installing the appliance, you must make sure that the site and the cabinet or rack you plan to use meet the specifications for a StorageGRID appliance.

### Steps

1. Confirm that the site meets the requirements for temperature, humidity, altitude range, airflow, heat dissipation, wiring, power, and grounding. See the [NetApp Hardware Universe](#) for more information.
2. Confirm that your location provides the correct voltage of AC power:

Model	Requirement
SGF6112	100 to 240 volts AC
SG6060	240-volt AC
SGF6024	120-volt AC
SG5760	240-volt AC
SG100 and SG1000	120 to 240 volts AC

3. Obtain a 19-inch (48.3-cm) cabinet or rack to fit shelves of the following size (without cables).

**SGF6112**

Height	Width	Depth	Maximum weight
1.70 in. (4.31 cm)	18.98 in. (48.2 cm)	33.11 in. (84.1 cm)	43.83 lb. (19.88 kg)

**SG6000**

Type of shelf	Height	Width	Depth	Maximum weight
E2860 controller shelf (SG6060)	6.87 in. (17.46 cm)	17.66 in. (44.86 cm)	38.25 in. (97.16 cm)	250 lb. (113 kg)
Expansion shelf (SG6060) - Optional	6.87 in. (17.46 cm)	17.66 in. (44.86 cm)	38.25 in. (97.16 cm)	250 lb. (113 kg)
EF570 controller shelf (SGF6024)	3.35 in. (8.50 cm)	17.66 in. (44.86 cm)	19.00 in. (48.26 cm)	51.74 lb. (23.47 kg)
SG6000-CN compute controller	1.70 in. (4.32 cm)	17.32 in. (44.0 cm)	32.0 in. (81.3 cm)	39 lb. (17.7 kg)

**SG5700**

Appliance model	Height	Width	Depth	Maximum weight
SG5712 (12 drives)	3.41 in. (8.68 cm)	17.6 in. (44.7 cm)	21.1 in. (53.6 cm)	63.9 lb (29.0 kg)
SG5760 (60 drives)	6.87 in. (17.46 cm)	17.66 in. (44.86 cm)	38.25 in. (97.16 cm)	250 lb. (113 kg)

**SG100 and SG1000**

Height	Width	Depth	Maximum weight
1.70 in. (4.32 cm)	17.32 in. (44.0 cm)	32.0 in. (81.3 cm)	39 lb. (17.7 kg)

4. Decide where you are going to install the appliance.



When installing the E2860 controller shelf or optional expansion shelves, install hardware from the bottom to the top of the rack or cabinet to prevent the equipment from tipping over. To ensure that the heaviest equipment is at the bottom of the cabinet or rack, install the SG6000-CN controller above the E2860 controller shelf and expansion shelves.



Before committing to the installation, verify that the 0.5m optic cables shipped with an SG6000 appliance, or cables that you supply, are long enough for the planned layout.




5. Install any required network switches. See the [NetApp Interoperability Matrix Tool](#) for compatibility information.

## Unpack boxes

Before installing your StorageGRID appliance, unpack all boxes and compare the contents to the items on the packing slip.

### SGF6112 appliances

#### Hardware


Item	What it looks like
SGF6112	
Rail kit with instructions	
Front bezel	

#### Power cords

The shipment for an SGF6112 appliance includes the following power cords.


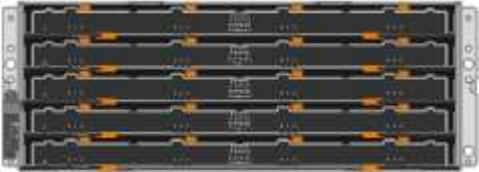
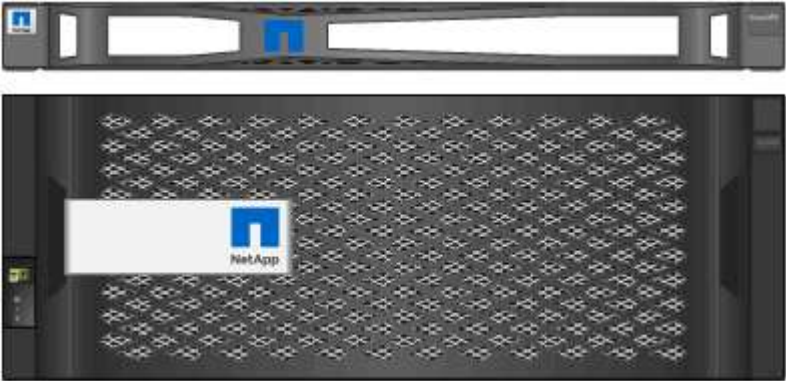

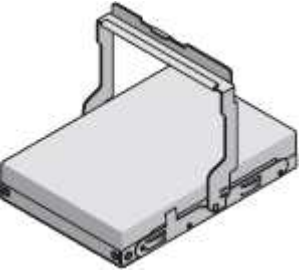
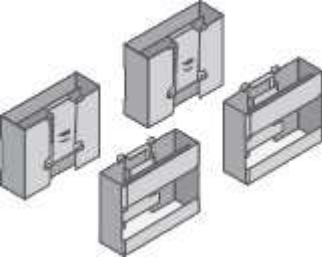


Your cabinet might have special power cords that you use instead of the power cords that ship with the appliance.

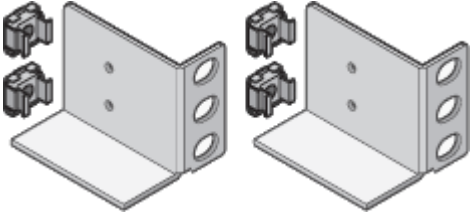
Item	What it looks like
Two power cords for your country	

SG6000 appliances


SG6060 hardware

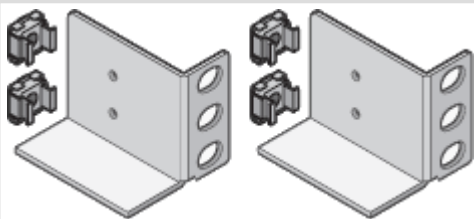
Item	What it looks like
SG6000-CN controller	 A long, thin, black server controller unit with multiple ports and indicator lights on the front panel.
E2860 controller shelf with no drives installed	 A black server shelf unit with multiple drive bays, each containing a blue drive carrier.
Two front bezels	 Two black front bezels for the server. The top one is a slim profile, and the bottom one is a full-width bezel with a large circular ventilation grille and a NetApp logo.
Two rail kits with instructions	 Two metal rail kits for the server, including screws and mounting brackets.
60 drives (2 SSD and 58 NL-SAS)	 A 3D rendering of a server drive tray, showing the internal drive bay and the external handle.
Four handles	 Four metal handles for the server, shown in a 3D perspective view.








Item	What it looks like
Back brackets and cage nuts for square-hole rack installation	

#### SG6060 expansion shelf

Item	What it looks like
Expansion shelf with no drives installed	
Front bezel	
60 NL-SAS drives	
One rail kit with instructions	
Four handles	

Item	What it looks like
Back brackets and cage nuts for square-hole rack installation	

#### SGF6024 hardware





Item	What it looks like
SG6000-CN controller	
EF570 flash array with 24 solid state (flash) drives installed	
Two front bezels	
Two rail kits with instructions	
Shelf endcaps	

#### Cables and connectors

The shipment for an SG6000 appliance includes the following cables and connectors.








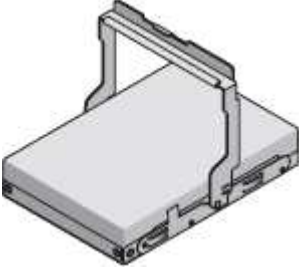
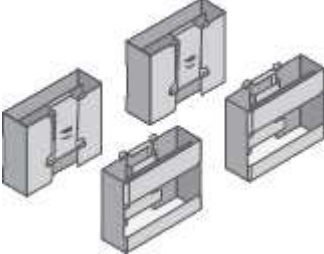
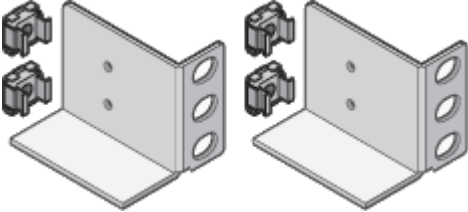
Your cabinet might have special power cords that you use instead of the power cords that ship with the appliance.

Item	What it looks like
Four power cords for your country	
Optical cables and SFP transceivers	  <ul style="list-style-type: none"> <li>• Four optical cables for the FC interconnect ports</li> <li>• Four SFP+ transceivers, which support 16-Gb/s FC</li> </ul>
Optional: Two SAS cables for connecting each SG6060 expansion shelf	

## SG5700 appliances

### Hardware

Item	What it looks like
SG5712 appliance with 12 drives installed	
SG5760 appliance with no drives installed	
Front bezel for the appliance	 


Item	What it looks like
Rail kit with instructions	
SG5760: Sixty drives	
SG5760: Handles	
SG5760: Back brackets and cage nuts for square-hole rack installation	

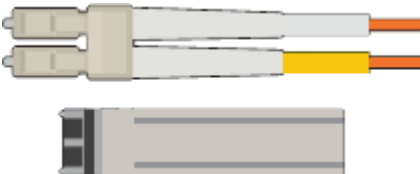
### Cables and connectors

The shipment for an SG5700 appliance includes the following cables and connectors.




Your cabinet might have special power cords that you use instead of the power cords that ship with the appliance.

Item	What it looks like
Two power cords for your country	

Item	What it looks like
Optical cables and SFP transceivers	 <ul style="list-style-type: none"> <li>• Two optical cables for the FC interconnect ports</li> <li>• Eight SFP+ transceivers, compatible with both the four 16Gb/s FC interconnect ports and the four 10-GbE network ports</li> </ul>

## SG100 and SG1000 appliances

### Hardware


Item	What it looks like
SG100 or SG1000	
Rail kit with instructions	

### Power cords

The shipment for an SG100 or SG1000 appliance includes the following power cords.



Your cabinet might have special power cords that you use instead of the power cords that ship with the appliance.

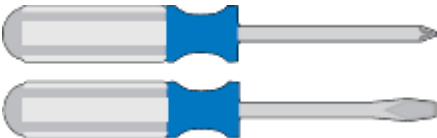



Item	What it looks like
Two power cords for your country	

## Obtain additional equipment and tools

Before installing a StorageGRID appliance, confirm you have all of the additional equipment and tools that you need.

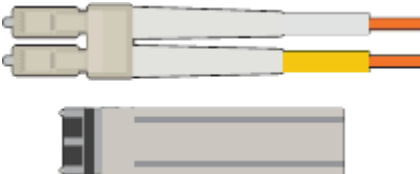

### All appliances

You need the following equipment to install and configure all appliances.

Item	What it looks like
Screwdrivers	 <ul style="list-style-type: none"> <li>• Phillips No. 2 screwdriver</li> <li>• Medium flat-blade screwdriver</li> </ul>
ESD wrist strap	
Service laptop	 <ul style="list-style-type: none"> <li>• <a href="#">Supported web browser</a></li> <li>• SSH client, such as PuTTY</li> <li>• 1-GbE (RJ-45) port</li> </ul> <div data-bbox="440 1402 495 1455"> </div> <div data-bbox="553 1413 1234 1444">Some ports might not support 10/100 Ethernet speeds.</div>
Optional tools	 <ul style="list-style-type: none"> <li>• Power drill with Phillips head bit</li> <li>• Flashlight</li> </ul>

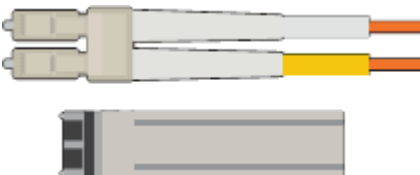
## SGF6112

You need the following additional equipment to install and configure the SGF6112 hardware.

Item	What it looks like
Optical cables and transceivers	 <ul style="list-style-type: none"><li>• One to four of either of these types of cables:<ul style="list-style-type: none"><li>◦ TwinAx/Copper</li><li>◦ Fibre/Optical</li></ul></li><li>• One to four of each of these transceivers/adapters based on link speed (mixed speeds aren't supported):<ul style="list-style-type: none"><li>◦ 10-GbE SFP+</li><li>◦ 25-GbE SFP28</li></ul></li></ul>
RJ-45 (Cat5/Cat5e/Cat6/Cat6a) Ethernet cables	

## SG6000




You need the following additional equipment to install and configure the SG6000 hardware.

Item	What it looks like
Optical cables and SFP transceivers	 <ul style="list-style-type: none"><li>• One to four of either of these types of cables:<ul style="list-style-type: none"><li>◦ TwinAx/Copper</li><li>◦ Fibre/Optical</li></ul></li><li>• One to four of each of these transceivers/adapters, based on link speed (mixed speeds aren't supported):<ul style="list-style-type: none"><li>◦ 10-GbE SFP+</li><li>◦ 25-GbE SFP28</li></ul></li></ul>

Item	What it looks like
RJ-45 (Cat5/Cat5e/Cat6) Ethernet cables	
Optional tools	Mechanized lift for 60-drive shelves

## SG5700



You need the following additional equipment to install and configure the SG5700 hardware.

Item	What it looks like
Optical cables and SFP transceivers	  <ul style="list-style-type: none"> <li>• Optical cables for the 10/25-GbE ports you plan to use</li> <li>• Optional: SFP28 transceivers if you want to use 25-GbE link speed</li> </ul>
Ethernet cables	
Optional tools	Mechanized lift for SG5760

## SG100 and SG1000

You need the following additional equipment to install and configure the SG100 and SG1000 hardware.



Item	What it looks like
Optical cables and transceivers	 <ul style="list-style-type: none"> <li>• One to four of either of these cable types: <ul style="list-style-type: none"> <li>◦ TwinAx/Copper</li> <li>◦ Fibre/Optical</li> </ul> </li> <li>• One to four of each of these transceivers/adapters based on link speed (mixed speeds aren't supported): <ul style="list-style-type: none"> <li>◦ SG100: <ul style="list-style-type: none"> <li>▪ 10-GbE SFP+</li> <li>▪ 25-GbE SFP28</li> </ul> </li> <li>◦ SG1000: <ul style="list-style-type: none"> <li>▪ 10-GbE QSFP-to-SFP adapter (QSA) and SFP+</li> <li>▪ 25-GbE QSFP-to-SFP adapter (QSA) and SFP28</li> <li>▪ 40-GbE QSFP+</li> <li>▪ 100-GbE QFSP28</li> </ul> </li> </ul> </li> </ul>
RJ-45 (Cat5/Cat5e/Cat6/Cat6a) Ethernet cables	

## Web browser requirements

You must use a supported web browser.

Web browser	Minimum supported version
Google Chrome	107
Microsoft Edge	107
Mozilla Firefox	106

You should set the browser window to a recommended width.

Browser width	Pixels
Minimum	1024

Browser width	Pixels
Optimum	1280

## Review appliance network connections

### Review appliance network connections

Before installing the StorageGRID appliance, you should understand which networks can be connected to the appliance and how the ports on each controller are used.

StorageGRID network requirements are fully explained in the [Networking guidelines](#).

When you deploy a StorageGRID appliance as a node in a StorageGRID system, you can connect it to the following networks:

- **Grid Network for StorageGRID:** The Grid Network is used for all internal StorageGRID traffic. It provides connectivity between all nodes in the grid, across all sites and subnets. The Grid Network is required.
- **Admin Network for StorageGRID:** The Admin Network is a closed network used for system administration and maintenance. The Admin Network is typically a private network and does not need to be routable between sites. The Admin Network is optional.
- **Client Network for StorageGRID:** The Client Network is an open network used to provide access to client applications, including S3 and Swift. The Client Network provides client protocol access to the grid, so the Grid Network can be isolated and secured. You can configure the Client Network so that the appliance can be accessed over this network using only the ports you choose to open. The Client Network is optional.
- **Management network for SANtricity** (optional for storage appliances, not needed for the SGF6112): This network provides access to SANtricity System Manager, allowing you to monitor and manage the hardware components in the appliance and storage controller shelf. This management network can be the same as the Admin Network for StorageGRID, or it can be an independent management network.
- **BMC management network** (optional for SG100, SG1000, SG6000, and SGF6112): This network provides access to the baseboard management controller in the SG100, SG1000, SG6000, and SGF6112 appliances allowing you to monitor and manage the hardware components in the appliance. This management network can be the same as the Admin Network for StorageGRID, or it can be an independent management network.

If the optional BMC management network is not connected, some support and maintenance procedures will be more difficult to perform. You can leave the BMC management network unconnected except when needed for support purposes.

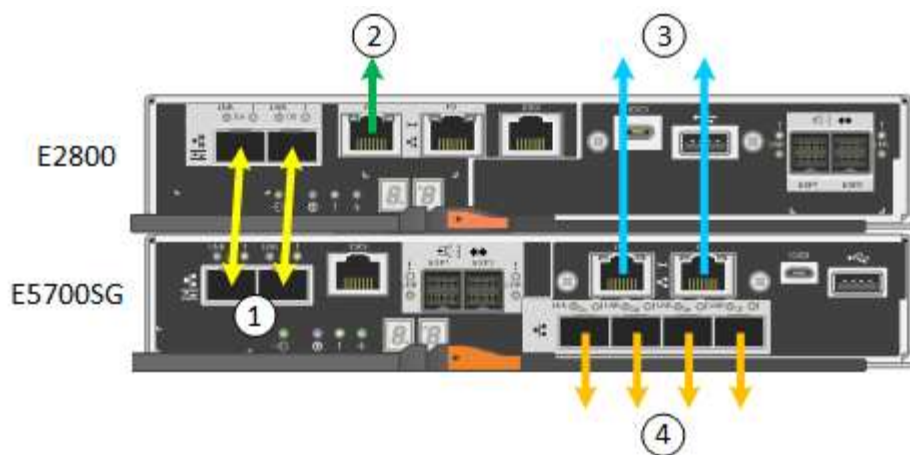


For detailed information about StorageGRID networks, see the [StorageGRID network types](#).

### Network connections (SG5700)

When you install a SG5700 StorageGRID appliance, you connect the two controllers to each other and to the required networks.

The figure shows the two controllers in the SG5760, with the E2800 controller on the top and the E5700SG controller on the bottom. In the SG5712, the E2800 controller is to the left of the E5700SG controller.



Callout	Port	Type of port	Use
1	Two interconnect ports on each controller	16Gb/s FC optical SFP+	Connect the two controllers to each other.
2	Management port 1 on the E2800 controller	1-GbE (RJ-45)	Connects to the network where you access SANtricity System Manager. You can use the Admin Network for StorageGRID or an independent management network.
	Management port 2 on the E2800 controller	1-GbE (RJ-45)	Reserved for technical support.
3	Management port 1 on the E5700SG controller	1-GbE (RJ-45)	Connects the E5700SG controller to the Admin Network for StorageGRID.
	Management port 2 on the E5700SG controller	1-GbE (RJ-45)	<ul style="list-style-type: none"> <li>• Can be bonded with management port 1 if you want a redundant connection to the Admin Network.</li> <li>• Can be left unwired and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, can be used to connect the E5700SG controller to a service laptop if DHCP-assigned IP addresses aren't available.</li> </ul>

Callout	Port	Type of port	Use
4	10/25-GbE ports 1-4 on the E5700SG controller	10-GbE or 25-GbE  <b>Note:</b> The SFP+ transceivers included with the appliance support 10-GbE link speeds. If you want to use 25-GbE link speeds for the four network ports, you must provide SFP28 transceivers.	Connect to the Grid Network and the Client Network for StorageGRID. See <a href="#">Port bond modes (E5700SG controller)</a> .

## Port bond modes (SGF6112)

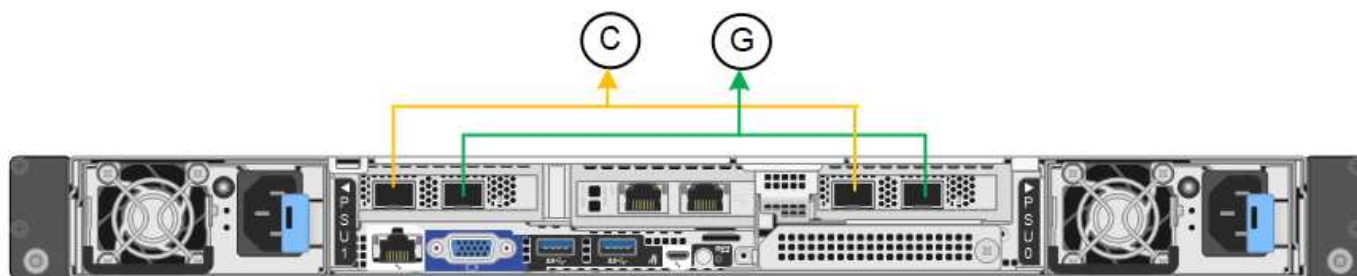
When [configuring network links](#) for the SGF6112 appliance, you can use port bonding for the ports that connect to the Grid Network and optional Client Network, and the 1/10-GbE management ports that connect to the optional Admin Network. Port bonding helps protect your data by providing redundant paths between StorageGRID networks and the appliance.

### Network bond modes

The networking ports on the appliance support Fixed port bond mode or Aggregate port bond mode for the Grid Network and Client Network connections.

### Fixed port bond mode

Fixed port bond mode is the default configuration for the networking ports.



Callout	Which ports are bonded
C	Ports 1 and 3 are bonded together for the Client Network, if this network is used.
G	Ports 2 and 4 are bonded together for the Grid Network.

When using Fixed port bond mode, the ports can be bonded using active-backup mode or Link Aggregation Control Protocol mode (LACP 802.3ad).

- In active-backup mode (default), only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Port 4 provides a backup path for port 2 (Grid Network), and port 3 provides a backup path for port 1 (Client Network).
- In LACP mode, each pair of ports forms a logical channel between the appliance and the network, allowing

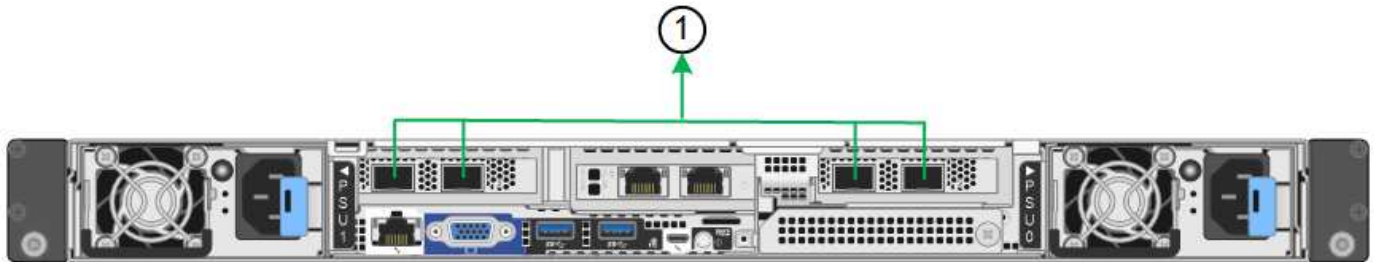
for higher throughput. If one port fails, the other port continues to provide the channel. Throughput is reduced, but connectivity is not impacted.



If you don't need redundant connections, you can use only one port for each network. However, be aware that the **Storage appliance link down** alert might be triggered in the Grid Manager after StorageGRID is installed, indicating that a cable is unplugged. You can safely disable this alert rule.

## Aggregate port bond mode

Aggregate port bond mode significantly increases the throughput for each StorageGRID network and provides additional failover paths.



Callout	Which ports are bonded
1	All connected ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

If you plan to use aggregate port bond mode:

- You must use LACP network bond mode.
- You must specify a unique VLAN tag for each network. This VLAN tag will be added to each network packet to ensure that network traffic is routed to the correct network.
- The ports must be connected to switches that can support VLAN and LACP. If multiple switches are participating in the LACP bond, the switches must support multi-chassis link aggregation groups (MLAG), or equivalent.
- You understand how to configure the switches to use VLAN, LACP, and MLAG, or equivalent.

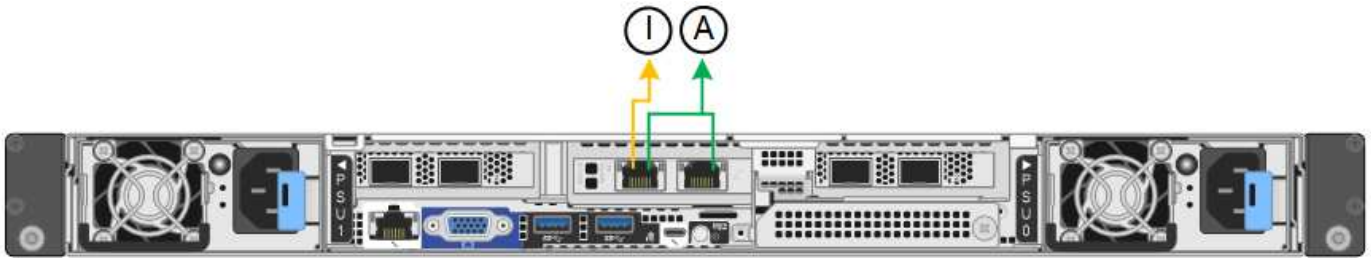
If you don't want to use all four ports, you can use one, two, or three ports. Using more than one port maximizes the chance that some network connectivity will remain available if one of the ports fails.



If you choose to use fewer than four network ports, be aware that a **Services appliance link down** alert might be triggered in the Grid Manager after the appliance node is installed, indicating that a cable is unplugged. You can safely disable this alert rule for the triggered alert.

## Network bond modes for management ports

For the two 1/10-GbE management ports, you can choose Independent network bond mode or Active-Backup network bond mode to connect to the optional Admin Network.



In Independent mode, only the management port on the left is connected to the Admin Network. This mode does not provide a redundant path. The management port on the right is unconnected and available for temporary local connections (uses IP address 169.254.0.1).

In Active-Backup mode, both management ports are connected to the Admin Network. Only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Bonding these two physical ports into one logical management port provides a redundant path to the Admin Network.



If you need to make a temporary local connection to the appliance when the 1/10-GbE management ports are configured for Active-Backup mode, remove the cables from both management ports, plug your temporary cable into the management port on the right, and access the appliance using IP address 169.254.0.1.

Callout	Network bond mode
A	Active-Backup mode. Both management ports are bonded into one logical management port connected to the Admin Network.
I	Independent mode. The port on the left is connected to the Admin Network. The port on the right is available for temporary local connections (IP address 169.254.0.1).

### Port bond modes (SG6000-CN controller)

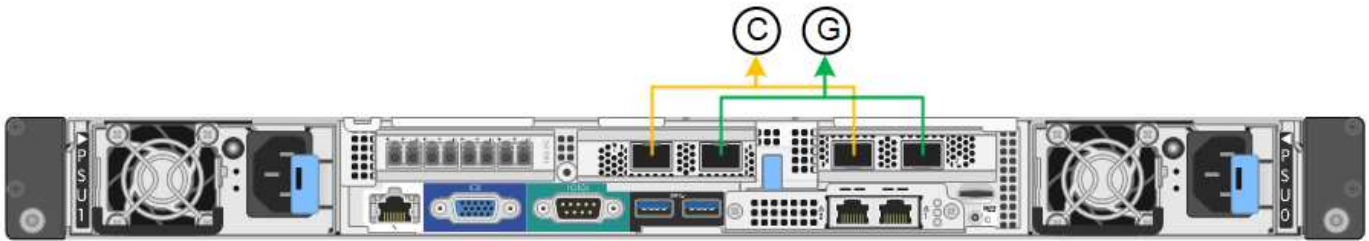
When [configuring network links](#) for the SG6000-CN controller, you can use port bonding for the 10/25-GbE ports that connect to the Grid Network and optional Client Network, and the 1-GbE management ports that connect to the optional Admin Network. Port bonding helps protect your data by providing redundant paths between StorageGRID networks and the appliance.

#### Network bond modes for 10/25-GbE ports

The 10/25-GbE networking ports on the SG6000-CN controller support Fixed port bond mode or Aggregate port bond mode for the Grid Network and Client Network connections.

#### Fixed port bond mode

Fixed mode is the default configuration for the 10/25-GbE networking ports.



Callout	Which ports are bonded
C	Ports 1 and 3 are bonded together for the Client Network, if this network is used.
G	Ports 2 and 4 are bonded together for the Grid Network.

When using Fixed port bond mode, the ports can be bonded using active-backup mode or Link Aggregation Control Protocol mode (LACP 802.3ad).

- In active-backup mode (default), only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Port 4 provides a backup path for port 2 (Grid Network), and port 3 provides a backup path for port 1 (Client Network).
- In LACP mode, each pair of ports forms a logical channel between the controller and the network, allowing for higher throughput. If one port fails, the other port continues to provide the channel. Throughput is reduced, but connectivity is not impacted.

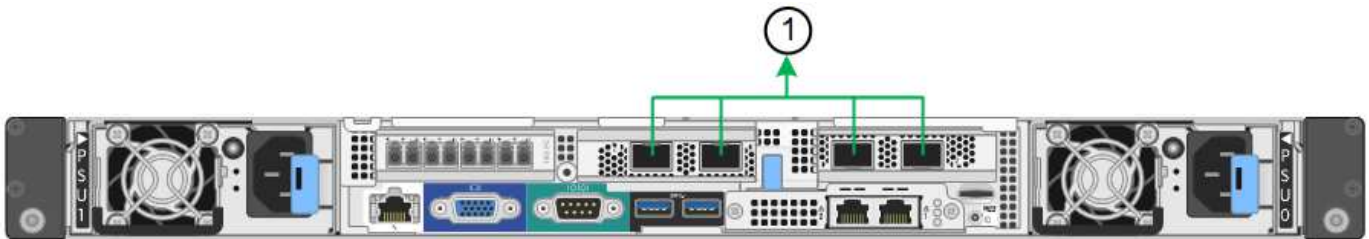


If you don't need redundant connections, you can use only one port for each network. However, be aware that an alert will be triggered in the Grid Manager after StorageGRID is installed, indicating that the link is down. Because this port is disconnected on purpose, you can safely disable this alert.

From the Grid Manager, select **Alert > Rules**, select the rule, and click **Edit rule**. Then, uncheck the **Enabled** checkbox.

### Aggregate port bond mode

Aggregate port bond mode significantly increases the throughput for each StorageGRID network and provides additional failover paths.



Callout	Which ports are bonded
1	All connected ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

If you plan to use aggregate port bond mode:



- You must use LACP network bond mode.
- You must specify a unique VLAN tag for each network. This VLAN tag will be added to each network packet to ensure that network traffic is routed to the correct network.
- The ports must be connected to switches that can support VLAN and LACP. If multiple switches are participating in the LACP bond, the switches must support multi-chassis link aggregation groups (MLAG), or equivalent.
- You understand how to configure the switches to use VLAN, LACP, and MLAG, or equivalent.

If you don't want to use all four 10/25-GbE ports, you can use one, two, or three ports. Using more than one port maximizes the chance that some network connectivity will remain available if one of the 10/25-GbE ports fails.



If you choose to use fewer than four ports, be aware that one or more alarms will be raised in the Grid Manager after StorageGRID is installed, indicating that cables are unplugged. You can safely acknowledge the alarms to clear them.

#### Network bond modes for 1-GbE management ports

For the two 1-GbE management ports on the SG6000-CN controller, you can choose Independent network bond mode or Active-Backup network bond mode to connect to the optional Admin Network.

In Independent mode, only the management port on the left is connected to the Admin Network. This mode does not provide a redundant path. The management port on the right is unconnected and available for temporary local connections (uses IP address 169.254.0.1)

In Active-Backup mode, both management ports are connected to the Admin Network. Only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Bonding these two physical ports into one logical management port provides a redundant path to the Admin Network.



If you need to make a temporary local connection to the SG6000-CN controller when the 1-GbE management ports are configured for Active-Backup mode, remove the cables from both management ports, plug your temporary cable into the management port on the right, and access the appliance using IP address 169.254.0.1.



Callout	Network bond mode
A	Both management ports are bonded into one logical management port connected to the Admin Network.
I	The port on the left is connected to the Admin Network. The port on the right is available for temporary local connections (IP address 169.254.0.1).



Port bond modes (E5700SG controller)

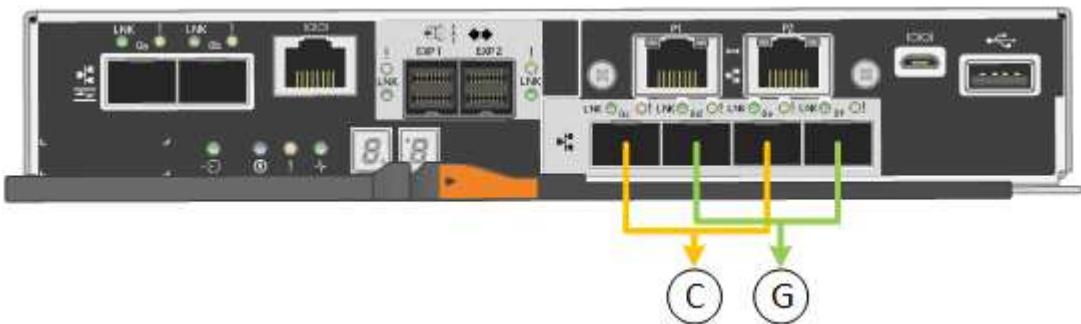
When [configuring network links](#) for the E5700SG controller, you can use port bonding for the 10/25-GbE ports that connect to the Grid Network and optional Client Network, and the 1-GbE management ports that connect to the optional Admin Network. Port bonding helps protect your data by providing redundant paths between StorageGRID networks and the appliance.

Network bond modes for 10/25-GbE ports

The 10/25-GbE networking ports on the E5700SG controller support Fixed port bond mode or Aggregate port bond mode for the Grid Network and Client Network connections.

Fixed port bond mode

Fixed mode is the default configuration for the 10/25-GbE networking ports.



Callout	Which ports are bonded
C	Ports 1 and 3 are bonded together for the Client Network, if this network is used.
G	Ports 2 and 4 are bonded together for the Grid Network.

When using Fixed port bond mode, you can use one of two network bond modes: Active-Backup or Link Aggregation Control Protocol (LACP).

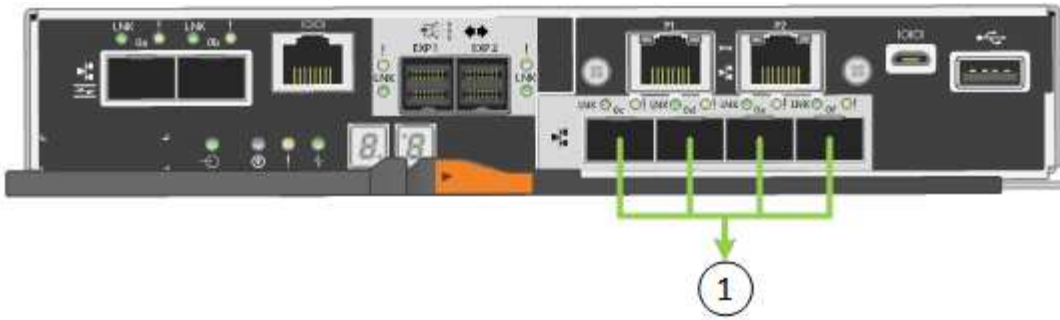
- In Active-Backup mode (default), only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Port 4 provides a backup path for port 2 (Grid Network), and port 3 provides a backup path for port 1 (Client Network).
- In LACP mode, each pair of ports forms a logical channel between the controller and the network, allowing for higher throughput. If one port fails, the other port continues to provide the channel. Throughput is reduced, but connectivity is not impacted.



If you don't need redundant connections, you can use only one port for each network. However, be aware that an alarm will be raised in the Grid Manager after StorageGRID is installed, indicating that a cable is unplugged. You can safely acknowledge this alarm to clear it.

Aggregate port bond mode

Aggregate port bond mode significantly increases the throughput for each StorageGRID network and provides additional failover paths.



Callout	Which ports are bonded
1	All connected ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

If you plan to use Aggregate port bond mode:

- You must use LACP network bond mode.
- You must specify a unique VLAN tag for each network. This VLAN tag will be added to each network packet to ensure that network traffic is routed to the correct network.
- The ports must be connected to switches that can support VLAN and LACP. If multiple switches are participating in the LACP bond, the switches must support multi-chassis link aggregation groups (MLAG), or equivalent.
- You understand how to configure the switches to use VLAN, LACP, and MLAG, or equivalent.

If you don't want to use all four 10/25-GbE ports, you can use one, two, or three ports. Using more than one port maximizes the chance that some network connectivity will remain available if one of the 10/25-GbE ports fails.



If you choose to use fewer than four ports, be aware that one or more alarms will be raised in the Grid Manager after StorageGRID is installed, indicating that cables are unplugged. You can safely acknowledge the alarms to clear them.

#### Network bond modes for 1-GbE management ports

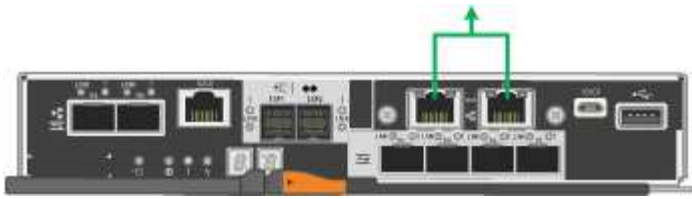
For the two 1-GbE management ports on the E5700SG controller, you can choose Independent network bond mode or Active-Backup network bond mode to connect to the optional Admin Network.

In Independent mode, only management port 1 is connected to the Admin Network. This mode does not provide a redundant path. Management port 2 is left unwired and available for temporary local connections (use IP address 169.254.0.1)

In Active-Backup mode, both management ports 1 and 2 are connected to the Admin Network. Only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Bonding these two physical ports into one logical management port provides a redundant path to the Admin Network.



If you need to make a temporary local connection to the E5700SG controller when the 1-GbE management ports are configured for Active-Backup mode, remove the cables from both management ports, plug your temporary cable into management port 2, and access the appliance using IP address 169.254.0.1.



### Port bond modes (SG100 and SG1000)

When configuring network links for the SG100 and SG1000 appliances, you can use port bonding for the ports that connect to the Grid Network and optional Client Network, and the 1-GbE management ports that connect to the optional Admin Network. Port bonding helps protect your data by providing redundant paths between StorageGRID networks and the appliance.

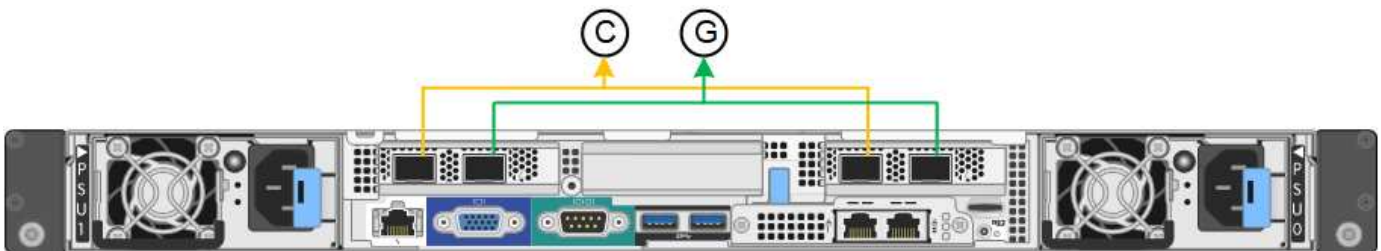
#### Network bond modes

The networking ports on the services appliance support Fixed port bond mode or Aggregate port bond mode for the Grid Network and Client Network connections.

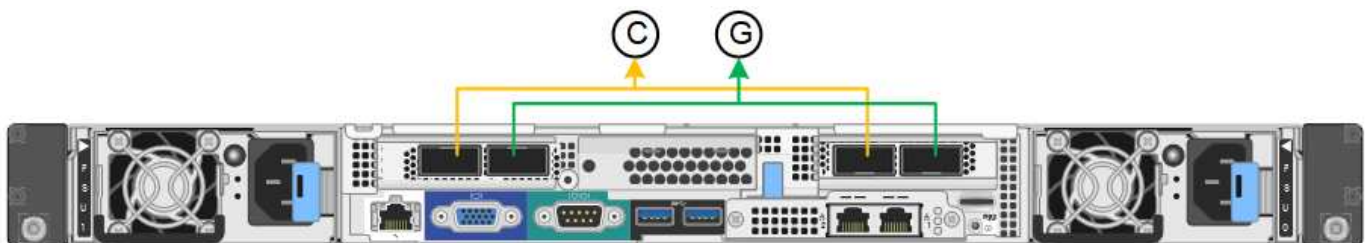
#### Fixed port bond mode

Fixed port bond mode is the default configuration for the networking ports. The figures show how the network ports on the SG1000 or SG100 are bonded in fixed port bond mode.

SG100:



SG1000:



Callout	Which ports are bonded
C	Ports 1 and 3 are bonded together for the Client Network, if this network is used.
G	Ports 2 and 4 are bonded together for the Grid Network.

When using Fixed port bond mode, the ports can be bonded using active-backup mode or Link Aggregation

Control Protocol mode (LACP 802.3ad).

- In active-backup mode (default), only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Port 4 provides a backup path for port 2 (Grid Network), and port 3 provides a backup path for port 1 (Client Network).
- In LACP mode, each pair of ports forms a logical channel between the services appliance and the network, allowing for higher throughput. If one port fails, the other port continues to provide the channel. Throughput is reduced, but connectivity is not impacted.

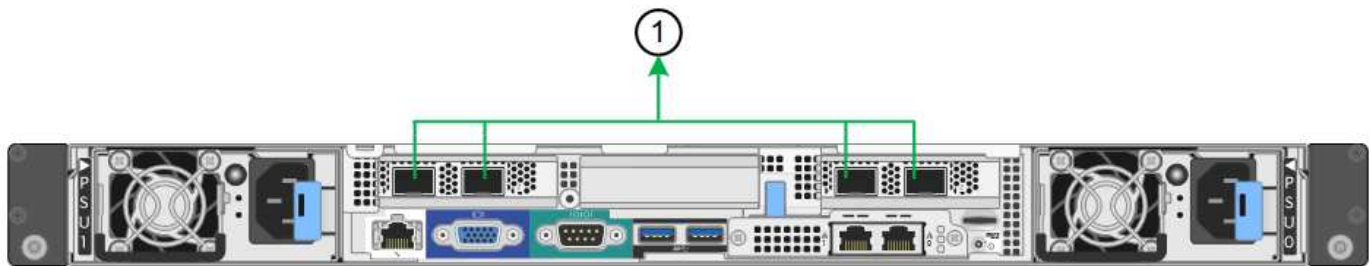


If you don't need redundant connections, you can use only one port for each network. However, be aware that the **Services appliance link down** alert might be triggered in the Grid Manager after StorageGRID is installed, indicating that a cable is unplugged. You can safely disable this alert rule.

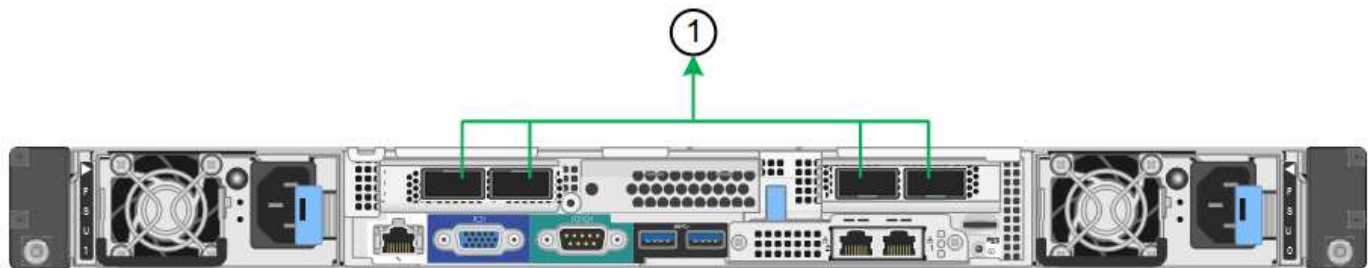
Aggregate port bond mode

Aggregate port bond mode significantly increases the throughput for each StorageGRID network and provides additional failover paths. These figures show how the network ports are bonded in aggregate port bond mode.

SG100:



SG1000:



Callout	Which ports are bonded
1	All connected ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

If you plan to use aggregate port bond mode:

- You must use LACP network bond mode.
- You must specify a unique VLAN tag for each network. This VLAN tag will be added to each network packet to ensure that network traffic is routed to the correct network.
- The ports must be connected to switches that can support VLAN and LACP. If multiple switches are participating in the LACP bond, the switches must support multi-chassis link aggregation groups (MLAG),

or equivalent.

- You understand how to configure the switches to use VLAN, LACP, and MLAG, or equivalent.

If you don't want to use all four ports, you can use one, two, or three ports. Using more than one port maximizes the chance that some network connectivity will remain available if one of the ports fails.



If you choose to use fewer than four network ports, be aware that a **Services appliance link down** alert might be triggered in the Grid Manager after the appliance node is installed, indicating that a cable is unplugged. You can safely disable this alert rule for the triggered alert.

#### Network bond modes for management ports

For the two 1-GbE management ports on the services appliance, you can choose Independent network bond mode or Active-Backup network bond mode to connect to the optional Admin Network. These figures show how the management ports on the appliances are bonded in network bond mode for the Admin Network.

SG100:



SG1000:



Callout	Network bond mode
A	Active-Backup mode. Both management ports are bonded into one logical management port connected to the Admin Network.
I	Independent mode. The port on the left is connected to the Admin Network. The port on the right is available for temporary local connections (IP address 169.254.0.1).

In Independent mode, only the management port on the left is connected to the Admin Network. This mode does not provide a redundant path. The management port on the right is unconnected and available for temporary local connections (uses IP address 169.254.0.1)

In Active-Backup mode, both management ports are connected to the Admin Network. Only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Bonding these two physical ports into one logical management port provides a redundant path to the Admin Network.



If you need to make a temporary local connection to the services appliance when the 1-GbE management ports are configured for Active-Backup mode, remove the cables from both management ports, plug your temporary cable into the management port on the right, and access the appliance using IP address 169.254.0.1.

## Gather installation information

### Gather installation information: Overview

As you install and configure a StorageGRID appliance, you make decisions and gather information about Ethernet switch ports, IP addresses, and port and network bond modes.

Refer to the instructions for your appliance to determine what information you need:

- [SGF6112](#)
- [SG6000](#)
- [SG5700](#)
- [SG100 and SG1000](#)

Alternatively, you can work with your NetApp Professional Services consultant to use the NetApp ConfigBuilder tool to streamline and automate the configuration steps. See [Automate appliance installation and configuration](#).

### Gather installation information (SGF6112)

Using the following tables, record the required information for each network you connect to the appliance. These values are required to install and configure the hardware.



Instead of using the tables, use the workbook provided with ConfigBuilder. Using the ConfigBuilder workbook allows you to upload your system information and generate a JSON file to automatically complete some configuration steps in the StorageGRID Appliance Installer. See [Automate appliance installation and configuration](#).

### Check StorageGRID version

Before installing an SGF6112 appliance, confirm your StorageGRID system is using a required version of StorageGRID software.

Appliance	Required StorageGRID version
SGF6112	11.7 or later (latest hotfix recommended)

### Administration and maintenance ports

The Admin Network for StorageGRID is an optional network, used for system administration and maintenance. The appliance connects to the Admin Network using the following ports on the appliance.

The following figure shows the RJ-45 ports on the SG6112 appliance.





Information needed	Your value
Admin Network enabled	Choose one: <ul style="list-style-type: none"> <li>• No</li> <li>• Yes (default)</li> </ul>
Network bond mode	Choose one: <ul style="list-style-type: none"> <li>• Independent (default)</li> <li>• Active-Backup</li> </ul>
Switch port for the left port circled in the diagram (default active port for Independent network bond mode)	
Switch port for the right port circled in the diagram (Active-Backup network bond mode only)	
<p>MAC address for the Admin Network port</p> <p><b>Note:</b> The MAC address label on the front of the appliance lists the MAC address for the BMC management port. To determine the MAC address for the Admin Network port, you must add <b>2</b> to the hexadecimal number on the label. For example, if the MAC address on the label ends in <b>09</b>, the MAC address for the Admin Port would end in <b>0B</b>. If the MAC address on the label ends in <b>(y)FF</b>, the MAC address for the Admin Port would end in <b>(y+1)01</b>. You can easily make this calculation by opening Calculator in Windows, setting it to Programmer mode, selecting Hex, typing the MAC address, then typing <b>+ 2 =</b>.</p>	
<p>DHCP-assigned IP address for the Admin Network port, if available after power on</p> <p><b>Note:</b> You can determine the DHCP-assigned IP address by using the MAC address to look up the assigned IP.</p>	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
<p>Static IP address you plan to use for the appliance node on the Admin Network</p> <p><b>Note:</b> If your network does not have a gateway, specify the same static IPv4 address for the gateway.</p>	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
Admin Network subnets (CIDR)	

## Networking ports

The four networking ports on the appliance connect to the StorageGRID Grid Network and the optional Client Network.

Information needed	Your value
Link speed	For the SGF6112, choose one of the following: <ul style="list-style-type: none"><li>• Auto (default)</li><li>• 10 GbE</li><li>• 25 GbE</li></ul>
Port bond mode	Choose one: <ul style="list-style-type: none"><li>• Fixed (default)</li><li>• Aggregate</li></ul>
Switch port for port 1 (Client Network for Fixed mode)	
Switch port for port 2 (Grid Network for Fixed mode)	
Switch port for port 3 (Client Network for Fixed mode)	
Switch port for port 4 (Grid Network for Fixed mode)	

## Grid Network ports

The Grid Network for StorageGRID is a required network, used for all internal StorageGRID traffic. The appliance connects to the Grid Network using the four network ports.

Information needed	Your value
Network bond mode	Choose one: <ul style="list-style-type: none"><li>• Active-Backup (default)</li><li>• LACP (802.3ad)</li></ul>
VLAN tagging enabled	Choose one: <ul style="list-style-type: none"><li>• No (default)</li><li>• Yes</li></ul>
VLAN tag (if VLAN tagging is enabled)	Enter a value between 0 and 4095:



Information needed	Your value
DHCP-assigned IP address for the Grid Network, if available after power on	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>
Static IP address you plan to use for the appliance node on the Grid Network  <b>Note:</b> If your network does not have a gateway, specify the same static IPv4 address for the gateway.	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>
Grid Network subnets (CIDRs)	
Maximum transmission unit (MTU) setting (optional). You can use the default value of 1500, or set the MTU to a value suitable for jumbo frames, such as 9000.	

### Client Network ports

The Client Network for StorageGRID is an optional network, typically used to provide client protocol access to the grid. The appliance connects to the Client Network using the four network ports.

Information needed	Your value
Client Network enabled	Choose one: <ul style="list-style-type: none"> <li>No (default)</li> <li>Yes</li> </ul>
Network bond mode	Choose one: <ul style="list-style-type: none"> <li>Active-Backup (default)</li> <li>LACP (802.3ad)</li> </ul>
VLAN tagging enabled	Choose one: <ul style="list-style-type: none"> <li>No (default)</li> <li>Yes</li> </ul>
VLAN tag(If VLAN tagging is enabled)	Enter a value between 0 and 4095:
DHCP-assigned IP address for the Client Network, if available after power on	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>

Information needed	Your value
Static IP address you plan to use for the appliance node on the Client Network  <b>Note:</b> If the Client Network is enabled, the default route on the appliance will use the gateway specified here.	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>

### BMC management network ports

You can access the BMC interface on the appliance using the 1-GbE management port circled in the diagram. This port supports remote management of the controller hardware over Ethernet using the Intelligent Platform Management Interface (IPMI) standard.



You can enable or disable remote IPMI access for all appliances containing a BMC by using the management API private endpoint, PUT /private/bmc.

The following figure shows the BMC management port on the SG6112 appliance.



Information needed	Your value
Ethernet switch port you will connect to the BMC management port (circled in the diagram)	
DHCP-assigned IP address for the BMC management network, if available after power on	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>
Static IP address you plan to use for the BMC management port	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>

### Related information

- [Cable appliance \(SGF6112\)](#)
- [Configure StorageGRID IP addresses](#)

### Gather installation information (SG6000)

Using the tables, record the required information for each network you connect to the appliance. These values are required to install and configure the hardware.



Instead of using the tables, use the workbook provided with ConfigBuilder. Using the ConfigBuilder workbook allows you to upload your system information and generate a JSON file to automatically complete some configuration steps in the StorageGRID Appliance Installer. See [Automate appliance installation and configuration](#).

## Information needed to connect to SANtricity System Manager on storage controllers

You connect both of the storage controllers in the appliance (either the E2800 series controllers or the EF570 controllers) to the management network you will use for SANtricity System Manager. The controllers are located in each appliance as follows:

- SG6060 and SG6060X: Controller A is on the top, and controller B is on the bottom.
- SGF6024: Controller A is on the left, and controller B is on the right.

Information needed	Your value for controller A	Your value for controller B
Ethernet switch port you will connect to management port 1 (labeled as P1 on the controller)		
MAC address for management port 1 (printed on a label near port P1)		
DHCP-assigned IP address for management port 1, if available after power on  <b>Note:</b> If the network you will connect to the storage controller includes a DHCP server, the network administrator can use the MAC address to determine the IP address that was assigned by the DHCP server.		
Static IP address you plan to use for the appliance on the management network	For IPv4: <ul style="list-style-type: none"><li>• IPv4 address:</li><li>• Subnet mask:</li><li>• Gateway:</li></ul> For IPv6: <ul style="list-style-type: none"><li>• IPv6 address:</li><li>• Routable IP address:</li><li>• storage controller router IP address:</li></ul>	For IPv4: <ul style="list-style-type: none"><li>• IPv4 address:</li><li>• Subnet mask:</li><li>• Gateway:</li></ul> For IPv6: <ul style="list-style-type: none"><li>• IPv6 address:</li><li>• Routable IP address:</li><li>• storage controller router IP address:</li></ul>
IP address format	Choose one: <ul style="list-style-type: none"><li>• IPv4</li><li>• IPv6</li></ul>	Choose one: <ul style="list-style-type: none"><li>• IPv4</li><li>• IPv6</li></ul>
Speed and duplex mode  <b>Note:</b> You must make sure the Ethernet switch for the SANtricity System Manager management network is set to autonegotiate.	Must be: <ul style="list-style-type: none"><li>• Autonegotiate (default)</li></ul>	Must be: <ul style="list-style-type: none"><li>• Autonegotiate (default)</li></ul>

## Information needed to connect SG6000-CN controller to Admin Network

The Admin Network for StorageGRID is an optional network, used for system administration and maintenance. The appliance connects to the Admin Network using the following 1-GbE management ports on the SG6000-CN controller.



Information needed	Your value
Admin Network enabled	Choose one: <ul style="list-style-type: none"><li>• No</li><li>• Yes (default)</li></ul>
Network bond mode	Choose one: <ul style="list-style-type: none"><li>• Independent (default)</li><li>• Active-Backup</li></ul>
Switch port for the left port in the red circle in the diagram (default active port for Independent network bond mode)	
Switch port for the right port in the red circle in the diagram (Active-Backup network bond mode only)	
MAC address for the Admin Network port <p><b>Note:</b> The MAC address label on the front of the SG6000-CN controller lists the MAC address for the BMC management port. To determine the MAC address for the Admin Network port, you must add <b>2</b> to the hexadecimal number on the label. For example, if the MAC address on the label ends in <b>09</b>, the MAC address for the Admin Port would end in <b>0B</b>. If the MAC address on the label ends in <b>(y)FF</b>, the MAC address for the Admin Port would end in <b>(y+1)01</b>. You can easily make this calculation by opening Calculator in Windows, setting it to Programmer mode, selecting Hex, typing the MAC address, then typing <b>+ 2 =</b>.</p>	
DHCP-assigned IP address for the Admin Network port, if available after power on <p><b>Note:</b> You can determine the DHCP-assigned IP address by using the MAC address to look up the assigned IP.</p>	<ul style="list-style-type: none"><li>• IPv4 address (CIDR):</li><li>• Gateway:</li></ul>
Static IP address you plan to use for the appliance Storage Node on the Admin Network <p><b>Note:</b> If your network does not have a gateway, specify the same static IPv4 address for the gateway.</p>	<ul style="list-style-type: none"><li>• IPv4 address (CIDR):</li><li>• Gateway:</li></ul>

Information needed	Your value
Admin Network subnets (CIDR)	

#### Information needed to connect and configure 10/25-GbE ports on SG6000-CN controller

The four 10/25-GbE ports on the SG6000-CN controller connect to the StorageGRID Grid Network and the optional Client Network.

Information needed	Your value
Link speed	Choose one: <ul style="list-style-type: none"> <li>• Auto (default)</li> <li>• 10 GbE</li> <li>• 25 GbE</li> </ul>
Port bond mode	Choose one: <ul style="list-style-type: none"> <li>• Fixed (default)</li> <li>• Aggregate</li> </ul>
Switch port for port 1 (Client Network for Fixed mode)	
Switch port for port 2 (Grid Network for Fixed mode)	
Switch port for port 3 (Client Network for Fixed mode)	
Switch port for port 4 (Grid Network for Fixed mode)	

#### Information needed to connect SG6000-CN controller to Grid Network

The Grid Network for StorageGRID is a required network, used for all internal StorageGRID traffic. The appliance connects to the Grid Network using the 10/25-GbE ports on the SG6000-CN controller.

Information needed	Your value
Network bond mode	Choose one: <ul style="list-style-type: none"> <li>• Active-Backup (default)</li> <li>• LACP (802.3ad)</li> </ul>
VLAN tagging enabled	Choose one: <ul style="list-style-type: none"> <li>• No (default)</li> <li>• Yes</li> </ul>

Information needed	Your value
VLAN tag(if VLAN tagging is enabled)	Enter a value between 0 and 4095:
DHCP-assigned IP address for the Grid Network, if available after power on	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
Static IP address you plan to use for the appliance Storage Node on the Grid Network  <b>Note:</b> If your network does not have a gateway, specify the same static IPv4 address for the gateway.	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
Grid Network subnets (CIDRs)	

#### Information needed to connect SG6000-CN controller to Client Network

The Client Network for StorageGRID is an optional network, typically used to provide client protocol access to the grid. The appliance connects to the Client Network using the 10/25-GbE ports on the SG6000-CN controller.

Information needed	Your value
Client Network enabled	Choose one: <ul style="list-style-type: none"> <li>• No (default)</li> <li>• Yes</li> </ul>
Network bond mode	Choose one: <ul style="list-style-type: none"> <li>• Active-Backup (default)</li> <li>• LACP (802.3ad)</li> </ul>
VLAN tagging enabled	Choose one: <ul style="list-style-type: none"> <li>• No (default)</li> <li>• Yes</li> </ul>
VLAN tag(If VLAN tagging is enabled)	Enter a value between 0 and 4095:
DHCP-assigned IP address for the Client Network, if available after power on	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>

Information needed	Your value
Static IP address you plan to use for the appliance Storage Node on the Client Network  <b>Note:</b> If the Client Network is enabled, the default route on the controller will use the gateway specified here.	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>

#### Information needed to connect SG6000-CN controller to BMC management network

You can access the BMC interface on the SG6000-CN controller using the following 1-GbE management port. This port supports remote management of the controller hardware over Ethernet using the Intelligent Platform Management Interface (IPMI) standard.



You can enable or disable remote IPMI access for all appliances containing a BMC by using the management API private endpoint, PUT /private/bmc.

Information needed	Your value
Ethernet switch port you will connect to the BMC management port (circled in the diagram)	
DHCP-assigned IP address for the BMC management network, if available after power on	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>
Static IP address you plan to use for the BMC management port	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>

#### Related information

- [SG6000 controllers](#)
- [Review appliance network connections](#)
- [Port bond modes \(SG6000-CN controller\)](#)
- [Cable appliance \(SG6000\)](#)
- [Configure StorageGRID IP addresses](#)

#### Gather installation information (SG5700)

Using the tables, record the required information for each network you connect to the appliance. These values are required to install and configure the hardware.



Instead of using the tables, use the workbook provided with ConfigBuilder. Using the ConfigBuilder workbook allows you to upload your system information and generate a JSON file to automatically complete some configuration steps in the StorageGRID Appliance Installer. See [Automate appliance installation and configuration](#).

#### Information needed to connect to SANtricity System Manager on E2800 controller

You connect the E2800 series controller to the management network you will use for SANtricity System Manager.

Information needed	Your value
Ethernet switch port you will connect to management port 1	
MAC address for management port 1 (printed on a label near port P1)	
DHCP-assigned IP address for management port 1, if available after power on  <b>Note:</b> If the network you will connect to the E2800 controller includes a DHCP server, the network administrator can use the MAC address to determine the IP address that was assigned by the DHCP server.	
Speed and duplex mode  <b>Note:</b> You must make sure the Ethernet switch for the SANtricity System Manager management network is set to autonegotiate.	Must be: <ul style="list-style-type: none"><li>• Autonegotiate (default)</li></ul>
IP address format	Choose one: <ul style="list-style-type: none"><li>• IPv4</li><li>• IPv6</li></ul>
Static IP address you plan to use for the appliance on the management network	For IPv4: <ul style="list-style-type: none"><li>• IPv4 address:</li><li>• Subnet mask:</li><li>• Gateway:</li></ul> For IPv6: <ul style="list-style-type: none"><li>• IPv6 address:</li><li>• Routable IP address:</li><li>• E2800 controller router IP address:</li></ul>

#### Information needed to connect E5700SG controller to Admin Network

The Admin Network for StorageGRID is an optional network, used for system administration and maintenance.



The appliance connects to the Admin Network using the 1-GbE management ports on the E5700SG controller.

Information needed	Your value
Admin Network enabled	Choose one: <ul style="list-style-type: none"><li>• No</li><li>• Yes (default)</li></ul>
Network bond mode	Choose one: <ul style="list-style-type: none"><li>• Independent</li><li>• Active-Backup</li></ul>
Switch port for port 1	
Switch port for port 2 (Active-Backup network bond mode only)	
DHCP-assigned IP address for management port 1, if available after power on  <b>Note:</b> If the Admin Network includes a DHCP server, the E5700SG controller displays the DHCP-assigned IP address on its seven-segment display after it boots up. You can also determine the DHCP-assigned IP address by using the MAC address to look up the assigned IP.	<ul style="list-style-type: none"><li>• IPv4 address (CIDR):</li><li>• Gateway:</li></ul>
Static IP address you plan to use for the appliance Storage Node on the Admin Network  <b>Note:</b> If your network does not have a gateway, specify the same static IPv4 address for the gateway.	<ul style="list-style-type: none"><li>• IPv4 address (CIDR):</li><li>• Gateway:</li></ul>
Admin Network subnets (CIDR)	

#### Information needed to connect and configure 10/25-GbE ports on E5700SG controller

The four 10/25-GbE ports on the E5700SG controller connect to the StorageGRID Grid Network and Client Network.



See [Port bond modes \(E5700SG controller\)](#).

Information needed	Your value
Link speed  <b>Note:</b> If you select 25 GbE, install SPF28 transceivers. Autonegotiation is not supported, so you must also configure the ports and the connected switches for 25GbE.	Choose one: <ul style="list-style-type: none"><li>• 10 GbE (default)</li><li>• 25 GbE</li></ul>

Information needed	Your value
Port bond mode	Choose one: <ul style="list-style-type: none"> <li>• Fixed (default)</li> <li>• Aggregate</li> </ul>
Switch port for port 1 (Client Network)	
Switch port for port 2 (Grid Network)	
Switch port for port 3 (Client Network)	
Switch port for port 4 (Grid Network)	

#### Information needed to connect E5700SG controller to Grid Network

The Grid Network for StorageGRID is a required network, used for all internal StorageGRID traffic. The appliance connects to the Grid Network using the 10/25-GbE ports on the E5700SG controller.



See [Port bond modes \(E5700SG controller\)](#).

Information needed	Your value
Network bond mode	Choose one: <ul style="list-style-type: none"> <li>• Active-Backup (default)</li> <li>• LACP (802.3ad)</li> </ul>
VLAN tagging enabled	Choose one: <ul style="list-style-type: none"> <li>• No (default)</li> <li>• Yes</li> </ul>
VLAN tag(if VLAN tagging is enabled)	Enter a value between 0 and 4095:
DHCP-assigned IP address for the Grid Network, if available after power on  <b>Note:</b> If the Grid Network includes a DHCP server, the E5700SG controller displays the DHCP-assigned IP address for the Grid Network on its seven-segment display after it boots up.	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
Static IP address you plan to use for the appliance Storage Node on the Grid Network  <b>Note:</b> If your network does not have a gateway, specify the same static IPv4 address for the gateway.	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>

Information needed	Your value
Grid Network subnets (CIDR)  <b>Note:</b> If the Client Network is not enabled, the default route on the controller will use the gateway specified here.	

#### Information needed to connect E5700SG controller to Client Network

The Client Network for StorageGRID is an optional network, typically used to provide client protocol access to the grid. The appliance connects to the Client Network using the 10/25-GbE ports on the E5700SG controller.



See [Port bond modes \(E5700SG controller\)](#).

Information needed	Your value
Client Network enabled	Choose one: <ul style="list-style-type: none"> <li>No (default)</li> <li>Yes</li> </ul>
Network bond mode	Choose one: <ul style="list-style-type: none"> <li>Active-Backup (default)</li> <li>LACP (802.3ad)</li> </ul>
VLAN tagging enabled	Choose one: <ul style="list-style-type: none"> <li>No (default)</li> <li>Yes</li> </ul>
VLAN tag (if VLAN tagging is enabled)	Enter a value between 0 and 4095:
DHCP-assigned IP address for the Client Network, if available after power on	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>
Static IP address you plan to use for the appliance Storage Node on the Client Network  <b>Note:</b> If the Client Network is enabled, the default route on the controller will use the gateway specified here.	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>

#### Related information

- [Network connections \(SG5700\)](#)
- [Port bond modes \(E5700SG controller\)](#)

- [Configure hardware \(SG5700\)](#)

## Gather installation information (SG100 and SG1000)

Using the tables, record the required information for each network you connect to the appliance. These values are required to install and configure the hardware.



Instead of using the tables, use the workbook provided with ConfigBuilder. Using the ConfigBuilder workbook allows you to upload your system information and generate a JSON file to automatically complete some configuration steps in the StorageGRID Appliance Installer. See [Automate appliance installation and configuration](#).

### Check StorageGRID version

Before installing an SG100 or SG1000 services appliance, confirm your StorageGRID system is using a required version of StorageGRID software.

Appliance	Required StorageGRID version
SG1000	11.3 or later (latest hotfix recommended)
SG100	11.4 or later (latest hotfix recommended)

### Administration and maintenance ports

The Admin Network for StorageGRID is an optional network, used for system administration and maintenance. The appliance connects to the Admin Network using the following 1-GbE management ports on the appliance.

SG100 RJ-45 ports:



SG1000 RJ-45 ports:



Information needed	Your value
Admin Network enabled	Choose one: <ul style="list-style-type: none"> <li>• No</li> <li>• Yes (default)</li> </ul>

Information needed	Your value
Network bond mode	Choose one: <ul style="list-style-type: none"> <li>• Independent (default)</li> <li>• Active-Backup</li> </ul>
Switch port for the left port circled in the diagram (default active port for Independent network bond mode)	
Switch port for the right port circled in the diagram (Active-Backup network bond mode only)	
MAC address for the Admin Network port  <b>Note:</b> The MAC address label on the front of the appliance lists the MAC address for the BMC management port. To determine the MAC address for the Admin Network port, add <b>2</b> to the hexadecimal number on the label. For example, if the MAC address on the label ends in <b>09</b> , the MAC address for the Admin Port would end in <b>0B</b> . If the MAC address on the label ends in <b>(y)FF</b> , the MAC address for the Admin Port would end in <b>(y+1)01</b> . You can easily make this calculation by opening Calculator in Windows, setting it to Programmer mode, selecting Hex, typing the MAC address, then typing <b>+ 2 =</b> .	
DHCP-assigned IP address for the Admin Network port, if available after power on  <b>Note:</b> You can determine the DHCP-assigned IP address by using the MAC address to look up the assigned IP.	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
Static IP address you plan to use for the appliance node on the Admin Network  <b>Note:</b> If your network does not have a gateway, specify the same static IPv4 address for the gateway.	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
Admin Network subnets (CIDR)	

### Networking ports

The four networking ports on the appliance connect to the StorageGRID Grid Network and the optional Client Network.

Information needed	Your value
Link speed	<p>For the SG100, choose one of the following:</p> <ul style="list-style-type: none"> <li>• Auto (default)</li> <li>• 10 GbE</li> <li>• 25 GbE</li> </ul> <p>For the SG1000, choose one of the following:</p> <ul style="list-style-type: none"> <li>• Auto (default)</li> <li>• 10 GbE</li> <li>• 25 GbE</li> <li>• 40 GbE</li> <li>• 100 GbE</li> </ul> <p><b>Note:</b> For the SG1000, 10- and 25-GbE speeds require the use of QSA adapters.</p>
Port bond mode	<p>Choose one:</p> <ul style="list-style-type: none"> <li>• Fixed (default)</li> <li>• Aggregate</li> </ul>
Switch port for port 1 (Client Network for Fixed mode)	
Switch port for port 2 (Grid Network for Fixed mode)	
Switch port for port 3 (Client Network for Fixed mode)	
Switch port for port 4 (Grid Network for Fixed mode)	

### Grid Network ports

The Grid Network for StorageGRID is a required network, used for all internal StorageGRID traffic. The appliance connects to the Grid Network using the four network ports.

Information needed	Your value
Network bond mode	<p>Choose one:</p> <ul style="list-style-type: none"> <li>• Active-Backup (default)</li> <li>• LACP (802.3ad)</li> </ul>

Information needed	Your value
VLAN tagging enabled	Choose one: <ul style="list-style-type: none"> <li>• No (default)</li> <li>• Yes</li> </ul>
VLAN tag(if VLAN tagging is enabled)	Enter a value between 0 and 4095:
DHCP-assigned IP address for the Grid Network, if available after power on	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
Static IP address you plan to use for the appliance node on the Grid Network  <b>Note:</b> If your network does not have a gateway, specify the same static IPv4 address for the gateway.	<ul style="list-style-type: none"> <li>• IPv4 address (CIDR):</li> <li>• Gateway:</li> </ul>
Grid Network subnets (CIDRs)	
Maximum transmission unit (MTU) setting (optional)You can use the default value of 1500, or set the MTU to a value suitable for jumbo frames, such as 9000.	

#### Client Network ports

The Client Network for StorageGRID is an optional network, typically used to provide client protocol access to the grid. The appliance connects to the Client Network using the four network ports.

Information needed	Your value
Client Network enabled	Choose one: <ul style="list-style-type: none"> <li>• No (default)</li> <li>• Yes</li> </ul>
Network bond mode	Choose one: <ul style="list-style-type: none"> <li>• Active-Backup (default)</li> <li>• LACP (802.3ad)</li> </ul>
VLAN tagging enabled	Choose one: <ul style="list-style-type: none"> <li>• No (default)</li> <li>• Yes</li> </ul>
VLAN tag (If VLAN tagging is enabled)	Enter a value between 0 and 4095:

Information needed	Your value
DHCP-assigned IP address for the Client Network, if available after power on	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>
Static IP address you plan to use for the appliance node on the Client Network  <b>Note:</b> If the Client Network is enabled, the default route on the appliance will use the gateway specified here.	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>

### BMC management network ports

You can access the BMC interface on the services appliance using the 1-GbE management port circled in the diagram. This port supports remote management of the controller hardware over Ethernet using the Intelligent Platform Management Interface (IPMI) standard.



You can enable or disable remote IPMI access for all appliances containing a BMC by using the management API private endpoint, `PUT /private/bmc`.

SG100 BMC management port:



SG1000 BMC management port:



Information needed	Your value
Ethernet switch port you will connect to the BMC management port (circled in the diagram)	
DHCP-assigned IP address for the BMC management network, if available after power on	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>
Static IP address you plan to use for the BMC management port	<ul style="list-style-type: none"> <li>IPv4 address (CIDR):</li> <li>Gateway:</li> </ul>

### Related information

- [Cable appliance \(SG100 and SG1000\)](#)
- [Configure StorageGRID IP addresses](#)



# Automate appliance installation and configuration

Automating installation and configuration can be useful for deploying multiple StorageGRID instances or one large, complex StorageGRID instance.

Using NetApp StorageGRID tools, you can automate the installation and configuration of your StorageGRID appliances. After you install and configure the appliances, you can [automate the configuration of the entire StorageGRID system](#).

You can automate the configuration of the following:

- Grid Network, Admin Network, and Client Network IP addresses
- BMC interface
- Network links
  - Port bond mode
  - Network bond mode
  - Link speed

## Automation options

To automate appliance installation and configuration, use one or more of the following options:

- Generate a JSON file that contains configuration details. Work with your NetApp Professional Services consultant to use the [NetApp ConfigBuilder tool](#) to complete these steps:

Step	Consult NetApp Professional Services	Use ConfigBuilder
1	Get sales order number	
2		Get workbook
3	Complete workbook	
4		Upload workbook
5		Generate JSON file
6	Upload JSON file to appliance	
7	Appliance ready for configuration. See <a href="#">Automate using Appliance Installer</a> .	



You can use the same JSON file to configure more than one appliance.

Configuring your appliance using an uploaded JSON file is often more efficient than performing the configuration manually, especially if you have to configure many nodes. Performing the configuration manually requires using multiple pages in the StorageGRID Appliance Installer and applying the configuration file for each node one at a time.

- If you are an advanced user, you can use the following StorageGRID Python scripts to install and configure your system:
  - `configure-sga.py`: Automate the installation and configuration of your appliances. See [Automate appliance installation and configuration using configure-sga.py script](#).
  - `configure-storagegrid.py`: Configure other components of the entire StorageGRID system (the "grid"). See [Automate StorageGRID configuration](#).



You can use StorageGRID automation Python scripts directly, or you can use them as examples of how to use the StorageGRID Installation REST API in grid deployment and configuration tools you develop yourself. See the instructions for [downloading and extracting the StorageGRID installation files](#).

## Automate appliance configuration using StorageGRID Appliance Installer

After you have generated a JSON file, you can automate the configuration of one or more appliances by using the StorageGRID Appliance Installer to upload the JSON file.

### Before you begin

- The appliance has been installed in a rack, connected to your networks, and powered on.
- You have [generated the JSON file](#) with the guidance of your NetApp Professional Services consultant.
- Your appliance contains the latest firmware compatible with StorageGRID 11.5 or higher.
- You are connected to the StorageGRID Appliance Installer on the appliance you are configuring using a [supported web browser](#).

### Steps

1. In the StorageGRID Appliance Installer, select **Advanced > Update Appliance Configuration**. The Update Appliance Configuration page appears.
2. Browse for and select the JSON file with the configuration you want to upload.

The file is uploaded and validated. When the validation process is complete, the file name is shown next to a green check mark.



You might lose connection to the appliance if the configuration from the JSON file includes sections for `link_config`, `networks`, or both. If you aren't reconnected within 1 minute, re-enter the appliance URL using one of the other IP addresses assigned to the appliance.

### Upload JSON

JSON configuration	<input type="button" value="Browse"/>	appliances.orig.json
Node name	<input type="text" value="-- Select a node --"/>	
<input type="button" value="Apply JSON configuration"/>		

The **Node name** drop down is populated with the top-level node names defined in the JSON file.



If the file is not valid, the file name is shown in red and an error message is displayed in a yellow banner. The invalid file is not applied to the appliance. ConfigBuilder verifies that you have a valid JSON file.

3. Select a node from the list in the **Node name** drop down.

The **Apply JSON configuration** button becomes enabled.

4. Select **Apply JSON configuration**.

The configuration is applied to the selected node.

## Automate appliance installation and configuration using `configure-sga.py` script

If you are an advanced user, you can use the `configure-sga.py` script to automate many of the installation and configuration tasks for StorageGRID appliance nodes, including installing and configuring a primary Admin Node. This script can be useful if you have a large number of appliances to configure.

You can also use the script to generate a JSON file that contains appliance configuration information. You can upload the JSON file to the StorageGRID Appliance Installer to configure all appliance nodes at the same time. You can also edit the JSON file, then upload it to apply a new configuration to one or more appliances.



This procedure is for advanced users with experience using command-line interfaces. Alternatively, you can [use the StorageGRID Appliance Installer to automate the configuration](#).

### Before you begin

- The appliance has been installed in a rack, connected to your networks, and powered on.
- You have [generated the JSON file](#) with the guidance of your NetApp Professional Services consultant.
- Your appliance contains the latest firmware compatible with StorageGRID 11.5 or higher.
- You have configured the IP address of the Admin Network for the appliance.
- You have downloaded the `configure-sga.py` file. The file is included in the installation archive, or you can access it by clicking **Help > Appliance Installation Script** in the StorageGRID Appliance Installer.

### Steps

1. Log in to the Linux machine you are using to run the Python script.
2. For general help with the script syntax and to see a list of the available parameters, enter the following:

```
configure-sga.py --help
```

The `configure-sga.py` script uses five subcommands:

- `advanced` for advanced StorageGRID appliance interactions, including BMC configuration and creating a JSON file containing the current configuration of the appliance
- `configure` for configuring the RAID mode, node name, and networking parameters
- `install` for starting a StorageGRID installation
- `monitor` for monitoring a StorageGRID installation

- `reboot` for rebooting the appliance

If you enter a subcommand (advanced, configure, install, monitor, or reboot) argument followed by the `--help` option you will get a different help text providing more detail on the options available within that subcommand:

```
configure-sga.py subcommand --help
```

If you will [back up the appliance configuration to a JSON file](#), ensure the node names follow these requirements:

- Each node name is unique if you want to automatically configure all appliance nodes using a JSON file.
  - Must be a valid hostname containing at least 1 and no more than 32 characters.
  - Can use letters, numbers, and hyphens.
  - Can't start or end with a hyphen.
  - Can't contain only numbers.
3. To apply the configuration from the JSON file to the appliance, enter the following, where *SGA-INSTALL-IP* is the Admin Network IP address for the appliance, *json-file-name* is the name of the JSON file, and *node-name-inside-json-file* is the name of the node with the configuration being applied:  

```
configure-sga.py advanced --restore-file json-file-name --restore-node node-name-inside-json-file SGA-INSTALL-IP
```
  4. To confirm the current configuration of the appliance node, enter the following where *SGA-INSTALL-IP* is the Admin Network IP address for the appliance:  

```
configure-sga.py configure SGA-INSTALL-IP
```

The results show current IP information for the appliance, including the IP address of the primary Admin Node and information about the Admin, Grid, and Client Networks.

```
Connecting to +https://10.224.2.30:8443+ (Checking version and
connectivity.)
2021/02/25 16:25:11: Performing GET on /api/versions... Received 200
2021/02/25 16:25:11: Performing GET on /api/v2/system-info... Received
200
2021/02/25 16:25:11: Performing GET on /api/v2/admin-connection...
Received 200
2021/02/25 16:25:11: Performing GET on /api/v2/link-config... Received
200
2021/02/25 16:25:11: Performing GET on /api/v2/networks... Received 200
2021/02/25 16:25:11: Performing GET on /api/v2/system-config... Received
200

StorageGRID Appliance
  Name:          LAB-SGA-2-30
  Node type:     storage

StorageGRID primary Admin Node
  IP:           172.16.1.170
```

State: unknown  
Message: Initializing...  
Version: Unknown

#### Network Link Configuration

##### Link Status

Link	State	Speed (Gbps)
----	-----	-----
1	Up	10
2	Up	10
3	Up	10
4	Up	10
5	Up	1
6	Down	N/A

##### Link Settings

Port bond mode: FIXED  
Link speed: 10GBE

Grid Network: ENABLED  
Bonding mode: active-backup  
VLAN: novlan  
MAC Addresses: 00:a0:98:59:8e:8a 00:a0:98:59:8e:82

Admin Network: ENABLED  
Bonding mode: no-bond  
MAC Addresses: 00:80:e5:29:70:f4

Client Network: ENABLED  
Bonding mode: active-backup  
VLAN: novlan  
MAC Addresses: 00:a0:98:59:8e:89 00:a0:98:59:8e:81

##### Grid Network

CIDR: 172.16.2.30/21 (Static)  
MAC: 00:A0:98:59:8E:8A  
Gateway: 172.16.0.1  
Subnets: 172.17.0.0/21  
172.18.0.0/21  
192.168.0.0/21  
MTU: 1500

##### Admin Network

CIDR: 10.224.2.30/21 (Static)  
MAC: 00:80:E5:29:70:F4  
Gateway: 10.224.0.1

```
Subnets: 10.0.0.0/8
          172.19.0.0/16
          172.21.0.0/16
MTU:      1500
```

#### Client Network

```
CIDR:      47.47.2.30/21 (Static)
MAC:       00:A0:98:59:8E:89
Gateway:   47.47.0.1
MTU:       2000
```

```
#####
##### If you are satisfied with this configuration, #####
##### execute the script with the "install" sub-command. #####
#####
```

5. If you need to change any of the values in the current configuration, use the `configure` subcommand to update them. For example, if you want to change the IP address that the appliance uses for connection to the primary Admin Node to `172.16.2.99`, enter the following:

```
configure-sga.py configure --admin-ip 172.16.2.99 _SGA-INSTALL-IP_
```

6. If you want to back up the appliance configuration to a JSON file, use the `advanced` and `backup-file` subcommands. For example, if you want to back up the configuration of an appliance with IP address `SGA-INSTALL-IP` to a file named `appliance-SG1000.json`, enter the following:  
`configure-sga.py advanced --backup-file appliance-SG1000.json SGA-INSTALL-IP`

The JSON file containing the configuration information is written to the same directory you executed the script from.



Check that the top-level node name in the generated JSON file matches the appliance name. Don't make any changes to this file unless you are an experienced user and have a thorough understanding of StorageGRID APIs.

7. When you are satisfied with the appliance configuration, use the `install` and `monitor` subcommands to install the appliance:  
`configure-sga.py install --monitor SGA-INSTALL-IP`
8. If you want to reboot the appliance, enter the following:  
`configure-sga.py reboot SGA-INSTALL-IP`

## Automate StorageGRID configuration

After you have installed and configured the grid nodes, you can automate the configuration of the StorageGRID system.

### Before you begin

- You know the location of the following files from the installation archive.

Filename	Description
<code>configure-storagegrid.py</code>	Python script used to automate the configuration
<code>configure-storagegrid.sample.json</code>	Sample configuration file for use with the script
<code>configure-storagegrid.blank.json</code>	Blank configuration file for use with the script

- You have created a `configure-storagegrid.json` configuration file. To create this file, you can modify the sample configuration file (`configure-storagegrid.sample.json`) or the blank configuration file (`configure-storagegrid.blank.json`).

### About this task

You can use the `configure-storagegrid.py` Python script and the `configure-storagegrid.json` configuration file to automate the configuration of your StorageGRID system.



You can also configure the system using the [Grid Manager](#) or the [Installation API](#).

### Steps

1. Log in to the Linux machine you are using to run the Python script.
2. Change to the directory where you extracted the installation archive.

For example:

```
cd StorageGRID-Webscale-version/platform
```

where *platform* is `debs`, `rpms`, or `vsphere`.

3. Run the Python script and use the configuration file you created.

For example:

```
./configure-storagegrid.py ./configure-storagegrid.json --start-install
```

### After you finish

A Recovery Package `.zip` file is generated during the configuration process, and it is downloaded to the directory where you are running the installation and configuration process. You must back up the Recovery Package file so that you can recover the StorageGRID system if one or more grid nodes fails. For example, copy it to a secure, backed up network location and to a secure cloud storage location.



The Recovery Package file must be secured because it contains encryption keys and passwords that can be used to obtain data from the StorageGRID system.

If you specified that random passwords should be generated, you need to extract the `Passwords.txt` file and look for the passwords required to access your StorageGRID system.

```
#####
##### The StorageGRID "recovery package" has been downloaded as: #####
#####      ./sgws-recovery-package-994078-rev1.zip      #####
#####   Safeguard this file as it will be needed in case of a   #####
#####      StorageGRID node recovery.      #####
#####
```

Your StorageGRID system is installed and configured when a confirmation message is displayed.

```
StorageGRID has been configured and installed.
```

## Overview of installation REST APIs

StorageGRID provides two REST APIs for performing installation tasks: the StorageGRID Installation API and the StorageGRID Appliance Installer API.

Both APIs use the Swagger open source API platform to provide the API documentation. Swagger allows both developers and non-developers to interact with the API in a user interface that illustrates how the API responds to parameters and options. This documentation assumes that you are familiar with standard web technologies and the JSON data format.



Any API operations you perform using the API Docs webpage are live operations. Be careful not to create, update, or delete configuration data or other data by mistake.

Each REST API command includes the API's URL, an HTTP action, any required or optional URL parameters, and an expected API response.

### StorageGRID Installation API

The StorageGRID Installation API is only available when you are initially configuring your StorageGRID system, and if you need to perform a primary Admin Node recovery. The Installation API can be accessed over HTTPS from the Grid Manager.

To access the API documentation, go to the installation web page on the primary Admin Node and select **Help > API documentation** from the menu bar.

The StorageGRID Installation API includes the following sections:

- **config**: Operations related to the product release and versions of the API. You can list the product release version and the major versions of the API supported by that release.
- **grid**: Grid-level configuration operations. You can get and update grid settings, including grid details, Grid Network subnets, grid passwords, and NTP and DNS server IP addresses.
- **nodes**: Node-level configuration operations. You can retrieve a list of grid nodes, delete a grid node, configure a grid node, view a grid node, and reset a grid node's configuration.
- **provision**: Provisioning operations. You can start the provisioning operation and view the status of the provisioning operation.



- **recovery**: Primary Admin Node recovery operations. You can reset information, upload the Recover Package, start the recovery, and view the status of the recovery operation.
- **recovery-package**: Operations to download the Recovery Package.
- **sites**: Site-level configuration operations. You can create, view, delete, and modify a site.

## StorageGRID Appliance Installer API

The StorageGRID Appliance Installer API can be accessed over HTTPS from *Controller\_IP*:8443.

To access the API documentation, go to the StorageGRID Appliance Installer on the appliance and select **Help > API Docs** from the menu bar.

The StorageGRID Appliance Installer API includes the following sections:

- **clone**: Operations to configure and control node cloning.
- **encryption**: Operations to manage encryption and view encryption status.
- **hardware config**: Operations to configure system settings on attached hardware.
- **installation**: Operations for starting the appliance installation and for monitoring installation status.
- **networking**: Operations related to the Grid, Admin, and Client Network configuration for a StorageGRID appliance and appliance port settings.
- **setup**: Operations to help with initial appliance installation setup including requests to get information about the system and update the primary Admin Node IP.
- **support**: Operations for rebooting the controller and getting logs.
- **update-config**: Operations to update StorageGRID appliance configuration.
- **upgrade**: Operations related to upgrading appliance firmware.
- **uploadsg**: Operations for uploading StorageGRID installation files.

## Install hardware

### Register hardware

Registering the appliance hardware provides support benefits.

#### Steps

1. Locate the chassis serial number for the appliance. For SG6000 appliances the chassis serial number is on the storage controller shelf.

You can find the number on the packing slip, in your confirmation email, or on the appliance after you unpack it.



There are several serial numbers on the SG6000 storage appliance. The serial number on the storage controller shelf is the one that must be registered and used if you call for service or support on the SG6000 appliance.

2. Go to the NetApp Support Site at [mysupport.netapp.com](https://mysupport.netapp.com).
3. Determine whether you need to register the hardware:

If you are a...	Follow these steps...
Existing NetApp customer	<ol style="list-style-type: none"><li>a. Sign in with your username and password.</li><li>b. Select <b>Products &gt; My Products</b>.</li><li>c. Confirm that the new serial number is listed.</li><li>d. If it is not, follow the instructions for new NetApp customers.</li></ol>
New NetApp customer	<ol style="list-style-type: none"><li>a. Click <b>Register Now</b>, and create an account.</li><li>b. Select <b>Products &gt; Register Products</b>.</li><li>c. Enter the product serial number and requested details.</li></ol> <p>After your registration is approved, you can download any required software. The approval process might take up to 24 hours.</p>

## Install into cabinet or rack

### Install into cabinet or rack (SGF6112)

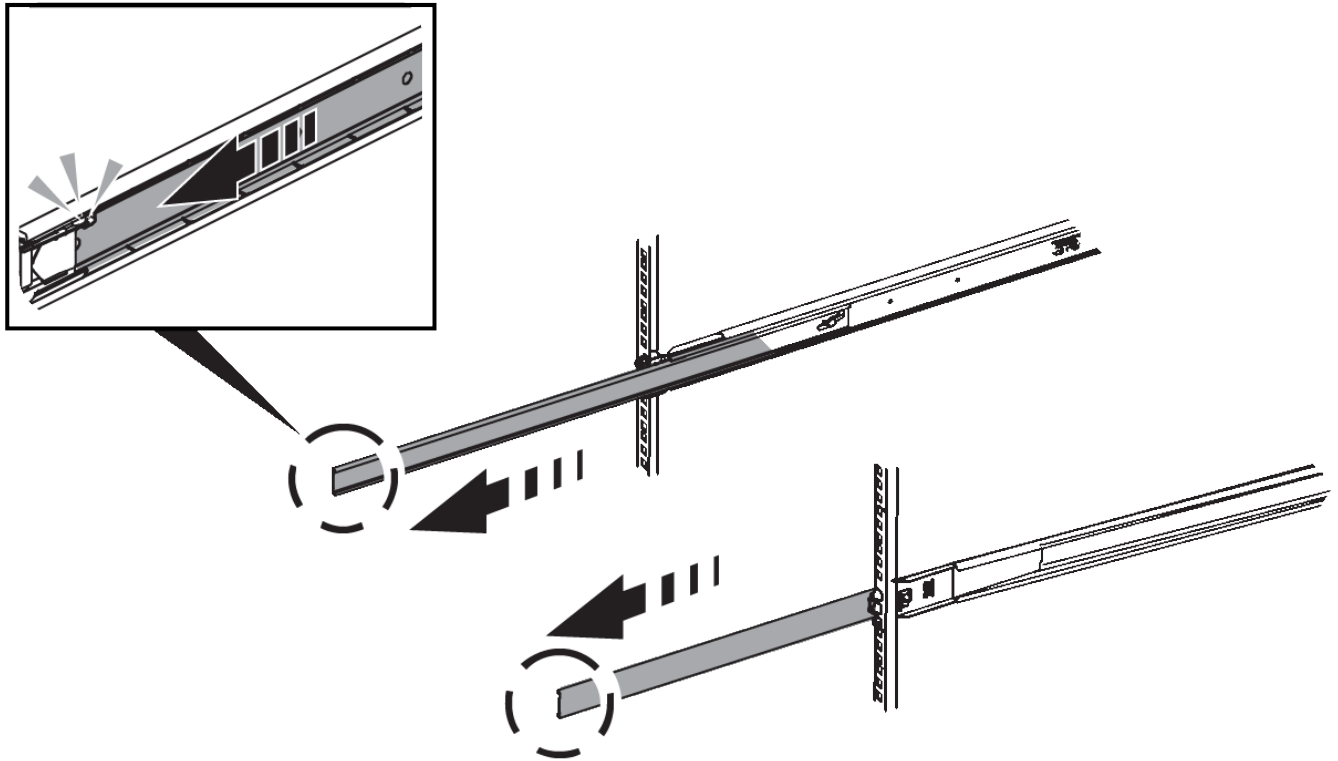
You install a set of rails for the appliance in your cabinet or rack, and then slide the appliance onto the rails.

#### Before you begin

- You have reviewed the Safety Notices document included in the box, and understand the precautions for moving and installing hardware.
- You have the instructions packaged with the rail kit.

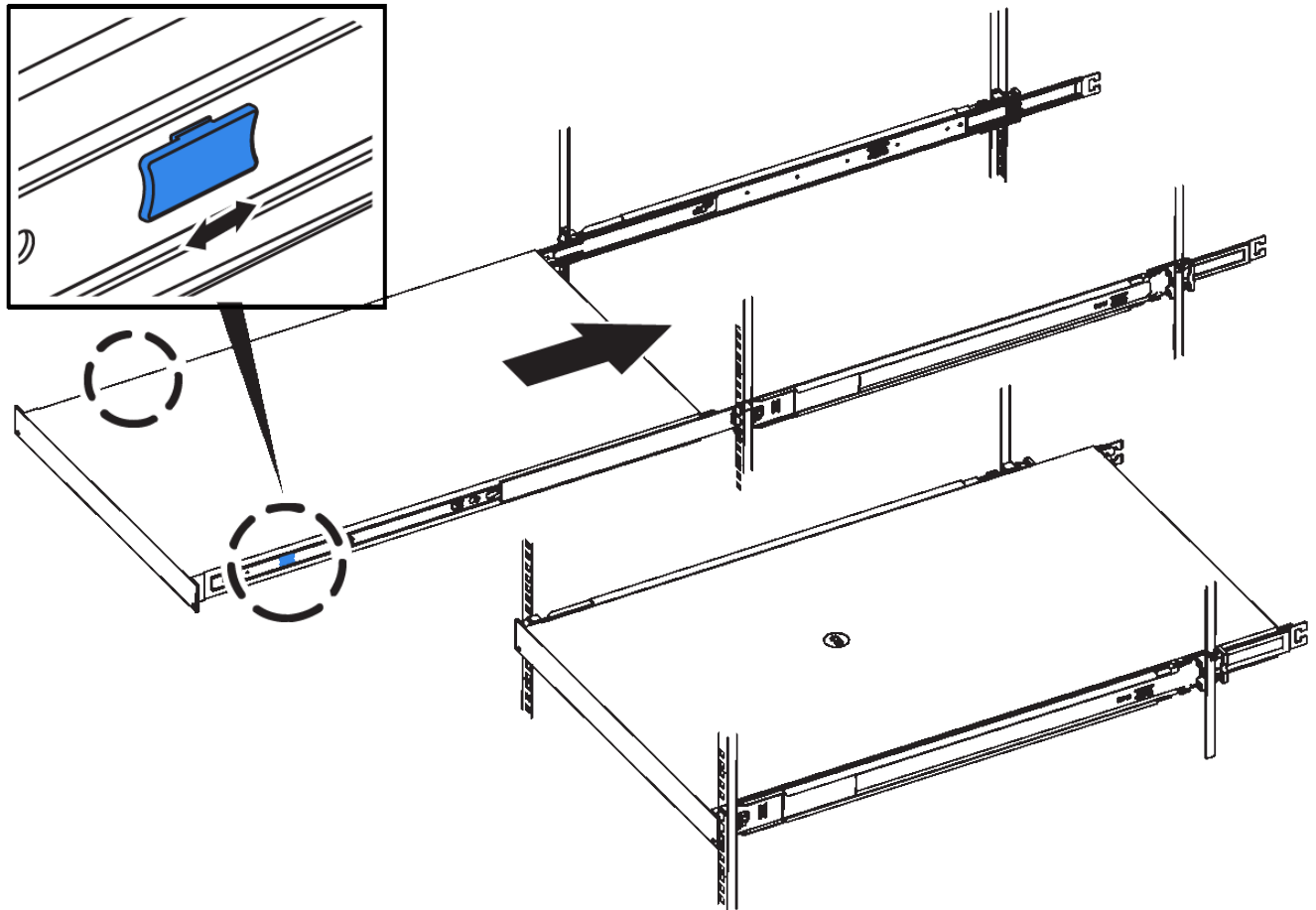
#### Steps

1. Carefully follow the instructions for the rail kit to install the rails in your cabinet or rack.
2. On the two rails installed in the cabinet or rack, extend the movable parts of the rails until you hear a click.



3. Insert the appliance into the rails.
4. Slide the appliance into the cabinet or rack.

When you can't move the appliance any further, pull the blue latches on both sides of the chassis to slide the appliance all the way in.



5. Tighten the captive screws on the appliance front panel to secure the appliance in the rack.



Don't attach the front bezel until after you power on the appliance.

## SG6000

### Install into cabinet or rack (SG6000)

For the SG6060 and SGF6024, you install rails in your cabinet or rack and slide the controller shelf, any expansion shelves, and the compute controller onto the rails. For the SG6060, don't install the drives in each shelf until the shelves are installed.

Model	Install	For information
SG6060	60-drive controller shelf and any 60-drive expansion shelves	<a href="#">Install 60-drive shelves</a>
SG6060	60 drives into each shelf	<a href="#">Install drives</a>

Model	Install	For information
SGF6024	24-drive controller shelf	<a href="#">Install 24-drive shelves</a>
SG6060 and SGF6024	SG6000-CN compute controller	<a href="#">Install SG6000-CN controller</a>

### Install 60-drive shelves (SG6060)

You install a set of rails for the E2860 controller shelf in your cabinet or rack, and then slide the controller shelf onto the rails. If you are installing 60-drive expansion shelves, the same procedure applies.

#### Before you begin

- You have reviewed the Safety Notices document included in the box, and understand the precautions for moving and installing hardware.
- You have the instructions packaged with the rail kit.



Each 60-drive shelf weighs approximately 132 lb (60 kg) without drives installed. Four people or a mechanized lift are required to safely move the shelf.



To avoid damaging the hardware, never move the shelf if drives are installed. You must remove all drives before moving the shelf.



When installing the E2860 controller shelf or optional expansion shelves, install hardware from the bottom to the top of the rack or cabinet to prevent the equipment from tipping over. To ensure that the heaviest equipment is at the bottom of the cabinet or rack, install the SG6000-CN controller above the E2860 controller shelf and expansion shelves.



Before committing to the installation, verify that the 0.5m optic cables shipped with the appliance, or cables that you supply, are long enough for the planned layout.

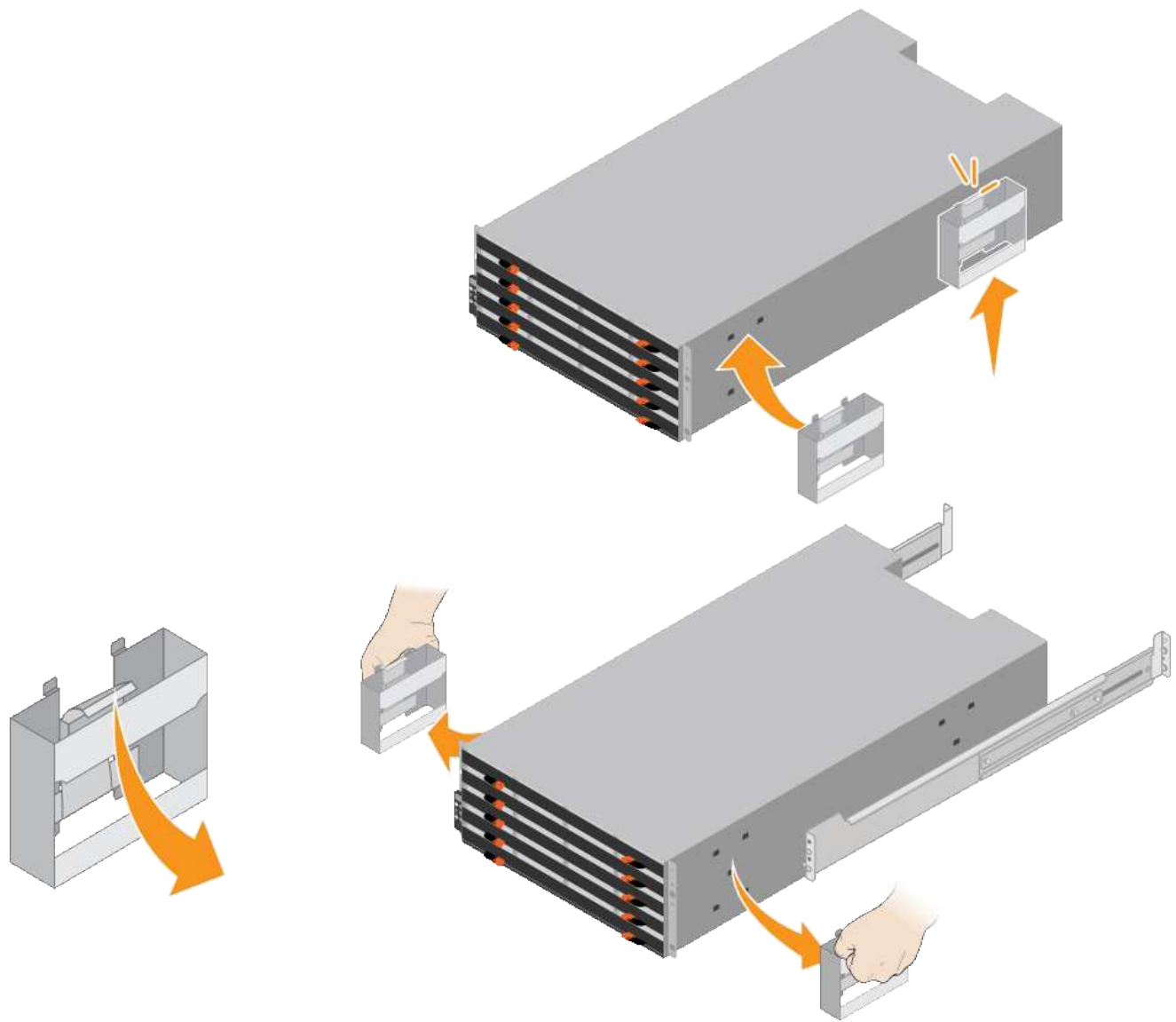
#### Steps

1. Carefully follow the instructions for the rail kit to install the rails in your cabinet or rack.

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

2. Remove the outer packing box for the appliance. Then, fold down the flaps on the inner box.
3. If you are lifting the appliance by hand, attach the four handles to the sides of the chassis.

Push up on each handle until it clicks into place.



4. Place the back of the shelf (the end with the connectors) on the rails.
5. Supporting the shelf from the bottom, slide it into the cabinet. If you are using the handles, use the thumb latches to detach one handle at a time as you slide the shelf in.

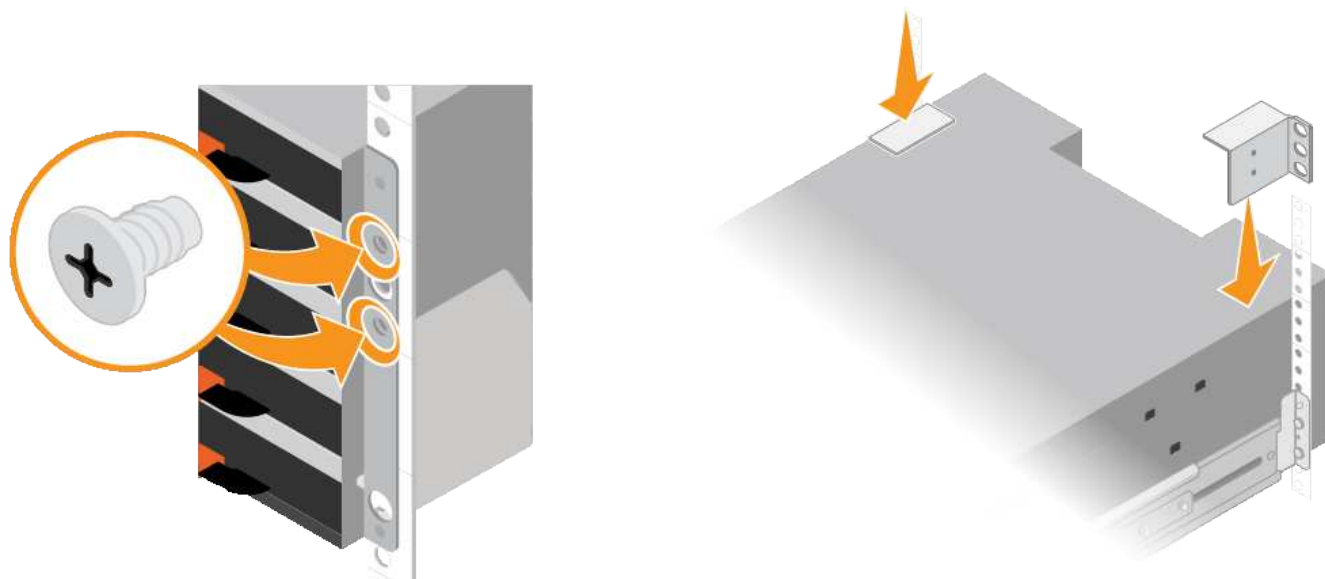
To remove the handles, pull back on the release latch, push down, then pull away from the shelf.

6. Secure the shelf to the front of the cabinet.

Insert screws into the first and third holes from the top of the shelf on both sides.

7. Secure the shelf to the rear of the cabinet.

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.



8. Repeat these steps for any expansion shelves.

### Install drives (SG6060)

After installing the 60-drive shelf into a cabinet or rack, install all 60 drives into the shelf. The shipment for the E2860 controller shelf includes two SSD drives, which you should install in the top drawer of the controller shelf. Each optional expansion shelf includes 60 HDD drives and no SSD drives.

### Before you begin

You have installed the E2860 controller shelf or optional expansion shelves (one or two) in the cabinet or rack.



To avoid damaging the hardware, never move the shelf if drives are installed. You must remove all drives before moving the shelf.

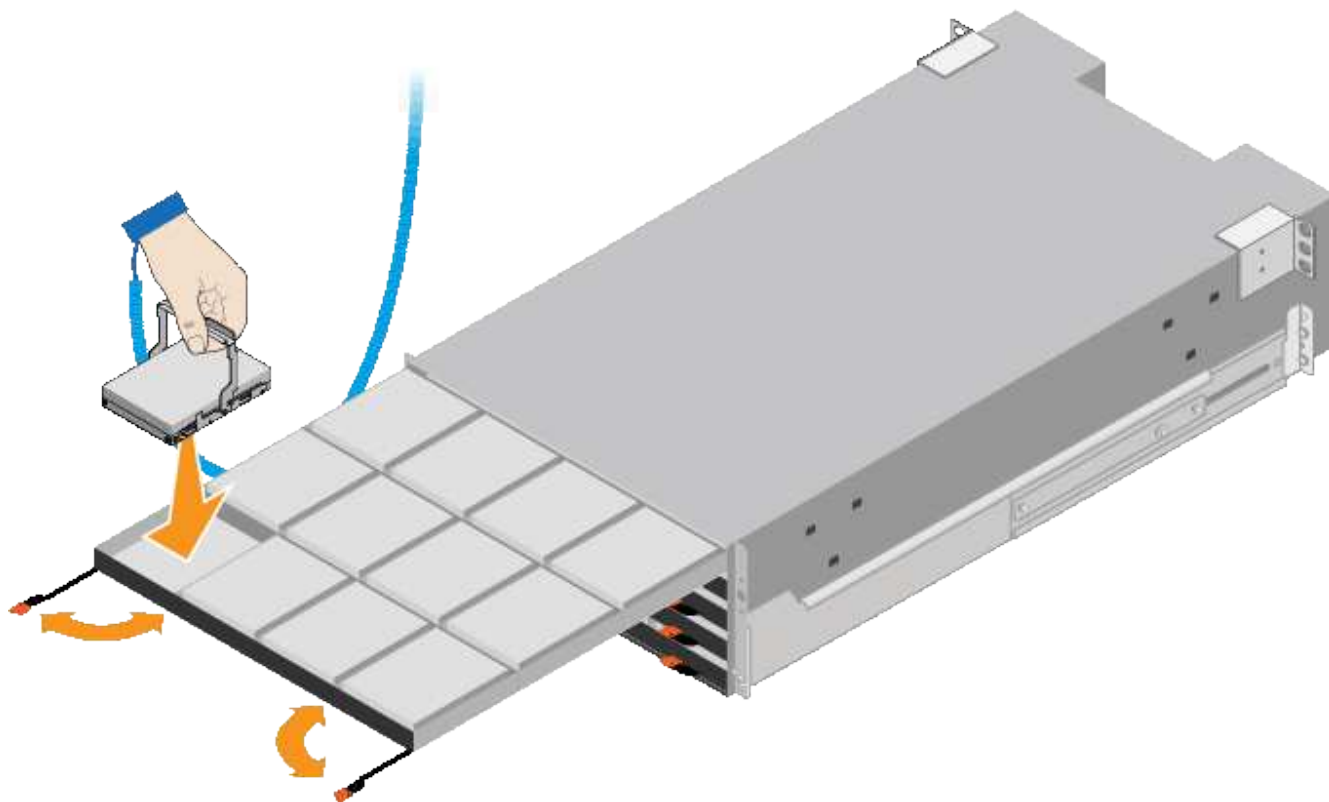
### Steps

1. Wrap the strap end of the ESD wristband around your wrist, and secure the clip end to a metal ground to prevent static discharge.
2. Remove the drives from their packaging.
3. Release the levers on the top drive drawer, and slide the drawer out using the levers.
4. Locate the two SSD drives.



Expansion shelves don't use SSD drives.

5. Raise each drive handle to a vertical position.
6. Install the two SSD drives in slots 0 and 1 (the first two slots along the lefthand side of the drawer).
7. Gently position each drive into its slot, and lower the raised drive handle until it clicks into place.



8. Install 10 HDD drives into the top drawer.

9. Slide the drawer back in by pushing on the center and closing both levers gently.



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.

10. Repeat these steps to install HDD drives into the other four drawers.



You must install all 60 drives to ensure correct operation.

11. Attach the front bezel to the shelf.

12. If you have expansion shelves, repeat these steps to install 12 HDD drives into each drawer of each expansion shelf.

13. Proceed to the instructions for installing the SG6000-CN into a cabinet or rack.

#### Install 24-drive shelves (SGF6024)

You install a set of rails for the EF570 controller shelf in your cabinet or rack, and then slide the array onto the rails.

#### Before you begin

- You have reviewed the Safety Notices document included in the box, and understand the precautions for moving and installing hardware.
- You have the instructions packaged with the rail kit.

#### Steps



1. Carefully follow the instructions for the rail kit to install the rails in your cabinet or rack.

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

2. Remove the outer packing box for the appliance. Then, fold down the flaps on the inner box.
3. Place the back of the shelf (the end with the connectors) on the rails.



A fully loaded shelf weighs approximately 52 lb (24 kg). Two people are required to safely move the enclosure.

4. Carefully slide the enclosure all the way onto the rails.



You might need to adjust the rails to ensure that the enclosure slides all the way onto the rails.

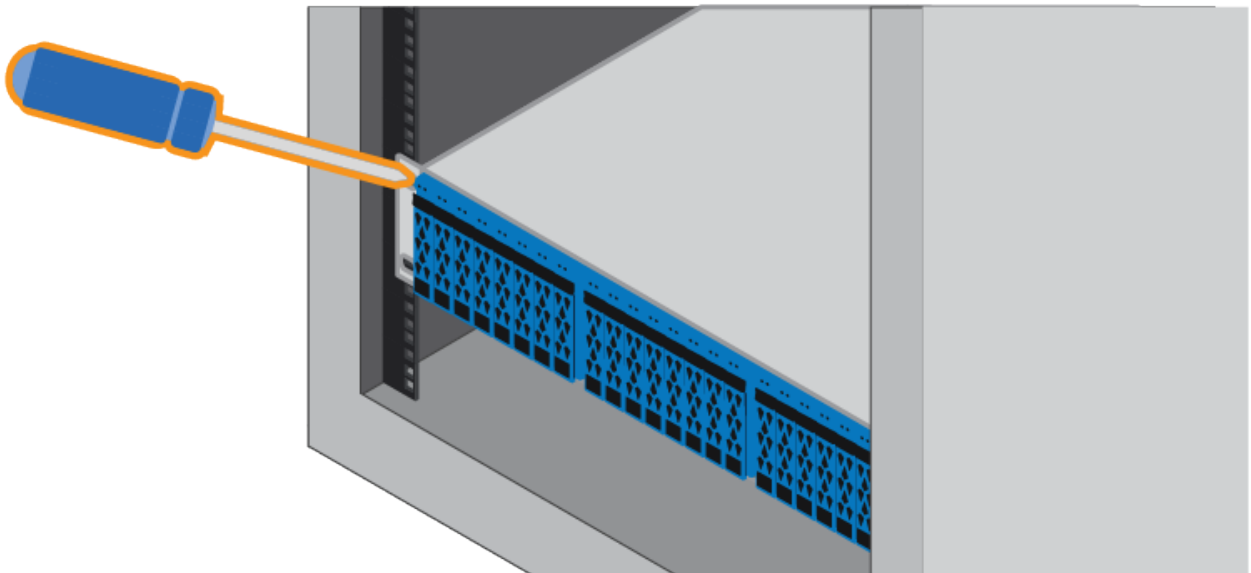


Don't place additional equipment on the rails after you finish installing the enclosure. The rails aren't designed to bear additional weight.

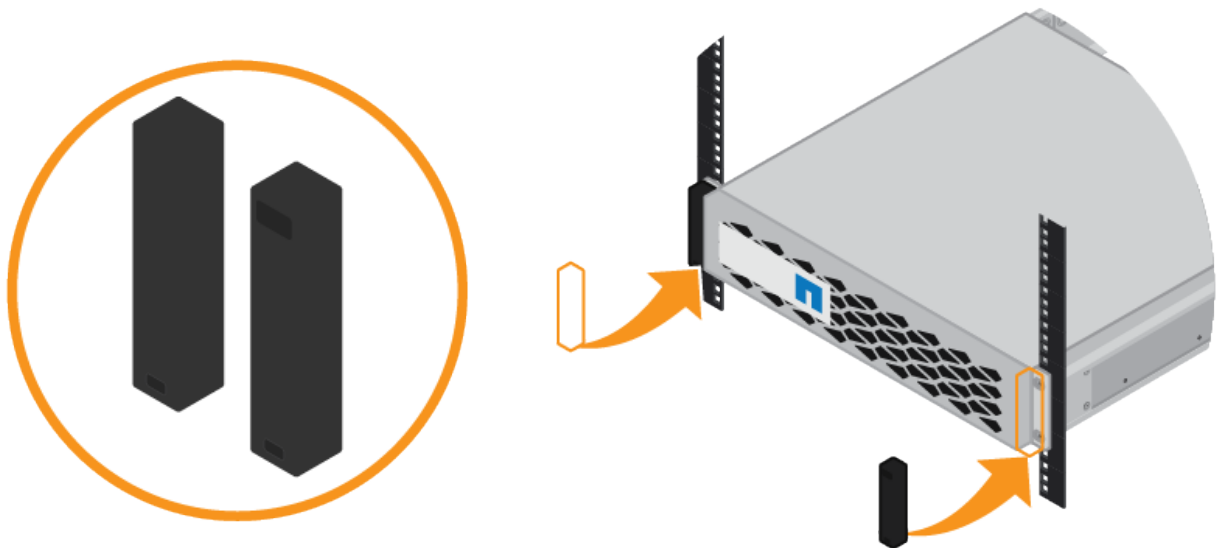


If applicable, you might need to remove the shelf end caps or the system bezel to secure the enclosure to the rack post; if so, you need to replace the end caps or bezel when you are done.

5. Secure the enclosure to the front of the cabinet or rack and rails by inserting two M5 screws through the mounting brackets (preinstalled on either side of the front of the enclosure), the holes on the rack or system cabinet, and the holes on the front of rails.



6. Secure the enclosure to the back of the rails by inserting two M5 screws through the brackets at the enclosure and the rail kit bracket.
7. If applicable, replace the shelf end caps or the system bezel.



#### Install SG6000-CN controller (SG6060 and SG6024)

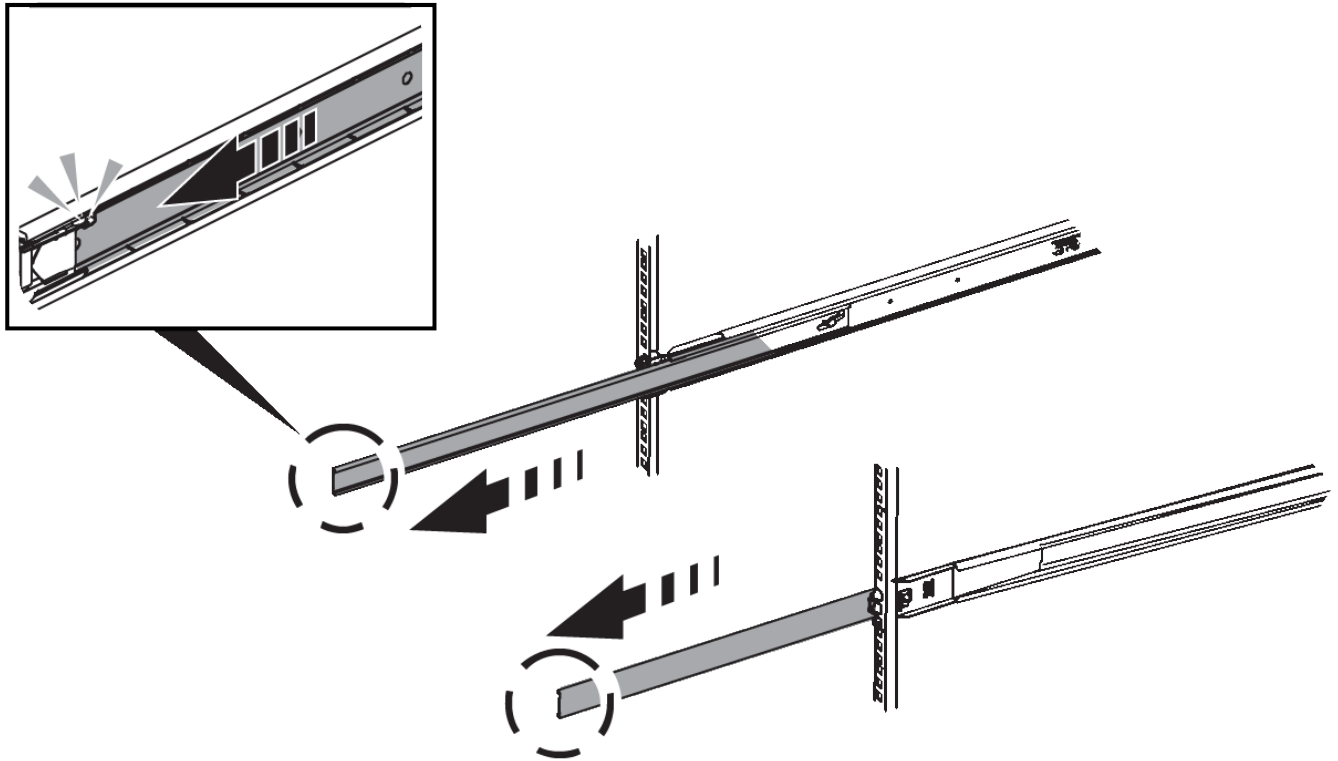
You install a set of rails for the SG6000-CN controller in your cabinet or rack, and then slide the controller onto the rails.

##### Before you begin

- You have reviewed the Safety Notices document included in the box, and understand the precautions for moving and installing hardware.
- You have the instructions packaged with the rail kit.
- You have installed the E2860 controller shelf and drives or the EF570 controller shelf.

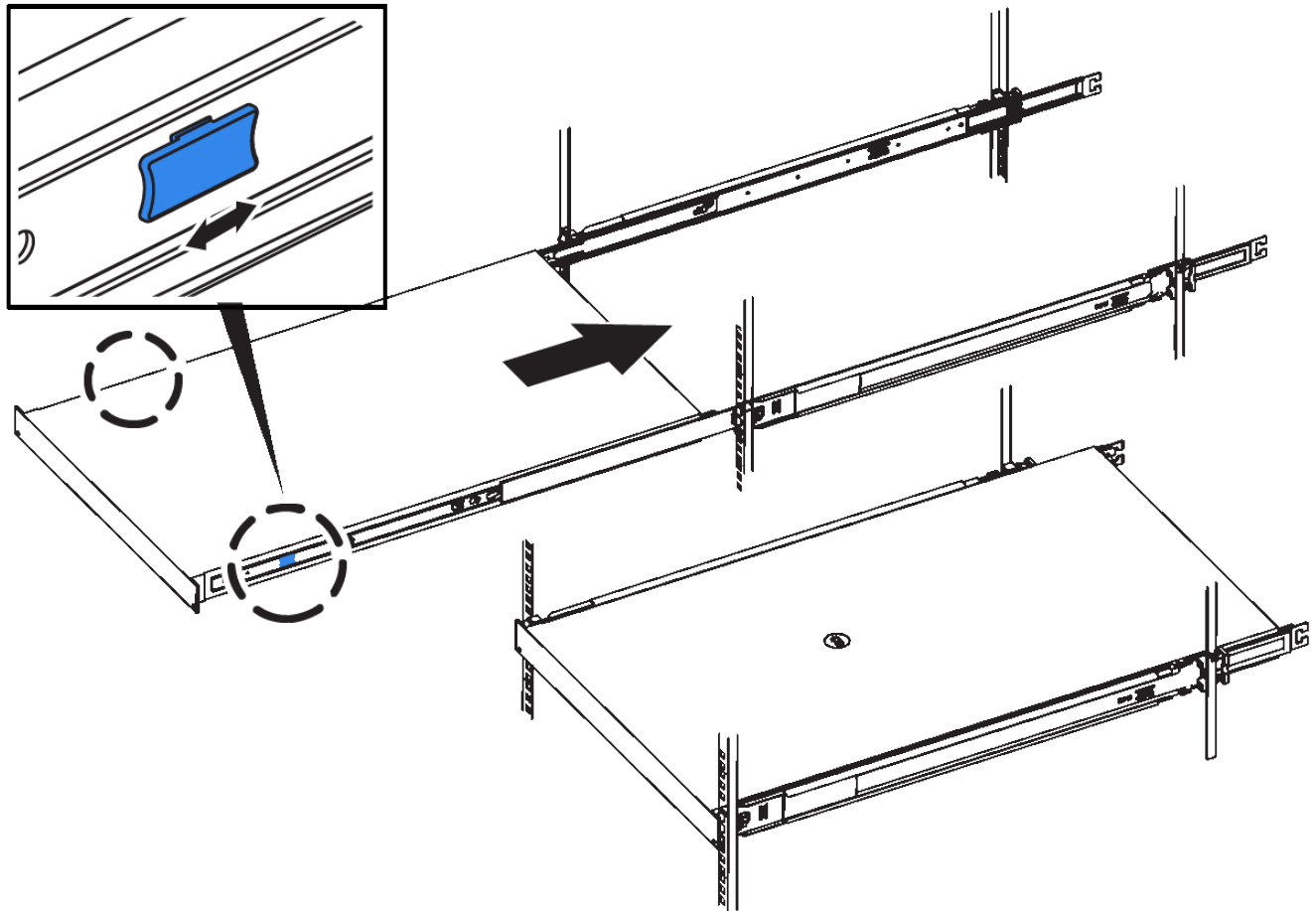
##### Steps

1. Carefully follow the instructions for the rail kit to install the rails in your cabinet or rack.
2. On the two rails installed in the cabinet or rack, extend the movable parts of the rails until you hear a click.



3. Insert the SG6000-CN controller into the rails.
4. Slide the controller into the cabinet or rack.

When you can't move the controller any further, pull the blue latches on both sides of the chassis to slide the controller all the way in.



Don't attach the front bezel until after you power on the controller.

5. Tighten the captive screws on the controller front panel to secure the controller in the rack.



### Install into cabinet or rack (SG5700)

You install a set of rails in your cabinet or rack and then slide the appliance onto the rails. If you have an SG5760, install the drives after installing the appliance.

#### Before you begin

- You have reviewed the Safety Notices document included in the box, and understand the precautions for moving and installing hardware.
- You have the instructions packaged with the rail kit.

#### Install SG5712

Follow these steps to install an SG5712 appliance into a rack or cabinet.



The SG5712 weighs approximately 64 lb (29 kg) when fully loaded with drives. Two people or a mechanized lift are required to safely move the SG5712.



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

### Steps

1. Follow the instructions for the rail kit to install the rails.
2. Place the back of the appliance (the end with the connectors) on the rails.
3. Carefully slide the appliance all the way back into the cabinet or rack.
4. Secure the appliance to the cabinet or rack as directed in the rail kit instructions.
5. Attach the bezel to the front.

### Install SG5760

Follow these steps to install an SG5760 appliance and any expansion shelves into a rack or cabinet.



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



The SG5760 weighs approximately 132 lb (60 kg) with no drives installed. Four people or a mechanized lift are required to safely move an empty SG5760.



To avoid damaging the hardware, never move an SG5760 if drives are installed. You must remove all drives before moving the shelf.

### Steps

1. Follow the instructions for the rail kit to install the rails in your cabinet or rack.
2. Prepare to move the appliance:
  - a. Remove the outer packing box.
  - b. Fold down the flaps on the inner box.
  - c. If you are lifting the SG5760 by hand, attach the four handles to the sides of the chassis.

You remove these handles as you slide the appliance onto the rails.

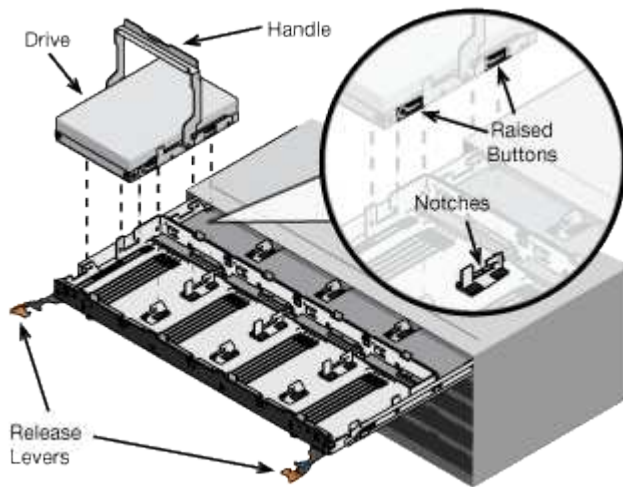
3. If your cabinet has square hole, install the cage nuts so that you can secure the front and rear of the shelf with screws.
4. Place the back of the appliance (the end with the connectors) on the rails.
5. Supporting the appliance from the bottom, slide it into the rack or cabinet.

Use the thumb latches to detach the handles as you slide the appliance in.

6. Secure the appliance to the front of the rack by inserting two screws in the first and third holes (counting down from the top) on each side.
7. Secure the appliance to the rear of the rack or cabinet with the brackets.
8. Install 12 drives in each of the five drive drawers.

You must install all 60 drives to ensure correct operation.

- a. Put on the ESD wristband, and remove the drives from their packaging.
- b. Release the levers on the top drive drawer, and slide the drawer out using the levers.
- c. Raise the drive handle to vertical, and align the buttons on the drive with the notches on the drawer.



- d. Pressing gently on the top of the drive, rotate the drive handle down until the drive snaps into place.
- e. After installing the first 12 drives, slide the drawer back in by pushing on the center and closing both levers gently.
- f. Repeat these steps for the other four drawers.

9. Attach the front bezel.

### **Install into cabinet or rack (SG100 and SG1000)**

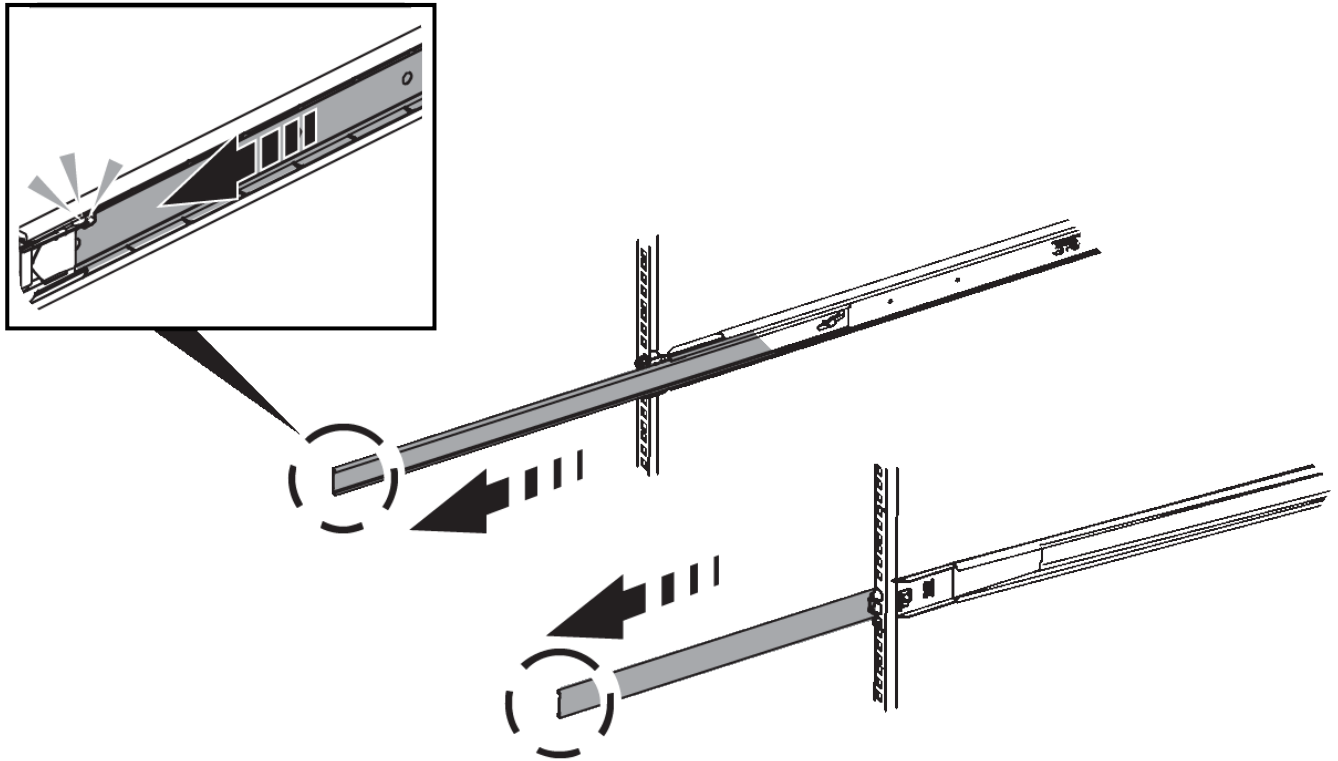
You install a set of rails for the appliance in your cabinet or rack, and then slide the appliance onto the rails.

#### **Before you begin**

- You have reviewed the Safety Notices document included in the box, and understand the precautions for moving and installing hardware.
- You have the instructions packaged with the rail kit.

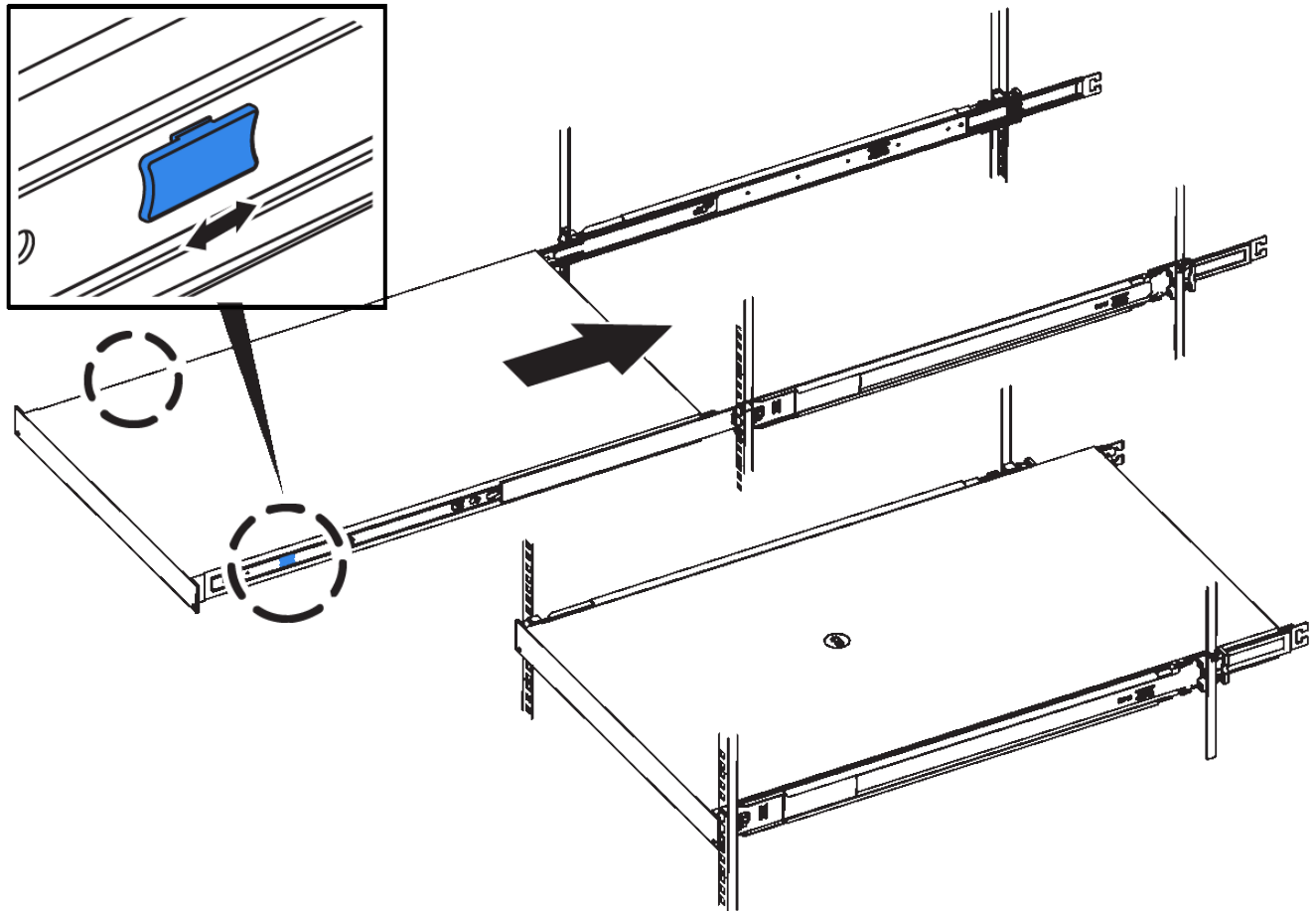
#### **Steps**

1. Carefully follow the instructions for the rail kit to install the rails in your cabinet or rack.
2. On the two rails installed in the cabinet or rack, extend the movable parts of the rails until you hear a click.



3. Insert the appliance into the rails.
4. Slide the appliance into the cabinet or rack.

When you can't move the appliance any further, pull the blue latches on both sides of the chassis to slide the appliance all the way in.



Don't attach the front bezel until after you power on the appliance.

## Cable appliance

### Cable appliance (SGF6112)

You connect the management port on the appliance to the service laptop and connect the network ports on the appliance to the Grid Network and optional Client Network for StorageGRID.

#### Before you begin

- You have an RJ-45 Ethernet cable for connecting the management port.
- You have one of the following options for the network ports. These items aren't provided with the appliance.
  - One to four TwinAx cables for connecting the four network ports.
  - One to four SFP+ or SFP28 transceivers if you plan to use optical cables for the ports.

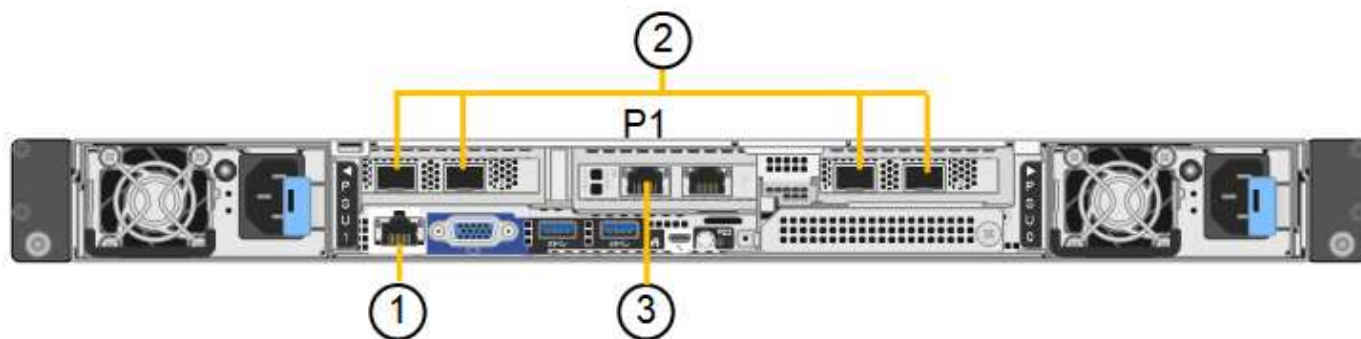


**Risk of exposure to laser radiation** — Don't disassemble or remove any part of an SFP transceiver. You might be exposed to laser radiation.

#### About this task

The following figures show the ports on the back of the SGF6112.





Callout	Port	Type of port	Use
1	BMC management port on the appliance	1-GbE (RJ-45)	Connects to the network where you access the BMC interface.
2	Four 10/25-GbE network ports on the appliance		Connect to the Grid Network and the Client Network for StorageGRID.
3	Admin Network port on the appliance (labeled P1 in the figure)	1-GbE (RJ-45) <b>Important:</b> This port operates only at 1/10-GbE (RJ-45) and does not support 100-megabit speeds.	Connects the appliance to the Admin Network for StorageGRID.
	Rightmost RJ-45 port on the appliance	1-GbE (RJ-45) <b>Important:</b> This port operates only at 1/10-GbE (RJ-45) and does not support 100-megabit speeds.	<ul style="list-style-type: none"> <li>• Can be bonded with management port 1 if you want a redundant connection to the Admin Network.</li> <li>• Can be left disconnected and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, can be used to connect the appliance to a service laptop if DHCP-assigned IP addresses aren't available.</li> </ul>

## Steps

1. Connect the BMC management port on the appliance to the management network, using an Ethernet cable.

Although this connection is optional, it is recommended to facilitate support.

2. Connect the network ports on the appliance to the appropriate network switches, using TwinAx cables or optical cables and transceivers.

All four network ports must use the same link speed.



SGF6112 link speed (GbE)	Required equipment
10	SFP+ transceiver
25	SFP28 transceiver

- If you plan to use Fixed port bond mode (default), connect the ports to the StorageGRID Grid and Client Networks, as shown in the table.

Port	Connects to...
Port 1	Client Network (optional)
Port 2	Grid Network
Port 3	Client Network (optional)
Port 4	Grid Network

- If you plan to use the Aggregate port bond mode, connect one or more of the network ports to one or more switches. You should connect at least two of the four ports to avoid having a single point of failure. If you use more than one switch for a single LACP bond, the switches must support MLAG or equivalent.
3. If you plan to use the Admin Network for StorageGRID, connect the Admin Network port on the appliance to the Admin Network, using an Ethernet cable.

### Cable appliance (SG6000)

You connect the storage controllers to the SG6000-CN controller, connect the management ports on all three controllers, and connect the network ports on the SG6000-CN controller to the Grid Network and optional Client Network for StorageGRID.

#### Before you begin

- You have the four optical cables provided with the appliance for connecting the two storage controllers to the SG6000-CN controller.
- You have RJ-45 Ethernet cables (four minimum) for connecting the management ports.
- You have one of the following options for the network ports. These items aren't provided with the appliance.
  - One to four TwinAx cables for connecting the four network ports.
  - One to four SFP+ or SFP28 transceivers if you plan to use optical cables for the ports.



**Risk of exposure to laser radiation** — Don't disassemble or remove any part of an SFP transceiver. You might be exposed to laser radiation.

#### About this task

The following figures show the three controllers in the SG6060 and SG6060X appliances, with the SG6000-CN compute controller on the top and the two E2800 storage controllers on the bottom. The SG6060 uses E2800A controllers, and the SG6060X uses E2800B controllers.

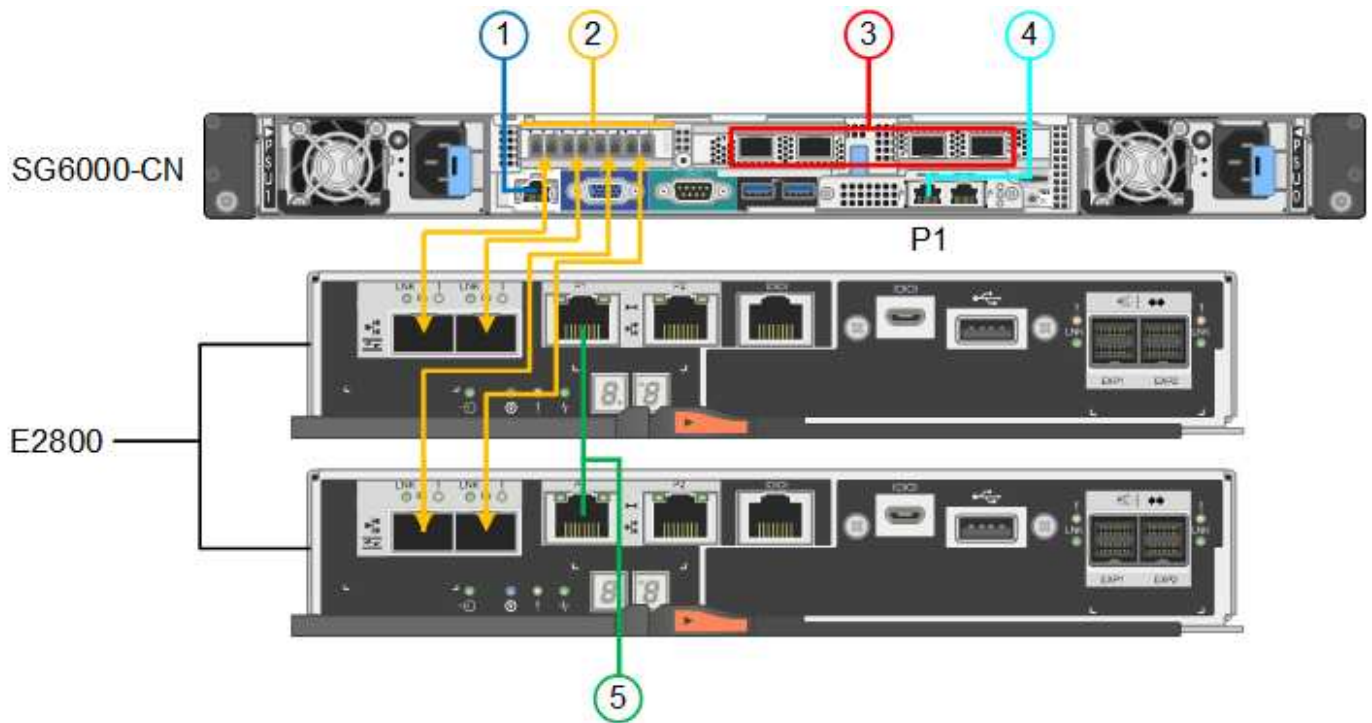


Both versions of the E2800 controller have identical specifications and function except for the location of the interconnect ports.

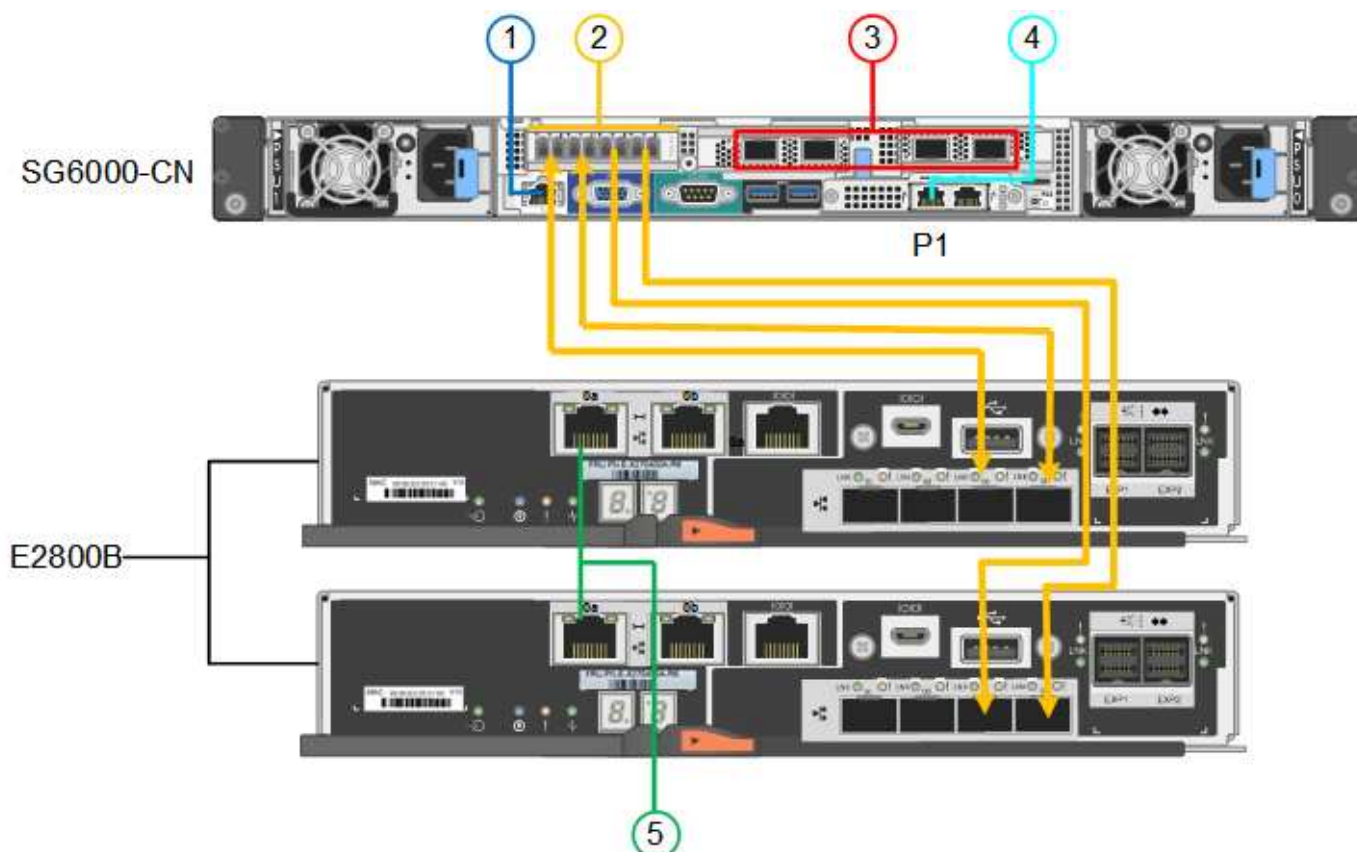


Don't use an E2800A and E2800B controller in the same appliance.

SG6060 connections:

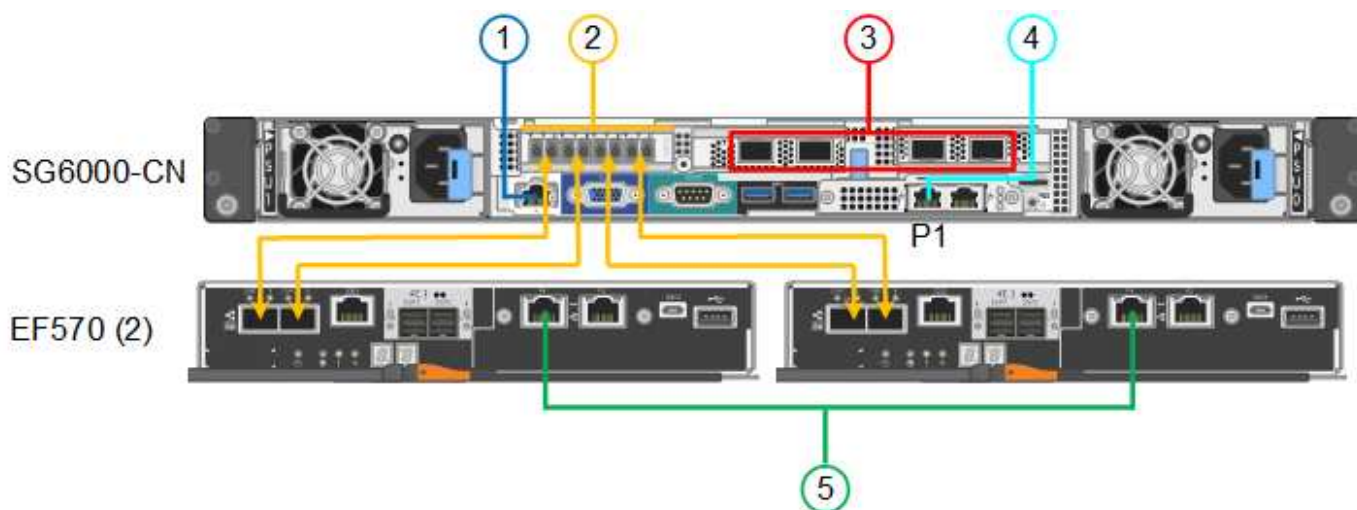


SG6060X connections:



The following figure shows the three controllers in the SGF6024 appliance, with the SG6000-CN compute controller on the top and the two EF570 storage controllers side by side below the compute controller.

SGF6024 connections:



Callout	Port	Type of port	Use
1	BMC management port on the SG6000-CN controller	1-GbE (RJ-45)	Connects to the network where you access the BMC interface.

Callout	Port	Type of port	Use
2	FC connection ports: <ul style="list-style-type: none"> <li>• 4 on the SG6000-CN controller</li> <li>• 2 on each storage controller</li> </ul>	16-Gb/s FC optical SFP+	Connect each storage controller to the SG6000-CN controller.
3	Four network ports on the SG6000-CN controller	10/25-GbE	Connect to the Grid Network and the Client Network for StorageGRID.
4	Admin Network port on the SG6000-CN controller (labeled P1 in the figure)	1-GbE (RJ-45)  <b>Important:</b> This port operates only at 1000 baseT/full and does not support 10- or 100-megabit speeds.	Connects the SG6000-CN controller to the Admin Network for StorageGRID.
	Rightmost RJ-45 port on the SG6000-CN controller	1-GbE (RJ-45)  <b>Important:</b> This port operates only at 1000 baseT/full and does not support 10- or 100-megabit speeds.	<ul style="list-style-type: none"> <li>• Can be bonded with management port 1 if you want a redundant connection to the Admin Network.</li> <li>• Can be left unwired and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, can be used to connect the SG6000-CN controller to a service laptop if DHCP-assigned IP addresses aren't available.</li> </ul>
5	Management port 1 on each storage controller	1-GbE (RJ-45)	Connects to the network where you access SANtricity System Manager.
	Management port 2 on each storage controller	1-GbE (RJ-45)	Reserved for technical support.

## Steps

1. Connect the BMC management port on the SG6000-CN controller to the management network, using an Ethernet cable.

Although this connection is optional, it is recommended to facilitate support.

2. Connect the two FC ports on each storage controller to the FC ports on the SG6000-CN controller, using four optical cables and four SFP+ transceivers for the storage controllers.
3. Connect the network ports on the SG6000-CN controller to the appropriate network switches, using TwinAx cables or optical cables and SFP+ or SFP28 transceivers.



The four network ports must use the same link speed. Install SFP+ transceivers if you plan to use 10-GbE link speeds. Install SFP28 transceivers if you plan to use 25-GbE link speeds.

- If you plan to use Fixed port bond mode (default), connect the ports to the StorageGRID Grid and Client Networks, as shown in the table.

Port	Connects to...
Port 1	Client Network (optional)
Port 2	Grid Network
Port 3	Client Network (optional)
Port 4	Grid Network

- If you plan to use the Aggregate port bond mode, connect one or more of the network ports to one or more switches. You should connect at least two of the four ports to avoid having a single point of failure. If you use more than one switch for a single LACP bond, the switches must support MLAG or equivalent.
4. If you plan to use the Admin Network for StorageGRID, connect the Admin Network port on the SG6000-CN controller to the Admin Network, using an Ethernet cable.
  5. If you plan to use the management network for SANtricity System Manager, connect management port 1 (P1) on each storage controller (the RJ-45 port on the left) to the management network for SANtricity System Manager, using an Ethernet cable.

Don't use management port 2 (P2) on the storage controllers (the RJ-45 port on the right). This port is reserved for technical support.

## Related information

[Port bond modes \(SG6000-CN controller\)](#)

## Cable appliance (SG5700)

You connect the two controllers to each other, connect the management ports on each controller, and connect the 10/25-GbE ports on the E5700SG controller to the Grid Network and optional Client Network for StorageGRID.

## Before you begin

- You have unpacked the following items, which are included with the appliance:
  - Two power cords.
  - Two optical cables for the FC interconnect ports on the controllers.
  - Eight SFP+ transceivers, which support either 10-GbE or 16-Gbps FC. The transceivers can be used with the two interconnect ports on both controllers and with the four 10/25-GbE network ports on the E5700SG controller, assuming you want the network ports to use a 10-GbE link speed.
- You have obtained the following items, which aren't included with the appliance:

- One to four optical cables for the 10/25-GbE ports you plan to use.
- One to four SFP28 transceivers, if you plan to use 25-GbE link speed.
- Ethernet cables for connecting the management ports.

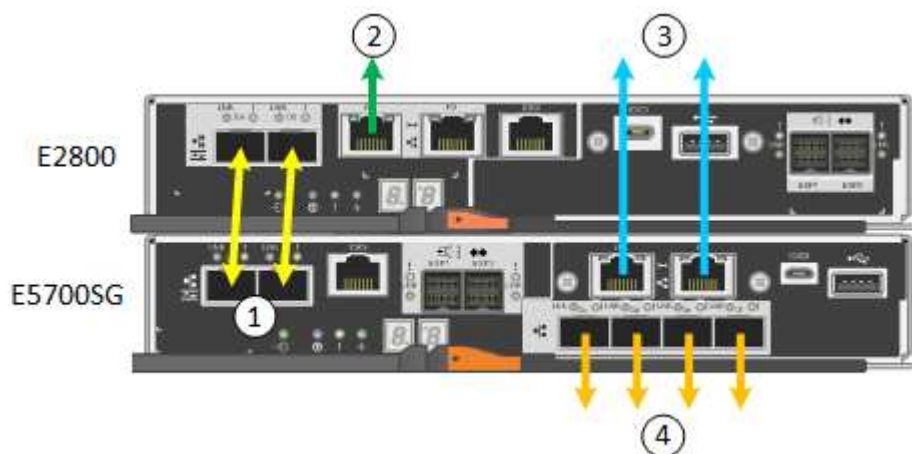


**Risk of exposure to laser radiation** — Don't disassemble or remove any part of an SFP transceiver. You might be exposed to laser radiation.

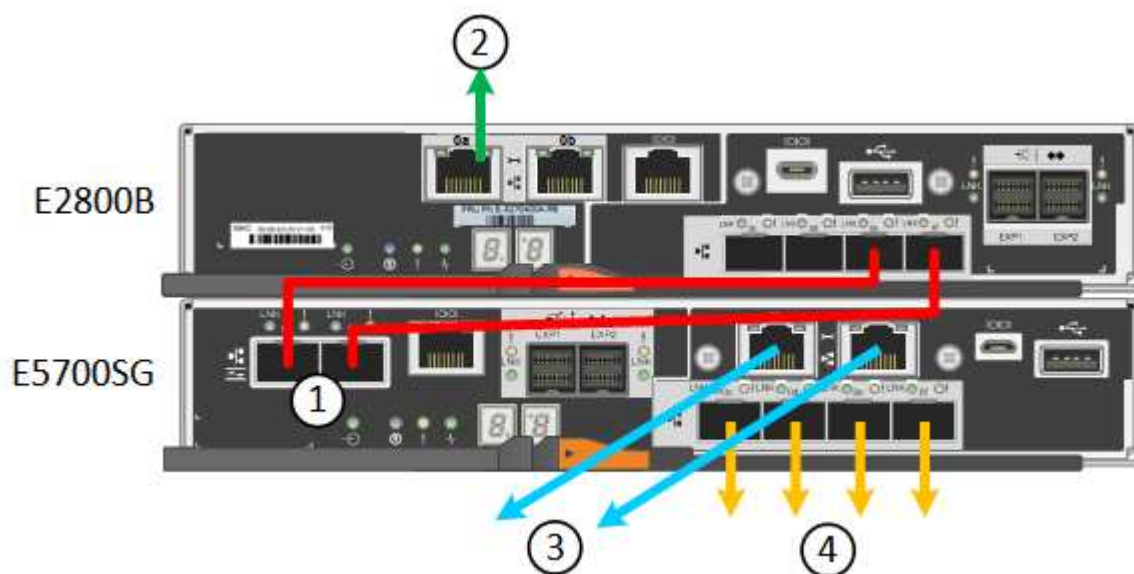
### About this task

The figures show the two controllers in the SG5760 and SG5760X, with the E2800 series storage controller on the top and the E5700SG controller on the bottom. In the SG5712 and SG5712X, the E2800 series storage controller is to the left of the E5700SG controller when viewed from the back.

SG5760 connections:



SG5760X connections:





Callout	Port	Type of port	Use
1	Two interconnect ports on each controller	16Gb/s FC optical SFP+	Connect the two controllers to each other.
2	Management port 1 on the E2800 series controller	1-GbE (RJ-45)	Connects to the network where you access SANtricity System Manager. You can use the Admin Network for StorageGRID or an independent management network.
2	Management port 2 on the E2800 series controller	1-GbE (RJ-45)	Reserved for technical support.
3	Management port 1 on the E5700SG controller	1-GbE (RJ-45)	Connects the E5700SG controller to the Admin Network for StorageGRID.
3	Management port 2 on the E5700SG controller	1-GbE (RJ-45)	<ul style="list-style-type: none"> <li>• Can be bonded with management port 1 if you want a redundant connection to the Admin Network.</li> <li>• Can be left unwired and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, can be used to connect the E5700SG controller to a service laptop if DHCP-assigned IP addresses aren't available.</li> </ul>
4	10/25-GbE ports 1-4 on the E5700SG controller	10-GbE or 25-GbE  <b>Note:</b> The SFP+ transceivers included with the appliance support 10-GbE link speeds. If you want to use 25-GbE link speeds for the four network ports, you must provide SFP28 transceivers.	Connect to the Grid Network and the Client Network for StorageGRID. See <a href="#">Port bond modes (E5700SG controller)</a> .

## Steps

1. Connect the E2800 controller to the E5700SG controller, using two optical cables and four of the eight SFP+ transceivers.



Connect this port...	To this port...
Interconnect port 1 on the E2800 controller	Interconnect port 1 on the E5700SG controller
Interconnect port 2 on the E2800 controller	Interconnect port 2 on the E5700SG controller

- If you plan to use SANtricity System Manager, connect management port 1 (P1) on the E2800 controller (the RJ-45 port on the left) to the management network for SANtricity System Manager, using an Ethernet cable.

Don't use management port 2 (P2) on the E2800 controller (the RJ-45 port on the right). This port is reserved for technical support.

- If you plan to use the Admin Network for StorageGRID, connect management port 1 on the E5700SG controller (the RJ-45 port on the left) to the Admin Network, using an Ethernet cable.

If you plan to use active-backup network bond mode for the Admin Network, connect management port 2 on the E5700SG controller (the RJ-45 port on the right) to the Admin Network, using an Ethernet cable.

- Connect the 10/25-GbE ports on the E5700SG controller to the appropriate network switches, using optical cables and SFP+ or SFP28 transceivers.



All ports must use the same link speed. Install SFP+ transceivers if you plan to use 10-GbE link speeds. Install SFP28 transceivers if you plan to use 25-GbE link speeds.

- If you plan to use Fixed port bond mode (default), connect the ports to the StorageGRID Grid and Client Networks, as shown in the table.

Port	Connects to...
Port 1	Client Network (optional)
Port 2	Grid Network
Port 3	Client Network (optional)
Port 4	Grid Network

- If you plan to use the Aggregate port bond mode, connect one or more of the network ports to one or more switches. You should connect at least two of the four ports to avoid having a single point of failure. If you use more than one switch for a single LACP bond, the switches must support MLAG or equivalent.

## Related information

[Access StorageGRID Appliance Installer](#)

## Cable appliance (SG100 and SG1000)

You must connect the management port on the appliance to the service laptop and connect the network ports on the appliance to the Grid Network and optional Client

# Network for StorageGRID.

## Before you begin

- You have an RJ-45 Ethernet cable for connecting the management port.
- You have one of the following options for the network ports. These items aren't provided with the appliance.
  - One to four TwinAx cables for connecting the four network ports.
  - For the SG100, one to four SFP+ or SFP28 transceivers if you plan to use optical cables for the ports.
  - For the SG1000, one to four QSFP+ or QSFP28 transceivers if you plan to use optical cables for the ports.

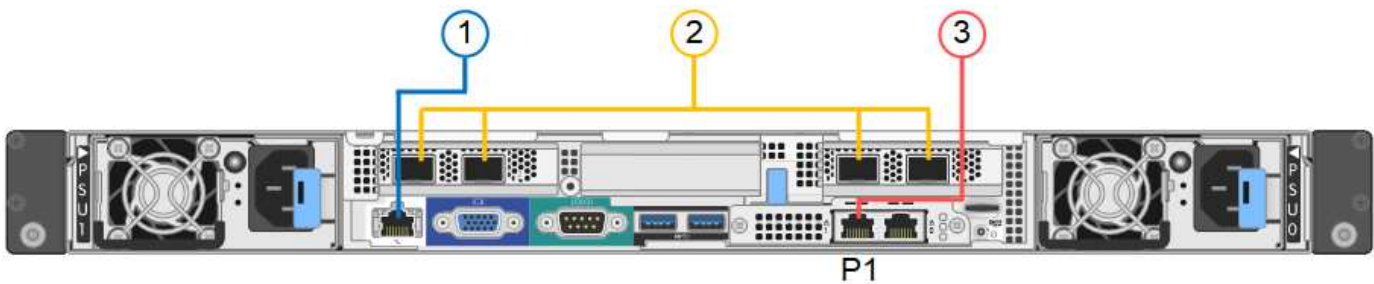


**Risk of exposure to laser radiation** — Don't disassemble or remove any part of a SFP or QSFP transceiver. You might be exposed to laser radiation.

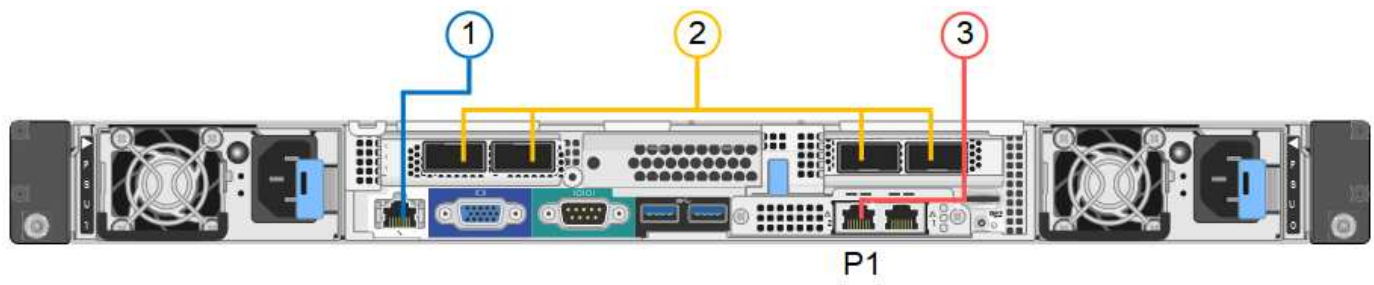
## About this task

The following figures show the ports on the back of the appliance.

SG100 port connections:



SG1000 port connections:



Callout	Port	Type of port	Use
1	BMC management port on the appliance	1-GbE (RJ-45)	Connects to the network where you access the BMC interface.
2	Four network ports on the appliance	<ul style="list-style-type: none"><li>• For the SG100: 10/25-GbE</li><li>• For the SG1000: 10/25/40/100-GbE</li></ul>	Connect to the Grid Network and the Client Network for StorageGRID.

Callout	Port	Type of port	Use
3	Admin Network port on the appliance (labeled P1 in the figures)	1-GbE (RJ-45)  <b>Important:</b> This port operates only at 1000 baseT/full and does not support 10- or 100-megabit speeds.	Connects the appliance to the Admin Network for StorageGRID.
	Rightmost RJ-45 port on the appliance	1-GbE (RJ-45)  <b>Important:</b> This port operates only at 1000 baseT/full and does not support 10- or 100-megabit speeds.	<ul style="list-style-type: none"> <li>• Can be bonded with management port 1 if you want a redundant connection to the Admin Network.</li> <li>• Can be left disconnected and available for temporary local access (IP 169.254.0.1).</li> <li>• During installation, can be used to connect the appliance to a service laptop if DHCP-assigned IP addresses aren't available.</li> </ul>

## Steps

1. Connect the BMC management port on the appliance to the management network, using an Ethernet cable.

Although this connection is optional, it is recommended to facilitate support.

2. Connect the network ports on the appliance to the appropriate network switches, using TwinAx cables or optical cables and transceivers.

All four network ports must use the same link speed. See the following table for the equipment required for your hardware and link speed.



SG100 link speed (GbE)	Required equipment
10	SFP+ transceiver
25	SFP28 transceiver
SG1000 link speed (GbE)	Required equipment
10	QSA and SFP+ transceiver
25	QSA and SFP28 transceiver
40	QSFP+ transceiver
100	QFSP28 transceiver

- If you plan to use Fixed port bond mode (default), connect the ports to the StorageGRID Grid and Client Networks, as shown in the table.

Port	Connects to...
Port 1	Client Network (optional)
Port 2	Grid Network
Port 3	Client Network (optional)
Port 4	Grid Network

- If you plan to use the Aggregate port bond mode, connect one or more of the network ports to one or more switches. You should connect at least two of the four ports to avoid having a single point of failure. If you use more than one switch for a single LACP bond, the switches must support MLAG or equivalent.
3. If you plan to use the Admin Network for StorageGRID, connect the Admin Network port on the appliance to the Admin Network, using an Ethernet cable.

## Connect power cords and apply power

### Connect power cords and apply power (SGF6112)

After connecting the network cables, you are ready to apply power to the appliance.

#### Steps

1. Connect a power cord to each of the two power supply units in the appliance.
2. Connect these two power cords to two different power distribution units (PDUs) in the cabinet or rack.
3. If the power button on the front of the appliance is not currently illuminated blue, press the button to turn on power to the appliance.

Don't press the power button again during the power-on process.

The LED on the power supply should be illuminated green without blinking.

4. If errors occur, correct any issues.
5. Attach the front bezel to the appliance if removed.

#### Related information

[View status indicators](#)

### Connect power cords and apply power (SG6000)

After connecting the network cables, you are ready to apply power to the SG6000-CN controller and to the two storage controllers or optional expansion shelves.

#### Steps

1. Confirm that both controllers in the storage controller shelf are off.



**Risk of electrical shock** — Before connecting the power cords, make sure that the power switches for each of the two storage controllers are off.

2. If you have expansion shelves, confirm that both of the IOM power switches are off.



**Risk of electrical shock** — Before connecting the power cords, make sure that the two power switches for each of the expansion shelves are off.

3. Connect a power cord to each of the two power supply units in the SG6000-CN controller.
4. Connect these two power cords to two different power distribution units (PDUs) in the cabinet or rack.
5. Connect a power cord to each of the two power supply units in the storage controller shelf.
6. If you have expansion shelves, connect a power cord to each of the two power supply units in each expansion shelf.
7. Connect the two power cords in each storage shelf (including the optional expansion shelves) to two different PDUs in the cabinet or rack.
8. If the power button on the front of the SG6000-CN controller is not currently illuminated blue, press the button to turn on power to the controller.

Don't press the power button again during the power-on process.

9. Turn on the two power switches on the back of the storage controller shelf. If you have expansion shelves, turn on the two power switches for each shelf.
  - Don't turn off the power switches during the power-on process.
  - The fans in the storage controller shelf and optional expansion shelves might be very loud when they first start up. The loud noise during start-up is normal.
10. After the components have booted up, check their status.
  - Check the seven-segment display on the back of each storage controller. Refer to the article about viewing boot-up status codes for more information.
  - Verify that the power button on the front of the SG6000-CN controller is lit.
11. If errors occur, correct any issues.
12. Attach the front bezel to the SG6000-CN controller if removed.

#### Related information

- [View status indicators](#)
- [Reinstall SG6000-CN controller into cabinet or rack](#)

#### Connect power cords and apply power (SG5700)

When you apply power to the appliance, both controllers boot up.

#### Before you begin

Both appliance power switches must be off before connecting power.



**Risk of electrical shock** — Before connecting the power cords, make sure that the two power switches on the appliance are off.

### Steps

1. Confirm that the two power switches on the appliance are off.
2. Connect the two power cords to the appliance.
3. Connect the two power cords to different power distribution units (PDUs) in the cabinet or rack.
4. Turn on the two power switches on the appliance.
  - Don't turn off the power switches during the power-on process.
  - The fans are very loud when they first start up. The loud noise during start-up is normal.
5. After the controllers have booted up, check their seven-segment displays.

### Connect power cords and apply power (SG100 and SG1000)

After connecting the network cables, you are ready to apply power to the appliance.

### Steps

1. Connect a power cord to each of the two power supply units in the appliance.
2. Connect these two power cords to two different power distribution units (PDUs) in the cabinet or rack.
3. If the power button on the front of the appliance is not currently illuminated blue, press the button to turn on power to the appliance.

Don't press the power button again during the power-on process.

4. If errors occur, correct any issues.
5. Attach the front bezel to the appliance if removed.

### Related information

[View status indicators](#)

### View status indicators and codes

The appliances and controllers include indicators that help you determine the status of the appliance components.

## SGF6112

The appliance includes indicators that help you determine the status of the appliance controller and the SSDs:

- [Appliance indicators and buttons](#)
- [General boot-up codes](#)
- [SSD indicators](#)

Use this information to help [troubleshoot SGF6112 hardware installation](#).

### Appliance indicators and buttons

The following figure shows indicators and buttons on the SG6112 appliance.



Callout	Display	State
1	Power button	<ul style="list-style-type: none"><li>• Blue: the appliance is powered on.</li><li>• Off: the appliance is powered off.</li></ul>
2	Reset button	Use this button to perform a hard reset of the controller.
3	Identify button	<p>Using the BMC, this button can be set to blink, On (Solid), or Off.</p> <ul style="list-style-type: none"><li>• Blue, blinking: Identifies the appliance in the cabinet or rack.</li><li>• Blue, solid: Identifies the appliance in the cabinet or rack.</li><li>• Off: The appliance is not visually identifiable in the cabinet or rack.</li></ul>
4	Status LED	<ul style="list-style-type: none"><li>• Amber, solid: An error has occurred.</li></ul> <p><b>Note:</b> To view the boot-up and error codes, <a href="#">access the BMC interface</a>.</p> <ul style="list-style-type: none"><li>• Off: No errors are present.</li></ul>
5	PFR	This light is not used by the SGF6112 appliance and remains off.

## General boot-up codes

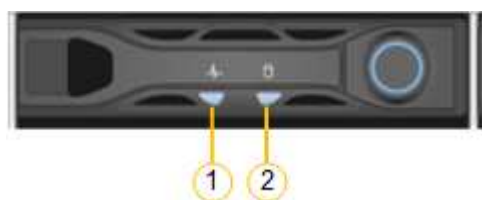
During boot-up or after a hard reset of the appliance, the following occurs:

1. The baseboard management controller (BMC) logs codes for the boot-up sequence, including any errors that occur.
2. The power button lights up.
3. If any errors occur during boot-up, the alarm LED lights up.

To view the boot-up and error codes, [access the BMC interface](#).

## SSD indicators

The following figure shows SSD indicators on the SG6112 appliance.



LED	Display	State
1	Drive status/fault	<ul style="list-style-type: none"><li>• Blue (solid): drive is online</li><li>• Amber (solid): drive failure</li><li>• Off: slot is empty</li></ul> <p><b>Note:</b> If a new working SSD is inserted into a working SGF6112 StorageGRID node, the LEDs on the SSD should blink initially, but stop blinking as soon as the system determines that the drive has enough capacity and is functional.</p>
2	Drive active	Blue (blinking): drive is being accessed

## SG6000

The SG6000 appliance controllers include indicators that help you determine the status of the appliance controller:

- [Status indicators and buttons on SG6000-CN controller](#)
- [General boot-up codes](#)
- [Boot-up status codes for SG6000 storage controllers](#)

Use this information to help [troubleshoot SG6000 installation](#).

### Status indicators and buttons on SG6000-CN controller

The SG6000-CN controller includes indicators that help you determine the status of the controller, including the following indicators and buttons.

The following figure shows status indicators and buttons on the SG6000-CN controller.





Callout	Display	Description
1	Power button	<ul style="list-style-type: none"> <li>• Blue: The controller is powered on.</li> <li>• Off: The controller is powered off.</li> </ul>
2	Reset button	<p><i>No indicator</i></p> <p>Use this button to perform a hard reset of the controller.</p>
3	Identify button	<ul style="list-style-type: none"> <li>• Blinking or solid blue: Identifies the controller in the cabinet or rack.</li> <li>• Off: The controller is not visually identifiable in the cabinet or rack.</li> </ul> <p>This button can be set to Blink, On (Solid), or Off.</p>
4	Alarm LED	<ul style="list-style-type: none"> <li>• Amber: An error has occurred.</li> </ul> <p><b>Note:</b> To view the boot-up and error codes, <a href="#">access the BMC interface</a>.</p> <ul style="list-style-type: none"> <li>• Off: No errors are present.</li> </ul>

### General boot-up codes

During boot-up or after a hard reset of the SG6000-CN controller, the following occurs:

1. The baseboard management controller (BMC) logs codes for the boot-up sequence, including any errors that occur.
2. The power button lights up.
3. If any errors occur during boot-up, the alarm LED lights up.

To view the boot-up and error codes, [access the BMC interface](#).

### Boot-up status codes for SG6000 storage controllers

Each storage controller has a seven-segment display that provides status codes as the controller powers up. The status codes are the same for both the E2800 controller and the EF570 controller.

For descriptions of these codes, see the E-Series system monitoring information for your storage controller type.

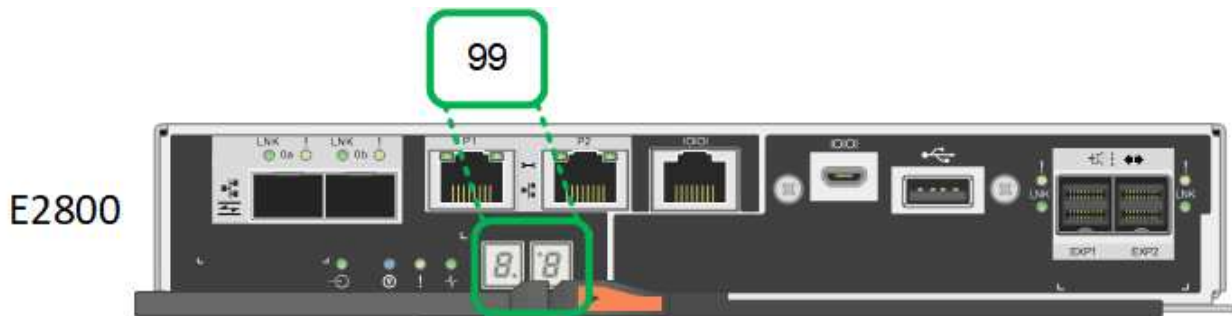
### Steps

1. During boot-up, monitor progress by viewing the codes shown on the seven-segment display for each storage controller.

The seven-segment display on each storage controller shows the repeating sequence **OS**, **Sd**, **blank** to indicate that the controller is performing start-of-day processing.

2. After the controllers have booted up, confirm that each storage controller shows 99, which is the default ID for an E-Series controller shelf.

Make sure this value is displayed on both storage controllers, as shown in this example E2800 controller.



3. If one or both controllers show other values, see [Troubleshoot hardware installation \(SG6000 or SG5700\)](#) and confirm you completed the installation steps correctly. If you are unable to resolve the problem, contact technical support.

#### Related information

- [NetApp Support](#)
- [Power on SG6000-CN controller and verify operation](#)

#### SG5700

The appliance controllers include indicators that help you determine the status of the appliance controller:

- [SG5700 boot-up status codes](#)
- [Status indicators on E5700SG controller](#)
- [General boot-up codes](#)
- [E5700SG controller boot-up codes](#)
- [E5700SG controller error codes](#)

Use this information to help [troubleshoot SG5700 hardware installation](#).

#### SG5700 boot-up status codes

The seven-segment displays on each controller show status and error codes as the appliance powers up.

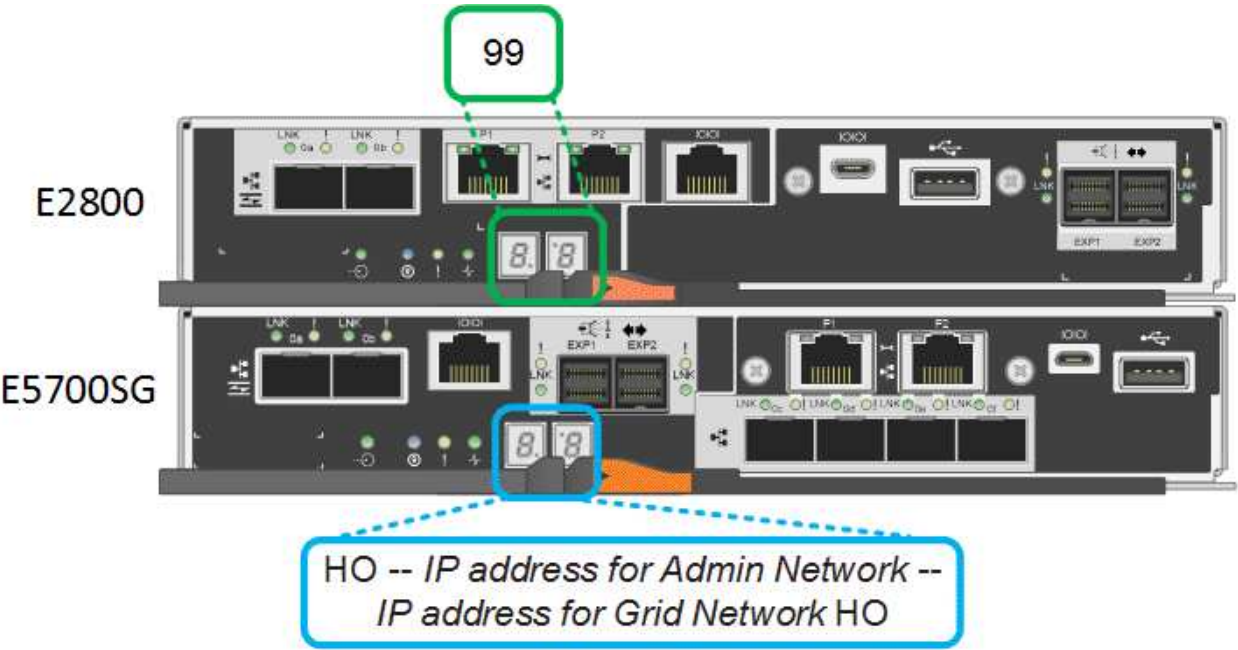
The E2800 controller and the E5700SG controller display different statuses and error codes.

To understand what these codes mean, see the following resources:

Controller	Reference
E2800 controller	<i>E5700 and E2800 System Monitoring Guide</i>  <b>Note:</b> The codes listed for the E-Series E5700 controller don't apply to the E5700SG controller in the appliance.
E5700SG controller	"Status indicators on the E5700SG controller"

Steps

- During boot-up, monitor progress by viewing the codes shown on the seven-segment displays.
  - The seven-segment display on the E2800 controller shows the repeating sequence **OS**, **Sd**, **blank** to indicate that it is performing start-of-day processing.
  - The seven-segment display on the E5700SG controller shows a sequence of codes, ending with **AA** and **FF**.
- After the controllers have booted up, confirm the seven-segment displays show the following:



Controller	Seven-segment display
E2800 controller	Shows 99, which is the default ID for an E-Series controller shelf.

Controller	Seven-segment display
E5700SG controller	<p>Shows <b>HO</b>, followed by a repeating sequence of two numbers.</p> <div style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> <pre>HO -- IP address for Admin Network -- IP address for Grid Network HO</pre> </div> <p>In the sequence, the first set of numbers is the DHCP-assigned IP address for the controller's management port 1. This address is used to connect the controller to the Admin Network for StorageGRID. The second set of numbers is the DHCP-assigned IP address used to connect the appliance to the Grid Network for StorageGRID.</p> <p><b>Note:</b> If an IP address could not be assigned using DHCP, 0.0.0.0 is displayed.</p>

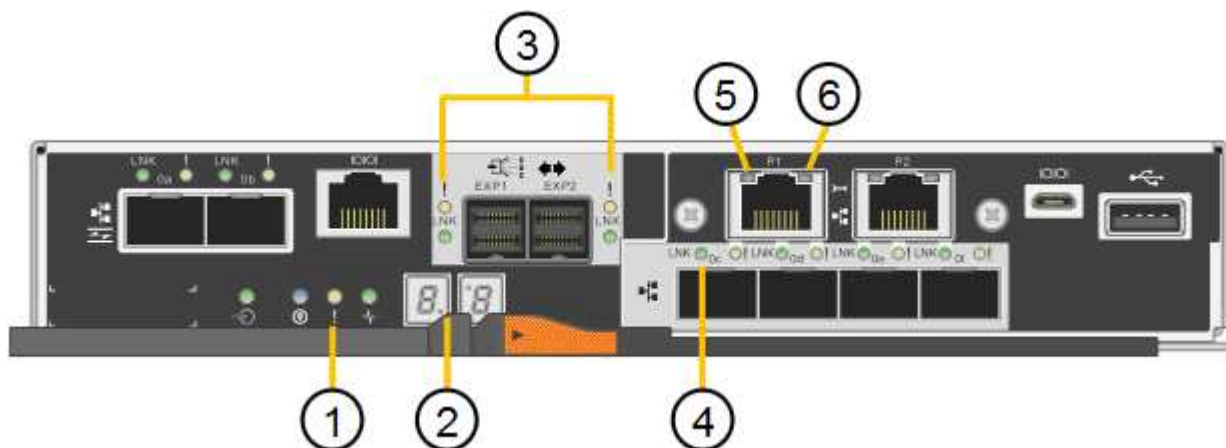
- If the seven-segment displays show other values, see [Troubleshoot hardware installation \(SG6000 or SG5700\)](#) and confirm you completed the installation steps correctly. If you are unable to resolve the problem, contact technical support.

### Status indicators on E5700SG controller

The seven-segment display and the LEDs on the E5700SG controller show status and error codes while the appliance powers up and while the hardware is initializing. You can use these displays to determine status and troubleshoot errors.

After the StorageGRID Appliance Installer has started, you should periodically review the status indicators on the E5700SG controller.

The following figure shows status indicators on the E5700SG controller.



Callout	Display	Description
1	Attention LED	<p>Amber: The controller is faulty and requires operator attention, or the installation script was not found.</p> <p>Off: The controller is operating normally.</p>
2	Seven-segment display	<p>Shows a diagnostic code</p> <p>Seven-segment display sequences enable you to understand errors and the operational state of the appliance.</p>
3	Expansion Port Attention LEDs	<p>Amber: These LEDs are always amber (no link established) because the appliance does not use the expansion ports.</p>
4	Host Port Link Status LEDs	<p>Green: The link is up.</p> <p>Off: The link is down.</p>
5	Ethernet Link State LEDs	<p>Green: A link is established.</p> <p>Off: No link is established.</p>
6	Ethernet Activity LEDs	<p>Green: The link between the management port and the device to which it is connected (such as an Ethernet switch) is up.</p> <p>Off: There is no link between the controller and the connected device.</p> <p>Blinking Green: There is Ethernet activity.</p>

### General boot-up codes

During boot-up or after a hard reset of the appliance, the following occurs:

1. The seven-segment display on the E5700SG controller shows a general sequence of codes that is not specific to the controller. The general sequence ends with the codes AA and FF.
2. Boot-up codes that are specific to the E5700SG controller appear.

### E5700SG controller boot-up codes

During a normal boot-up of the appliance, the seven-segment display on the E5700SG controller shows the following codes in the order listed:

Code	Indicates
HI	The master boot script has started.
PP	The system is checking to see if the FPGA needs to be updated.
HP	The system is checking to see if the 10/25-GbE controller firmware needs to be updated.
RB	The system is rebooting after applying firmware updates.
FP	The hardware subsystem firmware update checks have been completed. Inter-controller communication services are starting.
HE	<p>The system is awaiting connectivity with the E2800 controller and synchronizing with the SANtricity operating system.</p> <p><b>Note:</b> If this boot procedure does not progress past this stage, check the connections between the two controllers.</p>
HC	The system is checking for existing StorageGRID installation data.
HO	The StorageGRID Appliance Installer is running.
HA	StorageGRID is running.

### E5700SG controller error codes

These codes represent error conditions that might be shown on the E5700SG controller as the appliance boots up. Additional two-digit hexadecimal codes are displayed if specific low-level hardware errors occur. If any of these codes persists for more than a second or two, or if you are unable to resolve the error by following one of the prescribed troubleshooting procedures, contact technical support.

Code	Indicates
22	No master boot record found on any boot device.
23	The internal flash disk is not connected.
2A, 2B	Stuck bus, unable to read DIMM SPD data.
40	Invalid DIMMs.
41	Invalid DIMMs.
42	Memory test failed.

Code	Indicates
51	SPD reading failure.
92 to 96	PCI bus initialization.
A0 to A3	SATA drive initialization.
AB	Alternate boot code.
AE	Booting OS.
EA	DDR4 training failed.
E8	No memory installed.
EU	The installation script was not found.
EP	Installation or communication with the E2800 controller has failed.

#### Related information

- [NetApp Support](#)
- [E5700 and E2800 System Monitoring Guide](#)

#### SG100 and SG1000

The appliance includes indicators that help you determine the status of the appliance controller and the two SSDs:

- [Appliance indicators and buttons](#)
- [General boot-up codes](#)
- [SSD indicators](#)

Use this information to help [troubleshoot SG100 and SG1000 hardware installation](#).

#### Appliance indicators and buttons

The following figure shows status indicators and buttons on the SG100 and SG1000.



Callout	Display	State
1	Power button	<ul style="list-style-type: none"> <li>• Blue: the appliance is powered on.</li> <li>• Off: the appliance is powered off.</li> </ul>

Callout	Display	State
2	Reset button	Use this button to perform a hard reset of the controller.
3	Identify button	<p>This button can be set to Blink, On (Solid), or Off.</p> <ul style="list-style-type: none"> <li>• Blue, blinking: Identifies the appliance in the cabinet or rack.</li> <li>• Blue, solid: Identifies the appliance in the cabinet or rack.</li> <li>• Off: The appliance is not visually identifiable in the cabinet or rack.</li> </ul>
4	Alarm LED	<ul style="list-style-type: none"> <li>• Amber, solid: An error has occurred.</li> </ul> <p><b>Note:</b> To view the boot-up and error codes, <a href="#">access the BMC interface</a>.</p> <ul style="list-style-type: none"> <li>• Off: No errors are present.</li> </ul>

### General boot-up codes

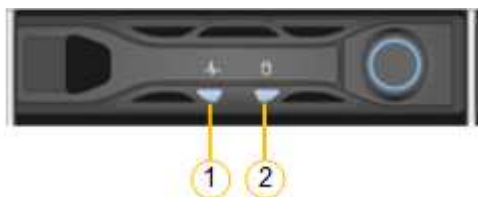
During boot-up or after a hard reset of the appliance, the following occurs:

1. The baseboard management controller (BMC) logs codes for the boot-up sequence, including any errors that occur.
2. The power button lights up.
3. If any errors occur during boot-up, the alarm LED lights up.

To view the boot-up and error codes, [access the BMC interface](#).

### SSD indicators

The following figure shows SSD indicators on the SG100 and SG1000.



LED	Display	State
1	Drive status/fault	<ul style="list-style-type: none"> <li>• Blue (solid): drive is online</li> <li>• Amber (blinking): drive failure</li> <li>• Off: slot is empty</li> </ul>



LED	Display	State
2	Drive active	Blue (blinking): drive is being accessed

## Set up hardware

### Set up hardware: Overview

After applying power to the appliance, you configure the network connections that will be used by StorageGRID.

#### Configure required network connections

For all appliances, you perform several tasks to configure required network connections such as:

- Access the Appliance Installer
- Configure network links
- Verify port-level network connections

#### Additional configuration that might be required

Depending upon which appliance types you are configuring, additional hardware configuration might be required.

#### SANtricity System Manager

For SG6000 and SG5700, you configure SANtricity System Manager. The SANtricity software is used to monitor the hardware for these appliances.

#### BMC interface

The following appliances have a BMC interface that must be configured:

- SGF6112
- SG6000
- SG1000
- SG100

#### Optional configuration

- Storage appliances
  - Configure SANtricity System Manager (SG6000 and SG5700) the software you will use to monitor the hardware
  - Change the RAID mode
- Services appliances
  - Access the BMC interface for the SG100 and SG1000 and the SG6000-CN controller

## Configure StorageGRID connections

### Access StorageGRID Appliance Installer

You must access the StorageGRID Appliance Installer to verify the installer version and configure the connections between the appliance and the three StorageGRID networks: the Grid Network, the Admin Network (optional), and the Client Network (optional).

#### Before you begin

- You are using any management client that can connect to the StorageGRID Admin Network, or you have a service laptop.
- The client or service laptop has a [supported web browser](#).
- The services appliance or storage appliance controller is connected to all of the StorageGRID networks you plan to use.
- You know the IP address, gateway, and subnet for the services appliance or storage appliance controller on these networks.
- You have configured the network switches you plan to use.

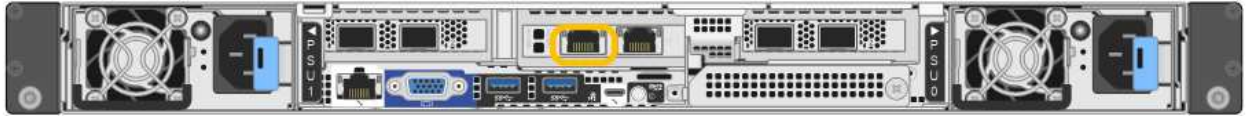
#### About this task

To initially access the StorageGRID Appliance Installer, you can use the DHCP-assigned IP address for the Admin Network port on the services appliance or storage appliance controller (assuming it is connected to the Admin Network), or you can connect a service laptop directly to the services appliance or storage appliance controller.

#### Steps

1. If possible, use the DHCP address for the Admin Network port on the services appliance or storage appliance controller. The Admin Network port is highlighted in the following figure. (Use the IP address on the Grid Network if the Admin Network is not connected.)

### SGF6112



### SG6000-CN



### E5700SG

For the E5700SG, you can do either of the following:

- Look at the seven-segment display on the E5700SG controller. If management port 1 and 10/25-GbE ports 2 and 4 on the E5700SG controller are connected to networks with DHCP servers, the controller attempts to obtain dynamically assigned IP addresses when you power on the enclosure. After the controller has completed the power-on process, its seven-segment display shows **HO**, followed by a repeating sequence of two numbers.

```
HO -- IP address for Admin Network -- IP address for Grid Network
HO
```

In the sequence:

- The first set of numbers is the DHCP address for the appliance Storage Node on the Admin Network, if it is connected. This IP address is assigned to management port 1 on the E5700SG controller.
- The second set of numbers is the DHCP address for the appliance Storage Node on the Grid Network. This IP address is assigned to 10/25-GbE ports 2 and 4 when you first apply power to the appliance.



If an IP address could not be assigned using DHCP, 0.0.0.0 is displayed.

### SG100



### SG1000



- a. Locate the MAC address label on the front of the services appliance or storage appliance, and determine the MAC address for the Admin Network port.

The MAC address label lists the MAC address for the BMC management port.

To determine the MAC address for the Admin Network port, add **2** to the hexadecimal number on the label. For example, if the MAC address on the label ends in **09**, the MAC address for the Admin Port would end in **0B**. If the MAC address on the label ends in **(y)FF**, the MAC address for the Admin Port would end in **(y+1)01**. You can easily make this calculation by opening Calculator in Windows, setting it to Programmer mode, selecting Hex, typing the MAC address, then typing **+ 2 =**.

- b. Provide the MAC address to your network administrator, so they can look up the DHCP address for the appliance on the Admin Network.
- c. From the client, enter this URL for the StorageGRID Appliance Installer:  
**`https://Appliance_IP:8443`**

For *Appliance\_IP*, use the DHCP address (use the IP address for the Admin Network if you have it).

- d. If you are prompted with a security alert, view and install the certificate using the browser's installation wizard.

The alert will not appear the next time you access this URL.

The StorageGRID Appliance Installer Home page appears. The information and messages shown when you first access this page depend on how your appliance is currently connected to StorageGRID networks. Error messages might appear that will be resolved in later steps.

# NetApp® StorageGRID® Appliance Installer

[Home](#)[Configure Networking ▾](#)[Configure Hardware ▾](#)[Monitor Installation](#)[Advanced ▾](#)

## Home

 The installation is ready to be started. Review the settings below, and then click Start Installation.

## This Node

Node type

Storage ▾

Node name

MM-2-108-SGA-lab25

Cancel

Save

## Primary Admin Node connection

Enable Admin Node discovery

☐

Primary Admin Node IP

172.16.1.178

Connection state

Connection to 172.16.1.178 ready

Cancel

Save

## Installation

Current state

Ready to start installation of MM-2-108-SGA-lab25 into grid with Admin Node 172.16.1.178 running StorageGRID 11.2.0, using StorageGRID software downloaded from the Admin Node.

[Start Installation](#)

2. If you can't obtain an IP address using DHCP, you can use a link-local connection.

### SGF6112

Connect a service laptop directly to the rightmost RJ-45 port on the appliance, using an Ethernet cable.



### SG6000-CN

Connect a service laptop directly to the rightmost RJ-45 port on the SG6000-CN controller, using an Ethernet cable.



### E5700SG

Connect the service laptop to management port 2 on the E5700SG controller, using an Ethernet cable.



### SG100

Connect a service laptop directly to the rightmost RJ-45 port on the services appliance, using an Ethernet cable.



### SG1000

Connect a service laptop directly to the rightmost RJ-45 port on the services appliance, using an Ethernet cable.



- Open a web browser on the service laptop.
- Enter this URL for the StorageGRID Appliance Installer:  
**`https://169.254.0.1:8443`**

The StorageGRID Appliance Installer Home page appears. The information and messages shown when you first access this page depend on how your appliance is currently connected to StorageGRID networks. Error messages might appear that will be resolved in later steps.



If you can't access the Home page over a link-local connection, configure the service laptop IP address as 169.254.0.2, and try again.

### After you finish

After accessing the StorageGRID Appliance Installer:

- Verify that the StorageGRID Appliance Installer version on the appliance matches the software version installed on your StorageGRID system. Upgrade StorageGRID Appliance Installer, if necessary.

#### [Verify and upgrade StorageGRID Appliance Installer version](#)

- Review any messages displayed on the StorageGRID Appliance Installer Home page and configure the link configuration and the IP configuration, as required.

### NetApp® StorageGRID® Appliance Installer

[Home](#) [Configure Networking ▾](#) [Configure Hardware ▾](#) [Monitor Installation](#) [Advanced ▾](#)

#### Home

##### This Node

Node type

Gateway ▾

Node name

xlr8r-10

Cancel

Save

##### Primary Admin Node connection

Enable Admin Node discovery

☐

Primary Admin Node IP

192.168.7.44

Connection state

Connection to 192.168.7.44 ready

Cancel

Save

##### Installation

Current state

Ready to start installation of xlr8r-10 into grid with Admin Node 192.168.7.44 running StorageGRID 11.6.0, using StorageGRID software downloaded from the Admin Node.

Start installation



## Verify and upgrade StorageGRID Appliance Installer version

The StorageGRID Appliance Installer version on the appliance must match the software version installed on your StorageGRID system to ensure that all StorageGRID features are supported.

### Before you begin

You have accessed the StorageGRID Appliance Installer.

### About this task

StorageGRID appliances come from the factory preinstalled with the StorageGRID Appliance Installer. If you are adding an appliance to a recently upgraded StorageGRID system, you might need to manually upgrade the StorageGRID Appliance Installer before installing the appliance as a new node.

The StorageGRID Appliance Installer automatically upgrades when you upgrade to a new StorageGRID version. You don't need to upgrade the StorageGRID Appliance Installer on installed appliance nodes. This procedure is only required when you are installing an appliance that contains an earlier version of the StorageGRID Appliance Installer.

### Steps

1. From the StorageGRID Appliance Installer, select **Advanced > Upgrade Firmware**.
2. Compare the Current Firmware version to the software version installed on your StorageGRID system. (From the top of the Grid Manager, select the help icon and select **About**.)

The second digit in the two versions should match. For example, if your StorageGRID system is running version 11.6.x.y, the StorageGRID Appliance Installer version should be 3.6.z.

3. If the appliance has a down-level version of the StorageGRID Appliance Installer, go to [NetApp Downloads: StorageGRID Appliance](#).

Sign in with the username and password for your NetApp account.

4. Download the appropriate version of the **Support file for StorageGRID Appliances** and the corresponding checksum file.

The Support file for StorageGRID appliances is a .zip archive that contains the current and previous firmware versions for all StorageGRID appliance models.

After downloading the Support file for StorageGRID appliances, extract the .zip archive and see the README file for important information about installing the StorageGRID Appliance Installer.

5. Follow the instructions on the Upgrade Firmware page of your StorageGRID Appliance Installer to perform these steps:
  - a. Upload the appropriate support file (firmware image) for your controller type. Some firmware versions also require uploading a checksum file. If you are prompted for a checksum file, it can also be found in the Support file for StorageGRID Appliances.
  - b. Upgrade the inactive partition.
  - c. Reboot and swap partitions.
  - d. Upload the appropriate support file (firmware image) again for your controller type. Some firmware versions also require uploading a checksum file. If you are prompted for a checksum file, it can also be found in the Support file for StorageGRID Appliances.



- e. Upgrade the second (inactive) partition.

## Related information

[Accessing StorageGRID Appliance Installer](#)

## Configure network links

You can configure network links for the ports used to connect the appliance to the Grid Network, the Client Network, and the Admin Network. You can set the link speed as well as the port and network bond modes.



If you are using ConfigBuilder to generate a JSON file, you can configure the network links automatically. See [Automate appliance installation and configuration](#).

## Before you begin

- You have [obtained the additional equipment](#) required for your cable type and link speed.
- You have installed the correct transceivers in the ports, based on the link speed you plan to use.
- You have connected the network ports to switches that support your chosen speed.

If you plan to use Aggregate port bond mode, LACP network bond mode, or VLAN tagging:

- You have connected the network ports on the appliance to switches that can support VLAN and LACP.
- If multiple switches are participating in the LACP bond, the switches support multi-chassis link aggregation groups (MLAG), or equivalent.
- You understand how to configure the switches to use VLAN, LACP, and MLAG or equivalent.
- You know the unique VLAN tag to use for each network. This VLAN tag will be added to each network packet to ensure that network traffic is routed to the correct network.

## About this task

You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.



The LACP transmit hash policy is layer2+3.

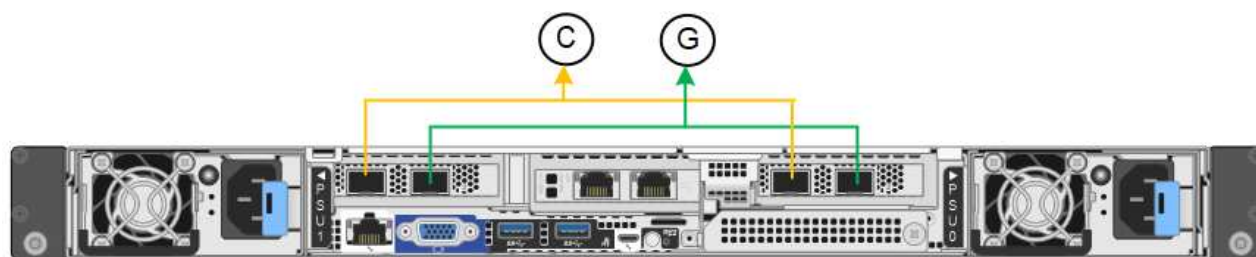
The figures and tables summarize the options for the port bond mode and network bond mode for each appliance. See the following for more information:

- [Port bond modes \(SGF6112\)](#)
- [Port bond modes \(SG6000-CN\)](#)
- [Port bond modes \(E5700SG\)](#)
- [Port bond modes \(SG1000 and SG100\)](#)

## SGF6112

### Fixed port bond mode (default)

The figure shows how the four network ports are bonded in fixed port bond mode (default configuration).



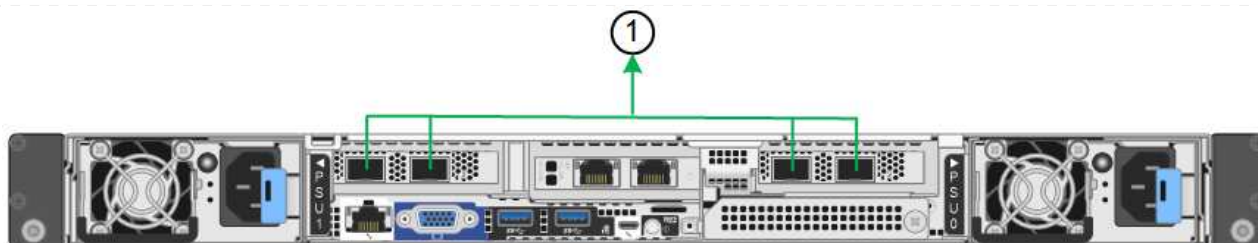
Callout	Which ports are bonded
C	Ports 1 and 3 are bonded together for the Client Network, if this network is used.
G	Ports 2 and 4 are bonded together for the Grid Network.

The table summarizes the options for configuring the network ports. You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.

Network bond mode	Client Network disabled (default)	Client Network enabled
Active-Backup (default)	<ul style="list-style-type: none"><li>• Ports 2 and 4 use an active-backup bond for the Grid Network.</li><li>• Ports 1 and 3 aren't used.</li><li>• A VLAN tag is optional.</li></ul>	<ul style="list-style-type: none"><li>• Ports 2 and 4 use an active-backup bond for the Grid Network.</li><li>• Ports 1 and 3 use an active-backup bond for the Client Network.</li><li>• VLAN tags can be specified for both networks for the convenience of the network administrator.</li></ul>
LACP (802.3ad)	<ul style="list-style-type: none"><li>• Ports 2 and 4 use an LACP bond for the Grid Network.</li><li>• Ports 1 and 3 aren't used.</li><li>• A VLAN tag is optional.</li></ul>	<ul style="list-style-type: none"><li>• Ports 2 and 4 use an LACP bond for the Grid Network.</li><li>• Ports 1 and 3 use an LACP bond for the Client Network.</li><li>• VLAN tags can be specified for both networks for the convenience of the network administrator.</li></ul>

### Aggregate port bond mode

The figure shows how the four network ports are bonded in aggregate port bond mode.



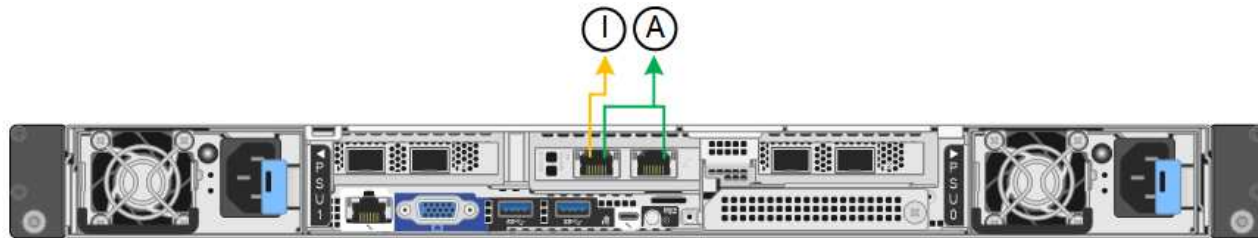
Callout	Which ports are bonded
1	All four ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

The table summarizes the options for configuring the network ports. You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.

Network bond mode	Client Network disabled (default)	Client Network enabled
LACP (802.3ad) only	<ul style="list-style-type: none"> <li>Ports 1-4 use a single LACP bond for the Grid Network.</li> <li>A single VLAN tag identifies Grid Network packets.</li> </ul>	<ul style="list-style-type: none"> <li>Ports 1-4 use a single LACP bond for the Grid Network and the Client Network.</li> <li>Two VLAN tags allow Grid Network packets to be segregated from Client Network packets.</li> </ul>

### Active-Backup network bond mode for management ports

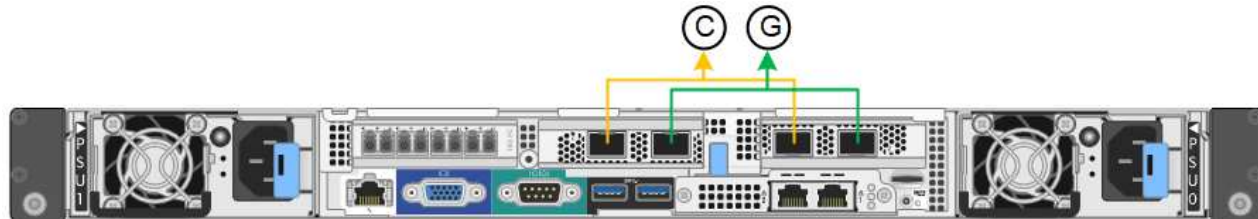
This figure shows how the two 1-GbE management ports on the SGF6112 are bonded in Active-Backup network bond mode for the Admin Network.



### SG6000

#### Fixed port bond mode (default)

This figure shows how the four network ports are bonded in fixed port bond mode (default configuration)



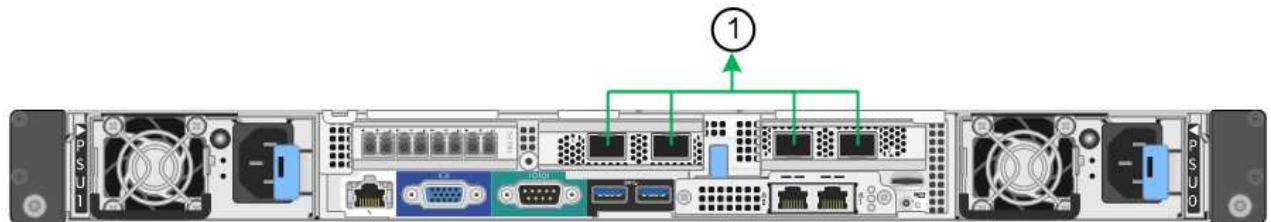
Callout	Which ports are bonded
C	Ports 1 and 3 are bonded together for the Client Network, if this network is used.
G	Ports 2 and 4 are bonded together for the Grid Network.

The table summarizes the options for configuring the network ports. You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.

Network bond mode	Client Network disabled (default)	Client Network enabled
Active-Backup (default)	<ul style="list-style-type: none"> <li>Ports 2 and 4 use an active-backup bond for the Grid Network.</li> <li>Ports 1 and 3 aren't used.</li> <li>A VLAN tag is optional.</li> </ul>	<ul style="list-style-type: none"> <li>Ports 2 and 4 use an active-backup bond for the Grid Network.</li> <li>Ports 1 and 3 use an active-backup bond for the Client Network.</li> <li>VLAN tags can be specified for both networks for the convenience of the network administrator.</li> </ul>
LACP (802.3ad)	<ul style="list-style-type: none"> <li>Ports 2 and 4 use an LACP bond for the Grid Network.</li> <li>Ports 1 and 3 aren't used.</li> <li>A VLAN tag is optional.</li> </ul>	<ul style="list-style-type: none"> <li>Ports 2 and 4 use an LACP bond for the Grid Network.</li> <li>Ports 1 and 3 use an LACP bond for the Client Network.</li> <li>VLAN tags can be specified for both networks for the convenience of the network administrator.</li> </ul>

### Aggregate port bond mode

This figure shows how the four network ports are bonded in aggregate port bond mode.



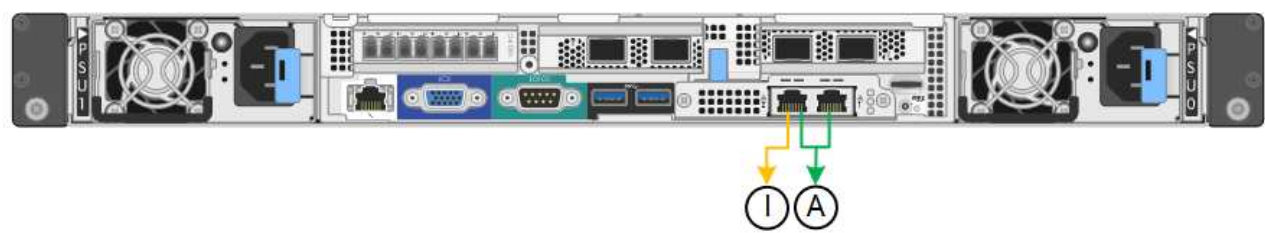
Callout	Which ports are bonded
1	All four ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

The table summarizes the options for configuring the network ports. You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.

Network bond mode	Client Network disabled (default)	Client Network enabled
LACP (802.3ad) only	<ul style="list-style-type: none"> <li>Ports 1-4 use a single LACP bond for the Grid Network.</li> <li>A single VLAN tag identifies Grid Network packets.</li> </ul>	<ul style="list-style-type: none"> <li>Ports 1-4 use a single LACP bond for the Grid Network and the Client Network.</li> <li>Two VLAN tags allow Grid Network packets to be segregated from Client Network packets.</li> </ul>

### Active-Backup network bond mode for management ports

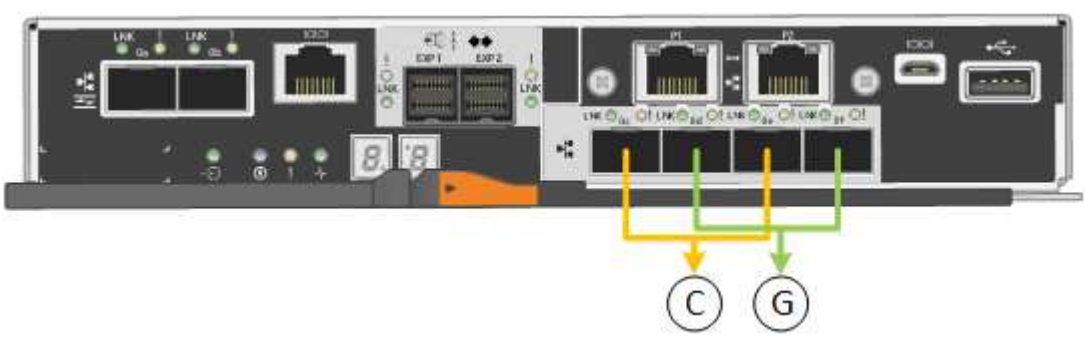
This figure shows how the two 1-GbE management ports on the SG6000-CN controller are bonded in Active-Backup network bond mode for the Admin Network.



### SG5700

#### Fixed port bond mode (default)

This figure shows how the four 10/25-GbE ports are bonded in Fixed port bond mode (default configuration).



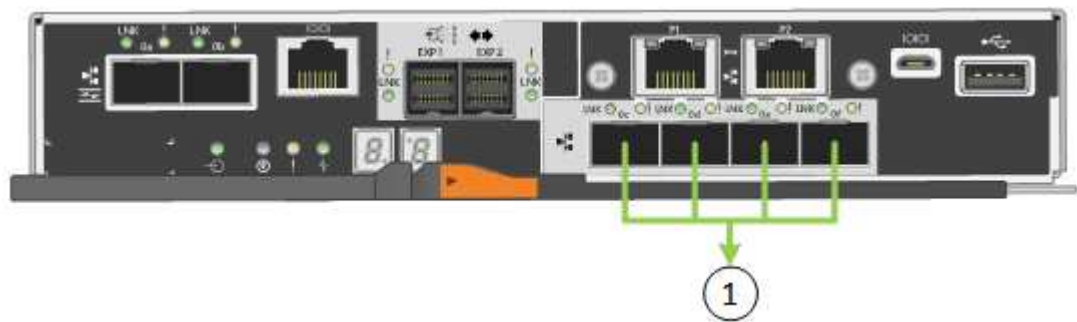
Callout	Which ports are bonded
C	Ports 1 and 3 are bonded together for the Client Network, if this network is used.
G	Ports 2 and 4 are bonded together for the Grid Network.

The table summarizes the options for configuring the four 10/25-GbE ports. You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.

Network bond mode	Client Network disabled (default)	Client Network enabled
Active-Backup (default)	<ul style="list-style-type: none"> <li>Ports 2 and 4 use an active-backup bond for the Grid Network.</li> <li>Ports 1 and 3 aren't used.</li> <li>A VLAN tag is optional.</li> </ul>	<ul style="list-style-type: none"> <li>Ports 2 and 4 use an active-backup bond for the Grid Network.</li> <li>Ports 1 and 3 use an active-backup bond for the Client Network.</li> <li>VLAN tags can be specified for both networks for the convenience of the network administrator.</li> </ul>
LACP (802.3ad)	<ul style="list-style-type: none"> <li>Ports 2 and 4 use an LACP bond for the Grid Network.</li> <li>Ports 1 and 3 aren't used.</li> <li>A VLAN tag is optional.</li> </ul>	<ul style="list-style-type: none"> <li>Ports 2 and 4 use an LACP bond for the Grid Network.</li> <li>Ports 1 and 3 use an LACP bond for the Client Network.</li> <li>VLAN tags can be specified for both networks for the convenience of the network administrator.</li> </ul>

### Aggregate port bond mode

This figure shows how the four 10/25-GbE ports are bonded in Aggregate port bond mode.



Callout	Which ports are bonded
1	All four ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

The table summarizes the options for configuring the four 10/25-GbE ports. You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.



Network bond mode	Client Network disabled (default)	Client Network enabled
LACP (802.3ad) only	<ul style="list-style-type: none"> <li>Ports 1-4 use a single LACP bond for the Grid Network.</li> <li>A single VLAN tag identifies Grid Network packets.</li> </ul>	<ul style="list-style-type: none"> <li>Ports 1-4 use a single LACP bond for the Grid Network and the Client Network.</li> <li>Two VLAN tags allow Grid Network packets to be segregated from Client Network packets.</li> </ul>

### Active-Backup network bond mode for management ports

This figure shows how the two 1-GbE management ports on the E5700SG controller are bonded in Active-Backup network bond mode for the Admin Network.

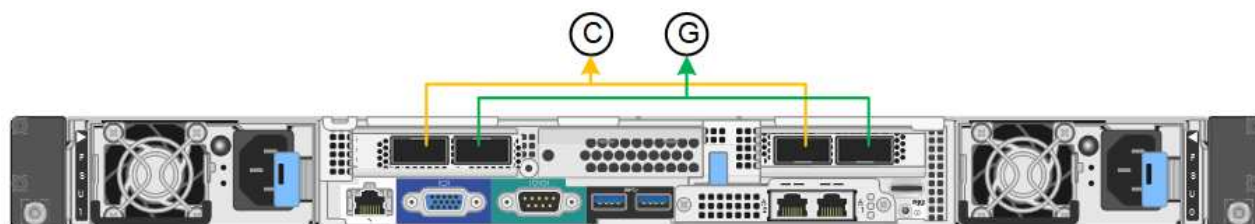


### SG100 and SG1000

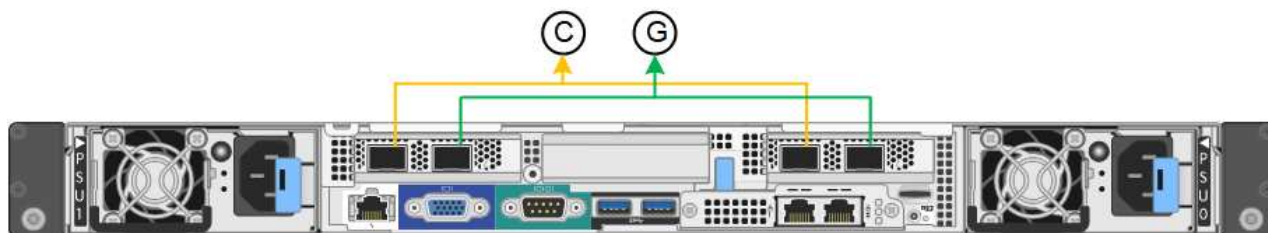
#### Fixed port bond mode (default)

The figures show how the four network ports on the SG1000 or SG100 are bonded in fixed port bond mode (default configuration).

SG1000:



SG100:



Callout	Which ports are bonded
C	Ports 1 and 3 are bonded together for the Client Network, if this network is used.
G	Ports 2 and 4 are bonded together for the Grid Network.

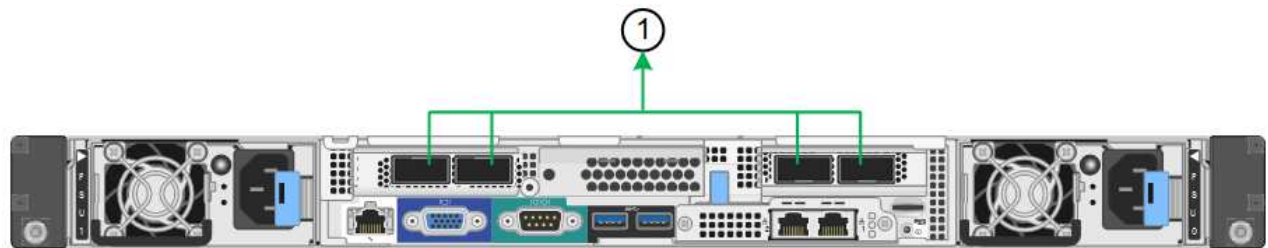
The table summarizes the options for configuring the four network ports. You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.

Network bond mode	Client Network disabled (default)	Client Network enabled
Active-Backup (default)	<ul style="list-style-type: none"><li>• Ports 2 and 4 use an active-backup bond for the Grid Network.</li><li>• Ports 1 and 3 aren't used.</li><li>• A VLAN tag is optional.</li></ul>	<ul style="list-style-type: none"><li>• Ports 2 and 4 use an active-backup bond for the Grid Network.</li><li>• Ports 1 and 3 use an active-backup bond for the Client Network.</li><li>• VLAN tags can be specified for both networks for the convenience of the network administrator.</li></ul>
LACP (802.3ad)	<ul style="list-style-type: none"><li>• Ports 2 and 4 use an LACP bond for the Grid Network.</li><li>• Ports 1 and 3 aren't used.</li><li>• A VLAN tag is optional.</li></ul>	<ul style="list-style-type: none"><li>• Ports 2 and 4 use an LACP bond for the Grid Network.</li><li>• Ports 1 and 3 use an LACP bond for the Client Network.</li><li>• VLAN tags can be specified for both networks for the convenience of the network administrator.</li></ul>

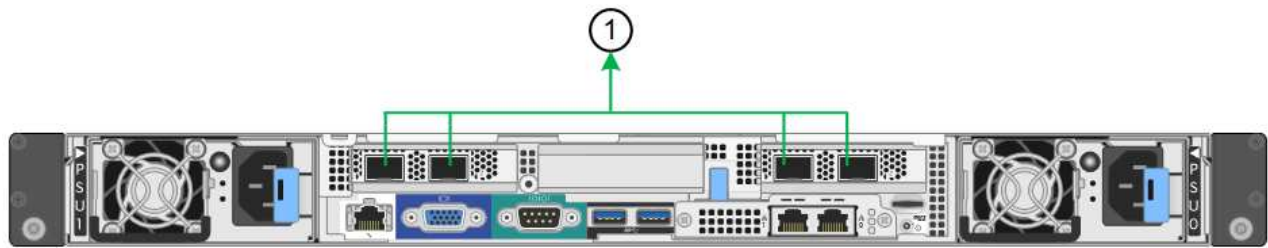
Aggregate port bond mode

These figures show how the four network ports are bonded in aggregate port bond mode.

SG1000:



SG100:



Callout	Which ports are bonded
1	All four ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.



The table summarizes the options for configuring the four network ports. You only need to configure the settings on the Link Configuration page if you want to use a non-default setting.

Network bond mode	Client Network disabled (default)	Client Network enabled
LACP (802.3ad) only	<ul style="list-style-type: none"> <li>Ports 1-4 use a single LACP bond for the Grid Network.</li> <li>A single VLAN tag identifies Grid Network packets.</li> </ul>	<ul style="list-style-type: none"> <li>Ports 1-4 use a single LACP bond for the Grid Network and the Client Network.</li> <li>Two VLAN tags allow Grid Network packets to be segregated from Client Network packets.</li> </ul>

### Active-Backup network bond mode for management ports

These figures show how the two 1-GbE management ports on the appliances are bonded in Active-Backup network bond mode for the Admin Network.

SG1000:



SG100:



### Steps

1. From the menu bar of the StorageGRID Appliance Installer, click **Configure Networking > Link Configuration**.

The Network Link Configuration page displays a diagram of your appliance with the network and management ports numbered.

The Link Status table lists the link state, link speed, and other statistics of the numbered ports.

The first time you access this page:

- **Link Speed** is set to **Auto**.
- **Port bond mode** is set to **Fixed**.
- **Network bond mode** is set to **Active-Backup** for the Grid Network.
- The **Admin Network** is enabled, and the network bond mode is set to **Independent**.

- The **Client Network** is disabled.

2. Select the link speed for the network ports from the **Link speed** drop-down list.

The network switches you are using for the Grid Network and the Client Network must also support and be configured for this speed. You must use the appropriate adapters or transceivers for the configured link speed. Use Auto link speed when possible because this option negotiates both link speed and Forward Error Correction (FEC) mode with the link partner.

If you plan to use the 25-GbE link speed for the SG6000 or SG5700 network ports:

- Use SFP28 transceivers and SFP28 TwinAx cables or optical cables.
- For the SG6000, select **Auto** from the **Link speed** drop-down list.
- For the SG5700, select **25GbE** from the **Link speed** drop-down list.

3. Enable or disable the StorageGRID networks you plan to use.

The Grid Network is required. You can't disable this network.

- If the appliance is not connected to the Admin Network, clear the **Enable network** checkbox for the Admin Network.
- If the appliance is connected to the Client Network, select the **Enable network** checkbox for the Client Network.

The Client Network settings for the data NIC ports are now shown.

4. Refer to the table, and configure the port bond mode and the network bond mode.

This example shows:

- **Aggregate** and **LACP** selected for the Grid and the Client Networks. You must specify a unique VLAN tag for each network. You can select values between 0 and 4095.
- **Active-Backup** selected for the Admin Network.

## Link Settings

Link speed

Port bond mode ☐ Fixed ☒ Aggregate

Choose Fixed port bond mode if you want to use ports 2 and 4 for the Grid Network and ports 1 and 3 for the Client Network (if enabled). Choose Aggregate port bond mode if you want all connected ports to share a single LACP bond for both the Grid and Client Networks.

## Grid Network

Enable network ☒

Network bond mode ☐ Active-Backup ☒ LACP (802.3ad)

If the port bond mode is Aggregate, all bonds must be in LACP (802.3ad) mode.

Enable VLAN (802.1q) tagging ☒

VLAN (802.1q) tag

MAC Addresses 50:6b:4b:42:d7:00 50:6b:4b:42:d7:01 50:6b:4b:42:d7:24 50:6b:4b:42:d7:25

If you are using DHCP, it is recommended that you configure a permanent DHCP reservation. Use all of these MAC addresses in the reservation to assign one IP address to this network interface.

## Admin Network

Enable network ☒

Network bond mode ☐ Independent ☒ Active-Backup

Connect the Admin Network to ports 5 and 6. If necessary, you can make a temporary direct Ethernet connection by disconnecting ports 5 and 6, then connecting to port 6 and using link-local IP address 169.254.0.1 for access.

MAC Addresses d8:c4:97:2a:e4:95

If you are using DHCP, it is recommended that you configure a permanent DHCP reservation. Use all of these MAC addresses in the reservation to assign one IP address to this network interface.

## Client Network

Enable network ☒

Network bond mode ☐ Active-Backup ☒ LACP (802.3ad)

If the port bond mode is Aggregate, all bonds must be in LACP (802.3ad) mode.

Enable VLAN (802.1q) tagging ☒

VLAN (802.1q) tag

MAC Addresses 50:6b:4b:42:d7:00 50:6b:4b:42:d7:01 50:6b:4b:42:d7:24 50:6b:4b:42:d7:25

If you are using DHCP, it is recommended that you configure a permanent DHCP reservation. Use all of these MAC addresses in the reservation to assign one IP address to this network interface.

5. When you are satisfied with your selections, click **Save**.



You might lose your connection if you made changes to the network or link you are connected through. If you aren't reconnected within 1 minute, re-enter the URL for the StorageGRID Appliance Installer using one of the other IP addresses assigned to the appliance:

**`https://appliance_IP:8443`**

## Configure StorageGRID IP addresses

You use the StorageGRID Appliance Installer to configure the IP addresses and routing information used for the services appliance or appliance Storage Node on the StorageGRID Grid, Admin, and Client Networks.

If you are using ConfigBuilder to generate a JSON file, you can configure IP addresses automatically. See [Automate appliance installation and configuration](#).

### About this task

You must either assign a static IP for the appliance on each connected network or assign a permanent lease for the address on the DHCP server.

To change the link configuration, see the following instructions:

- [Change link configuration of the SGF6112 appliance](#)
- [Change link configuration of the SG6000-CN controller](#)
- [Change link configuration of the E5700SG controller](#)
- [Change link configuration of the SG100 or SG1000 services appliance](#)

### Steps

1. In the StorageGRID Appliance Installer, select **Configure Networking > IP Configuration**.

The IP Configuration page appears.

2. To configure the Grid Network, select either **Static** or **DHCP** in the **Grid Network** section of the page.
3. If you selected **Static**, follow these steps to configure the Grid Network:
  - a. Enter the static IPv4 address, using CIDR notation.
  - b. Enter the gateway.

If your network does not have a gateway, re-enter the same static IPv4 address.

- c. If you want to use jumbo frames, change the MTU field to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value of 1500.



The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.



For the best network performance, all nodes should be configured with similar MTU values on their Grid Network interfaces. The **Grid Network MTU mismatch** alert is triggered if there is a significant difference in MTU settings for the Grid Network on individual nodes. The MTU values don't have to be the same for all network types.

- d. Click **Save**.

When you change the IP address, the gateway and list of subnets might also change.

If you lose your connection to the StorageGRID Appliance Installer, re-enter the URL using the new static IP address you just assigned. For example,

**https://appliance\_IP:8443**

- e. Confirm that the list of Grid Network subnets is correct.

If you have grid subnets, the Grid Network gateway is required. All grid subnets specified must be reachable through this gateway. These Grid Network subnets must also be defined in the Grid Network Subnet List on the primary Admin Node when you start StorageGRID installation.



The default route is not listed. If the Client Network is not enabled, the default route will use the Grid Network gateway.

- To add a subnet, click the insert icon **+** to the right of the last entry.
- To remove an unused subnet, click the delete icon **x**.

- f. Click **Save**.

4. If you selected **DHCP**, follow these steps to configure the Grid Network:

- a. After you select the **DHCP** radio button, click **Save**.

The **IPv4 Address**, **Gateway**, and **Subnets** fields are automatically populated. If the DHCP server is set up to assign an MTU value, the **MTU** field is populated with that value, and the field becomes read-only.

Your web browser is automatically redirected to the new IP address for the StorageGRID Appliance Installer.

- b. Confirm that the list of Grid Network subnets is correct.

If you have grid subnets, the Grid Network gateway is required. All grid subnets specified must be reachable through this gateway. These Grid Network subnets must also be defined in the Grid Network Subnet List on the primary Admin Node when you start StorageGRID installation.



The default route is not listed. If the Client Network is not enabled, the default route will use the Grid Network gateway.

- To add a subnet, click the insert icon **+** to the right of the last entry.
- To remove an unused subnet, click the delete icon **x**.

- c. If you want to use jumbo frames, change the MTU field to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value of 1500.



The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.



For the best network performance, all nodes should be configured with similar MTU values on their Grid Network interfaces. The **Grid Network MTU mismatch** alert is triggered if there is a significant difference in MTU settings for the Grid Network on individual nodes. The MTU values don't have to be the same for all network types.

d. Click **Save**.

5. To configure the Admin Network, select either **Static** or **DHCP** in the **Admin Network** section of the page.



To configure the Admin Network, you enable the Admin Network on the Link Configuration page.

### Admin Network

The Admin Network is a closed network used for system administration and maintenance. The Admin Network is typically a private network and does not need to be routable between sites.

IP Assignment ☒ Static ☐ DHCP

IPv4 Address (CIDR)

Gateway

Subnets (CIDR)  **+**

MTU

6. If you selected **Static**, follow these steps to configure the Admin Network:

a. Enter the static IPv4 address, using CIDR notation, for Management Port 1 on the appliance.

Management Port 1 is the left of the two 1-GbE RJ45 ports on the right end of the appliance.

b. Enter the gateway.

If your network does not have a gateway, re-enter the same static IPv4 address.

c. If you want to use jumbo frames, change the MTU field to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value of 1500.



The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.

- d. Click **Save**.

When you change the IP address, the gateway and list of subnets might also change.

If you lose your connection to the StorageGRID Appliance Installer, re-enter the URL using the new static IP address you just assigned. For example,

**https://appliance:8443**

- e. Confirm that the list of Admin Network subnets is correct.

You must verify that all subnets can be reached using the gateway you provided.



The default route can't be made to use the Admin Network gateway.

- To add a subnet, click the insert icon **+** to the right of the last entry.
- To remove an unused subnet, click the delete icon **x**.

- f. Click **Save**.

7. If you selected **DHCP**, follow these steps to configure the Admin Network:

- a. After you select the **DHCP** radio button, click **Save**.

The **IPv4 Address**, **Gateway**, and **Subnets** fields are automatically populated. If the DHCP server is set up to assign an MTU value, the **MTU** field is populated with that value, and the field becomes read-only.

Your web browser is automatically redirected to the new IP address for the StorageGRID Appliance Installer.

- b. Confirm that the list of Admin Network subnets is correct.

You must verify that all subnets can be reached using the gateway you provided.



The default route can't be made to use the Admin Network gateway.

- To add a subnet, click the insert icon **+** to the right of the last entry.
- To remove an unused subnet, click the delete icon **x**.

- c. If you want to use jumbo frames, change the MTU field to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value of 1500.



The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.

- d. Click **Save**.

8. To configure the Client Network, select either **Static** or **DHCP** in the **Client Network** section of the page.



To configure the Client Network, you enable the Client Network on the Link Configuration page.

## Client Network

The Client Network is an open network used to provide access to client applications, including S3 and Swift. The Client Network enables grid nodes to communicate with any subnet reachable through the Client Network gateway. The Client Network does not become operational until you complete the StorageGRID configuration steps.

IP Assignment ☒ Static ☐ DHCP

IPv4 Address (CIDR)

Gateway

MTU

9. If you selected **Static**, follow these steps to configure the Client Network:

- Enter the static IPv4 address, using CIDR notation.
- Click **Save**.
- Confirm that the IP address for the Client Network gateway is correct.



If the Client Network is enabled, the default route is displayed. The default route uses the Client Network gateway and can't be moved to another interface while the Client Network is enabled.

- If you want to use jumbo frames, change the MTU field to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value of 1500.



The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.

- Click **Save**.

10. If you selected **DHCP**, follow these steps to configure the Client Network:

- After you select the **DHCP** radio button, click **Save**.

The **IPv4 Address** and **Gateway** fields are automatically populated. If the DHCP server is set up to assign an MTU value, the **MTU** field is populated with that value, and the field becomes read-only.



Your web browser is automatically redirected to the new IP address for the StorageGRID Appliance Installer.

- b. Confirm that the gateway is correct.



If the Client Network is enabled, the default route is displayed. The default route uses the Client Network gateway and can't be moved to another interface while the Client Network is enabled.

- c. If you want to use jumbo frames, change the MTU field to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value of 1500.



The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.

## Verify network connections

You should confirm you can access the StorageGRID networks you are using from the appliance. To validate routing through network gateways, you should test connectivity between the StorageGRID Appliance Installer and IP addresses on different subnets. You can also verify the MTU setting.

### Steps

1. From the menu bar of the StorageGRID Appliance Installer, click **Configure Networking > Ping and MTU Test**.

The Ping and MTU Test page appears.

### Ping and MTU Test

Use a ping request to check the appliance's connectivity to a remote host. Select the network you want to check connectivity through, and enter the IP address of the host you want to reach. To verify the MTU setting for the entire path through the network to the destination, select Test MTU.

#### Ping and MTU Test

Network

Destination IPv4 Address or FQDN

Test MTU ☐

2. From the **Network** drop-down box, select the network you want to test: Grid, Admin, or Client.
3. Enter the IPv4 address or fully qualified domain name (FQDN) for a host on that network.

For example, you might want to ping the gateway on the network or the primary Admin Node.

4. Optionally, select the **Test MTU** checkbox to verify the MTU setting for the entire path through the network to the destination.

For example, you can test the path between the appliance node and a node at a different site.

5. Click **Test Connectivity**.

If the network connection is valid, the "Ping test passed" message appears, with the ping command output listed.

### Ping and MTU Test

Use a ping request to check the appliance's connectivity to a remote host. Select the network you want to check connectivity through, and enter the IP address of the host you want to reach. To verify the MTU setting for the entire path through the network to the destination, select Test MTU.

#### Ping and MTU Test

Network	<input type="text" value="Grid"/>
Destination IPv4 Address or FQDN	<input type="text" value="10.96.104.223"/>
Test MTU	<input checked="" type="checkbox"/>
<input type="button" value="Test Connectivity"/>	

Ping test passed

#### Ping command output

```
PING 10.96.104.223 (10.96.104.223) 1472(1500) bytes of data.  
1480 bytes from 10.96.104.223: icmp_seq=1 ttl=64 time=0.318 ms  
  
--- 10.96.104.223 ping statistics ---  
1 packets transmitted, 1 received, 0% packet loss, time 0ms  
rtt min/avg/max/mdev = 0.318/0.318/0.318/0.000 ms  
  
Found MTU 1500 for 10.96.104.223 via br0
```

### Related information

- [Configure network links](#)
- [Change MTU setting](#)

### Verify port-level network connections

To ensure that access between the StorageGRID Appliance Installer and other nodes is not obstructed by firewalls, confirm that the StorageGRID Appliance Installer can connect to a specific TCP port or set of ports at the specified IP address or range of addresses.

### About this task

Using the list of ports provided in the StorageGRID Appliance Installer, you can test the connectivity between the appliance and the other nodes in your Grid Network.

Additionally, you can test connectivity on the Admin and Client Networks and on UDP ports, such as those used for external NFS or DNS servers. For a list of these ports, see the [network port reference](#).



The Grid Network ports listed in the port connectivity table are valid only for StorageGRID version 11.7.0. To verify which ports are correct for each node type, you should always consult the networking guidelines for your version of StorageGRID.

Steps

1. From the StorageGRID Appliance Installer, click **Configure Networking > Port Connectivity Test (nmap)**.

The Port Connectivity Test page appears.

The port connectivity table lists node types that require TCP connectivity on the Grid Network. For each node type, the table lists the Grid Network ports that should be accessible to your appliance.

You can test the connectivity between the appliance ports listed in the table and the other nodes in your Grid Network.

2. From the **Network** drop-down, select the network you want to test: **Grid**, **Admin**, or **Client**.
3. Specify a range of IPv4 addresses for the hosts on that network.

For example, you might want to probe the gateway on the network or the primary Admin Node.

Specify a range using a hyphen, as shown in the example.

4. Enter a TCP port number, a list of ports separated by commas, or a range of ports.

Port Connectivity Test

Network

Grid

IPv4 Address Ranges

10.224.6.160-161

Port Ranges

22,2022

Protocol

☒ TCP

☐ UDP

Test Connectivity

5. Click **Test Connectivity**.
  - If the selected port-level network connections are valid, the “Port connectivity test passed” message appears in a green banner. The nmap command output is listed below the banner.

Port connectivity test passed

Nmap command output. Note: Unreachable hosts will not appear in the output.

```
# Nmap 7.70 scan initiated Fri Nov 13 18:32:03 2020 as: /usr/bin/nmap -n -oN - -e br0 -p 22,2022 10.224.6.160-161
Nmap scan report for 10.224.6.160
Host is up (0.00072s latency).

PORT      STATE SERVICE
22/tcp    open  ssh
2022/tcp  open  down

Nmap scan report for 10.224.6.161
Host is up (0.00060s latency).

PORT      STATE SERVICE
22/tcp    open  ssh
2022/tcp  open  down

# Nmap done at Fri Nov 13 18:32:04 2020 -- 2 IP addresses (2 hosts up) scanned in 0.55 seconds
```

- If a port-level network connection is made to the remote host, but the host is not listening on one or more of the selected ports, the “Port connectivity test failed” message appears in a yellow banner. The nmap command output is listed below the banner.

Any remote port the host is not listening to has a state of “closed.” For example, you might see this yellow banner when the node you are trying to connect to is in a pre-installed state and the StorageGRID NMS service is not yet running on that node.

 Port connectivity test failed

Connection not established. Services might not be listening on target ports.

Nmap command output. Note: Unreachable hosts will not appear in the output.

```
# Nmap 7.70 scan initiated Sat May 16 17:07:02 2020 as: /usr/bin/nmap -n -oN - -e br0 -p 22,80,443,1504,1505,1506,1508,7443,9999
Nmap scan report for 172.16.4.71
Host is up (0.00020s latency).

PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http
443/tcp    open  https
1504/tcp  closed evb-elm
1505/tcp  open  funkproxy
1506/tcp  open  utcd
1508/tcp  open  diagmond
7443/tcp  open  oracleas-https
9999/tcp  open  abyss
MAC Address: 00:50:56:87:39:AE (VMware)

# Nmap done at Sat May 16 17:07:03 2020 -- 1 IP address (1 host up) scanned in 0.59 seconds
```

- If a port-level network connection can’t be made for one or more selected ports, the “Port connectivity test failed” message appears in a red banner. The nmap command output is listed below the banner.

The red banner indicates that a TCP connection attempt to a port on the remote host was made, but nothing was returned to the sender. When no response is returned, the port has a state of “filtered” and is likely blocked by a firewall.



Ports with “closed” are also listed.

❗ Port connectivity test failed  
Connection failed to one or more ports.

Nmap command output. Note: Unreachable hosts will not appear in the output.

```
# Nmap 7.70 scan initiated Sat May 16 17:11:01 2020 as: /usr/bin/nmap -n -oN - -e br0 -p 22,79,80,443,1504,1505,1506,1508,7443,9999 172.16.4.71
Nmap scan report for 172.16.4.71
Host is up (0.00029s latency).

PORT      STATE      SERVICE
22/tcp    open       ssh
79/tcp    filtered   finger
80/tcp    open       http
443/tcp   open       https
1504/tcp   closed     evb-elm
1505/tcp   open       funkproxy
1506/tcp   open       utcd
1508/tcp   open       diagmond
7443/tcp   open       oracleas-https
9999/tcp   open       abyss
MAC Address: 00:50:56:87:39:AE (VMware)

# Nmap done at Sat May 16 17:11:02 2020 -- 1 IP address (1 host up) scanned in 1.60 seconds
```

## Configure SANtricity System Manager (SG6000 and SG5700)

You can use SANtricity System Manager to monitor the status of the storage controllers, storage disks, and other hardware components in the storage controller shelf. You can also configure a proxy for E-Series AutoSupport that enables you to send AutoSupport messages from the appliance without the use of the management port.

### Set up and access SANtricity System Manager

You might need to access SANtricity System Manager on the storage controller to monitor the hardware in the storage controller shelf or to configure E-Series AutoSupport.

#### Before you begin

- You are using a [supported web browser](#).
- To access SANtricity System Manager through Grid Manager, you have installed StorageGRID, and you have the Storage appliance administrator permission or Root access permission.
- To access SANtricity System Manager using the StorageGRID Appliance Installer, you have the SANtricity System Manager administrator username and password.
- To access SANtricity System Manager directly using a web browser, you have the SANtricity System Manager administrator username and password.



You must have SANtricity firmware 8.70 or higher to access SANtricity System Manager using the Grid Manager or the StorageGRID Appliance Installer. You can check your firmware version by using the StorageGRID Appliance Installer and selecting **Help > About**.



Accessing SANtricity System Manager from the Grid Manager or from the Appliance Installer is generally meant only for monitoring your hardware and configuring E-Series AutoSupport. Many features and operations within SANtricity System Manager such as upgrading firmware don't apply to monitoring your StorageGRID appliance. To avoid issues, always follow the hardware installation and maintenance instructions for your appliance.

#### About this task

There are three ways to access SANtricity System Manager, depending upon what stage of the installation and

configuration process you are in:

- If the appliance has not yet been deployed as a node in your StorageGRID system, you should use the Advanced tab in the StorageGRID Appliance Installer.



Once the node is deployed, you can no longer use the StorageGRID Appliance Installer to access SANtricity System Manager.

- If the appliance has been deployed as a node in your StorageGRID system, use the SANtricity System Manager tab on the Nodes page in Grid Manager.
- If you can't use the StorageGRID Appliance Installer or Grid Manager, you can access SANtricity System Manager directly using a web browser connected to the management port.

This procedure includes steps for your initial access to SANtricity System Manager. If you have already set up SANtricity System Manager, go to the [configure hardware alerts step](#).



Using either the Grid Manager or the StorageGRID Appliance Installer enables you to access SANtricity System Manager without having to configure or connect the management port of the appliance.

You use SANtricity System Manager to monitor the following:

- Performance data such as storage array level performance, I/O latency, CPU utilization, and throughput
- Hardware component status
- Support functions including viewing diagnostic data

You can use SANtricity System Manager to configure the following settings:

- Email alerts, SNMP alerts, or syslog alerts for the components in the storage controller shelf
- E-Series AutoSupport settings for the components in the storage controller shelf.

For additional details on E-Series AutoSupport, see the [NetApp E-Series Systems Documentation Site](#).

- Drive Security keys, which are needed to unlock secured drives (this step is required if the Drive Security feature is enabled)
- Administrator password for accessing SANtricity System Manager

## Steps

1. Do one of the following:

- Use the StorageGRID Appliance Installer and select **Advanced > SANtricity System Manager**
- Use the Grid Manager and select **NODES > *appliance Storage Node* > SANtricity System Manager**



If these options aren't available or the login page does not appear, use the [IP addresses for the storage controllers](#). Access SANtricity System Manager by browsing to the storage controller IP.

2. Set or enter the administrator password.

SANtricity System Manager uses a single administrator password that is shared among all users.

[More \(10 total\) >](#)**1** Welcome**2** Verify Hardware**3** Verify Hosts**4** Select Applications**5** Define Workloads**6** Activate

Welcome to the SANtricity® System Manager! With System Manager, you can...

- Configure your storage array and set up alerts.
- Monitor and troubleshoot any problems when they occur.
- Keep track of how your system is performing in real time.

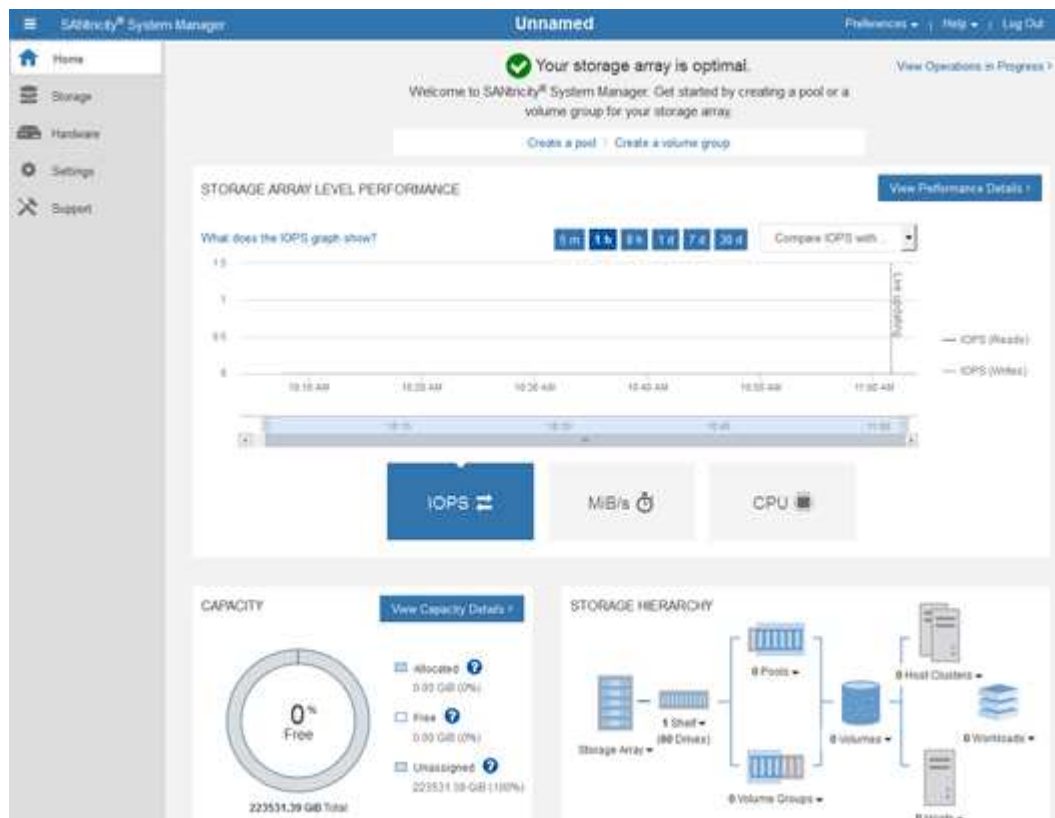
Cancel

Next &gt;

3. Select **Cancel** to close the wizard.



Don't complete the Set Up wizard for a StorageGRID appliance.



4. Configure hardware alerts.

- Select **Help** to access the online help for SANtricity System Manager.
- Use the **Settings > Alerts** section of the online help to learn about alerts.



- c. Follow the “How To” instructions to set up email alerts, SNMP alerts, or syslog alerts.
5. Manage AutoSupport for the components in the storage controller shelf.
  - a. Select **Help** to access the online help for SANtricity System Manager.
  - b. Use the **SUPPORT > Support Center** section of the online help to learn about the AutoSupport feature.
  - c. Follow the “How To” instructions to manage AutoSupport.

For specific instructions on configuring a StorageGRID proxy for sending E-Series AutoSupport messages without using the management port, go to the [instructions for configuring storage proxy settings](#).

- c. Follow the “How To” instructions to manage AutoSupport.
6. If the Drive Security feature is enabled for the appliance, create and manage the security key.
  - a. Select **Help** to access the online help for SANtricity System Manager.
  - b. Use the **Settings > System > Security key management** section of the online help to learn about Drive Security.
  - c. Follow the “How To” instructions to create and manage the security key.
7. Optionally, change the administrator password.
  - a. Select **Help** to access the online help for SANtricity System Manager.
  - b. Use the **Home > Storage array administration** section of the online help to learn about the administrator password.
  - c. Follow the “How To” instructions to change the password.

### Review hardware status in SANtricity System Manager

You can use SANtricity System Manager to monitor and manage the individual hardware components in the storage controller shelf and to review hardware diagnostic and environmental information, such as component temperatures, as well as issues related to the drives.

### Before you begin

- You are using a [supported web browser](#).
- To access SANtricity System Manager through Grid Manager, you have the Storage appliance administrator permission or Root access permission.
- To access SANtricity System Manager using the StorageGRID Appliance Installer, you have the SANtricity System Manager administrator username and password.
- To access SANtricity System Manager directly using a web browser, you have the SANtricity System Manager administrator username and password.



You must have SANtricity firmware 8.70 or higher to access SANtricity System Manager using the Grid Manager or the StorageGRID Appliance Installer.



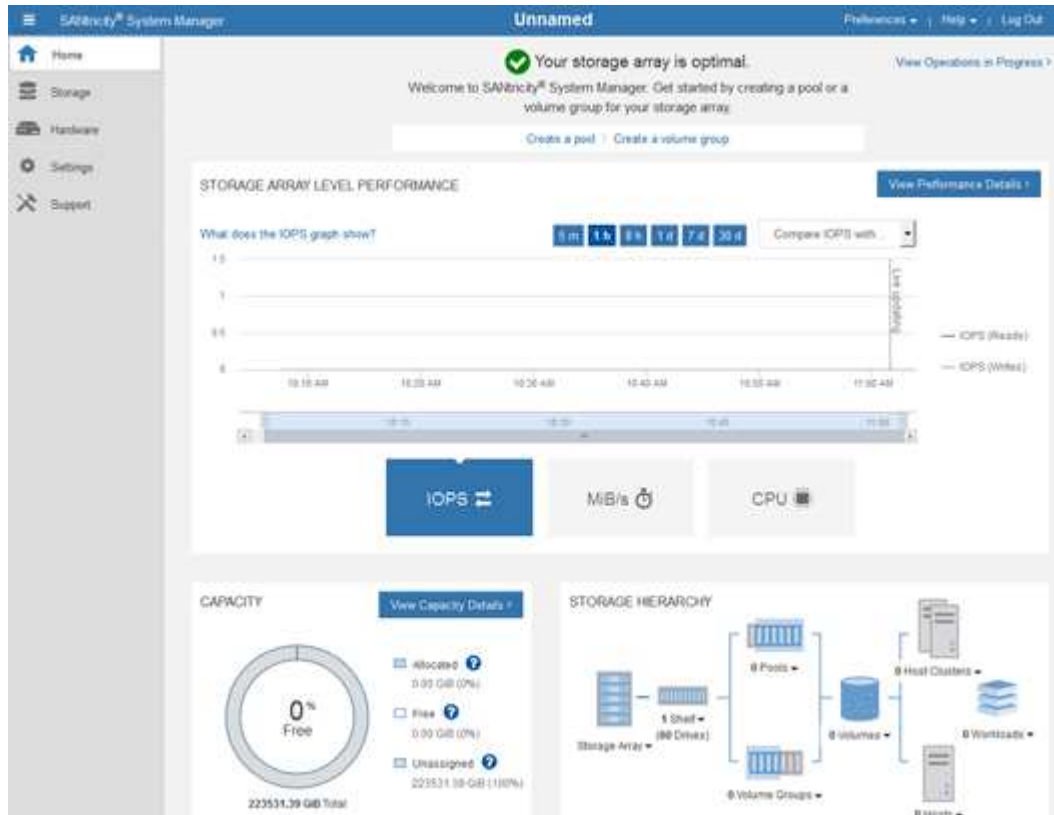
Accessing SANtricity System Manager from the Grid Manager or from the Appliance Installer is generally meant only for monitoring your hardware and configuring E-Series AutoSupport. Many features and operations within SANtricity System Manager such as upgrading firmware don't apply to monitoring your StorageGRID appliance. To avoid issues, always follow the hardware installation and maintenance instructions for your appliance.

### Steps

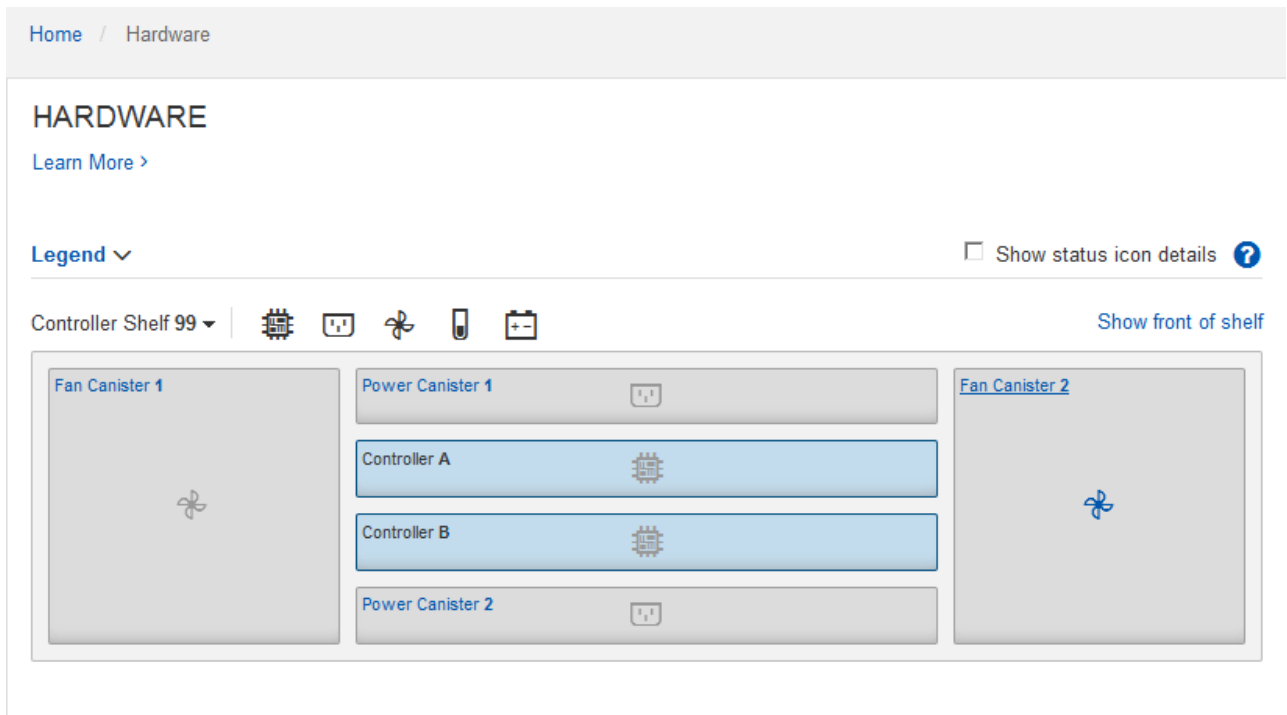


1. [Access SANtricity System Manager.](#)
2. Enter the administrator username and password if required.
3. Click **Cancel** to close the Set Up wizard and to display the SANtricity System Manager home page.

The SANtricity System Manager home page appears. In SANtricity System Manager, the controller shelf is referred to as a storage array.



4. Review the information displayed for appliance hardware and confirm that all hardware components have a status of Optimal.
  - a. Click the **Hardware** tab.
  - b. Click **Show back of shelf**.



From the back of the shelf, you can view both storage controllers, the battery in each storage controller, the two power canisters, the two fan canisters, and expansion shelves (if any). You can also view component temperatures.

- c. To see the settings for each storage controller, select the controller, and select **View settings** from the context menu.
- d. To see the settings for other components in the back of the shelf, select the component you want to view.
- e. Click **Show front of shelf**, and select the component you want to view.

From the front of the shelf, you can view the drives and the drive drawers for the storage controller shelf or the expansion shelves (if any).

If the status of any component is Needs Attention, follow the steps in the Recovery Guru to resolve the issue or contact technical support.

### Set IP addresses for storage controllers using StorageGRID Appliance Installer

Management port 1 on each storage controller connects the appliance to the management network for SANtricity System Manager. If you can't access SANtricity System Manager from the StorageGRID Appliance Installer, set a static IP address for each storage controller to ensure that you don't lose your management connection to the hardware and the controller firmware in the controller shelf.

#### Before you begin

- You are using any management client that can connect to the StorageGRID Admin Network, or you have a service laptop.
- The client or service laptop has a supported web browser.

#### About this task

DHCP-assigned addresses can change at any time. Assign static IP addresses to the controllers to ensure consistent accessibility.



Follow this procedure only if you don't have access to SANtricity System Manager from the StorageGRID Appliance Installer (**Advanced** > **SANtricity System Manager**) or Grid Manager (**NODES** > **SANtricity System Manager**).

## Steps

1. From the client, enter the URL for the StorageGRID Appliance Installer:

**`https://Appliance_Controller_IP:8443`**

For *Appliance\_Controller\_IP*, use the IP address for the appliance on any StorageGRID network.

The StorageGRID Appliance Installer Home page appears.

2. Select **Configure Hardware** > **Storage Controller Network Configuration**.

The Storage Controller Network Configuration page appears.

3. Depending on your network configuration, select **Enabled** for IPv4, IPv6, or both.

4. Make a note of the IPv4 address that is automatically displayed.

DHCP is the default method for assigning an IP address to the storage controller management port.



It might take a few minutes for the DHCP values to appear.

IPv4 Address Assignment    ☐ Static    ☒ DHCP

IPv4 Address (CIDR)	10.224.5.166/21
Default Gateway	10.224.0.1

5. Optionally, set a static IP address for the storage controller management port.



You should either assign a static IP for the management port or assign a permanent lease for the address on the DHCP server.

- a. Select **Static**.
- b. Enter the IPv4 address, using CIDR notation.
- c. Enter the default gateway.

IPv4 Address Assignment    ☒ Static    ☐ DHCP

IPv4 Address (CIDR)	10.224.2.200/21
Default Gateway	10.224.0.1

- d. Click **Save**.

It might take a few minutes for your changes to be applied.

When you connect to SANtricity System Manager, you will use the new static IP address as the URL:  
**`https://Storage_Controller_IP`**

## Configure BMC interface (SGF6112, SG6000, SG100, and SG1000)

### BMC interface: Overview (SGF6112, SG6000, SG100, and SG1000)

The user interface for the baseboard management controller (BMC) on the SGF6112, SG6000, or services appliance provides status information about the hardware and allows you to configure SNMP settings and other options for the appliances.

Use the following procedures in this section to configure the BMC when you install the appliance:

- [Change root password for BMC interface](#)
- [Set IP address for BMC management port](#)
- [Access BMC interface](#)
- [Configure SNMP settings](#)
- [Set up email notifications for BMC alerts](#)

If the appliance has already been installed into a grid and is running StorageGRID software, use the following procedures:



- [Place the appliance into maintenance mode](#) to access the StorageGRID appliance installer.
- See [Set IP address for BMC management port](#) for information about accessing the BMC interface using the StorageGRID Appliance Installer.

### Change root password for BMC interface

For security, you must change the password for the BMC's root user.

#### Before you begin

The management client is using a [supported web browser](#).

#### About this task

When you first install the appliance, the BMC uses a default password for the root user. You must change the password for the root user to secure your system.

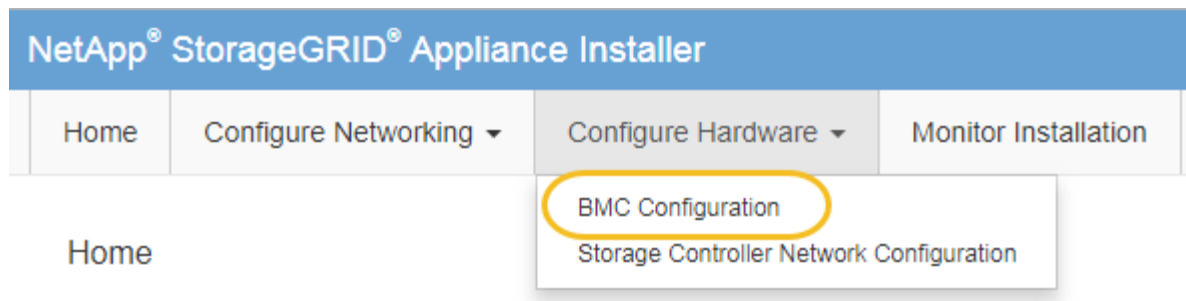
#### Steps

1. From the client, enter the URL for the StorageGRID Appliance Installer:  
**`https://Appliance_IP:8443`**

For *Appliance\_IP*, use the IP address for the appliance on any StorageGRID network.

The StorageGRID Appliance Installer Home page appears.

2. Select **Configure Hardware > BMC Configuration**.



The Baseboard Management Controller Configuration page appears.

3. Enter a new password for the root account in the two fields provided.

## Baseboard Management Controller Configuration

### User Settings

Root Password	<input type="password" value="....."/>
Confirm Root Password	<input type="password" value="....."/>

4. Click **Save**.

### Set IP address for BMC management port

Before you can access the BMC interface, configure the IP address for the BMC management port on the SGF6112, SG6000-CN controller, or services appliances.

If you are using ConfigBuilder to generate a JSON file, you can configure IP addresses automatically. See [Automate appliance installation and configuration](#).

### Before you begin

- The management client is using a [supported web browser](#).
- You are using any management client that can connect to a StorageGRID network.
- The BMC management port is connected to the management network you plan to use.

#### SG6112



#### SG6000



#### SG1000



#### SG100



#### About this task

For support purposes, the BMC management port allows low-level hardware access.



You should only connect this port to a secure, trusted, internal management network. If no such network is available, leave the BMC port unconnected or blocked, unless a BMC connection is requested by technical support.

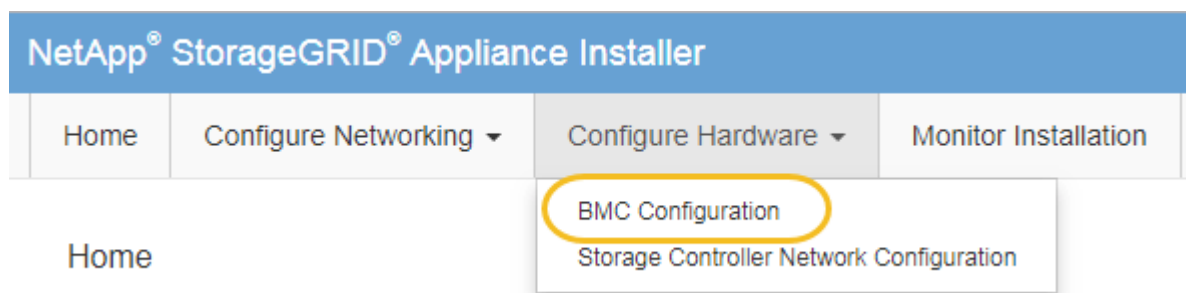
#### Steps

1. From the client, enter the URL for the StorageGRID Appliance Installer:  
**`https://Appliance_IP:8443`**

For `Appliance_IP`, use the IP address for the appliance on any StorageGRID network.

The StorageGRID Appliance Installer Home page appears.

2. Select **Configure Hardware > BMC Configuration**.



The Baseboard Management Controller Configuration page appears.

3. Make a note of the IPv4 address that is automatically displayed.

DHCP is the default method for assigning an IP address to this port.



It might take a few minutes for the DHCP values to appear.

#### Baseboard Management Controller Configuration

##### LAN IP Settings

IP Assignment	<input type="radio"/> Static <input checked="" type="radio"/> DHCP
MAC Address	d8:c4:97:28:50:62
IPv4 Address (CIDR)	10.224.3.225/21
Default gateway	10.224.0.1

Cancel	Save
--------	------

4. Optionally, set a static IP address for the BMC management port.



You should either assign a static IP for the BMC management port or assign a permanent lease for the address on the DHCP server.

- a. Select **Static**.
- b. Enter the IPv4 address, using CIDR notation.
- c. Enter the default gateway.

#### Baseboard Management Controller Configuration

##### LAN IP Settings

IP Assignment	<input checked="" type="radio"/> Static <input type="radio"/> DHCP
MAC Address	d8:c4:97:28:50:62
IPv4 Address (CIDR)	10.224.3.225/21
Default gateway	10.224.0.1

Cancel	Save
--------	------

- d. Click **Save**.

It might take a few minutes for your changes to be applied.



## Access BMC interface

You can access the BMC interface using the DHCP or static IP address for the BMC management port on the following appliance models:

- SGF6112
- SG6000
- SG1000
- SG100

### Before you begin

- The management client is using a [supported web browser](#).
- The BMC management port on the appliance is connected to the management network you plan to use.

#### SGF6112



#### SG6000



#### SG1000



#### SG100



### Steps

1. Enter the URL for the BMC interface:

**`https://BMC_Port_IP`**

For *BMC\_Port\_IP*, use the DHCP or static IP address for the BMC management port.

The BMC sign-in page appears.





If you haven't yet configured BMC\_Port\_IP, follow the instructions in [Configure BMC interface](#). If you are unable to follow that procedure due to a hardware problem, and have not yet configured a BMC IP address, you might still be able to access the BMC. By default, the BMC obtains an IP address using DHCP. If DHCP is enabled on the BMC network, your network administrator can provide the IP address assigned to the BMC MAC, which is printed on the label on the front of the appliance. If DHCP is not enabled on the BMC network, the BMC will not respond after a few minutes and assign itself the default static IP 192.168.0.120. You might need to connect your laptop directly to the BMC port, and change the networking setting to assign your laptop an IP such as 192.168.0.200/24, in order to browse to 192.168.0.120.

2. Enter the root username and password, using the password you set when you [changed the default root password](#):

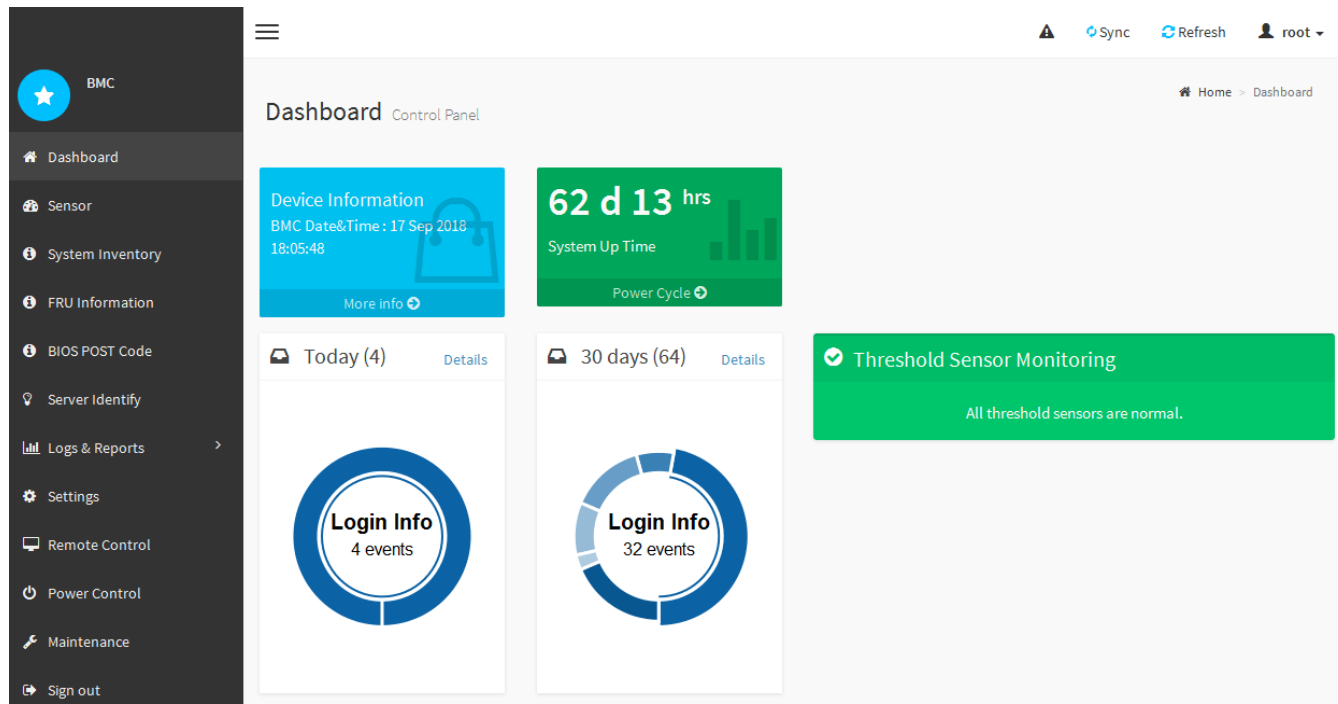


☐ Remember Username

**Sign me in**

[I forgot my password](#)

3. Select **Sign me in**.



- Optionally, create additional users by selecting **Settings > User Management** and clicking on any “disabled” user.



When users sign in for the first time, they might be prompted to change their password for increased security.

## Configure SNMP settings for BMC

If you are familiar with configuring SNMP for hardware, you can use the BMC interface to configure the SNMP settings for the SGF6112, SG6000, and services appliances. You can provide secure community strings, enable SNMP Trap, and specify up to five SNMP destinations.

### Before you begin

- You know how to access the BMC dashboard.
- You have experience in configuring SNMP settings for SNMPv1-v2c equipment.



BMC settings made by this procedure might not be preserved if the appliance fails and has to be replaced. Make sure you have a record of all settings you have applied, so they can be easily reapplied after a hardware replacement if necessary.

### Steps

- From the BMC dashboard, select **Settings > SNMP Settings**.
- On the SNMP Settings page, select **Enable SNMP V1/V2**, and then provide a Read-Only Community String and a Read-Write Community String.

The Read-Only Community String is like a user ID or password. You should change this value to prevent intruders from getting information about your network setup. The Read-Write Community String protects the device against unauthorized changes.

3. Optionally, select **Enable Trap**, and enter the required information.



Enter the Destination IP for each SNMP trap using an IP address. Fully qualified domain names aren't supported.

Enable traps if you want the appliance to send immediate notifications to an SNMP console when it is in an unusual state. Depending on the device, traps might indicate hardware failures of various components, link up/down conditions, temperature thresholds being exceeded, or high traffic.

4. Optionally, click **Send Test Trap** to test your settings.

5. If the settings are correct, click **Save**.

## Set up email notifications for BMC alerts

If you want email notifications to be sent when alerts occur, use the BMC interface to configure SMTP settings, users, LAN destinations, alert policies, and event filters.



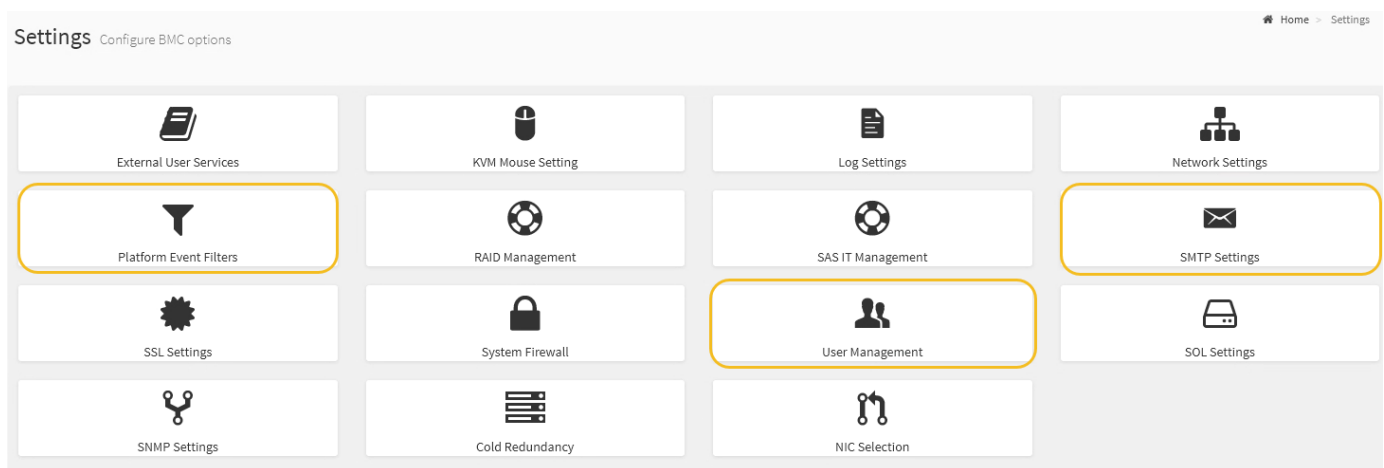
BMC settings made by this procedure might not be preserved if the SG6000-CN controller or services appliance fails and has to be replaced. Make sure you have a record of all settings you have applied, so they can be easily reapplied after a hardware replacement if necessary.

## Before you begin

You know how to access the BMC dashboard.

## About this task

In the BMC interface, you use the **SMTP Settings**, **User Management**, and **Platform Event Filters** options on the Settings page to configure email notifications.



## Steps

1. [Configure SNMP settings for BMC](#).

- Select **Settings > SMTP Settings**.
- For Sender Email ID, enter a valid email address.

This email address is provided as the From address when the BMC sends email.

2. Set up users to receive alerts.

- a. From the BMC dashboard, select **Settings > User Management**.
- b. Add at least one user to receive alert notifications.

The email address you configure for a user is the address the BMC sends alert notifications to. For example, you could add a generic user, such as “notification-user,” and use the email address of a technical support team email distribution list.

3. Configure the LAN destination for alerts.
  - a. Select **Settings > Platform Event Filters > LAN Destinations**.
  - b. Configure at least one LAN destination.
    - Select **Email** as the Destination Type.
    - For BMC Username, select a user name that you added earlier.
    - If you added multiple users and want all of them to receive notification emails, add a LAN Destination for each user.
  - c. Send a test alert.
4. Configure alert policies so you can define when and where the BMC sends alerts.
  - a. Select **Settings > Platform Event Filters > Alert Policies**.
  - b. Configure at least one alert policy for each LAN destination.
    - For Policy Group Number, select **1**.
    - For Policy Action, select **Always send alert to this destination**.
    - For LAN Channel, select **1**.
    - In the Destination Selector, select the LAN destination for the policy.
5. Configure event filters to direct alerts for different event types to the appropriate users.
  - a. Select **Settings > Platform Event Filters > Event Filters**.
  - b. For Alert Policy Group Number, enter **1**.
  - c. Create filters for every event you want the Alert Policy Group to be notified about.
    - You can create event filters for power actions, specific sensor events, or all events.
    - If you are uncertain which events to monitor, select **All Sensors** for Sensor Type and **All Events** for Event Options. If you receive unwanted notifications, you can change your selections later.

## Optional: Enable node encryption

If you enable node encryption, the disks in your appliance can be protected by secure key management server (KMS) encryption against physical loss or removal from the site. You must select and enable node encryption during appliance installation. You can't disable node encryption after the KMS encryption process starts.

If you are using ConfigBuilder to generate a JSON file, you can enable node encryption automatically. See [Automate appliance installation and configuration](#).

### Before you begin

Review the information about [configuring KMS](#).

### About this task

An appliance that has node encryption enabled connects to the external key management server (KMS) that is configured for the StorageGRID site. Each KMS (or KMS cluster) manages the encryption keys for all appliance nodes at the site. These keys encrypt and decrypt the data on each disk in an appliance that has node encryption enabled.

A KMS can be set up in Grid Manager before or after the appliance is installed in StorageGRID. See the information about KMS and appliance configuration in the instructions for administering StorageGRID for additional details.

- If a KMS is set up before installing the appliance, KMS-controlled encryption begins when you enable node encryption on the appliance and add it to a StorageGRID site where KMS is configured.
- If a KMS is not set up before you install the appliance, KMS-controlled encryption is performed on each appliance that has node encryption enabled as soon as a KMS is configured and available for the site that contains the appliance node.



When an appliance is installed with node encryption enabled, a temporary key is assigned. The data on the appliance is not protected until the appliance is connected to the Key Management System (KMS) and a KMS security key is set. See the [KMS appliance configuration overview](#) for additional information.

Without the KMS key needed to decrypt the disk, data on the appliance can't be retrieved and is effectively lost. This is the case whenever the decryption key can't be retrieved from the KMS. The key becomes inaccessible if a customer clears the KMS configuration, a KMS key expires, connection to the KMS is lost, or the appliance is removed from the StorageGRID system where its KMS keys are installed.

## Steps

1. Open a browser, and enter one of the IP addresses for the appliance's compute controller.

**`https://Controller_IP:8443`**

*Controller\_IP* is the IP address of the compute controller (not the storage controller) on any of the three StorageGRID networks.

The StorageGRID Appliance Installer Home page appears.



After the appliance has been encrypted with a KMS key, the appliance disks can't be decrypted without using the same KMS key.

2. Select **Configure Hardware > Node Encryption**.

NetApp® StorageGRID® Appliance Installer
Help

Home
Configure Networking
Configure Hardware
Monitor Installation
Advanced

Node Encryption

Node encryption allows you to use an external key management server (KMS) to encrypt all StorageGRID data on this appliance. If node encryption is enabled for the appliance and a KMS is configured for the site, you cannot access any data on the appliance unless the appliance can communicate with the KMS.

Encryption Status

⚠ You can only enable node encryption for an appliance during installation. You cannot enable or disable the node encryption setting after the appliance is installed.

Enable node encryption
☒

Save

Key Management Server Details

### 3. Select **Enable node encryption**.

Before appliance installation, you can clear **Enable node encryption** without risk of data loss. When the installation begins, the appliance node accesses the KMS encryption keys in your StorageGRID system and begins disk encryption. You can't disable node encryption after the appliance is installed.



After you add an appliance that has node encryption enabled to a StorageGRID site that has a KMS, you can't stop using KMS encryption for the node.

### 4. Select **Save**.

### 5. Deploy the appliance as a node in your StorageGRID system.

KMS-controlled encryption begins when the appliance accesses the KMS keys configured for your StorageGRID site. The installer displays progress messages during the KMS encryption process, which might take a few minutes depending on the number of disk volumes in the appliance.



Appliances are initially configured with a random non-KMS encryption key assigned to each disk volume. The disks are encrypted using this temporary encryption key, that is not secure, until the appliance that has node encryption enabled accesses the KMS keys configured for your StorageGRID site.

### After you finish

You can view node-encryption status, KMS details, and the certificates in use when the appliance node is in maintenance mode. See [Monitor node encryption in maintenance mode](#) for information.

## Optional: Change RAID mode

On some appliance models, you can change to a different RAID mode on the appliance to accommodate your storage and recovery requirements. You can only change the mode before deploying the appliance Storage Node.

If you are using ConfigBuilder to generate a JSON file, you can change the RAID mode automatically. See [Automate appliance installation and configuration](#).

### About this task

If supported by your appliance, you can choose one of the following volume configuration options:

- **Dynamic Disk Pools (DDP):** This mode uses two parity drives for every eight data drives. This is the default and recommended mode for all appliances. When compared to RAID 6, DDP delivers better system performance, reduced rebuild times after drive failures, and ease of management. DDP also provides drawer loss protection in SG5760 appliances.



DDP does not provide drawer loss protection in SG6060 appliances because of the two SSDs. Drawer loss protection is effective in any expansion shelves that are added to an SG6060.

- **DDP16:** This mode uses two parity drives for every 16 data drives, which results in higher storage efficiency compared to DDP. When compared to RAID 6, DDP16 delivers better system performance, reduced rebuild times after drive failures, ease of management, and comparable storage efficiency. To use DDP16 mode, your configuration must contain at least 20 drives. DDP16 does not provide drawer loss protection.
- **RAID6:** This mode uses two parity drives for every 16 or more data drives. It is a hardware protection scheme that uses parity stripes on each disk, and allows for two disk failures within the RAID set before any data is lost. To use RAID 6 mode, your configuration must contain at least 20 drives. Although RAID 6 can increase storage efficiency of the appliance when compared to DDP, it is not recommended for most StorageGRID environments.



If any volumes have already been configured or if StorageGRID was previously installed, changing the RAID mode causes the volumes to be removed and replaced. Any data on those volumes will be lost.

## SG6000

### Before you begin

- You are using any client that can connect to StorageGRID.
- The client has a [supported web browser](#).

### Steps

1. Open a browser, and enter one of the IP addresses for the appliance's compute controller.

**`https://Controller_IP:8443`**

*Controller\_IP* is the IP address of the compute controller (not the storage controller) on any of the three StorageGRID networks.

The StorageGRID Appliance Installer Home page appears.

2. Select **Advanced > RAID Mode**.
3. On the **Configure RAID Mode** page, select the desired RAID mode from the Mode drop-down list.
4. Click **Save**.

## SG5760

### Before you begin

- You have an SG5760 with 60 drives. If you have an SG5712, you must use the default DDP mode.
- You are using any client that can connect to StorageGRID.
- The client has a [supported web browser](#).

### Steps

1. Using the service laptop, open a web browser and access the StorageGRID Appliance Installer:

**`https://E5700SG_Controller_IP:8443`**

Where *E5700SG\_Controller\_IP* is any of the IP addresses for the E5700SG controller.

2. Select **Advanced > RAID Mode**.
3. On the **Configure RAID Mode** page, select the desired RAID mode from the Mode drop-down list.
4. Click **Save**.

### Related information

[NetApp E-Series Systems Documentation Site](#)

## Optional: Remap network ports for appliance

You can optionally remap the internal ports on an appliance node to different external ports. For example, you might need to remap ports because of a firewall issue.

### Before you begin

- You have previously accessed the StorageGRID Appliance Installer.

### About this task



You can't use remapped ports for load balancer endpoints. If you need to remove a remapped port, follow the steps in [Remove port remaps](#).

### Steps

1. From the StorageGRID Appliance Installer, select **Configure Networking > Remap Ports**.

The Remap Port page appears.

2. From the **Network** drop-down box, select the network for the port you want to remap: Grid, Admin, or Client.
3. From the **Protocol** drop-down box, select the IP protocol: TCP or UDP.
4. From the **Remap Direction** drop-down box, select which traffic direction you want to remap for this port: Inbound, Outbound, or Bi-directional.
5. For **Original Port**, enter the number of the port you want to remap.
6. For **Mapped-To Port**, enter the number of the port you want to use instead.
7. Select **Add Rule**.

The new port mapping is added to the table, and the remapping takes effect immediately.

8. To remove a port mapping, select the radio button for the rule you want to remove, and select **Remove Selected Rule**.

## Deploy appliance node

### Deploy appliance Storage Node

After installing and configuring the storage appliance, you can deploy it as a Storage Node in a StorageGRID system. When you deploy an appliance as a Storage Node, you use the StorageGRID Appliance Installer included on the appliance.

#### Before you begin

- If you are cloning an appliance node, continue following the [appliance node cloning](#) process.
- The appliance has been installed in a rack or cabinet, connected to your networks, and powered on.
- Network links, IP addresses, and port remapping (if necessary) have been configured for the appliance using the StorageGRID Appliance Installer.
- You know one of the IP addresses assigned to the appliance's compute controller. You can use the IP address for any attached StorageGRID network.
- The primary Admin Node for the StorageGRID system has been deployed.
- All Grid Network subnets listed on the IP Configuration page of the StorageGRID Appliance Installer have been defined in the Grid Network Subnet List on the primary Admin Node.
- You have a service laptop with a supported web browser.

#### About this task

Each storage appliance functions as a single Storage Node. Any appliance can connect to the Grid Network, the Admin Network, and the Client Network

To deploy an appliance Storage Node in a StorageGRID system, you access the StorageGRID Appliance

Installer and perform the following steps:

- You specify or confirm the IP address of the primary Admin Node and the name of the Storage Node.
- You start the deployment and wait as volumes are configured and the software is installed.
- When the installation pauses partway through the appliance installation tasks, you resume the installation by signing into the Grid Manager, approving all grid nodes, and completing the StorageGRID installation and deployment processes.



If you need to deploy multiple appliance nodes at one time, you can automate the installation process by using the `configure-sga.py` Appliance Installation script.

- If you are performing an expansion or recovery operation, follow the appropriate instructions:
  - To add an appliance Storage Node to an existing StorageGRID system, see the instructions for [adding grid nodes](#).
  - To deploy an appliance Storage Node as part of a recovery operation, see instructions [recovering an appliance Storage Node](#).

## Steps

1. Open a browser, and enter one of the IP addresses for the appliance's compute controller.  
**`https://Controller_IP:8443`**

The StorageGRID Appliance Installer Home page appears.

NetApp® StorageGRID® Appliance Installer

Home

Configure Networking ▾

Configure Hardware ▾

Monitor Installation

Advanced ▾

Home

The installation is ready to be started. Review the settings below, and then click Start Installation.

Primary Admin Node connection

Enable Admin Node discovery

☐

Primary Admin Node IP

172.16.4.210

Connection state

Connection to 172.16.4.210 ready

Cancel

Save

Node name

Node name

NetApp-SGA

Cancel

Save

Installation

Current state

Ready to start installation of NetApp-SGA into grid with Admin Node 172.16.4.210.

Start Installation

2. In the **Primary Admin Node connection** section, determine whether you need to specify the IP address for the primary Admin Node.

If you have previously installed other nodes in this data center, the StorageGRID Appliance Installer can discover this IP address automatically, assuming the primary Admin Node, or at least one other grid node with ADMIN\_IP configured, is present on the same subnet.

3. If this IP address is not shown or you need to change it, specify the address:

Option	Description
Manual IP entry	<ol style="list-style-type: none"> <li>Clear the <b>Enable Admin Node discovery</b> checkbox.</li> <li>Enter the IP address manually.</li> <li>Click <b>Save</b>.</li> <li>Wait for the connection state for the new IP address to become ready.</li> </ol>
Automatic discovery of all connected primary Admin Nodes	<ol style="list-style-type: none"> <li>Select the <b>Enable Admin Node discovery</b> checkbox.</li> <li>Wait for the list of discovered IP addresses to be displayed.</li> <li>Select the primary Admin Node for the grid where this appliance Storage Node will be deployed.</li> <li>Click <b>Save</b>.</li> <li>Wait for the connection state for the new IP address to become ready.</li> </ol>

- In the **Node name** field, provide the system name you want to use for this appliance node, and click **Save**.

The name that appears here will be the appliance node's system name. System names are required for internal StorageGRID operations and can't be changed.

- In the **Installation** section, confirm that the current state is "Ready to start installation of *node name* into grid with primary Admin Node *admin\_ip*" and that the **Start Installation** button is enabled.

If the **Start Installation** button is not enabled, you might need to change the network configuration or port settings. For instructions, see the maintenance instructions for your appliance.



If you are deploying the Storage Node appliance as a node cloning target, stop the deployment process here and continue the [node cloning procedure](#).

- From the StorageGRID Appliance Installer home page, click **Start Installation**.

The Current state changes to "Installation is in progress," and the Monitor Installation page is displayed.



If you need to access the Monitor Installation page manually, click **Monitor Installation**.

- If your grid includes multiple appliance Storage Nodes, repeat these steps for each appliance.



If you need to deploy multiple appliance Storage Nodes at one time, you can automate the installation process by using the `configure-sga.py` Appliance Installation script.

## Deploy services appliance node

You can deploy a services appliance as a primary Admin Node, a non-primary Admin Node, or a Gateway Node. Both the SG100 and the SG1000 appliances can operate as Gateway Nodes and Admin Nodes (primary or non-primary) at the same time.

## Deploy services appliance as primary Admin Node

When you deploy a services appliance as a primary Admin Node, you use the StorageGRID Appliance Installer included on the appliance to install the StorageGRID software, or you upload the software version you want to install. You must install and configure the primary Admin Node before you install any other appliance node types. A primary Admin Node can connect to the Grid Network, and to the optional Admin Network and Client Network, if one or both are configured.

### Before you begin

- The appliance has been installed in a rack or cabinet, connected to your networks, and powered on.
- Network links, IP addresses, and port remapping (if necessary) have been configured for the appliance using the StorageGRID Appliance Installer.
- You have a service laptop with a [supported web browser](#).
- You know one of the IP addresses assigned to the appliance. You can use the IP address for any attached StorageGRID network.

### About this task

To install StorageGRID on an appliance primary Admin Node:

- You use the StorageGRID Appliance Installer to install the StorageGRID software. If you want to install a different version of the software, you first upload it using the StorageGRID Appliance Installer.
- You wait as the software is installed.
- When the software has been installed, the appliance is rebooted automatically.

### Steps

1. Open a browser, and enter the IP address for the appliance.  
**`https://services_appliance_IP:8443`**

The StorageGRID Appliance Installer Home page appears.

2. In the **This Node** section, select **Primary Admin**.
3. In the **Node name** field, enter the name you want to use for this appliance node, and click **Save**.

The node name is assigned to this appliance node in the StorageGRID system. It is shown on the Grid Nodes page in the Grid Manager.

4. Optionally, to install a different version of the StorageGRID software, follow these steps:

- a. Download the installation archive:

[NetApp Downloads: StorageGRID Appliance](#)

- b. Extract the archive.
- c. From the StorageGRID Appliance Installer, select **Advanced > Upload StorageGRID Software**.
- d. Click **Remove** to remove the current software package.

NetApp® StorageGRID® Appliance Installer

Home
Configure Networking ▼
Configure Hardware ▼
Monitor Installation
Advanced ▼

### Upload StorageGRID Software

If this node is the primary Admin Node of a new deployment, you must use this page to upload the StorageGRID software installation package, unless the version of the software you want to install has already been uploaded. If you are adding this node to an existing deployment, you can avoid network traffic by uploading the installation package that matches the software version running on the existing grid. If you do not upload the correct package, the node obtains the software from the grid's primary Admin Node during installation.

#### Current StorageGRID Installation Software

Version	11.3.0
Package Name	storagegrid-webscale-images-11-3-0_11.3.0-20190806.1731.4064510_amd64.deb

Remove

- e. Click **Browse** for the software package you downloaded and extracted, and then click **Browse** for the checksum file.

NetApp® StorageGRID® Appliance Installer

Home
Configure Networking ▼
Configure Hardware ▼
Monitor Installation
Advanced ▼

### Upload StorageGRID Software

If this node is the primary Admin Node of a new deployment, you must use this page to upload the StorageGRID software installation package, unless the version of the software you want to install has already been uploaded. If you are adding this node to an existing deployment, you can avoid network traffic by uploading the installation package that matches the software version running on the existing grid. If you do not upload the correct package, the node obtains the software from the grid's primary Admin Node during installation.

#### Current StorageGRID Installation Software

Version	None
Package Name	None

#### Upload StorageGRID Installation Software

Software Package	Browse
Checksum File	Browse

- f. Select **Home** to return to the Home page.

5. Confirm that the current state is “Ready to start installation of primary Admin Node name with software version x.y” and that the **Start Installation** button is enabled.



If you are deploying the Admin Node appliance as a node cloning target, stop the deployment process here and continue the [node cloning procedure](#).

6. From the StorageGRID Appliance Installer home page, click **Start Installation**.

The Current state changes to “Installation is in progress,” and the Monitor Installation page is displayed.



If you need to access the Monitor Installation page manually, click **Monitor Installation** from the menu bar.

## Deploy services appliance as Gateway or non-primary Admin Node

When you deploy a services appliance as a Gateway Node or non-primary Admin Node, you use the StorageGRID Appliance Installer included on the appliance.

### Before you begin

- The appliance has been installed in a rack or cabinet, connected to your networks, and powered on.
- Network links, IP addresses, and port remapping (if necessary) have been configured for the appliance using the StorageGRID Appliance Installer.
- The primary Admin Node for the StorageGRID system has been deployed.
- All Grid Network subnets listed on the IP Configuration page of the StorageGRID Appliance Installer have been defined in the Grid Network Subnet List on the primary Admin Node.
- You have a service laptop with a [supported web browser](#).
- You know the IP address assigned to the appliance. You can use the IP address for any attached StorageGRID network.

### About this task

To install StorageGRID on a services appliance node:

- You specify or confirm the IP address of the primary Admin Node and the name of the appliance node.
- You start the installation and wait as the software is installed.

Partway through the appliance Gateway Node installation tasks, the installation pauses. To resume the

installation, you sign into the Grid Manager, approve all grid nodes, and complete the StorageGRID installation process. The installation of a non-primary Admin Node does not require your approval.



Don't deploy the SG100 and SG1000 service appliances in the same site. Unpredictable performance might result.



If you need to deploy multiple appliance nodes at one time, you can automate the installation process. See [Automate appliance installation and configuration](#).

## Steps

1. Open a browser, and enter the IP address for the appliance.

**`https://Controller_IP:8443`**

The StorageGRID Appliance Installer Home page appears.

2. In the Primary Admin Node connection section, determine whether you need to specify the IP address for the primary Admin Node.

If you have previously installed other nodes in this data center, the StorageGRID Appliance Installer can discover this IP address automatically, assuming the primary Admin Node, or at least one other grid node with ADMIN\_IP configured, is present on the same subnet.

3. If this IP address is not shown or you need to change it, specify the address:

Option	Description
Manual IP entry	<ol style="list-style-type: none"><li>a. Clear the <b>Enable Admin Node discovery</b> checkbox.</li><li>b. Enter the IP address manually.</li><li>c. Click <b>Save</b>.</li><li>d. Wait for the connection state for the new IP address to become ready.</li></ol>
Automatic discovery of all connected primary Admin Nodes	<ol style="list-style-type: none"><li>a. Select the <b>Enable Admin Node discovery</b> checkbox.</li><li>b. Wait for the list of discovered IP addresses to be displayed.</li><li>c. Select the primary Admin Node for the grid where this appliance Storage Node will be deployed.</li><li>d. Click <b>Save</b>.</li><li>e. Wait for the connection state for the new IP address to become ready.</li></ol>

4. In the **Node name** field, provide the system name you want to use for this appliance node, and click **Save**.

The name that appears here will be the appliance node's system name. System names are required for internal StorageGRID operations and can't be changed.

5. Optionally, to install a different version of the StorageGRID software, follow these steps:
  - a. Download the installation archive:



## NetApp Downloads: StorageGRID Appliance

- b. Extract the archive.
- c. From the StorageGRID Appliance Installer, select **Advanced** > **Upload StorageGRID Software**.
- d. Click **Remove** to remove the current software package.

NetApp® StorageGRID® Appliance Installer

Home

Configure Networking ▾

Configure Hardware ▾

Monitor Installation

Advanced ▾

Upload StorageGRID Software

If this node is the primary Admin Node of a new deployment, you must use this page to upload the StorageGRID software installation package, unless the version of the software you want to install has already been uploaded. If you are adding this node to an existing deployment, you can avoid network traffic by uploading the installation package that matches the software version running on the existing grid. If you do not upload the correct package, the node obtains the software from the grid's primary Admin Node during installation.

Current StorageGRID Installation Software

Version

11.3.0

Package Name

storagegrid-webscale-images-11-3-0\_11.3.0-20190806.1731.4064510\_amd64.deb

Remove

- e. Click **Browse** for the software package you downloaded and extracted, and then click **Browse** for the checksum file.

NetApp® StorageGRID® Appliance Installer

Home

Configure Networking ▾

Configure Hardware ▾

Monitor Installation

Advanced ▾

Upload StorageGRID Software

If this node is the primary Admin Node of a new deployment, you must use this page to upload the StorageGRID software installation package, unless the version of the software you want to install has already been uploaded. If you are adding this node to an existing deployment, you can avoid network traffic by uploading the installation package that matches the software version running on the existing grid. If you do not upload the correct package, the node obtains the software from the grid's primary Admin Node during installation.

Current StorageGRID Installation Software

Version

None

Package Name

None

Upload StorageGRID Installation Software

Software Package

Browse

Checksum File

Browse

- f. Select **Home** to return to the Home page.
6. In the Installation section, confirm that the current state is "Ready to start installation of *node name* into grid with primary Admin Node *admin\_ip*" and that the **Start Installation** button is enabled.

If the **Start Installation** button is not enabled, you might need to change the network configuration or port settings. For instructions, see the maintenance instructions for your appliance.

7. From the StorageGRID Appliance Installer home page, click **Start Installation**.

## Home

The installation is ready to be started. Review the settings below, and then click Start Installation.

### This Node

Node type

Non-primary Admin (with Load Balancer) ▼

Node name

GW-SG1000-003-074

Cancel

Save

### Primary Admin Node connection

Enable Admin Node discovery

☐

Primary Admin Node IP

172.16.6.32

Connection state

Connection to 172.16.6.32 ready

Cancel

Save

### Installation

Current state

Ready to start installation of GW-SG1000-003-074 into grid with Admin Node 172.16.6.32 running StorageGRID 11.6.0, using StorageGRID software downloaded from the Admin Node.

Start Installation

The Current state changes to “Installation is in progress,” and the Monitor Installation page is displayed.



If you need to access the Monitor Installation page manually, click **Monitor Installation** from the menu bar.

8. If your grid includes multiple appliance nodes, repeat the previous steps for each appliance.

## **Monitor appliance installation**

The StorageGRID Appliance Installer provides status until installation is complete. When the software installation is complete, the appliance is rebooted.

Example 1. Steps

Storage appliance


- 1. To monitor the installation progress, click **Monitor Installation**.

The Monitor Installation page shows the installation progress.

Monitor Installation

1. Configure storage			Running
Step	Progress	Status	
Connect to storage controller	<div></div>	Complete	
Clear existing configuration	<div></div>	Complete	
Configure volumes	<div></div>	Creating volume StorageGRID-obj-00	
Configure host settings		Pending	
2. Install OS			Pending
3. Install StorageGRID			Pending
4. Finalize installation			Pending

The blue status bar indicates which task is currently in progress. Green status bars indicate tasks that have completed successfully.



The installer ensures that tasks completed in a previous install aren't re-run. If you are re-running an installation, any tasks that don't need to be re-run are shown with a green status bar and a status of "Skipped."

- 2. Review the progress of the first two installation stages.

1. Configure storage

During this stage, the installer connects to the storage controller, clears any existing configuration, creates RAIDs according to the configured RAID Mode, allocates volumes for StorageGRID software and object data storage, and configures host settings.

2. Install OS

During this stage, the installer copies the base operating system image for StorageGRID to the appliance.

- 3. Continue monitoring the installation progress until the **Install StorageGRID** stage pauses and a message appears on the embedded console, prompting you to approve this node on the Admin Node using the Grid Manager. Go to the next step.

## Monitor Installation

1. Configure storage	Complete
2. Install OS	Complete
3. Install StorageGRID	Running
4. Finalize installation	Pending

Connected (unencrypted) to: QEMU

```

/platform.type=: Device or resource busy
[2017-07-31T22:09:12.362566] INFO -- [INSG] NOTICE: seeding /var/local with c
ontainer data
[2017-07-31T22:09:12.366205] INFO -- [INSG] Fixing permissions
[2017-07-31T22:09:12.369633] INFO -- [INSG] Enabling syslog
[2017-07-31T22:09:12.511533] INFO -- [INSG] Stopping system logging: syslog-n
g.
[2017-07-31T22:09:12.570096] INFO -- [INSG] Starting system logging: syslog-n
g.
[2017-07-31T22:09:12.576360] INFO -- [INSG] Beginning negotiation for downloa
d of node configuration
[2017-07-31T22:09:12.581363] INFO -- [INSG]
[2017-07-31T22:09:12.585066] INFO -- [INSG]
[2017-07-31T22:09:12.588314] INFO -- [INSG]
[2017-07-31T22:09:12.591851] INFO -- [INSG]
[2017-07-31T22:09:12.594886] INFO -- [INSG]
[2017-07-31T22:09:12.598360] INFO -- [INSG]
[2017-07-31T22:09:12.601324] INFO -- [INSG]
[2017-07-31T22:09:12.604759] INFO -- [INSG]
[2017-07-31T22:09:12.607800] INFO -- [INSG]
[2017-07-31T22:09:12.610985] INFO -- [INSG]
[2017-07-31T22:09:12.614597] INFO -- [INSG]
[2017-07-31T22:09:12.618282] INFO -- [INSG] Please approve this node on the A
dmin Node GMI to proceed...

```

4. Go to the Grid Manager of the Primary Admin node, approve the pending storage node, and complete the StorageGRID installation process.

When you click **Install** from the Grid Manager, Stage 3 completes and stage 4, **Finalize Installation**, begins. When stage 4 completes, the controller is rebooted.

### Services appliance

1. To monitor the installation progress, click **Monitor Installation** from the menu bar.

The Monitor Installation page shows the installation progress.

## Monitor Installation

1. Configure storage		Complete
2. Install OS		Running
<b>Step</b>	<b>Progress</b>	<b>Status</b>
Obtain installer binaries	<div></div>	Complete
Configure installer	<div></div>	Complete
Install OS	<div></div>	Installer VM running
3. Install StorageGRID		Pending
4. Finalize installation		Pending

The blue status bar indicates which task is currently in progress. Green status bars indicate tasks that have completed successfully.



The installer ensures that tasks completed in a previous install aren't re-run. If you are re-running an installation, any tasks that don't need to be re-run are shown with a green status bar and a status of "Skipped."

### 2. Review the progress of first two installation stages.

#### ◦ 1. Configure storage

During this stage, the installer clears any existing configuration from the drives in the appliance, and configures host settings.

#### ◦ 2. Install OS

During this stage, the installer copies the base operating system image for StorageGRID to the appliance.

### 3. Continue monitoring the installation progress until one of the following processes occurs:

- For all appliance nodes except the primary Admin Node, the Install StorageGRID stage pauses and a message appears on the embedded console, prompting you to approve this node on the Admin Node using the Grid Manager. Go to the next step.
- For appliance primary Admin Node installation, you don't need to approve the node. The appliance is rebooted. You can skip the next step.



During installation of an appliance primary Admin Node, a fifth phase appears (see the example screen shot showing four phases). If the fifth phase is in progress for more than 10 minutes, refresh the web page manually.

## Monitor Installation

1. Configure storage	Complete
2. Install OS	Complete
3. Install StorageGRID	Running
4. Finalize installation	Pending

Connected (unencrypted) to: QEMU

```

/platform.type=: Device or resource busy
[2017-07-31T22:09:12.362566] INFO -- [INSG] NOTICE: seeding /var/local with c
ontainer data
[2017-07-31T22:09:12.366205] INFO -- [INSG] Fixing permissions
[2017-07-31T22:09:12.369633] INFO -- [INSG] Enabling syslog
[2017-07-31T22:09:12.511533] INFO -- [INSG] Stopping system logging: syslog-n
g.
[2017-07-31T22:09:12.570096] INFO -- [INSG] Starting system logging: syslog-n
g.
[2017-07-31T22:09:12.576360] INFO -- [INSG] Beginning negotiation for downloa
d of node configuration
[2017-07-31T22:09:12.581363] INFO -- [INSG]
[2017-07-31T22:09:12.585066] INFO -- [INSG]
[2017-07-31T22:09:12.588314] INFO -- [INSG]
[2017-07-31T22:09:12.591851] INFO -- [INSG]
[2017-07-31T22:09:12.594886] INFO -- [INSG]
[2017-07-31T22:09:12.598360] INFO -- [INSG]
[2017-07-31T22:09:12.601324] INFO -- [INSG]
[2017-07-31T22:09:12.604759] INFO -- [INSG]
[2017-07-31T22:09:12.607800] INFO -- [INSG]
[2017-07-31T22:09:12.610985] INFO -- [INSG]
[2017-07-31T22:09:12.614597] INFO -- [INSG]
[2017-07-31T22:09:12.618282] INFO -- [INSG] Please approve this node on the A
dmin Node GMI to proceed...

```

- Go to the Grid Manager of the Primary Admin node, approve the pending grid node, and complete the StorageGRID installation process.

When you click **Install** from the Grid Manager, Stage 3 completes and stage 4, **Finalize Installation**, begins. When stage 4 completes, the appliance is rebooted.

## Reboot appliance while StorageGRID Appliance Installer is running

You might need to reboot the appliance while the StorageGRID Appliance Installer is running. For example, you might need to reboot the appliance if the installation fails.

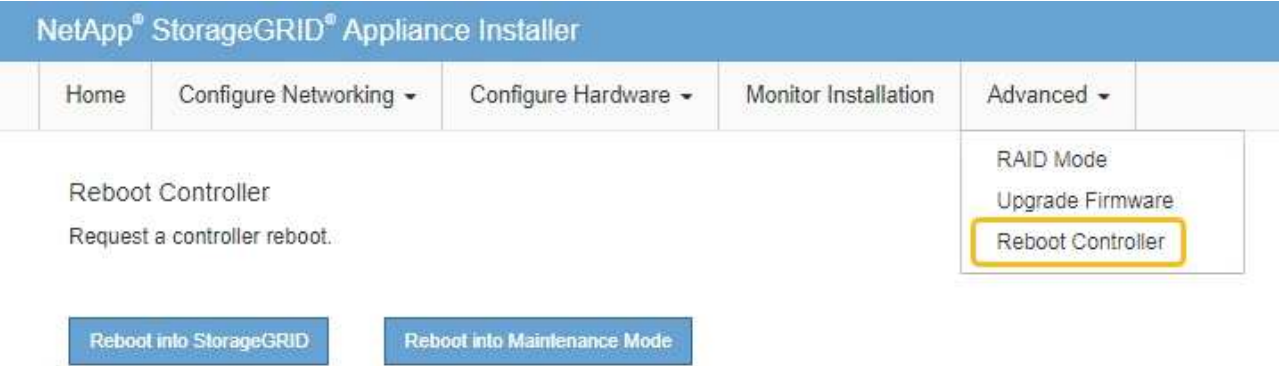
### About this task

This procedure only applies when the appliance is running the StorageGRID Appliance Installer. Once the installation is completed, this step no longer works because the StorageGRID Appliance Installer is no longer

available.

**Steps**

1. From the StorageGRID Appliance Installer, click **Advanced > Reboot Controller**, and then select one of these options:
  - Select **Reboot into StorageGRID** to reboot the controller with the node rejoining the grid. Select this option if you are done working in maintenance mode and are ready to return the node to normal operation.
  - Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. (This option is available only when the controller is in maintenance mode.) Select this option if there are additional maintenance operations you need to perform on the node before rejoining the grid.



The appliance is rebooted.

**Troubleshoot hardware installation (SGF6112)**

If you encounter issues during the installation, you might find it helpful to review troubleshooting information related to hardware setup and connectivity issues.

**View boot-up codes (SGF6112)**

When you apply power to the appliance, the BMC logs a series of boot-up codes. You can view these codes on a graphical console that is connected to the BMC management port.

**Before you begin**

- You know how to access the BMC dashboard.
- If you want to use serial-over-LAN (SOL), you have experience using IPMI SOL console applications.

**Steps**

1. Select one of the following methods for viewing the boot-up codes for the appliance controller, and gather the required equipment.



Method	Required equipment
VGA console	<ul style="list-style-type: none"> <li>• VGA-capable monitor</li> <li>• VGA cable</li> </ul>
KVM	<ul style="list-style-type: none"> <li>• RJ-45 cable</li> </ul>
Serial port	<ul style="list-style-type: none"> <li>• DB-9 serial cable</li> <li>• Virtual serial terminal</li> </ul>
SOL	<ul style="list-style-type: none"> <li>• Virtual serial terminal</li> </ul>

2. If you are using a VGA console, perform these steps:
  - a. Connect a VGA-capable monitor to the VGA port on the back of the appliance.
  - b. View the codes displayed on the monitor.
3. If you are using BMC KVM, perform these steps:
  - a. Connect to the BMC management port and log in to the BMC web interface.
  - b. Select **Remote Control**.
  - c. Launch the KVM.
  - d. View the codes on the virtual monitor.
4. If you are using a serial port and terminal, perform these steps:
  - a. Connect to the serial USB port on the back of the appliance.
  - b. Use settings 115200 8-N-1.
  - c. View the codes printed over the serial terminal.
5. If you are using SOL, perform these steps:
  - a. Connect to the IPMI SOL using the BMC IP address and login credentials.

```
ipmitool -I lanplus -H BMC_Port_IP -U root -P Password sol activate
```

- b. View the codes on the virtual serial terminal.
6. Use the table to look up the codes for your appliance.

Code	Indicates
HI	The master boot script has started.
HP	The system is checking to see if the network interface card (NIC) firmware needs to be updated.
RB	The system is rebooting after applying firmware updates.
FP	The hardware subsystem firmware update checks have been completed. Inter-controller communication services are starting.

Code	Indicates
HC	The system is checking for existing StorageGRID installation data.
HO	The StorageGRID appliance is running.
HA	StorageGRID is running.

#### Related information

[Access BMC interface](#)

#### View error codes (SGF6112)

If a hardware error occurs when the appliance is booting up, the BMC logs an error code. As required, you can view these error codes using the BMC interface, and then work with technical support to resolve the issue.

#### Before you begin

- You know how to access the BMC dashboard.

#### Steps

1. From the BMC dashboard, select **BIOS POST Code**.
2. Review the information displayed for Current Code and the Previous Code.

If any of the following error codes are shown, work with technical support to resolve the issue.

Code	Indicates
0x0E	Microcode not found
0x0F	Microcode not loaded
0x50	Memory initialization error. Invalid memory type or incompatible memory speed.
0x51	Memory initialization error. SPD reading has failed.
0x52	Memory initialization error. Invalid memory size or memory modules don't match.
0x53	Memory initialization error. No usable memory detected.
0x54	Unspecified memory initialization error
0x55	Memory not installed

<b>Code</b>	<b>Indicates</b>
0x56	Invalid CPU type or speed
0x57	CPU mismatch
0x58	CPU self-test failed, or possible CPU cache error
0x59	CPU micro-code is not found, or micro-code update failed
0x5A	Internal CPU error
0x5B	Reset PPI is not available
0x5C	PEI phase BMC self-test failure
0xD0	CPU initialization error
0xD1	North bridge initialization error
0xD2	South bridge initialization error
0xD3	Some architectural protocols aren't available
0xD4	PCI resource allocation error. Out of resources.
0xD5	No space for legacy option ROM
0xD6	No console output devices are found
0xD7	No console input devices are found
0xD8	Invalid password
0xD9	Error loading boot option (LoadImage returned error)
0xDA	Boot option failed (StartImage returned error)
0xDB	Flash update failed
0xDC	Reset protocol is not available
0xDD	DXE phase BMC self-test failure
0xE8	MRC: ERR_NO_MEMORY

Code	Indicates
0xE9	MRC: ERR_LT_LOCK
0xEA	MRC: ERR_DDR_INIT
0xEB	MRC: ERR_MEM_TEST
0xEC	MRC: ERR_VENDOR_SPECIFIC
0xED	MRC: ERR_DIMM_COMPAT
0xEE	MRC: ERR_MRC_COMPATIBILITY
0xEF	MRC: ERR_MRC_STRUCT
0xF0	MRC: ERR_SET_VDD
0xF1	MRC: ERR_IOT_MEM_BUFFER
0xF2	MRC: ERR_RC_INTERNAL
0xF3	MRC: ERR_INVALID_REG_ACCESS
0xF4	MRC: ERR_SET_MC_FREQ
0xF5	MRC: ERR_READ_MC_FREQ
0x70	MRC: ERR_DIMM_CHANNEL
0x74	MRC: ERR_BIST_CHECK
0xF6	MRC: ERR_SMBUS
0xF7	MRC: ERR_PCU
0xF8	MRC: ERR_NGN
0xF9	MRC: ERR_INTERLEAVE_FAILURE

#### Hardware setup appears to hang (SGF6112)

The StorageGRID Appliance Installer might not be available if hardware faults or cabling errors prevent the appliance from completing its boot-up processing.

## Steps

1. Review the LEDs on the appliance and the boot-up and error codes displayed in the BMC.
2. If you need help resolving an issue, contact technical support.

## Related information

- [View boot-up codes \(SGF6112\)](#)
- [View error codes \(SGF6112\)](#)

## Troubleshoot connection issues (SGF6112)

If you encounter connection issues during the StorageGRID appliance installation, you should perform the corrective action steps listed.

### Unable to connect to appliance

If you can't connect to the services appliance, there might be a network issue, or the hardware installation might not have been completed successfully.

## Steps

1. Try to ping the appliance using the IP address for the appliance :  
**ping appliance\_IP**
2. If you receive no response from the ping, confirm you are using the correct IP address.  
  
You can use the IP address of the appliance on the Grid Network, the Admin Network, or the Client Network.
3. If the IP address is correct, check appliance cabling, QSFP or SFP transceivers, and the network setup.
4. If physical access to the appliance is available, you can use a direct connection to the permanent link-local IP 169.254.0.1 to check controller networking configuration and update if necessary. For detailed instructions, see step 2 in [Access StorageGRID Appliance Installer](#).

If that does not resolve the issue, contact technical support.

5. If the ping was successful, open a web browser.
6. Enter the URL for the StorageGRID Appliance Installer:  
**https://appliances\_controller\_IP:8443**

The Home page appears.

## Troubleshoot hardware installation (SG6000 or SG5700)

If you encounter issues during the installation, you might find it helpful to review troubleshooting information related to hardware setup and connectivity issues.

### View boot-up codes (SG6000-CN controller)

When you apply power to the appliance, the BMC logs a series of boot-up codes for the SG6000-CN controller. You can view these codes in several ways.

### Before you begin

- You know how to access the BMC dashboard.
- If you want to use serial-over-LAN (SOL), you have experience using IPMI SOL console applications.

## Steps

1. Select one of the following methods for viewing the boot-up codes for the appliance controller, and gather the required equipment.

Method	Required equipment
VGA console	<ul style="list-style-type: none"> <li>• VGA-capable monitor</li> <li>• VGA cable</li> </ul>
KVM	<ul style="list-style-type: none"> <li>• RJ-45 cable</li> </ul>
Serial port	<ul style="list-style-type: none"> <li>• DB-9 serial cable</li> <li>• Virtual serial terminal</li> </ul>
SOL	<ul style="list-style-type: none"> <li>• Virtual serial terminal</li> </ul>

2. If you are using a VGA console, perform these steps:
  - a. Connect a VGA-capable monitor to the VGA port on the back of the appliance.
  - b. View the codes displayed on the monitor.
3. If you are using BMC KVM, perform these steps:
  - a. Connect to the BMC management port and log in to the BMC web interface.
  - b. Select **Remote Control**.
  - c. Launch the KVM.
  - d. View the codes on the virtual monitor.
4. If you are using a serial port and terminal, perform these steps:
  - a. Connect to the DB-9 serial port on the back of the appliance.
  - b. Use settings 115200 8-N-1.
  - c. View the codes printed over the serial terminal.
5. If you are using SOL, perform these steps:
  - a. Connect to the IPMI SOL using the BMC IP address and login credentials.
 

```
ipmitool -I lanplus -H BMC_Port_IP -U root -P Password sol activate
```
  - b. View the codes on the virtual serial terminal.
6. Use the table to look up the codes for your appliance.

Code	Indicates
HI	The master boot script has started.

Code	Indicates
HP	The system is checking to see if the network interface card (NIC) firmware needs to be updated.
RB	The system is rebooting after applying firmware updates.
FP	The hardware subsystem firmware update checks have been completed. Inter-controller communication services are starting.
HE	<p>For an appliance Storage Node only:</p> <p>The system is awaiting connectivity with the storage controllers and synchronizing with the SANtricity operating system.</p> <p><b>Note:</b> If the boot-up procedure does not progress past this stage, perform these steps:</p> <ol style="list-style-type: none"> <li>Confirm that the four interconnect cables between the SG6000-CN controller and the two storage controllers are securely connected.</li> <li>As required, replace one or more of the cables, and try again.</li> <li>If this does not resolve the issue, contact technical support.</li> </ol>
HC	The system is checking for existing StorageGRID installation data.
HO	The StorageGRID Appliance Installer is running.
HA	StorageGRID is running.

### View error codes (SG6000-CN controller)

If a hardware error occurs when the SG6000-CN controller is booting up, the BMC logs an error code. As required, you can view these error codes using the BMC interface, and then work with technical support to resolve the issue.

#### Before you begin

- You know how to access the BMC dashboard.

#### Steps

- From the BMC dashboard, select **BIOS POST Code**.
- Review the information displayed for Current Code and the Previous Code.

If any of the following error codes are shown, work with technical support to resolve the issue.

Code	Indicates
0x0E	Microcode not found

<b>Code</b>	<b>Indicates</b>
0x0F	Microcode not loaded
0x50	Memory initialization error. Invalid memory type or incompatible memory speed.
0x51	Memory initialization error. SPD reading has failed.
0x52	Memory initialization error. Invalid memory size or memory modules don't match.
0x53	Memory initialization error. No usable memory detected.
0x54	Unspecified memory initialization error
0x55	Memory not installed
0x56	Invalid CPU type or speed
0x57	CPU mismatch
0x58	CPU self-test failed, or possible CPU cache error
0x59	CPU micro-code is not found, or micro-code update failed
0x5A	Internal CPU error
0x5B	Reset PPI is not available
0x5C	PEI phase BMC self-test failure
0xD0	CPU initialization error
0xD1	North bridge initialization error
0xD2	South bridge initialization error
0xD3	Some architectural protocols aren't available
0xD4	PCI resource allocation error. Out of resources.
0xD5	No space for legacy option ROM
0xD6	No console output devices are found



Code	Indicates
0xD7	No console input devices are found
0xD8	Invalid password
0xD9	Error loading boot option (LoadImage returned error)
0xDA	Boot option failed (StartImage returned error)
0xDB	Flash update failed
0xDC	Reset protocol is not available
0xDD	DXE phase BMC self-test failure
0xE8	MRC: ERR_NO_MEMORY
0xE9	MRC: ERR_LT_LOCK
0xEA	MRC: ERR_DDR_INIT
0xEB	MRC: ERR_MEM_TEST
0xEC	MRC: ERR_VENDOR_SPECIFIC
0xED	MRC: ERR_DIMM_COMPAT
0xEE	MRC: ERR_MRC_COMPATIBILITY
0xEF	MRC: ERR_MRC_STRUCT
0xF0	MRC: ERR_SET_VDD
0xF1	MRC: ERR_IOT_MEM_BUFFER
0xF2	MRC: ERR_RC_INTERNAL
0xF3	MRC: ERR_INVALID_REG_ACCESS
0xF4	MRC: ERR_SET_MC_FREQ
0xF5	MRC: ERR_READ_MC_FREQ
0x70	MRC: ERR_DIMM_CHANNEL

Code	Indicates
0x74	MRC: ERR_BIST_CHECK
0xF6	MRC: ERR_SMBUS
0xF7	MRC: ERR_PCU
0xF8	MRC: ERR_NGN
0xF9	MRC: ERR_INTERLEAVE_FAILURE

#### **Hardware setup appears to hang (SG6000 or SG5700)**

The StorageGRID Appliance Installer might not be available if hardware faults or cabling errors prevent the storage controllers or the appliance controller from completing their boot-up processing.

## Example 2. Steps

### SG6000

1. For the storage controllers, watch the codes on the seven-segment displays.

While the hardware is initializing during power up, the two seven-segment displays show a sequence of codes. When the hardware boots successfully, both seven-segment displays show 99.

2. Review the LEDs on the SG6000-CN controller and the boot-up and error codes displayed in the BMC.
3. If you need help resolving an issue, contact technical support.

### SG5700

1. Watch the codes on the seven-segment displays.

While the hardware is initializing during power up, the two seven-segment displays show a sequence of codes. When the hardware boots successfully, the seven-segment displays show different codes for each controller.

2. Review the codes on the seven-segment display for the E5700SG controller.



The installation and provisioning take time. Some installation phases don't report updates to the StorageGRID Appliance Installer for several minutes.

If an error occurs, the seven-segment display flashes a sequence, such as HE.

3. To understand what these codes mean, see the following resources:

Controller	Reference
E5700SG controller	<ul style="list-style-type: none"><li>• “Status indicators on the E5700SG controller”</li><li>• “HE error: Error synchronizing with SANtricity OS Software”</li></ul>
E2800 controller	<p><i>E5700 and E2800 System Monitoring Guide</i></p> <p><b>Note:</b> The codes described for the E-Series E5700 controller don't apply to the E5700SG controller in the appliance.</p>

4. If this does not resolve the issue, contact technical support.

### Related information

- [View status indicators](#)
- [NetApp E-Series Systems Documentation Site](#)
- [HE error: Error synchronizing with SANtricity OS Software](#)
- [E5700 and E2800 System Monitoring Guide](#)
- [View boot-up codes \(SG6000-CN controller\)](#)
- [View error codes \(SG6000-CN controller\)](#)

## Troubleshoot connection issues (SG6000 or SG5700)

If you encounter connection issues during the StorageGRID appliance installation, you should perform the corrective action steps listed.

### Unable to connect to SG6000 appliance

If you can't connect to the appliance, there might be a network issue, or the hardware installation might not have been completed successfully.

#### Steps

1. If you are unable to connect to SANtricity System Manager:
  - a. Try to ping the appliance using the IP address for either storage controller on the management network for SANtricity System Manager:  
**ping *Storage\_Controller\_IP***
  - b. If you receive no response from the ping, confirm you are using the correct IP address.  
  
Use the IP address for management port 1 on either storage controller.
  - c. If the IP address is correct, check appliance cabling and the network setup.  
  
If that does not resolve the issue, contact technical support.
  - d. If the ping was successful, open a web browser.
  - e. Enter the URL for SANtricity System Manager:  
**https://*Storage\_Controller\_IP***  
  
The log in page for SANtricity System Manager appears.
2. If you are unable to connect to the SG6000-CN controller:
  - a. Try to ping the appliance using the IP address for the SG6000-CN controller:  
**ping *SG6000-CN\_Controller\_IP***
  - b. If you receive no response from the ping, confirm you are using the correct IP address.  
  
You can use the IP address of the appliance on the Grid Network, the Admin Network, or the Client Network.
  - c. If the IP address is correct, check appliance cabling, SFP transceivers, and the network setup.
  - d. If physical access to the SG6000-CN is available, you can use a direct connection to the permanent link-local IP 169.254.0.1 to check controller networking configuration and update if necessary. For detailed instructions, see step 2 in [Accessing StorageGRID Appliance Installer](#).  
  
If that does not resolve the issue, contact technical support.
  - e. If the ping was successful, open a web browser.
  - f. Enter the URL for the StorageGRID Appliance Installer:  
**https://*SG6000-CN\_Controller\_IP*:8443**  
  
The Home page appears.

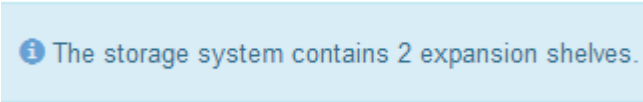
## SG6060 expansion shelves don't appear in Appliance Installer

If you have installed expansion shelves for the SG6060 and they don't appear in the StorageGRID Appliance Installer, you should verify that the shelves have been completely installed and powered on.

### About this task

You can verify that the expansion shelves are connected to the appliance by viewing the following information in the StorageGRID Appliance Installer:

- The **Home** page contains a message about expansion shelves.



**i** The storage system contains 2 expansion shelves.

- The **Advanced > RAID Mode** page indicates by number of drives whether or not the appliance includes expansion shelves. For example, in the following screen shot, two SSDs and 178 HDDs are shown. An SG6060 with two expansion shelves contains 180 total drives.

### Configure RAID Mode

This appliance contains the following drives.

Type	Size	Number of drives
SSD	800 GB	2
HDD	11.8 TB	178

If the StorageGRID Appliance Installer pages don't indicate that expansion shelves are present, follow this procedure.

### Steps

1. Verify that all required cables have been firmly connected. See [Cable appliance \(SG6000\)](#).
2. Verify that you have powered on the expansion shelves. See [Connect power cords and apply power \(SG6000\)](#).
3. If you need help resolving an issue, contact technical support.

### Unable to connect to SG5700 appliance

If you can't connect to the appliance, there might be a network issue, or the hardware installation might not have been completed successfully.

### Steps

1. If you are unable to connect to SANtricity System Manager:
  - a. Try to ping the appliance using the IP address for the E2800 controller on the management network for SANtricity System Manager:  
**ping E2800\_Controller\_IP**
  - b. If you receive no response from the ping, confirm you are using the correct IP address.  
  
Use the IP address for management port 1 on the E2800 controller.
  - c. If the IP address is correct, check appliance cabling and the network setup.

If that does not resolve the issue, contact technical support.

- d. If the ping was successful, open a web browser.
- e. Enter the URL for SANtricity System Manager:  
**https://E2800\_Controller\_IP**

The log in page for SANtricity System Manager appears.

2. If you are unable to connect to the E5700SG controller:

- a. Try to ping the appliance using the IP address for the E5700SG controller:  
**ping E5700SG\_Controller\_IP**
- b. If you receive no response from the ping, confirm you are using the correct IP address.

You can use the IP address of the appliance on the Grid Network, the Admin Network, or the Client Network.

- c. If the IP address is correct, check appliance cabling, SFP transceivers, and the network setup.

If that does not resolve the issue, contact technical support.

- d. If the ping was successful, open a web browser.
- e. Enter the URL for the StorageGRID Appliance Installer:  
**https://E5700SG\_Controller\_IP:8443**

The Home page appears.

#### Related information

[View status indicators](#)

#### HE error: Error synchronizing with SANtricity OS Software (SG5700)

The seven-segment display on the compute controller shows an HE error code if the StorageGRID Appliance Installer can't synchronize with SANtricity OS Software.

#### About this task

If an HE error code is displayed, perform this corrective action.

#### Steps

1. Check the integrity of the two SAS interconnect cables, and confirm they are securely connected.
2. As required, replace one or both of the cables, and try again.
3. If this does not resolve the issue, contact technical support.

#### Troubleshoot hardware installation (SG100 and SG1000)

If you encounter issues during the installation, you might find it helpful to review troubleshooting information related to hardware setup and connectivity issues.

## View boot-up codes (SG100 and SG1000)

When you apply power to the appliance, the BMC logs a series of boot-up codes. You can view these codes on a graphical console that is connected to the BMC management port.

### Before you begin

- You know how to access the BMC dashboard.
- If you want to use serial-over-LAN (SOL), you have experience using IPMI SOL console applications.

### Steps

1. Select one of the following methods for viewing the boot-up codes for the appliance controller, and gather the required equipment.

Method	Required equipment
VGA console	<ul style="list-style-type: none"><li>• VGA-capable monitor</li><li>• VGA cable</li></ul>
KVM	<ul style="list-style-type: none"><li>• RJ-45 cable</li></ul>
Serial port	<ul style="list-style-type: none"><li>• DB-9 serial cable</li><li>• Virtual serial terminal</li></ul>
SOL	<ul style="list-style-type: none"><li>• Virtual serial terminal</li></ul>

2. If you are using a VGA console, perform these steps:
  - a. Connect a VGA-capable monitor to the VGA port on the back of the appliance.
  - b. View the codes displayed on the monitor.
3. If you are using BMC KVM, perform these steps:
  - a. Connect to the BMC management port and log in to the BMC web interface.
  - b. Select **Remote Control**.
  - c. Launch the KVM.
  - d. View the codes on the virtual monitor.
4. If you are using a serial port and terminal, perform these steps:
  - a. Connect to the DB-9 serial port on the back of the appliance.
  - b. Use settings 115200 8-N-1.
  - c. View the codes printed over the serial terminal.
5. If you are using SOL, perform these steps:
  - a. Connect to the IPMI SOL using the BMC IP address and login credentials.

```
ipmitool -I lanplus -H BMC_Port_IP -U root -P Password sol activate
```

- b. View the codes on the virtual serial terminal.

6. Use the table to look up the codes for your appliance.

Code	Indicates
HI	The master boot script has started.
HP	The system is checking to see if the network interface card (NIC) firmware needs to be updated.
RB	The system is rebooting after applying firmware updates.
FP	The hardware subsystem firmware update checks have been completed. Inter-controller communication services are starting.
HC	The system is checking for existing StorageGRID installation data.
HO	The StorageGRID appliance is running.
HA	StorageGRID is running.

#### Related information

[Access BMC interface](#)

#### View error codes (SG100 and SG1000)

If a hardware error occurs when the appliance is booting up, the BMC logs an error code. As required, you can view these error codes using the BMC interface, and then work with technical support to resolve the issue.

#### Before you begin

- You know how to access the BMC dashboard.

#### Steps

1. From the BMC dashboard, select **BIOS POST Code**.
2. Review the information displayed for Current Code and the Previous Code.

If any of the following error codes are shown, work with technical support to resolve the issue.

Code	Indicates
0x0E	Microcode not found
0x0F	Microcode not loaded
0x50	Memory initialization error. Invalid memory type or incompatible memory speed.



<b>Code</b>	<b>Indicates</b>
0x51	Memory initialization error. SPD reading has failed.
0x52	Memory initialization error. Invalid memory size or memory modules don't match.
0x53	Memory initialization error. No usable memory detected.
0x54	Unspecified memory initialization error
0x55	Memory not installed
0x56	Invalid CPU type or speed
0x57	CPU mismatch
0x58	CPU self-test failed, or possible CPU cache error
0x59	CPU micro-code is not found, or micro-code update failed
0x5A	Internal CPU error
0x5B	Reset PPI is not available
0x5C	PEI phase BMC self-test failure
0xD0	CPU initialization error
0xD1	North bridge initialization error
0xD2	South bridge initialization error
0xD3	Some architectural protocols aren't available
0xD4	PCI resource allocation error. Out of resources.
0xD5	No space for legacy option ROM
0xD6	No console output devices are found
0xD7	No console input devices are found
0xD8	Invalid password

Code	Indicates
0xD9	Error loading boot option (LoadImage returned error)
0xDA	Boot option failed (StartImage returned error)
0xDB	Flash update failed
0xDC	Reset protocol is not available
0xDD	DXE phase BMC self-test failure
0xE8	MRC: ERR_NO_MEMORY
0xE9	MRC: ERR_LT_LOCK
0xEA	MRC: ERR_DDR_INIT
0xEB	MRC: ERR_MEM_TEST
0xEC	MRC: ERR_VENDOR_SPECIFIC
0xED	MRC: ERR_DIMM_COMPAT
0xEE	MRC: ERR_MRC_COMPATIBILITY
0xEF	MRC: ERR_MRC_STRUCT
0xF0	MRC: ERR_SET_VDD
0xF1	MRC: ERR_IOT_MEM_BUFFER
0xF2	MRC: ERR_RC_INTERNAL
0xF3	MRC: ERR_INVALID_REG_ACCESS
0xF4	MRC: ERR_SET_MC_FREQ
0xF5	MRC: ERR_READ_MC_FREQ
0x70	MRC: ERR_DIMM_CHANNEL
0x74	MRC: ERR_BIST_CHECK
0xF6	MRC: ERR_SMBUS

Code	Indicates
0xF7	MRC: ERR_PCU
0xF8	MRC: ERR_NGN
0xF9	MRC: ERR_INTERLEAVE_FAILURE

### Hardware setup appears to hang (SG100 and SG1000)

The StorageGRID Appliance Installer might not be available if hardware faults or cabling errors prevent the appliance from completing its boot-up processing.

#### Steps

1. Review the LEDs on the appliance and the boot-up and error codes displayed in the BMC.
2. If you need help resolving an issue, contact technical support.

#### Related information

- [View boot-up codes \(SG100 and SG1000\)](#)
- [View error codes \(SG100 and SG1000\)](#)

### Troubleshoot connection issues (SG100 and SG1000)

If you encounter connection issues during the StorageGRID appliance installation, you should perform the corrective action steps listed.

#### Unable to connect to appliance

If you can't connect to the services appliance, there might be a network issue, or the hardware installation might not have been completed successfully.

#### Steps

1. Try to ping the appliance using the IP address for the appliance :  
**ping services\_appliance\_IP**
2. If you receive no response from the ping, confirm you are using the correct IP address.  
  
You can use the IP address of the appliance on the Grid Network, the Admin Network, or the Client Network.
3. If the IP address is correct, check appliance cabling, QSFP or SFP transceivers, and the network setup.
4. If physical access to the appliance is available, you can use a direct connection to the permanent link-local IP 169.254.0.1 to check controller networking configuration and update if necessary. For detailed instructions, see step 2 in [Access StorageGRID Appliance Installer](#).

If that does not resolve the issue, contact technical support.

5. If the ping was successful, open a web browser.
6. Enter the URL for the StorageGRID Appliance Installer:

**`https://appliances_controller_IP:8443`**

The Home page appears.

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