



# **SG5700 storage appliances**

## **StorageGRID**

NetApp  
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# Table of Contents

- SG5700 storage appliances . . . . . 1
  - SG5700 appliances: Overview . . . . . 1
  - Installation and deployment overview . . . . . 6
  - Prepare for installation (SG5700) . . . . . 8
  - Install hardware (SG5700) . . . . . 21
  - Configure hardware (SG5700) . . . . . 32
  - Deploy appliance Storage Node . . . . . 64
  - Monitor storage appliance installation . . . . . 68
  - Automate appliance installation and configuration (SG5700) . . . . . 69
  - Overview of installation REST APIs . . . . . 77
  - Troubleshoot hardware installation (SG5700) . . . . . 79
  - Maintain SG5700 appliance . . . . . 81

# SG5700 storage appliances

## SG5700 appliances: 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.

The StorageGRID SG5700 appliance provides the following features:

- Integrates the storage and computing elements for a StorageGRID Storage Node.
- Includes the StorageGRID Appliance Installer to simplify Storage Node deployment and configuration.
- Includes E-Series SANtricity System Manager for hardware management and monitoring.
- Supports up to four 10-GbE or 25-GbE connections to the StorageGRID Grid Network and Client Network.
- Supports Full Disk Encryption (FDE) drives or Federal Information Processing Standard (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 two models: the SG5712 and the SG5760. Both models include the following components:

Component	SG5712	SG5760
Compute controller	E5700SG controller	E5700SG controller
Storage controller	E-Series E2800 controller	E-Series E2800 controller
Chassis	E-Series DE212C enclosure, a two rack-unit (2U) enclosure	E-Series DE460C enclosure, a four rack-unit (4U) enclosure
Drives	12 NL-SAS drives (3.5-inch)	60 NL-SAS drives (3.5-inch)
Redundant power supplies and fans	Two power-fan canisters	Two power canisters and two fan canisters

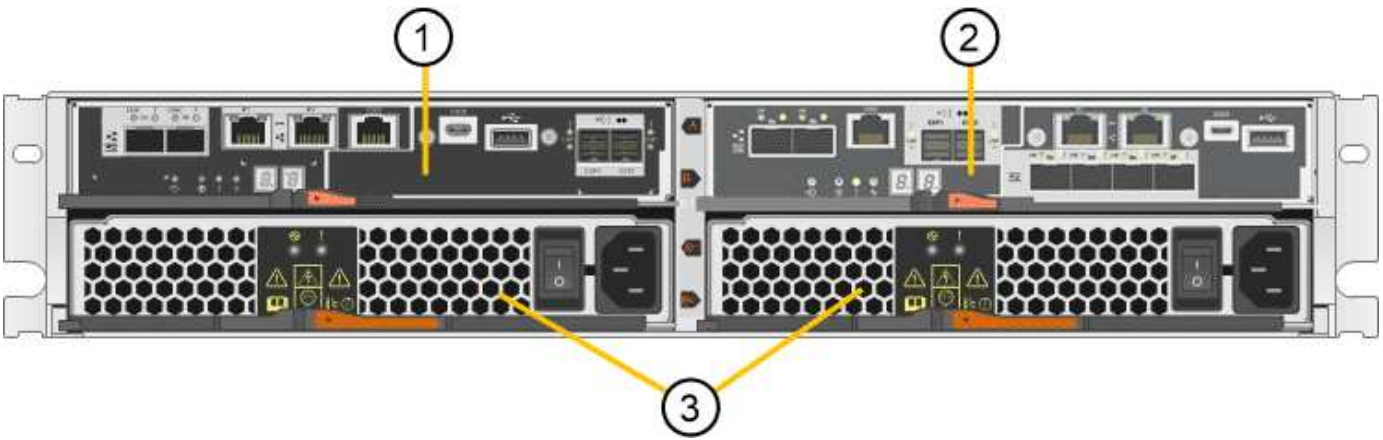
The maximum raw storage available in the StorageGRID appliance is fixed, based on the number of drives in each enclosure. You cannot expand the available storage by adding a shelf with additional drives.

### Model SG5712

This figure shows the front and back of the SG5712 model, a 2U enclosure that holds 12 drives.



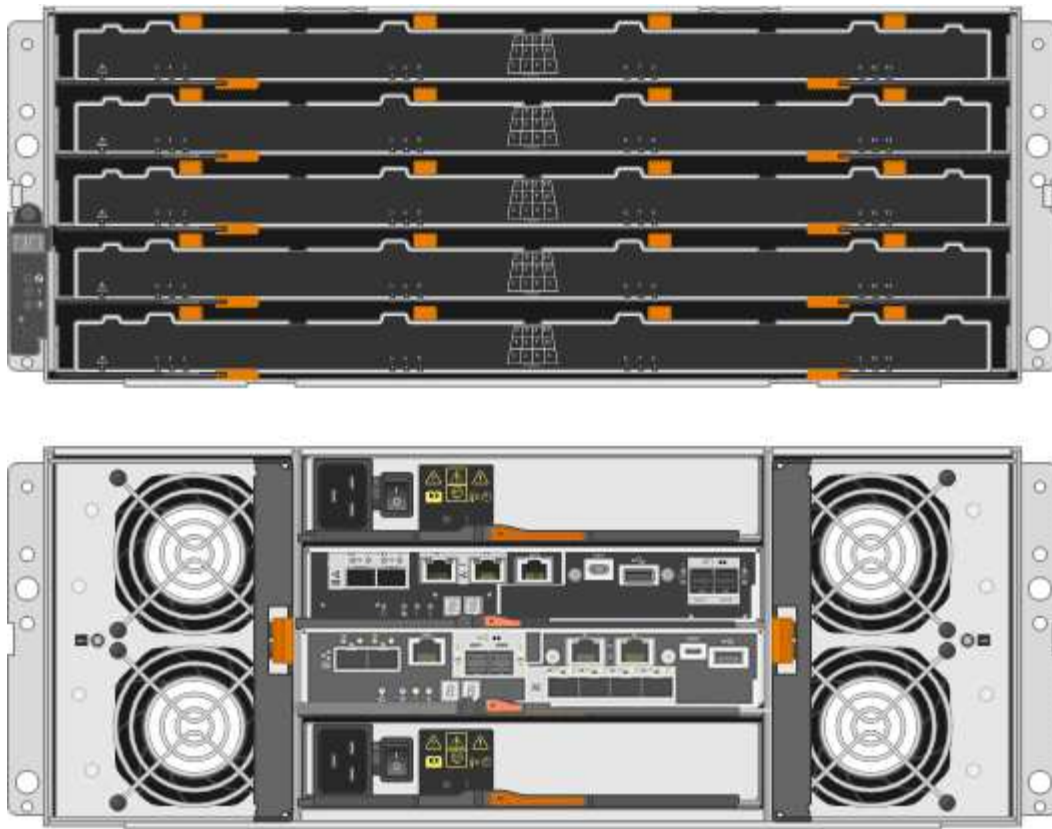
The SG5712 includes two controllers and two power-fan canisters.



Callout	Description
1	E2800 controller (storage controller)
2	E5700SG controller (compute controller)
3	Power-fan canisters

## Model SG5760

This figure shows the front and back of the SG5760 model, a 4U enclosure that holds 60 drives in 5 drive drawers.



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

Callout	Description
1	E2800 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](#)

## Controllers in StorageGRID appliance

Both the SG5712 and SG5760 models of the StorageGRID appliance include an E5700SG controller and an E2800 controller. You should review the diagrams to learn the differences between the controllers.

### E5700SG controller

- Operates as the compute server for the appliance.

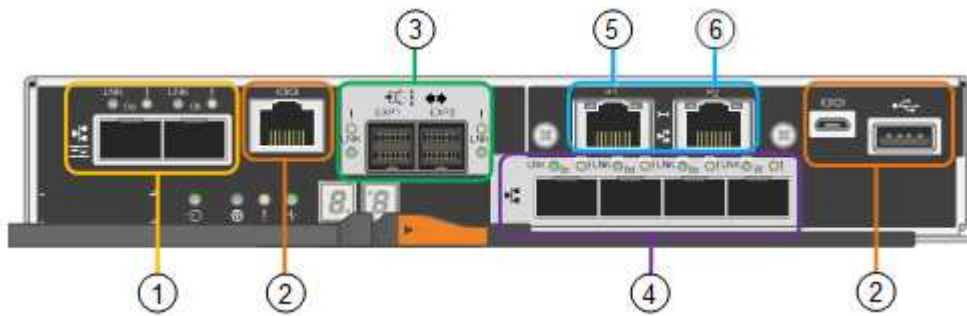
- Includes the StorageGRID Appliance Installer.



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.

This figure shows the connectors on the back of the E5700SG controller.



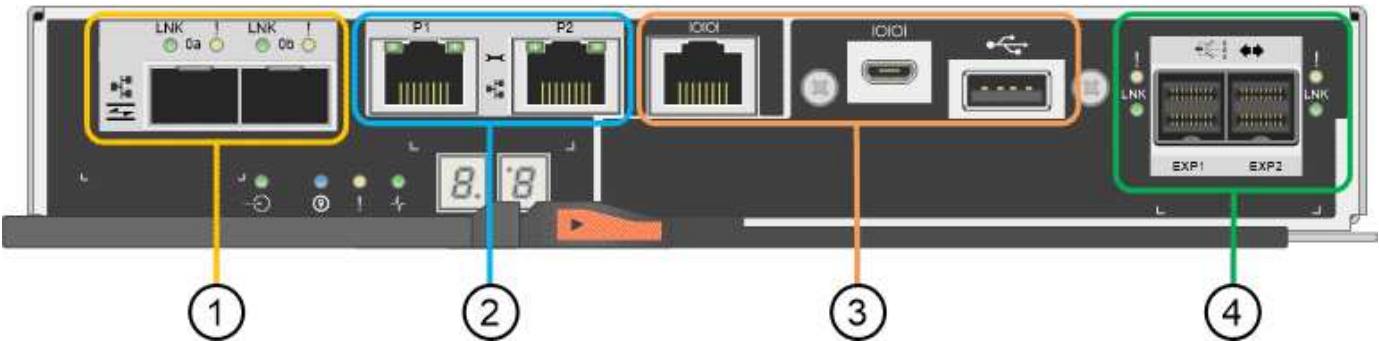
	Port	Type	Use
1	Interconnect ports 1 and 2	16Gb/s Fibre Channel (FC), optical SFPa	Connect the E5700SG controller to the E2800 controller.
2	Diagnostic and support ports	<ul style="list-style-type: none"> <li>• RJ-45 serial port</li> <li>• Micro USB serial port</li> <li>• USB port</li> </ul>	Reserved for technical support.
3	Drive expansion ports	12Gb/s SAS	Not used. StorageGRID appliances do not 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.

	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 are not available.</li> </ul>

E2800 controller

- 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.

This figure shows the connectors on the back of the E2800 controller.



	Port	Type	Use
1	Interconnect ports 1 and 2	16Gb/s FC optical SFPa	Connect the E2800 controller to the E5700SG controller.

	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.	12Gb/s SAS	Not used. StorageGRID appliances do not support expansion drive shelves.

## Installation and deployment overview

You can install one or more StorageGRID appliances when you first deploy StorageGRID, or you can add appliance Storage Nodes later as part of an expansion. You might also



need to install an appliance Storage Node as part of a recovery operation.

Adding a StorageGRID storage appliance to a StorageGRID system includes four primary steps:

1. Preparing for installation:
  - Preparing the installation site
  - Unpacking the boxes and checking the contents
  - Obtaining additional equipment and tools
  - Gathering IP addresses and network information
  - Optional: Configuring an external key management server (KMS) if you plan to encrypt all appliance data. See details about external key management in the instructions for administering StorageGRID.
2. Installing the hardware:
  - Registering the hardware
  - Installing the appliance into a cabinet or rack
  - Installing the drives (SG5760 only)
  - Cabling the appliance
  - Connecting the power cords and applying power
  - Viewing boot-up status codes
3. Configuring the hardware:
  - Accessing SANtricity System Manager, setting a static IP address for management port 1 on the E2800 controller, and configuring SANtricity System Manager settings
  - Accessing StorageGRID Appliance Installer and configuring the link and network IP settings required to connect to StorageGRID networks
  - Optional: Enabling node encryption if you plan to use an external KMS to encrypt appliance data.
  - Optional: Changing the RAID mode.
4. Deploying the appliance as a Storage Node:

Task	Instructions
Deploying an appliance Storage Node in a new StorageGRID system	<a href="#">Deploy appliance Storage Node</a>
Adding an appliance Storage Node to an existing StorageGRID system	Instructions for expanding a StorageGRID system
Deploying an appliance Storage Node as part of a Storage Node recovery operation	Instructions for recovery and maintenance

#### Related information

[Prepare for installation \(SG5700\)](#)

[Install hardware](#)

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

[Install VMware](#)

[Install Red Hat Enterprise Linux or CentOS](#)

[Install Ubuntu or Debian](#)

[SG100 and SG1000 services appliances](#)

[Expand your grid](#)

[Recover and maintain](#)

[Administer StorageGRID](#)

## Prepare for installation (SG5700)

Preparing to install a StorageGRID appliance entails preparing the site and obtaining all required hardware, cables, and tools. You should also gather IP addresses and network information.

### Related information

[Web browser requirements](#)

## Prepare site (SG5700)

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. If you are installing the SG5760 model, confirm that your location provides 240-volt AC power.
3. Obtain a 19-inch (48.3-cm) cabinet or rack to fit shelves of this size (without cables):

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)

4. Install any required network switches. See the NetApp Interoperability Matrix Tool for compatibility information.

### Related information

[NetApp Hardware Universe](#)

## Unpack boxes (SG5700)

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

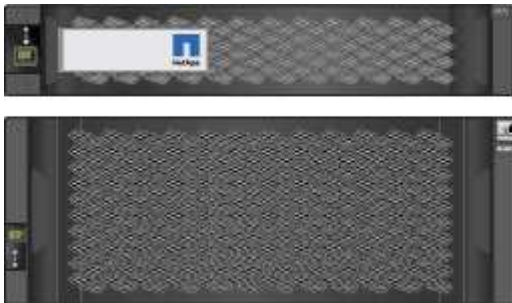
- SG5712 appliance with 12 drives installed



- SG5760 appliance with no drives installed



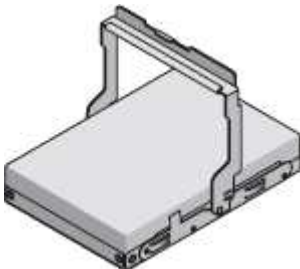
- Front bezel for the appliance



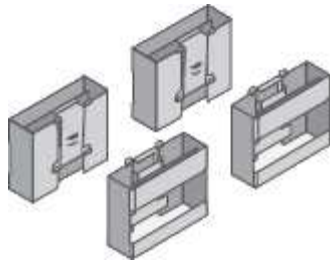
- Rail kit with instructions



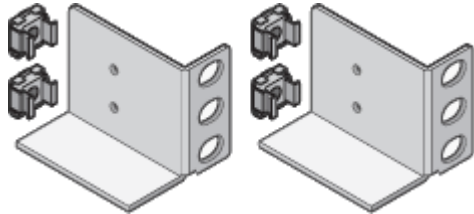
- SG5760: Sixty drives



- SG5760: Handles



- **SG5760: Back brackets and cage nuts for square-hole rack installation**



## Cables and connectors

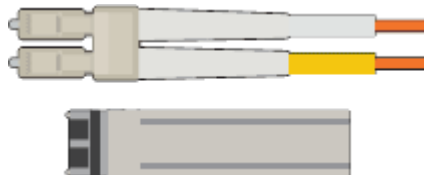
The shipment for the StorageGRID appliance includes the following cables and connectors:

- **Two power cords for your country**



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

- **Optical cables and SFP transceivers**



Two optical cables for the FC interconnect ports

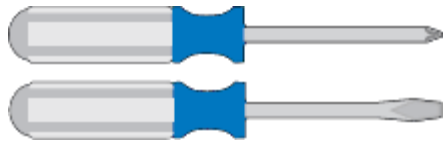
Eight SFP+ transceivers, compatible with both the four 16Gb/s FC interconnect ports and the four 10-GbE network ports

## Obtain additional equipment and tools (SG5700)

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

You need the following additional equipment to install and configure the hardware:

- **Screwdrivers**



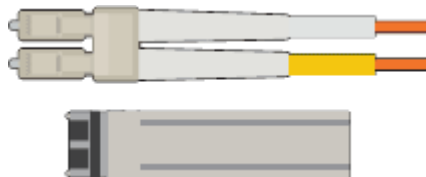
Phillips No. 2 screwdriver

Medium flat-blade screwdriver

- **ESD wrist strap**



- **Optical cables and SFP transceivers**



Optical cables for the 10/25-GbE ports you plan to use

Optional: SFP28 transceivers if you want to use 25-GbE link speed

- **Ethernet cables**



- **Service laptop**



[Supported web browser](#)

SSH client, such as PuTTY

1-Gb (RJ-45) Ethernet port

- **Optional tools**



Power drill with Phillips head bit

Flashlight

Mechanized lift for SG5760

## Review appliance network connections (SG5700)

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 appliance networks

When you deploy a StorageGRID appliance as a Storage Node in a StorageGRID grid, 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. The Client Network is optional.
- **Management network for SANtricity System Manager** (optional): This network provides access to SANtricity System Manager on the E2800 controller, 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 SANtricity System Manager network is not connected, you might be unable to use some SANtricity features.

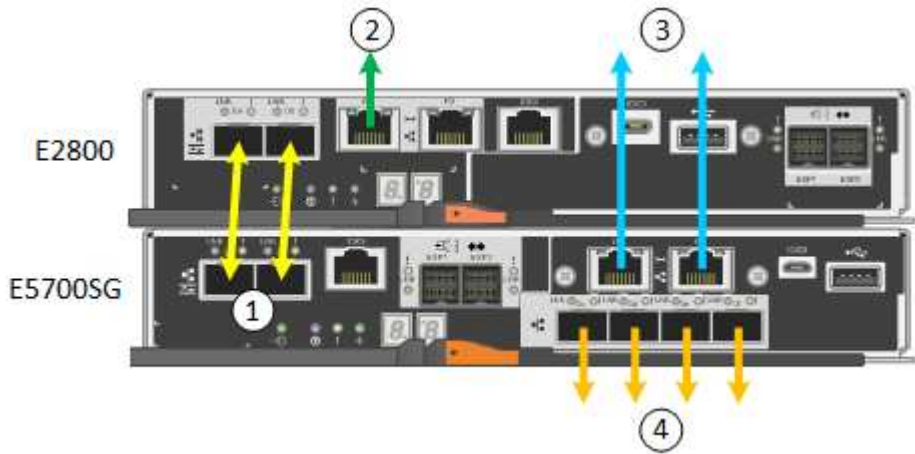


For detailed information about StorageGRID networks, see the *Grid Primer*.

### StorageGRID appliance connections

When you install a StorageGRID appliance, you must 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.



	Port	Type of port	Function
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.
2	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.

	Port	Type of port	Function
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 are not 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 “10/25-GbE port connections for the E5700SG controller.”

#### Related information

[Gather installation information \(SG5700\)](#)

[Cable appliance \(SG5700\)](#)

[Port bond modes for E5700SG controller ports](#)

[Networking guidelines](#)

[Install VMware](#)

[Install Red Hat Enterprise Linux or CentOS](#)

[Install Ubuntu or Debian](#)

#### Port bond modes for E5700SG controller ports

When configuring network links for the E5700SG controller ports, 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.

**Related information**

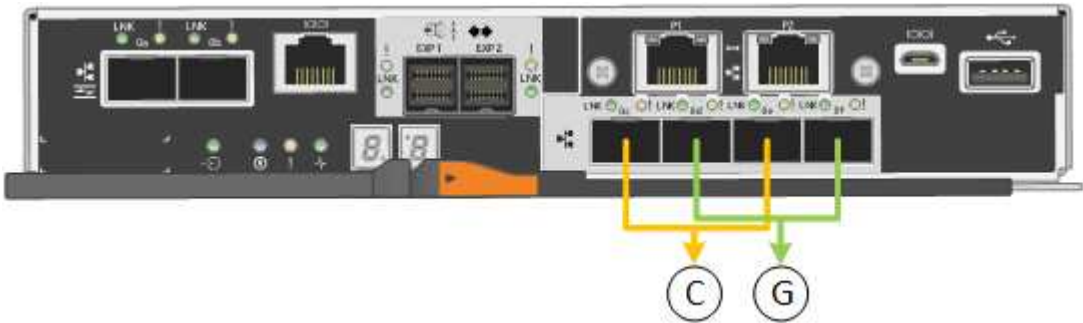
[Configure network links \(SG5700\)](#)

**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).

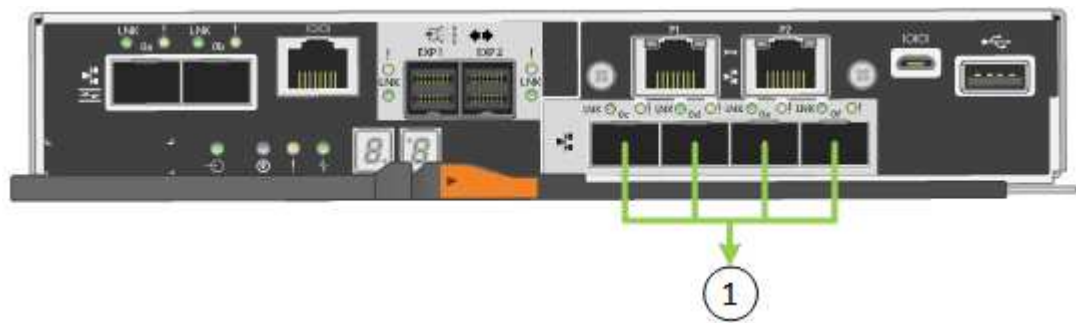
- In Active-Backup mode (default), only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Port 4 provides a backup path for port 2 (Grid Network), and port 3 provides a backup path for port 1 (Client Network).
- In LACP mode, each pair 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 do not 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 must understand how to configure the switches to use VLAN, LACP, and MLAG, or equivalent.

If you do not 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.



Gather installation information (SG5700)

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

About this task

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

Information needed to connect to SANtricity System Manager on E2800 controller

You must connect the E2800 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>

Information needed	Your value
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)	

Information needed	Your value
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 "10/25-GbE port connections for the E5700SG controller" for more information about the options for these ports.

Information needed	Your value
Link speed  <b>Note:</b> If you select 25 GbE, you must install SPF28 transceivers. Auto-negotiation 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>
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 "10/25-GbE port connections for the E5700SG controller" for more information about the options for these 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:
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>
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 "10/25-GbE port connections for the E5700SG controller" for more information about the options for these 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>
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

[Review appliance network connections \(SG5700\)](#)

[Port bond modes for E5700SG controller ports](#)

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

## Install hardware (SG5700)

Hardware installation entails installing the appliance into a cabinet or rack, connecting the cables, and applying power.

### Register hardware

Registering the appliance hardware provides support benefits.

#### Steps

1. Locate the chassis serial number.

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



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	<ul 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></ul>
New NetApp customer	<ul 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></ul> <p>After your registration is approved, you can download any required software. The approval process might take up to 24 hours.</p>

## Install appliance in cabinet or rack (SG5700)

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

### What you'll need

- 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 the *Installation and Setup Instructions* for the appliance.



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



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.





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. Carefully follow the instructions for the rail kit to install the rails in your cabinet or rack.
2. If you have an SG5760, follow these steps to prepare for moving the appliance.
  - a. Remove the outer packing box. Then, fold down the flaps on the inner box.
  - b. 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.

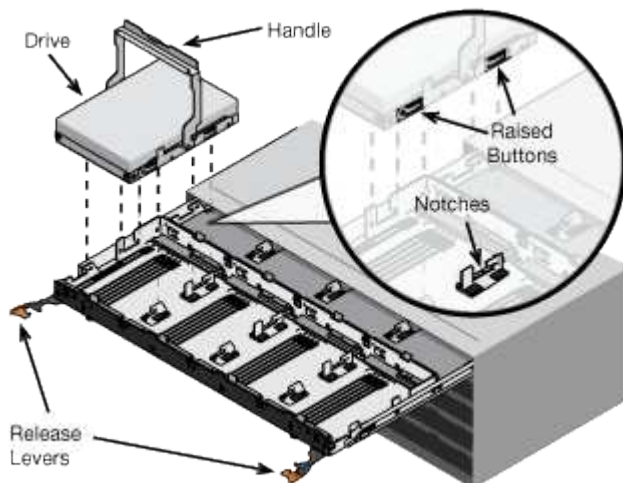
3. See the *Installation and Setup Instructions*, and slide the appliance in the cabinet or rack.
4. See the *Installation and Setup Instructions*, and secure the appliance to the cabinet or rack.

If you have an SG5760, use the back brackets to secure the appliance to the rear of the rack or cabinet. Use the cage nuts if your rack or cabinet has square holes.

5. If you have an SG5760, install 12 drives in each of the 5 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.
6. Attach the front bezel.

Cable appliance (SG5700)

You must 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.

What you'll need

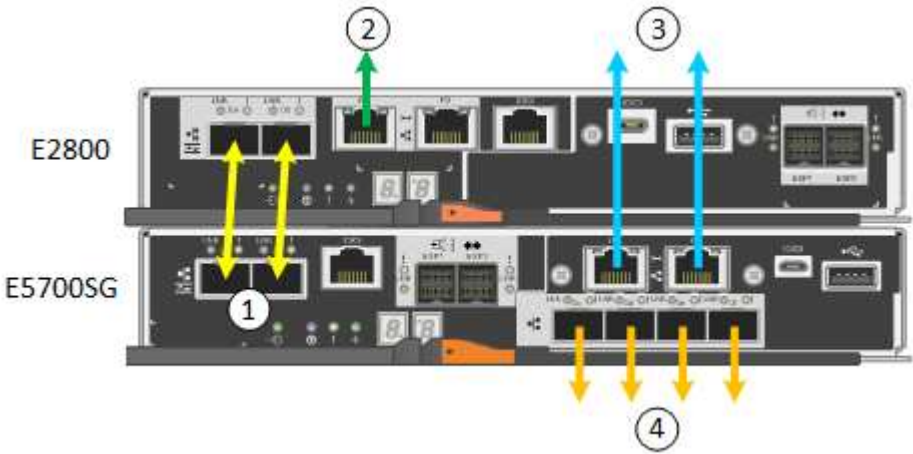
- You have unpacked the following items, which are included with the appliance:
  - Two power cords.
  - Two optical cables for the FC interconnect ports on the controllers.
  - Eight SFP+ transceivers, which support either 10-GbE or 16-Gbps FC. The transceivers can be used with the two interconnect 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 are not 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** — Do not disassemble or remove any part of an SFP transceiver. You might be exposed to laser radiation.

About this task

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 when viewed from the back.



	Port	Type of port	Function
1	Two interconnect ports on each controller	16Gb/s FC optical SFP+	Connect the two controllers to each other.

	Port	Type of port	Function
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.
2	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.
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 are not 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 “10/25-GbE port connections for the E5700SG controller.”

## 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

2. 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.

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

3. 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.

4. 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](#)

[Port bond modes for E5700SG controller ports](#)

## Connect power cords and apply power (SG5700)

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

### What you'll need

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.
  - Do not 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.

## View SG5700 boot-up status codes

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

### About this task

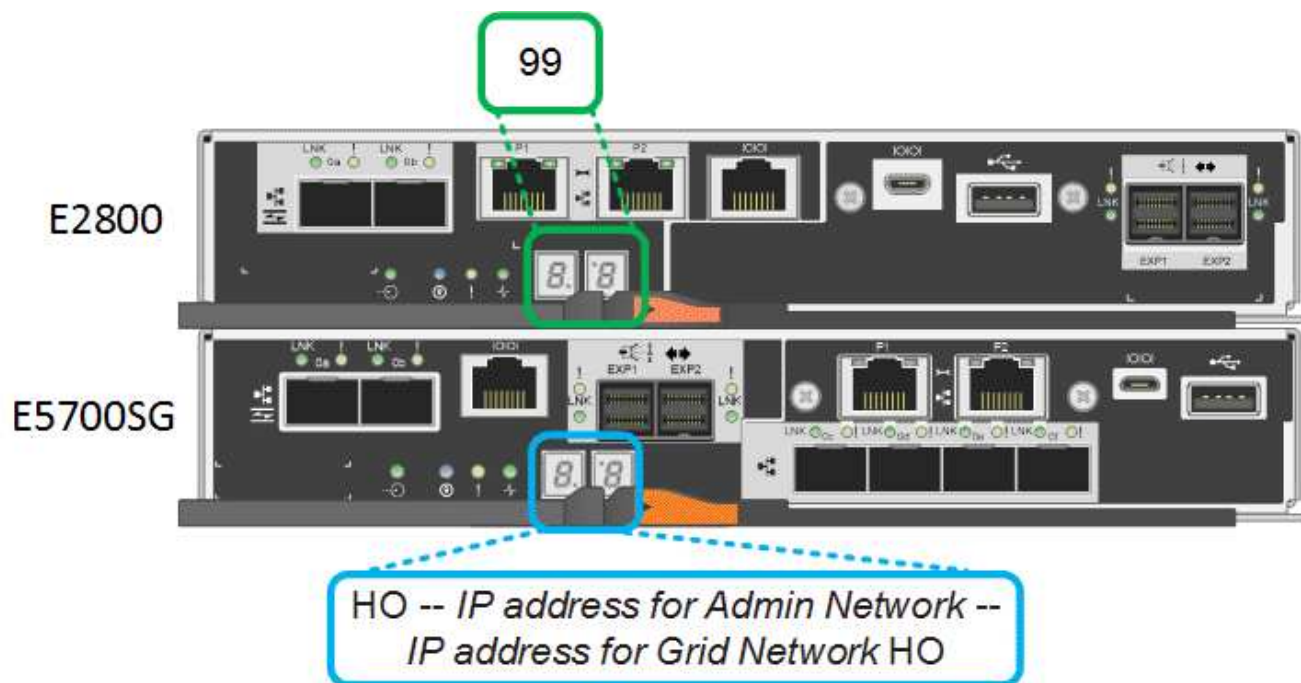
The E2800 controller and the E5700SG controller display different statuses and error codes.

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 do not apply to the E5700SG controller in the appliance.
E5700SG controller	"Status indicators on the E5700SG controller"

### Steps

1. 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**.
2. 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.
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;"> <p>HO -- IP address for Admin Network -- IP address for Grid Network HO</p> </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 \(SG5700\)](#) and confirm you completed the installation steps correctly. If you are unable to resolve the problem, contact technical support.

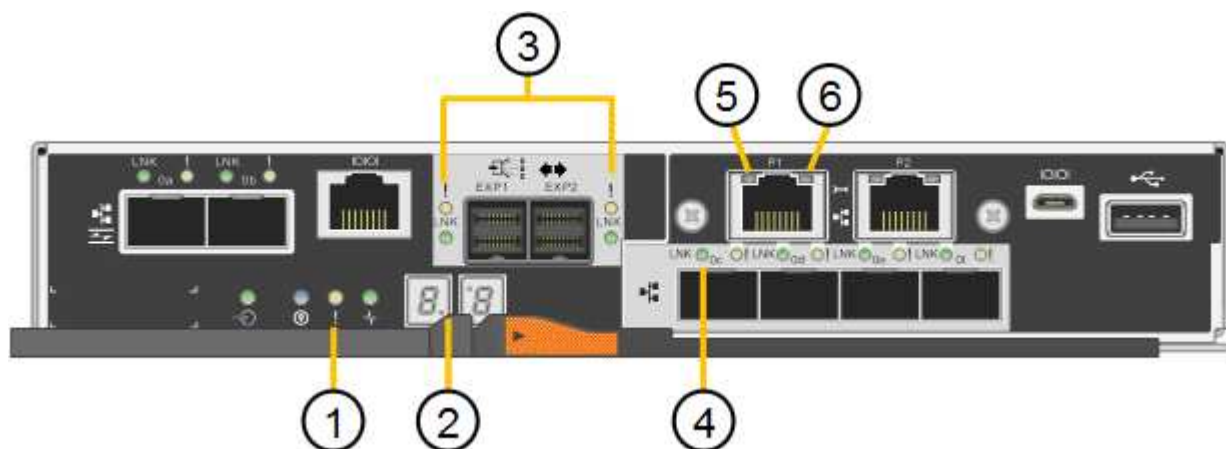
#### Related information

[Status indicators on the E5700SG controller](#)

### 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.



	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>

	Display	Description
5	Ethernet Link State LEDs	Green: A link is established.  Off: No link is established.
6	Ethernet Activity LEDs	Green: The link between the management port and the device to which it is connected (such as an Ethernet switch) is up.  Off: There is no link between the controller and the connected device.  Blinking Green: There is Ethernet activity.

### 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.



Code	Indicates
HE	The system is awaiting connectivity with the E2800 controller and synchronizing with the SANtricity operating system.  <b>Note:</b> If this boot procedure does not progress past this stage, check the connections between the two controllers.
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.
51	SPD reading failure.
92 to 96	PCI bus initialization.
A0 to A3	SATA drive initialization.
AB	Alternate boot code.
AE	Booting OS.

Code	Indicates
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

[Troubleshoot hardware installation \(SG5700\)](#)

[NetApp Support](#)

## Configure hardware (SG5700)

After applying power to the appliance, you must configure SANtricity System Manager, which is the software you will use to monitor the hardware. You must also configure the network connections that will be used by StorageGRID.

### Configure StorageGRID connections (SG5700)

Before you can deploy a StorageGRID appliance as a Storage Node in a StorageGRID grid, you must configure the connections between the appliance and the networks you plan to use. You can configure networking by browsing to the StorageGRID Appliance Installer, which is included on the E5700SG controller (the compute controller in the appliance).

#### Steps

- [Access StorageGRID Appliance Installer](#)
- [Verify and upgrade StorageGRID Appliance Installer version](#)
- [Configure network links \(SG5700\)](#)
- [Set IP configuration](#)
- [Verify network connections](#)
- [Verify port-level network connections](#)

#### Access StorageGRID Appliance Installer

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

#### What you'll need

- You are using a [supported web browser](#).

- The appliance is connected to all of the StorageGRID networks you plan to use.
- You know the IP address, gateway, and subnet for the appliance on these networks.
- You have configured the network switches you plan to use.

### About this task

When you first access the StorageGRID Appliance Installer, you can use the DHCP-assigned IP address for the Admin Network (assuming the appliance is connected to the Admin Network) or the DHCP-assigned IP address for the Grid Network. Using the IP address for the Admin Network is preferred. Otherwise, if you access the StorageGRID Appliance Installer using the DHCP address for the Grid Network, you might lose connection with the StorageGRID Appliance Installer when you change link settings and when you enter a static IP.

### Steps

1. Obtain the DHCP address for the appliance on the Admin Network (if it is connected) or the Grid Network (if the Admin Network is not connected).

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.

- Provide the MAC address for management port 1 to your network administrator, so they can look up the DHCP address for this port on the Admin Network. The MAC address is printed on a label on the E5700SG controller, next to the port.
2. If you were able to obtain either of the DHCP addresses:
    - a. Open a web browser on the service laptop.
    - b. Enter this URL for the StorageGRID Appliance Installer:  
**`https://E5700SG_Controller_IP:8443`**

For `E5700SG_Controller_IP`, use the DHCP address for the controller (use the IP address for the Admin Network if you have it).

- c. 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**

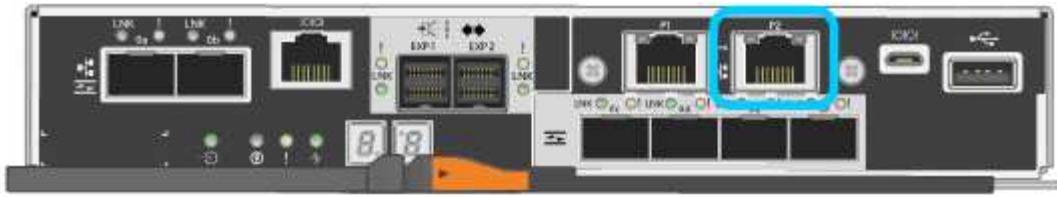
Current state

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

3. If the E5700SG controller could not acquire an IP address using DHCP:

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



- b. Open a web browser on the service laptop.
- c. 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.



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

4. Review any messages displayed on the Home page and configure the link configuration and the IP configuration, as required.

#### Related information

[Web browser requirements](#)

#### 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.

#### What you'll need

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 do not 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 the NetApp Downloads page for StorageGRID.

## NetApp Downloads: StorageGRID

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 file is a `.zip` archive that contains the current and previous firmware versions for all StorageGRID appliance models, in subdirectories for each controller type.

After downloading the Support file for StorageGRID Appliances file, 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 the StorageGRID Appliance Installer to perform these steps:
  - a. Upload the appropriate support file (firmware image) for your controller type and the checksum file.
  - b. Upgrade the inactive partition.
  - c. Reboot and swap partitions.
  - d. Upgrade the second (inactive) partition.

### Related information

[Access StorageGRID Appliance Installer](#)

### Configure network links (SG5700)

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.

### What you'll need

If you plan to use the 25-GbE link speed for the 10/25-GbE ports:

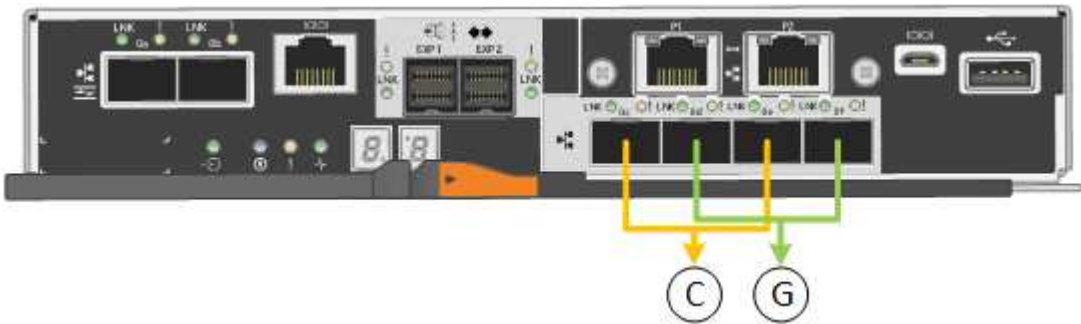
- You have installed SFP28 transceivers in the ports you plan to use.
- You have connected the ports to switches that can support these features.
- You understand how to configure the switches to use this higher speed.

If you plan to use Aggregate port bond mode, LACP network bond mode, or VLAN tagging for the 10/25-GbE ports:

- You have connected the 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.
- If you plan to use Active-Backup mode for the Admin Network, you have connected Ethernet cables to both management ports on the controller.

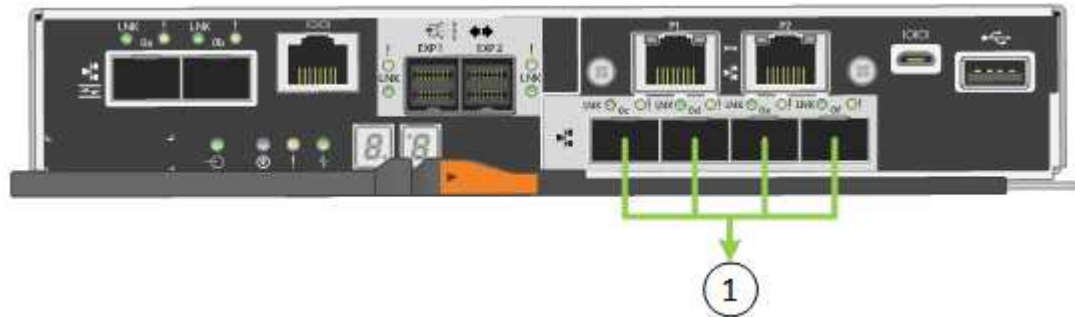
### About this task

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.

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

- **Fixed (default) port bond mode**

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 are not 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 are not 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

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>

See the information about 10/25-GbE port connections for the E5700SG controller for more information about port bond and network bond modes.

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.



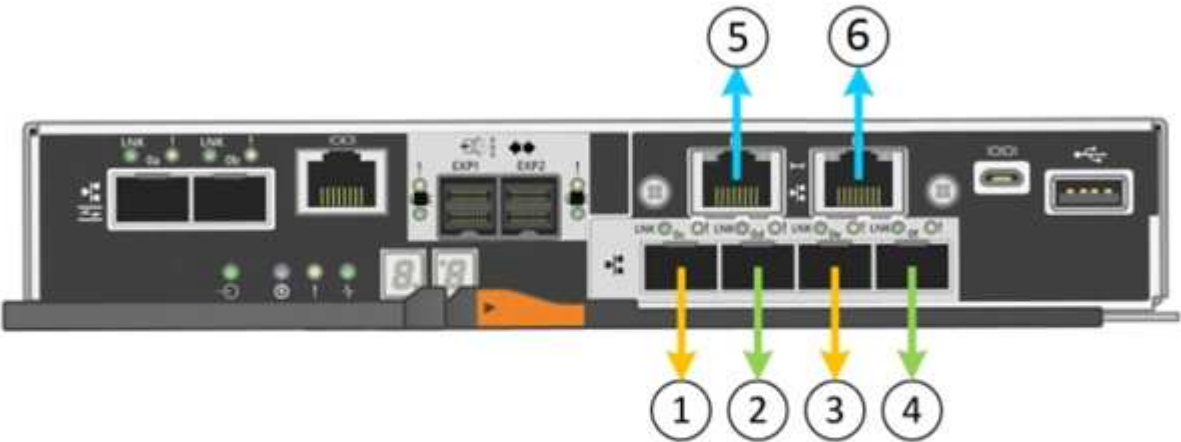
#### Steps



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.

Network Link Configuration



**⚠** You might lose your connection if you make changes to the network or link you are connected through. If you are not reconnected within 1 minute, re-enter the URL using one of the other IP addresses assigned to the appliance.

The Link Status table lists the link state (up/down) and speed (1/10/25/40/100 Gbps) of the numbered ports.

Link Status

Link	State	Speed (Gbps)
1	Up	25
2	Up	25
3	Up	25
4	Up	25
5	Up	1
6	Up	1

The first time you access this page:

- **Link Speed** is set to **10GbE**.

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

#### 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)

Enable VLAN (802.1q) tagging ☐

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 port 5. Leave port 6 unconnected. If necessary, you can make a temporary direct Ethernet connection to port 6 and use 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 ☐

Enabling the Client Network causes the default gateway for this node to move to the Client Network. Before enabling the Client Network, ensure that you've added all necessary subnets to the Grid Network Subnet List. Otherwise, the connection to the node might be lost.

2. If you plan to use the 25-GbE link speed for the 10/25 GbE ports, select **25GbE** 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. SFP28 transceivers must be installed in the ports.

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

The Grid Network is required. You cannot disable this network.

- a. If the appliance is not connected to the Admin Network, unselect the **Enable network** check box for the Admin Network.

#### Admin Network

---

Enable network



- b. If the appliance is connected to the Client Network, select the **Enable network** check box for the Client Network.

The Client Network settings for the 10/25-GbE ports are now shown.

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

The 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

### 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.

### 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

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 are not 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://E5700SG_Controller_IP:8443`**

### Related information

[Port bond modes for E5700SG controller ports](#)

### Set IP configuration

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

## Client Networks.

### 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.

If you want to change the link configuration, see the instructions for changing the link configuration of the E5700SG controller.

### 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.


## Grid Network

The Grid Network is used for all internal StorageGRID traffic. The Grid Network provides connectivity between all nodes in the grid, across all sites and subnets. All hosts on the Grid Network must be able to talk to all other hosts. The Grid Network can consist of multiple subnets. Networks containing critical grid services, such as NTP, can also be added as Grid subnets.

IP Assignment ☒ Static ☐ DHCP

IPv4 Address (CIDR)

Gateway

 All required Grid Network subnets must also be defined in the Grid Network Subnet List on the Primary Admin Node before starting installation.

Subnets (CIDR)	<input type="text" value="172.18.0.0/21"/>	✕
	<input type="text" value="172.18.0.0/21"/>	✕
	<input type="text" value="192.168.0.0/21"/>	+ ✕
MTU	<input type="text" value="1500"/>	

Cancel

Save

3. If you selected **Static**, follow these steps to configure the Grid Network:

- Enter the static IPv4 address, using CIDR notation.
- Enter the gateway.

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

- 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 do not 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://services_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 do not 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 must 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://services_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 cannot 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 cannot 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 must 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 cannot 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 cannot 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.

## Related information

[Change link configuration of the E5700SG controller](#)

## 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	<input type="text" value="Grid"/>
Destination IPv4 Address or FQDN	<input type="text"/>
Test MTU	<input type="checkbox"/>
<input type="button" value="Test Connectivity"/>	

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** check box 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 \(SG5700\)](#)

[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 port reference in the StorageGRID networking guidelines.



The Grid Network ports listed in the port connectivity table are valid only for StorageGRID version 11.6.0. 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 cannot 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
NAC 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
```

## Related information

[Networking guidelines](#)

## Access and configure SANtricity System Manager (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.

#### What you'll need

- You are using a [supported web browser](#).
- To access SANtricity System Manager through Grid Manager, you must have installed StorageGRID, and you must have the Storage Appliance Administrator permission or Root Access permission.
- To access SANtricity System Manager using the StorageGRID Appliance Installer, you must have the SANtricity System Manager administrator username and password.
- To access SANtricity System Manager directly using a web browser, you must 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 do not 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 cannot 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 E-Series documentation center.

[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 are not available or the login page does not appear, you must use the IP address of the storage controller. Access SANtricity System Manager by browsing to the storage controller IP:

**`https://Storage_Controller_IP`**

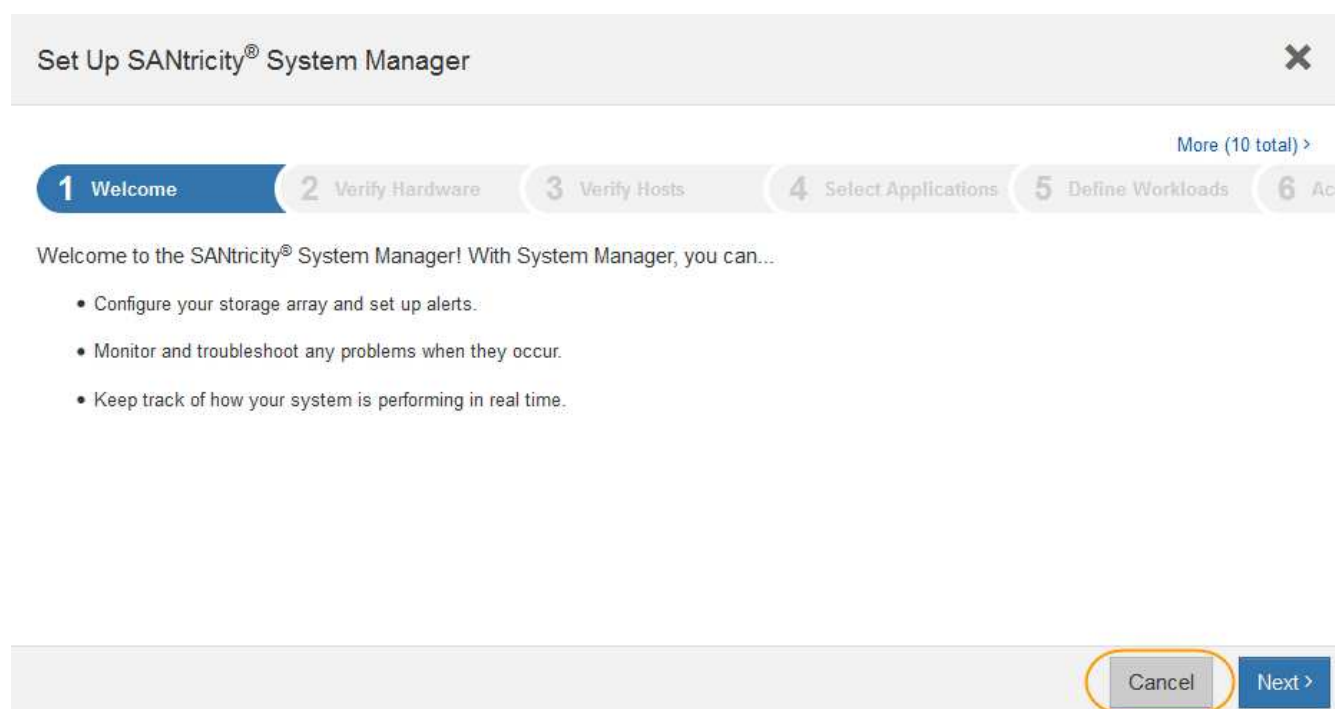
The login page for SANtricity System Manager appears.

2. Set or enter the administrator password.



SANtricity System Manager uses a single administrator password that is shared among all users.

The Set Up wizard appears.

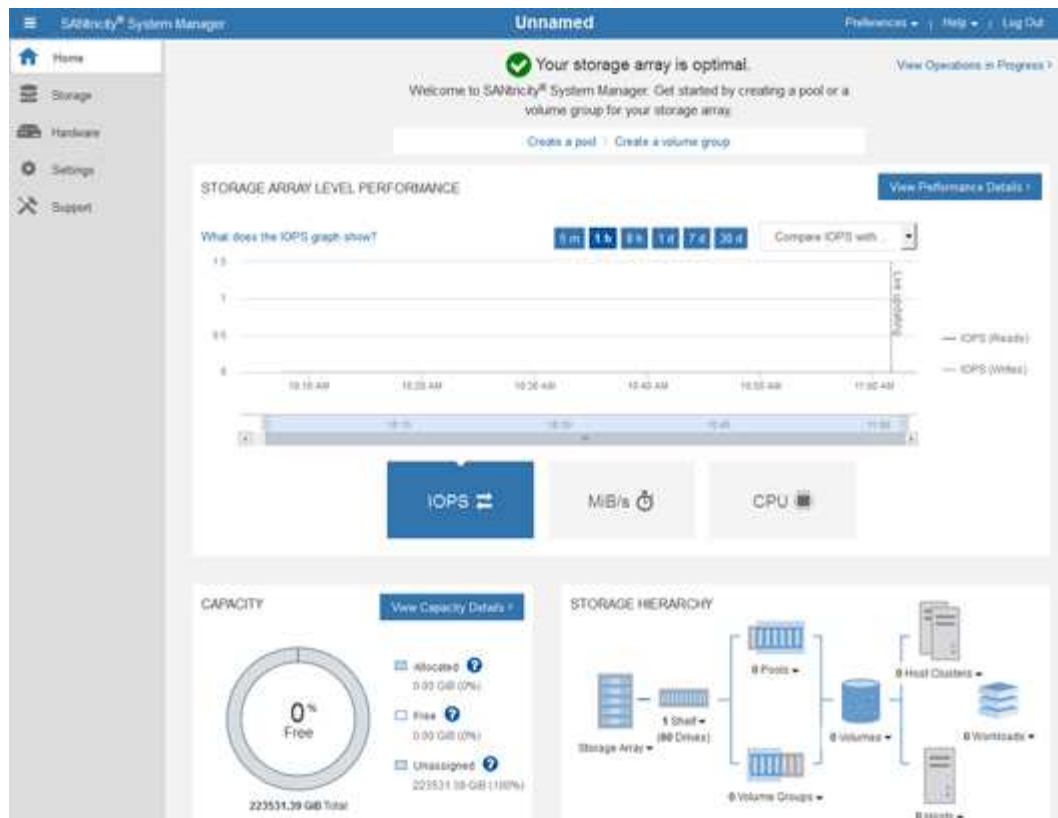


3. Select **Cancel** to close the wizard.



Do not complete the Set Up wizard for a StorageGRID appliance.

The SANtricity System Manager home page appears.



4. Configure hardware alerts.
  - a. Select **Help** to access the online help for SANtricity System Manager.
  - b. 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 administering StorageGRID and search for “proxy settings for E-Series AutoSupport.”

### Administer StorageGRID

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.

### What you'll need

- You are using a [supported web browser](#).
- To access SANtricity System Manager through Grid Manager, you must have the Storage Appliance Administrator permission or Root Access permission.
- To access SANtricity System Manager using the StorageGRID Appliance Installer, you must have the SANtricity System Manager administrator username and password.
- To access SANtricity System Manager directly using a web browser, you must 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 do not apply to monitoring your StorageGRID appliance. To avoid issues, always follow the hardware installation and maintenance instructions for your appliance.

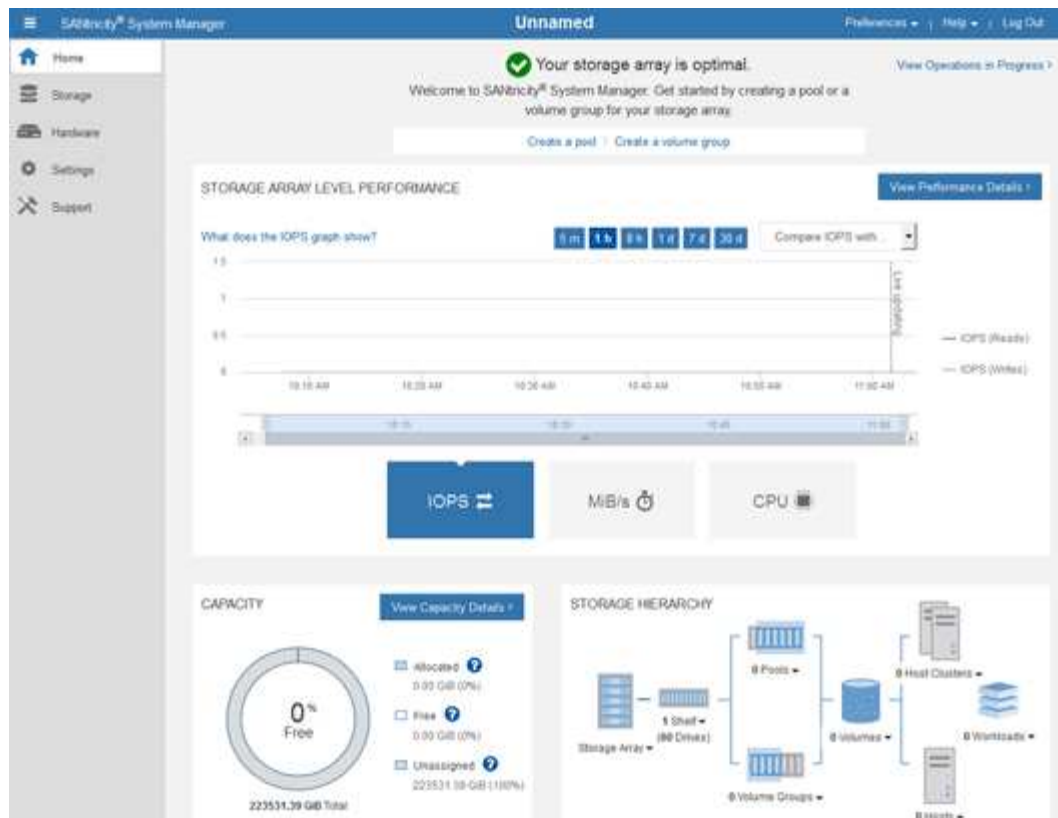
### Steps

1. Access SANtricity System Manager.

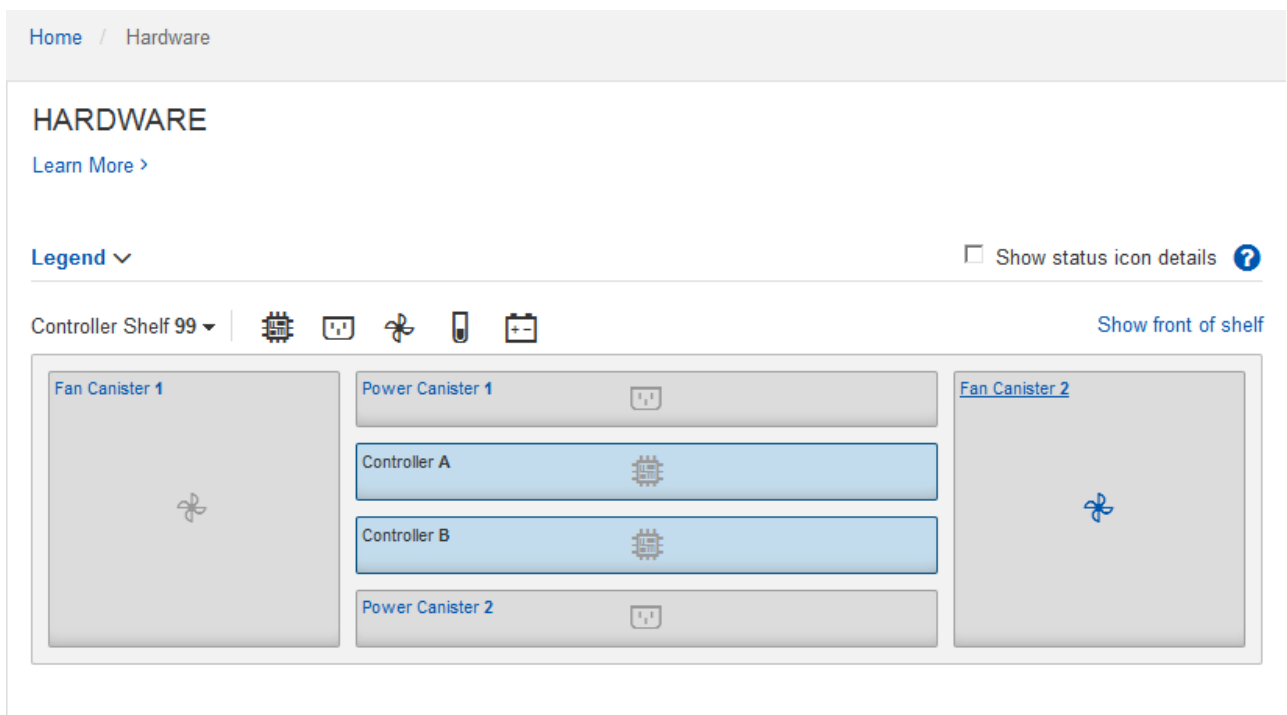
#### [Set up and access SANtricity System Manager](#)

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 cannot access to the SANtricity System Manager from the StorageGRID Appliance Installer, you must set a static IP address for each storage controller to ensure that you do not lose your management connection to the hardware and the controller firmware in the controller shelf.

#### What you'll need

- 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 do not 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.

- Select **Static**.
- Enter the IPv4 address, using CIDR notation.
- Enter the default gateway.

IPv4 Address Assignment    ☒ Static    ☐ DHCP

IPv4 Address (CIDR)    10.224.2.200/21

Default Gateway    10.224.0.1

- 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`**

## 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 and cannot unselect node encryption once the KMS encryption process starts.

### What you'll need

Review the information about KMS in the instructions for administering StorageGRID.

### 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.



Data that exists prior to connecting to the KMS on an appliance that has node encryption enabled is encrypted with a temporary key that is not secure. The appliance is not protected from removal or theft until the key is set to a value provided by the KMS.

Without the KMS key needed to decrypt the disk, data on the appliance cannot be retrieved and is effectively lost. This is the case whenever the decryption key cannot 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 cannot 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**.

Prior to appliance installation you can unselect **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 are not able to 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 cannot 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.

### Related information

[Administer StorageGRID](#)

[Monitor node encryption in maintenance mode \(SG5700\)](#)

## Optional: Change RAID mode (SG5760 only)

If you have an SG5760 with 60 drives, you can change to a different RAID mode to accommodate your storage and recovery requirements. You can only change the mode before deploying the StorageGRID appliance Storage Node.

### What you'll need

- You have an SG5760. If you have an SG5712, you must use DDP mode.
- You are using any client that can connect to StorageGRID.
- The client has a [supported web browser](#).

### About this task

Before deploying the SG5760 appliance as a Storage Node, you can choose one of the following volume configuration options:

- **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 RAID6, DDP delivers better system performance, reduced rebuild times after drive failures, and ease of management. DDP also provides drawer loss protection in 60-drive appliances.
- **DDP16:** This mode uses two parity drives for every 16 data drives, which results in higher storage efficiency compared to DDP. When compared to RAID6, 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. To use RAID 6 mode, your configuration must contain at least 20 drives. Although RAID6 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.

### 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 might need to remap the internal ports on the appliance Storage Node to different external ports. For example, you might need to remap ports because of a firewall issue.

### What you'll need

- You have previously accessed the StorageGRID Appliance Installer.
- You have not configured and do not plan to configure load balancer endpoints.



If you remap any ports, you cannot use the same ports to configure load balancer endpoints. If you want to configure load balancer endpoints and have already remapped ports, follow the steps in [Remove port remaps](#).

### Steps

1. From the menu bar of the StorageGRID Appliance Installer, click **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.

- For **Mapped-To Port**, enter the number of the port you want to use instead.
- Click **Add Rule**.

The new port mapping is added to the table, and the remapping takes effect immediately.

## Remap Ports

If required, you can remap the internal ports on the appliance Storage Node to different external ports. For example, you might need to remap ports because of a firewall issue.

Network	Protocol	Remap Direction	Original Port	Mapped-To Port
Grid	TCP	Bi-directional	1800	1801

- To remove a port mapping, select the radio button for the rule you want to remove, and click **Remove Selected Rule**.

## 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.

### What you'll need

- If you are cloning an appliance node, continue following the process in recovery and maintenance.

### Recover and maintain

- 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 expanding a StorageGRID system.
  - To deploy an appliance Storage Node as part of a recovery operation, see instructions for recovery and maintenance.

## 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

Connection state

Connection to 172.16.4.210 ready

Cancel

Save

#### Node name

Node name

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>Unselect the <b>Enable Admin Node discovery</b> check box.</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> check box.</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, 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 Nodes page (Overview tab) in the Grid Manager. If required, you can change the name when you approve the node.

- 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 installation and 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 in recovery and maintenance.

### Recover and maintain

- 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.

Related information

[Expand your grid](#)

[Recover and maintain](#)

# Monitor storage appliance installation

The StorageGRID Appliance Installer provides status until installation is complete. When the software installation is complete, the appliance is rebooted.

Steps

- 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 are not re-run. If you are re-running an installation, any tasks that do not 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, communicates with SANtricity software to configure volumes, 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...

```

- 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.

## Automate appliance installation and configuration (SG5700)

You can automate the installation and configuration of your appliances and configuration of the whole StorageGRID system.

### About this task

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

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

- Create a JSON file that specifies the configuration settings for your appliances. Upload the JSON file using the StorageGRID Appliance Installer.



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

- Use the `StorageGRIDconfigure-sga.py` Python script to automate the configuration of your appliances.
- Use additional Python scripts to configure other components of the whole StorageGRID system (the "grid").



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 information about [downloading and extracting the StorageGRID installation files](#) in the Recovery and Maintenance instructions.

## Automate appliance configuration using StorageGRID Appliance Installer

You can automate the configuration of an appliance by using a JSON file that contains the configuration information. You upload the file using the StorageGRID Appliance Installer.

### What you'll need

- Your appliance must be on the latest firmware compatible with StorageGRID 11.5 or higher.
- You must be connected to the StorageGRID Appliance Installer on the appliance you are configuring using a [supported web browser](#).

### About this task

You can automate appliance configuration tasks such as configuring the following:

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

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



Experienced users who want to automate both the installation and configuration of their appliances can use the `configure-sga.py` script. [Automate installation and configuration of appliance nodes using configure-sga.py script](#)

### Steps



1. Generate the JSON file using one of the following methods:

- The ConfigBuilder application

[ConfigBuilder.netapp.com](https://configbuilder.netapp.com)

- The `configure-sga.py` appliance configuration script. You can download the script from StorageGRID Appliance Installer (**Help > Appliance Configuration Script**). See the instructions on automating the configuration using the `configure-sga.py` script.

[Automate installation and configuration of appliance nodes using configure-sga.py script](#)

The node names in the JSON file must follow these requirements:

- Must be a valid hostname containing at least 1 and no more than 32 characters
- Can use letters, numbers, and hyphens
- Cannot start or end with a hyphen
- Cannot or contain only numbers



Ensure that the node names (the top-level names) in the JSON file are unique, or you will not be able to configure more than one node using the JSON file.

2. Select **Advanced > Update Appliance Configuration**.

The Update Appliance Configuration page appears.

### Update Appliance Configuration

Use a JSON file to update this appliance's configuration. You can generate the JSON file from the [ConfigBuilder](#) application or from the [appliance configuration script](#).

You might lose your connection if the applied configuration from the JSON file includes "link\_config" and/or "networks" sections. If you are not reconnected within 1 minute, re-enter the URL using one of the other IP addresses assigned to the appliance.

### Upload JSON

JSON  
configuration

Browse

Node name

-- Upload a file ▼

Apply JSON configuration

3. Select the JSON file with the configuration you want to upload.

- Select **Browse**.
- Locate and select the file.
- Select **Open**.

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 are not reconnected within 1 minute, re-enter the appliance URL using one of the other IP addresses assigned to the appliance.

#### Upload JSON

JSON  
configuration

Browse

✓ appliances.orig.json

Node name

-- Select a node ▼

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. You can use ConfigBuilder to ensure you have a valid JSON file.

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

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

#### Upload JSON

JSON  
configuration

Browse

✓ appliances.orig.json

Node name

Lab-80-1000 ▼

Apply JSON configuration

5. Select **Apply JSON configuration**.

The configuration is applied to the selected node.

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

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.

### About this task

- The appliance has been installed in a rack, connected to your networks, and powered on.
- Network links and IP addresses have been configured for the primary Admin Node using the StorageGRID Appliance Installer.
- If you are installing the primary Admin Node, you know its IP address.
- If you are installing and configuring other nodes, the primary Admin Node has been deployed, and you know its IP address.
- For all nodes other than the primary Admin Node, 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 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.



This procedure is for advanced users with some experience using command-line interfaces. Alternatively, you can also use the StorageGRID Appliance Installer to automate the configuration.

[Automate appliance configuration using 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
```

3. To confirm the current configuration of the appliance node, enter the following where `SGA-install-ip` is any one of the IP addresses for the appliance node:

```
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. ####
#####

```

4. 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`
5. 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. Do not make any changes to this file unless you are an experienced user and have a thorough understanding of StorageGRID APIs.

6. 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
```

7. If you want to reboot the appliance, enter the following:

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

## Automate configuration of StorageGRID

After deploying the grid nodes, you can automate the configuration of the StorageGRID system.

### What you'll need

- 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 (JavaScript Object Notation) 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 in the event that 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 configuration** — 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.
- **upgrade** — Operations related to upgrading appliance firmware.
- **uploadsg** — Operations for uploading StorageGRID installation files.



# Troubleshoot hardware installation (SG5700)

If you encounter issues during the installation, you might find it helpful to review troubleshooting information related to hardware setup and connectivity issues.

## Hardware setup appears to hang (SG5700)

The StorageGRID Appliance Installer might not be available if hardware faults or cabling errors prevent the E5700SG controller from completing its boot-up processing.

### Steps

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 do not 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 do not apply to the E5700SG controller in the appliance.</p>

4. If this does not resolve the issue, contact technical support.

### Related information

[Status indicators on the E5700SG controller](#)

[HE error: Error synchronizing with SANtricity OS Software](#)

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

### HE error: Error synchronizing with SANtricity OS Software

The seven-segment display on the compute controller shows an HE error code if the

## StorageGRID Appliance Installer cannot synchronize with SANtricity OS Software.

### About this task

If an HE error code is displayed, perform this corrective action.

### Steps

1. Check the two interconnect cables between the two controllers, and confirm that the cables and SFP+ transceivers are securely connected.
2. As required, replace one or both of the cables or SFP+ transceivers, and try again.
3. If this does not resolve the issue, contact technical support.

## Troubleshoot connection issues (SG5700)

If you encounter connection issues during the StorageGRID appliance installation, you should perform the corrective action steps listed.

### Unable to connect to the appliance

If you cannot 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.

## Reboot controller while StorageGRID Appliance Installer is running

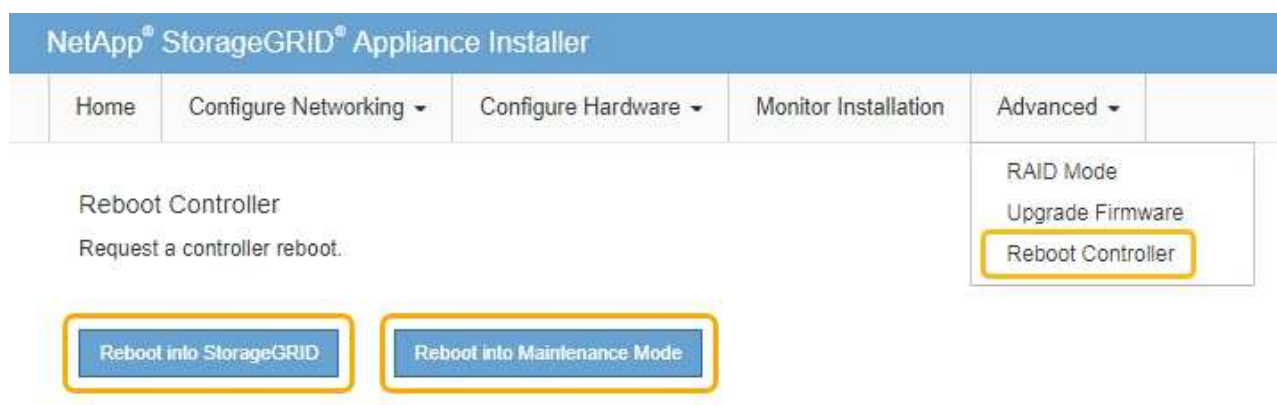
You might need to reboot the compute controller while the StorageGRID Appliance Installer is running. For example, you might need to reboot the controller if the installation fails.

### About this task

This procedure only applies when the compute controller 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 SG6000-CN controller is rebooted.

## Maintain SG5700 appliance

You might need to upgrade the SANtricity OS Software on the E2800 controller, change

the Ethernet link configuration of the E5700SG controller, replace the E2800 controller or the E5700SG controller, or replace specific components. The procedures in this section assume that the appliance has already been deployed as a Storage Node in a StorageGRID system.

### Place appliance into maintenance mode

You must place the appliance into maintenance mode before performing specific maintenance procedures.

#### What you'll need

- You are signed in to the Grid Manager using a [supported web browser](#).
- You have the Maintenance or Root access permission. For details, see the instructions for administering StorageGRID.

#### About this task

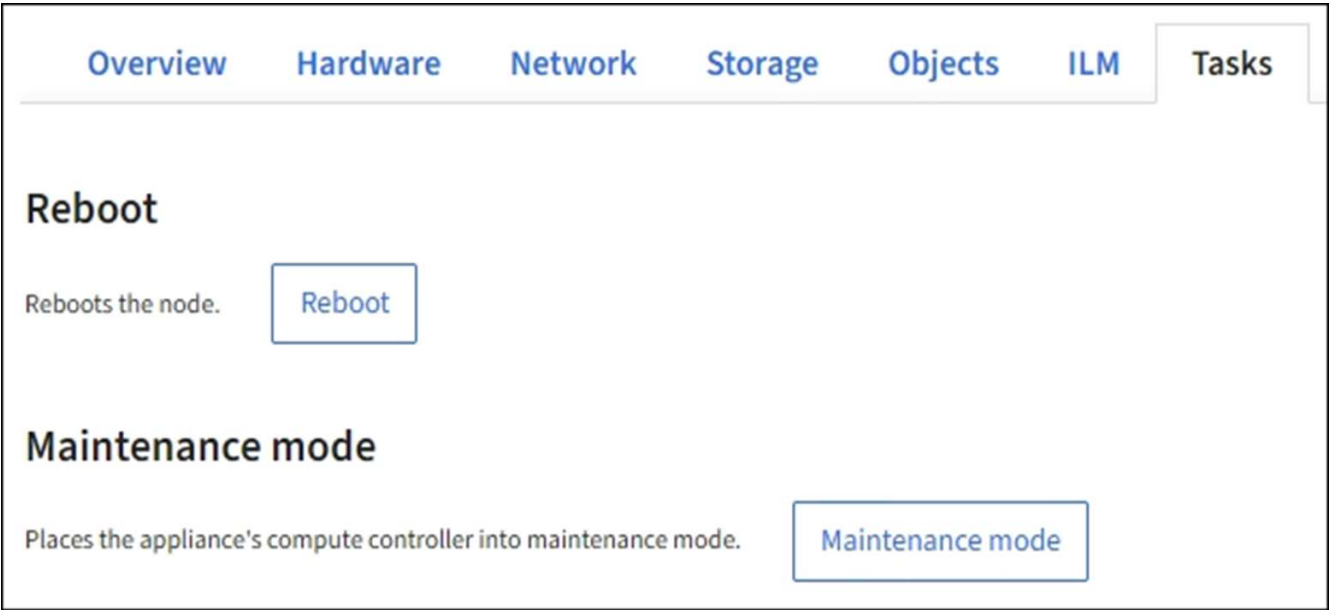
In rare instances, placing a StorageGRID appliance into maintenance mode might make the appliance unavailable for remote access.




The admin account password and SSH host keys for a StorageGRID appliance in maintenance mode remain the same as they were when the appliance was in service.

#### Steps

1. From the Grid Manager, select **NODES**.
2. From the tree view of the Nodes page, select the appliance Storage Node.
3. Select **Tasks**.



4. Select **Maintenance mode**.  
A confirmation dialog box appears.

 Enter maintenance mode on S2-10-224-2-24

×


You must place the appliance's compute controller into maintenance mode to perform certain maintenance procedures on the appliance.

Attention: All StorageGRID services on this node will be shut down. Wait a few minutes for the node to reboot into maintenance mode.

If you are ready to start, enter the provisioning passphrase and select OK.

Provisioning passphrase

.....




Cancel

OK

5. Enter the provisioning passphrase, and select **OK**.

A progress bar and a series of messages, including "Request Sent," "Stopping StorageGRID," and "Rebooting," indicate that the appliance is completing the steps for entering maintenance mode.

S2-10-224-2-24 (Storage Node) 

×

Overview

Hardware

Network

Storage

Objects

ILM

Tasks

Reboot


Reboots the node.

Reboot


Maintenance mode

Places the appliance's compute controller into maintenance mode.

Maintenance mode

 **Attention**

Your request has been sent, but the appliance might take 10-15 minutes to enter maintenance mode. **Do not perform maintenance procedures until this tab indicates maintenance mode is ready, or data could become corrupted.**

 Rebooting...

When the appliance is in maintenance mode, a confirmation message lists the URLs you can use to access the StorageGRID Appliance Installer.

S2-10-224-2-24 (Storage Node)

Overview

Hardware

Network

Storage

Objects

ILM

Tasks

Reboot

Reboots the node. 

Reboot

Maintenance mode

Places the appliance's compute controller into maintenance mode. 

Maintenance mode

This node is currently in maintenance mode. Navigate to one of the URLs listed below and perform any necessary maintenance procedures.

- <https://172.16.2.24:8443>
- <https://10.224.2.24:8443>

When you are done with any required maintenance procedures, you must exit maintenance mode by selecting Reboot Controller from the StorageGRID Appliance Installer.

6. To access the StorageGRID Appliance Installer, browse to any of the URLs displayed.

If possible, use the URL containing the IP address of the appliance's Admin Network port.



If you have a direct connection to the appliance's management port, use `https://169.254.0.1:8443` to access the StorageGRID Appliance Installer page.

7. From the StorageGRID Appliance Installer, confirm that the appliance is in maintenance mode.

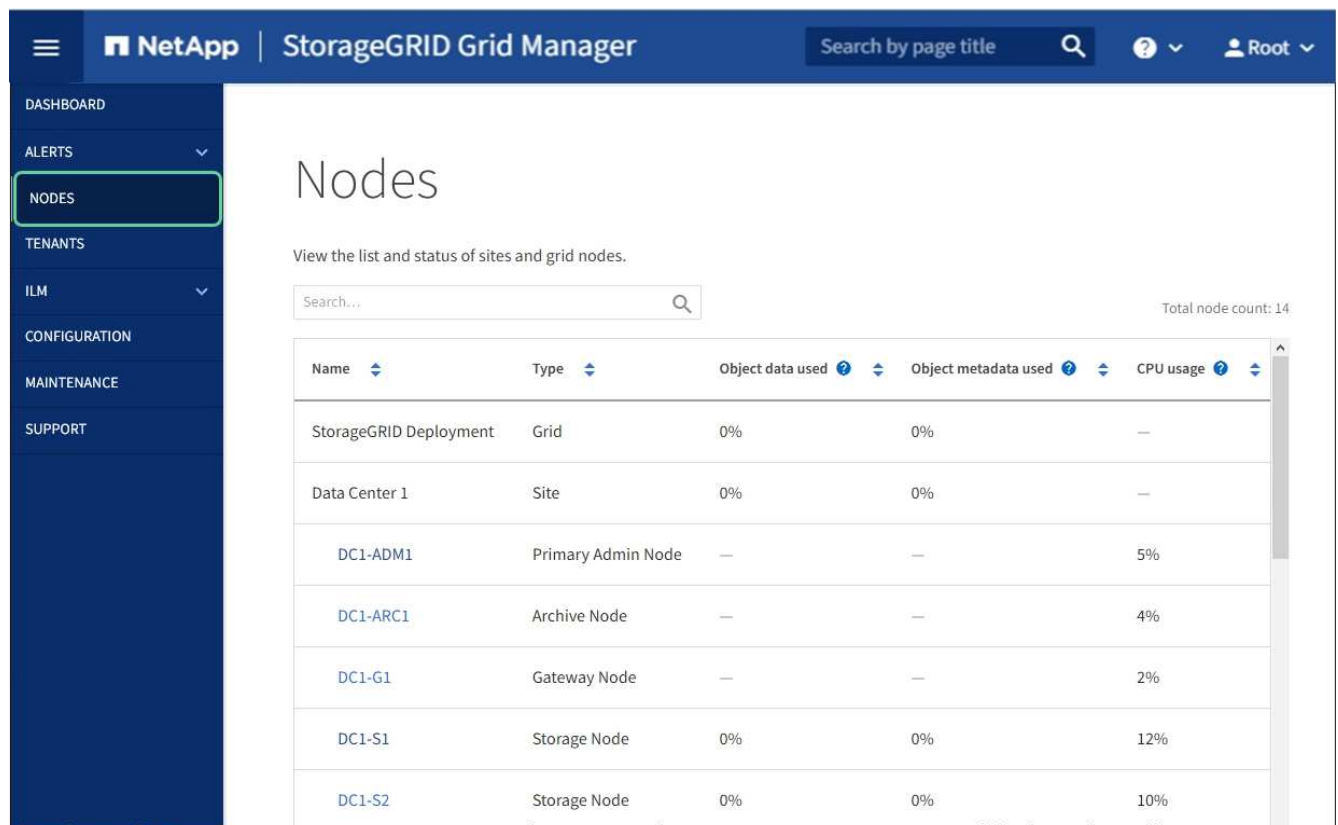
This node is in maintenance mode. Perform any required maintenance procedures. If you want to exit maintenance mode manually to resume normal operation, go to Advanced > Reboot Controller to [reboot](#) the controller.

8. Perform any required maintenance tasks.

9. After completing maintenance tasks, exit maintenance mode and resume normal node operation. From the StorageGRID Appliance Installer, select **Advanced > Reboot Controller**, and then select **Reboot into StorageGRID**.



It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The **NODES** page should display a normal status (no icon) for the appliance node, indicating that no alerts are active and the node is connected to the grid.



## Upgrade SANtricity OS on storage controller

To ensure optimal functioning of the storage controller, you must upgrade to the latest maintenance release of the SANtricity OS that is qualified for your StorageGRID appliance. Consult the NetApp Interoperability Matrix Tool (IMT) to determine which version you should be using. If you need assistance, contact technical support.

- If the storage controller is using SANtricity OS 08.42.20.00 (11.42) or newer, use the Grid Manager to perform the upgrade.

#### [Upgrade SANtricity OS on storage controllers using Grid Manager](#)

- If the storage controller is using a SANtricity OS version older than 08.42.20.00 (11.42), use maintenance mode to perform the upgrade.

#### [Upgrade SANtricity OS on E2800 controller using maintenance mode](#)

### **Related information**

[NetApp Interoperability Matrix Tool](#)

[NetApp Downloads: SANtricity OS](#)

[Monitor and troubleshoot](#)

### **Upgrade SANtricity OS on storage controllers using Grid Manager**

For storage controllers currently using SANtricity OS 08.42.20.00 (11.42) or newer, you must use the Grid Manager to apply an upgrade.

#### **What you'll need**

- You have consulted the NetApp Interoperability Matrix Tool (IMT) to confirm that the SANtricity OS version you are using for the upgrade is compatible with your appliance.
- You have the Maintenance or Root access permission.
- You are signed in to the Grid Manager using a [supported web browser](#).
- You have the provisioning passphrase.
- You have access to the NetApp downloads page for SANtricity OS.

#### **About this task**

You cannot perform other software updates (StorageGRID software upgrade or a hotfix) until you have completed the SANtricity OS upgrade process. If you attempt to start a hotfix or a StorageGRID software upgrade before the SANtricity OS upgrade process has finished, you are redirected to the SANtricity OS upgrade page.

The procedure will not be complete until the SANtricity OS upgrade has been successfully applied to all applicable nodes that have been selected for the upgrade. It might take more than 30 minutes to load the SANtricity OS on each node (sequentially) and up to 90 minutes to reboot each StorageGRID storage appliance.



The following steps are only applicable when you are using the Grid Manager to perform the upgrade. The storage controllers in the appliance cannot be upgraded using the Grid Manager when the controllers are using SANtricity OS older than 08.42.20.00 (11.42).



This procedure will automatically upgrade the NVSRAM to the most recent version associated with the SANtricity OS upgrade. You do not need to apply a separate NVSRAM upgrade file.

### **Steps**

1. Download the new SANtricity OS Software file from the NetApp support site.



Be sure to choose the SANtricity OS version for your storage controllers.

[NetApp Downloads: SANtricity OS](#)

2. Select **MAINTENANCE > System > Software update**.

Software update

You can upgrade StorageGRID software, apply a hotfix, or upgrade the SANtricity OS software on StorageGRID storage appliances.

StorageGRID upgrade	StorageGRID hotfix	SANtricity OS update
Upgrade to the next StorageGRID version and apply the latest hotfix for that version.	Apply a hotfix to your current StorageGRID software version.	Update the SANtricity OS software on your StorageGRID storage appliances.
<a href="#">Upgrade →</a>	<a href="#">Apply hotfix →</a>	<a href="#">Update →</a>

3. In the SANtricity OS update section, select **Update**.

The SANtricity OS upgrade page appears.

SANtricity OS

Use this procedure to upgrade the SANtricity OS software (controller firmware) on the storage controllers in your storage appliances.

1. Download the SANtricity OS version that is compatible with the storage controllers. If you use different appliance models, repeat these steps for each model.
2. Confirm the storage controllers are Nominal (**NODES > appliance node > Hardware**) and ready to upgrade.
3. Start the upgrade and approve the nodes you want to upgrade. Nodes are upgraded one at a time.  
During the upgrade, a health check is performed and valid NVSRAM is installed. When the upgrade is complete, the appliance is rebooted. The upgrade can take up to 30 minutes for each appliance.
4. Select **Skip Nodes and Finish** if you only want to apply this upgrade to some nodes or if you want to upgrade some nodes later.

**SANtricity OS Upgrade File**

SANtricity OS Upgrade File [?](#) [Browse](#)

**Passphrase**

Provisioning Passphrase [?](#) [Start](#)

4. Select the SANtricity OS upgrade file you downloaded from the NetApp support site.
  - a. Select **Browse**.
  - b. Locate and select the file.
  - c. Select **Open**.

The file is uploaded and validated. When the validation process is done, the file name is shown next to

the **Browse** button.



Do not change the file name since it is part of the verification process.

5. Enter the provisioning passphrase.

The **Start** button is enabled.

The screenshot shows the 'SANtricity OS' upgrade interface. It includes a list of instructions for upgrading the software. Below the instructions, there is a section titled 'SANtricity OS Upgrade File' with a 'Browse' button. A file named 'RCB\_00-72-00-00-000\_0000.dlp' is listed with a green checkmark. Below this, there is a 'Passphrase' section with a 'Provisioning Passphrase' field containing masked characters and a 'Start' button.

6. Select **Start**.

A warning box appears stating that your browser's connection might be lost temporarily as services on nodes that are upgraded are restarted.

The screenshot shows a yellow warning dialog box with a warning icon and the text 'Warning'. Below the title bar, it says 'Nodes can disconnect and services might be affected'. The main text reads: 'The node will be automatically rebooted at the end of upgrade and services will be affected. Are you sure you want to start the SANtricity OS upgrade?'. At the bottom right, there are 'Cancel' and 'OK' buttons.

7. Select **OK** to stage the SANtricity OS upgrade file to the primary Admin Node.

When the SANtricity OS upgrade starts:

a. The health check is run. This process checks that no nodes have the status of Needs Attention.



If any errors are reported, resolve them and select **Start** again.

- b. The SANtricity OS Upgrade Progress table appears. This table shows all Storage Nodes in your grid and the current stage of the upgrade for each node.



The table shows all appliance Storage Nodes. Software-based Storage Nodes are not displayed. Select **Approve** for all nodes that require the upgrade.

## SANtricity OS

Use this procedure to upgrade the SANtricity OS software (controller firmware) on the storage controllers in your storage appliances.

1. Download the SANtricity OS version that is compatible with the storage controllers. If you use different appliance models, repeat these steps for each model.
2. Confirm the storage controllers are Nominal (**NODES > appliance node > Hardware**) and ready to upgrade.
3. Start the upgrade and approve the nodes you want to upgrade. Nodes are upgraded one at a time.  
During the upgrade, a health check is performed and valid NVSRAM is installed. When the upgrade is complete, the appliance is rebooted. The upgrade can take up to 30 minutes for each appliance.
4. Select **Skip Nodes and Finish** if you only want to apply this upgrade to some nodes or if you want to upgrade some nodes later.

### SANtricity OS Upgrade Progress

▲ Storage Nodes - 0 out of 4 completed

Site	Name	Progress	Stage	Details	Current Controller Firmware Version	Action
DC1-SGAs	SG6060	<div style="width: 0%;"></div>	Waiting for you to approve		98.72.02.00	<input type="button" value="Approve"/>
DC1-SGAs	SG6060	<div style="width: 0%;"></div>	Waiting for you to approve		98.72.02.00	<input type="button" value="Approve"/>
DC1-SGAs	SG5712	<div style="width: 0%;"></div>	Waiting for you to approve		98.72.02.00	<input type="button" value="Approve"/>
DC1-SGAs	SG5660	<div style="width: 0%;"></div>	Waiting for you to approve		08.40.50.00	<input type="button" value="Approve"/>

8. Optionally, sort the list of nodes in ascending or descending order by **Site**, **Name**, **Progress**, **Stage**, **Details**, or **Current Controller Firmware Version**. Or, enter a term in the **Search** box to search for specific nodes.

You can scroll through the list of nodes by using the left and right arrows at the bottom right corner of the section.

9. Approve the grid nodes you are ready to add to the upgrade queue. Approved nodes of the same type are upgraded one at a time.



Do not approve the SANtricity OS upgrade for an appliance storage node unless you are sure the node is ready to be stopped and rebooted. When the SANtricity OS upgrade is approved on a node, the services on that node are stopped and the upgrade process begins. Later, when the node is finished upgrading, the appliance node is rebooted. These operations might cause service interruptions for clients that are communicating with the node.

- Select either of the **Approve All** buttons to add all Storage Nodes to the SANtricity OS upgrade queue.



If the order in which nodes are upgraded is important, approve nodes or groups of nodes one at a time and wait until the upgrade is complete on each node before approving the next node(s).

- Select one or more **Approve** buttons to add one or more nodes to the SANtricity OS upgrade queue.

After you select **Approve**, the upgrade process determines if the node can be upgraded. If a node can be upgraded, it is added to the upgrade queue.

For some nodes, the selected upgrade file is intentionally not applied and you can complete the upgrade process without upgrading these specific nodes. Nodes intentionally not upgraded show a stage of Complete (upgrade attempted) and list the reason the node was not upgraded in the Details column.

10. If you need to remove a node or all nodes from the SANtricity OS upgrade queue, select **Remove** or **Remove All**.

When the stage progresses beyond Queued, the **Remove** button is hidden and you can no longer remove the node from the SANtricity OS upgrade process.

11. Wait while the SANtricity OS upgrade is applied to each approved grid node.

- If any node shows a stage of Error while the SANtricity OS upgrade is being applied, the upgrade has failed for the node. With the assistance of technical support, you might need to place the appliance in maintenance mode to recover it.
- If the firmware on the node is too old to be upgraded with the Grid Manager, the node shows a stage of Error with the details: "You must use maintenance mode to upgrade SANtricity OS on this node. See the installation and maintenance instructions for your appliance. After the upgrade, you can use this utility for future upgrades." To resolve the error, do the following:
  - a. Use maintenance mode to upgrade SANtricity OS on the node that shows a stage of Error.
  - b. Use the Grid Manager to restart and complete the SANtricity OS upgrade.

When the SANtricity OS upgrade is complete on all approved nodes, the SANtricity OS Upgrade Progress table closes and a green banner shows the date and time the SANtricity OS upgrade was completed.

SANtricity OS upgrade completed on 2 nodes at 2021-10-04 15:43:23 EDT.

### SANtricity OS Upgrade File

SANtricity OS Upgrade File

Browse

### Passphrase

Provisioning Passphrase

Start

12. If a node cannot be upgraded, note the reason shown in the Details column and take the appropriate action:
- “Storage Node was already upgraded.” No further action required.
  - “SANtricity OS upgrade is not applicable to this node.” The node does not have a storage controller that can be managed by the StorageGRID system. Complete the upgrade process without upgrading the node displaying this message.
  - “SANtricity OS file is not compatible with this node.” The node requires a SANtricity OS file different than the one you selected. After completing the current upgrade, download the correct SANtricity OS file for the node and repeat the upgrade process.

*i*

The SANtricity OS upgrade process will not be complete until you approve the SANtricity OS upgrade on all the listed Storage Nodes.

13. If you want to end approving nodes and return to the SANtricity OS page to allow for an upload of a new SANtricity OS file, do the following:
- a. Select **Skip Nodes and Finish**.
 

A warning appears asking if you are sure you want to finish the upgrade process without upgrading all nodes.
  - b. Select **OK** to return to the **SANtricity OS** page.
  - c. When you are ready to continue approving nodes, go to [Download the SANtricity OS](#) to restart the upgrade process.

*i*

Nodes already approved and upgraded without errors remain upgraded.

14. Repeat this upgrade procedure for any nodes with a stage of Complete that require a different SANtricity OS upgrade file.

*i*

For any nodes with a status of Needs Attention, use maintenance mode to perform the upgrade.



When you repeat the upgrade procedure, you have to approve previously upgraded nodes.

## Related information

[NetApp Interoperability Matrix Tool](#)

[Upgrade SANtricity OS on E2800 controller using maintenance mode](#)

## Upgrade SANtricity OS on E2800 controller using maintenance mode

For storage controllers currently using SANtricity OS older than 08.42.20.00 (11.42), you must use the maintenance mode procedure to apply an upgrade.

### What you'll need

- You have consulted the NetApp Interoperability Matrix Tool (IMT) to confirm that the SANtricity OS version you are using for the upgrade is compatible with your appliance.
- You must place the E5700SG controller into maintenance mode, which interrupts the connection to the E2800 controller.

[Place appliance into maintenance mode](#)



In rare instances, placing a StorageGRID appliance into maintenance mode might make the appliance unavailable for remote access.

### About this task

Do not upgrade the SANtricity OS or NVSRAM in the E-Series controller on more than one StorageGRID appliance at a time.



Upgrading more than one StorageGRID appliance at a time might cause data unavailability, depending on your deployment model and ILM policies.

### Steps

1. From a service laptop, access SANtricity System Manager and sign in.
2. Download the new SANtricity OS Software file and NVSRAM file to the management client.



The NVSRAM is specific to the StorageGRID appliance. Do not use the standard NVSRAM download.

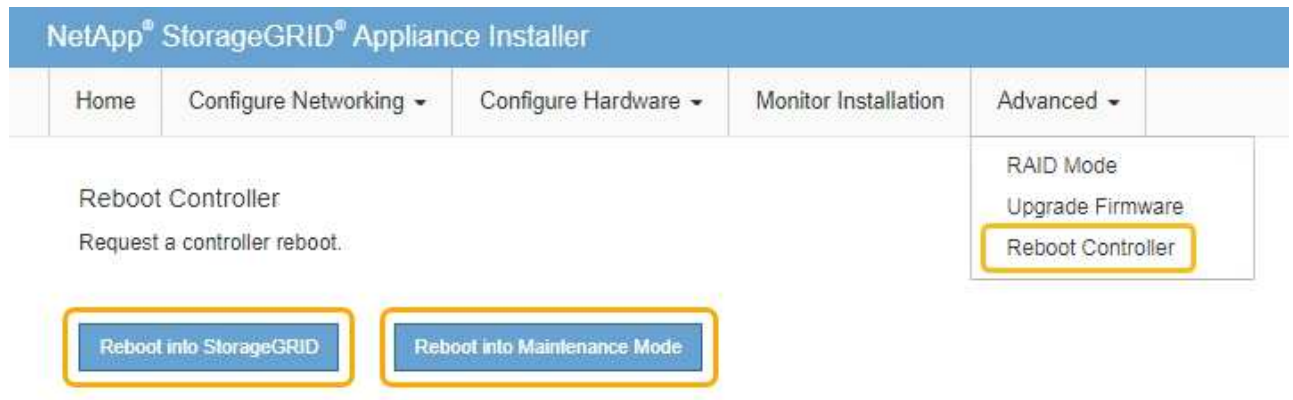
3. Follow the instructions in the *E2800 and E5700 SANtricity Software and Firmware Upgrade Guide* or the SANtricity System Manager online help to upgrade the E2800 controller's firmware and NVSRAM.



Activate the upgrade files immediately. Do not defer activation.

4. If this procedure completed successfully and you have additional procedures to perform while the node is in maintenance mode, perform them now. When you are done, or if you experienced any failures and want to start over, select **Advanced > Reboot Controller**, and then select one of these options:
  - Select **Reboot into StorageGRID**
  - Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. Select this option if you experienced any failures during the procedure and want to

start over. After the node finishes rebooting into maintenance mode, restart from the appropriate step in the procedure that failed.



It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The Nodes page should display a normal status (no icons to the left of the node name) for the appliance node, indicating that no alerts are active and the node is connected to the grid.

## Nodes

View the list and status of sites and grid nodes.

Search... Q Total node count: 14

Name ▾	Type ▾	Object data used ⓘ ▾	Object metadata used ⓘ ▾	CPU usage ⓘ ▾
StorageGRID Deployment	Grid	0%	0%	—
▲ Data Center 1	Site	0%	0%	—
DC1-ADM1	Primary Admin Node	—	—	5%
DC1-ARC1	Archive Node	—	—	2%
DC1-G1	Gateway Node	—	—	2%
DC1-S1	Storage Node	0%	0%	12%
DC1-S2	Storage Node	0%	0%	11%
DC1-S3	Storage Node	0%	0%	11%

### Related information

[Upgrade SANtricity OS on storage controllers using Grid Manager](#)



## Upgrade drive firmware using SANtricity System Manager

You upgrade your drive firmware to make sure you have all the latest features and bug fixes.

### What you'll need

- The storage appliance has an Optimal status.
- All drives have an Optimal status.
- You have the latest version of SANtricity System Manager installed that is compatible with your StorageGRID version.
- You have [placed the StorageGRID appliance in maintenance mode](#).



Maintenance mode interrupts the connection to the storage controller, stopping all I/O activity and placing all drives offline.



Do not upgrade the drive firmware on more than one StorageGRID appliance at a time. Doing so might cause data unavailability, depending on your deployment model and ILM policies.

### Steps

1. Access SANtricity System Manager using one of these methods:
  - Use the StorageGRID Appliance Installer and select **Advanced > SANtricity System Manager**
  - Use SANtricity System Manager by browsing to the storage controller IP:  
**`https://Storage_Controller_IP`**
2. Enter the SANtricity System Manager administrator username and password, if required.
3. Verify the drive firmware version currently installed in the storage appliance:
  - a. From SANtricity System Manager, select **SUPPORT > Upgrade Center**.
  - b. Under Drive Firmware upgrade, select **Begin Upgrade**.

The Upgrade Drive Firmware displays the drive firmware files currently installed.

- c. Note the current drive firmware revisions and drive identifiers in the Current Drive Firmware column.



Upgrade Drive Firmware

1 Select Upgrade Files

2 Select Drives

Review your current drive firmware and select upgrade files below...

[What do I need to know before upgrading drive firmware?](#)

Current Drive Firmware	Associated Drives
MS02, KPM51VUG800G	<a href="#">View drives</a>

Total rows: 1 | 

Select up to four drive firmware files: [Browse...](#)

In this example:

- The drive firmware revision is **MS02**.
- The drive identifier is **KPM51VUG800G**.

Select **View drives** in the Associated Drives column to display where these drives are installed in your storage appliance.

- d. Close the Upgrade Drive Firmware window.
4. Download and prepare the available drive firmware upgrade:
  - a. Under Drive Firmware upgrade, select **NetApp Support**.
  - b. On the NetApp Support web site, select the **Downloads** tab, and then select **E-Series Disk Drive Firmware**.

The E-Series Disk Firmware page displays.

- c. Search for each **Drive Identifier** installed in your storage appliance and verify that each drive identifier has the latest firmware revision.
  - If the firmware revision is not a link, this drive identifier has the latest firmware revision.
  - If one or more drive part numbers are listed for a drive identifier, a firmware upgrade is available for these drives. You can select any link to download the firmware file.

PRODUCTS ▾ SYSTEMS ▾ DOCS & KNOWLEDGEBASE ▾ COMMUNITY ▾ DOWNLOADS ▾ TOOLS ▾ CASES ▾ PARTS ▾

Downloads > Firmware > E-Series Disk Firmware

## E-Series Disk Firmware

Download all current E-Series Disk Firmware

Drive Part Number ▾	Descriptions ▾	Drive Identifier ▾	Firmware Rev. (Download)	Notes and Config Info	Release Date ▾
Drive Part Number	Descriptions	KPM51VUG800G	Firmware Rev. (Download)		
E-X4041C	SSD, 800GB, SAS, PI	KPM51VUG800G	MS03	MS02 Fixes <a href="#">Bug 1194908</a> MS03 Fixes <a href="#">Bug 1334862</a>	04-Sep-2020

- d. If a later firmware revision is listed, select the link in the Firmware Rev. (Download) column to download a .zip archive containing the firmware file.
- e. Extract (unzip) the drive firmware archive files you downloaded from the Support site.

5. Install the drive firmware upgrade:

- a. From SANtricity System Manager, under Drive Firmware upgrade, select **Begin Upgrade**.
- b. Select **Browse**, and select the new drive firmware files that you downloaded from the Support site.

Drive firmware files have a filename similar to +  
D\_HUC101212CSS600\_30602291\_MS01\_2800\_0002.dlp

You can select up to four drive firmware files, one at a time. If more than one drive firmware file is compatible with the same drive, you get a file conflict error. Decide which drive firmware file you want to use for the upgrade and remove the other one.

- c. Select **Next**.

**Select Drives** lists the drives that you can upgrade with the selected firmware files.

Only drives that are compatible appear.

The selected firmware for the drive appears in **Proposed Firmware**. If you must change this firmware, select **Back**.

- d. Select **Offline (parallel)** upgrade.

You can use the offline upgrade method because the appliance is in maintenance mode, where I/O activity is stopped for all drives and all volumes.



Do not proceed unless you are certain that the appliance is in maintenance mode. Failure to place the appliance into maintenance mode prior to initiating an offline drive firmware update might cause data loss.

- e. In the first column of the table, select the drive or drives you want to upgrade.

The best practice is to upgrade all drives of the same model to the same firmware revision.

- f. Select **Start**, and confirm that you want to perform the upgrade.

If you need to stop the upgrade, select **Stop**. Any firmware downloads currently in progress complete.

Any firmware downloads that have not started are canceled.



Stopping the drive firmware upgrade might result in data loss or unavailable drives.

g. (Optional) To see a list of what was upgraded, select **Save Log**.

The log file is saved in the downloads folder for your browser with the name `latest-upgrade-log-timestamp.txt`.

If any of the following errors occur during the upgrade procedure, take the appropriate recommended action.

- **Failed assigned drives**

One reason for the failure might be that the drive does not have the appropriate signature. Make sure that the affected drive is an authorized drive. Contact technical support for more information.

When replacing a drive, make sure that the replacement drive has a capacity equal to or greater than the failed drive you are replacing.

You can replace the failed drive while the storage array is receiving I/O.

- **Check storage array**

- Make sure that an IP address has been assigned to each controller.
- Make sure that all cables connected to the controller are not damaged.
- Make sure that all cables are tightly connected.

- **Integrated hot spare drives**

This error condition must be corrected before you can upgrade the firmware.

- **Incomplete volume groups**

If one or more volume groups or disk pools are incomplete, you must correct this error condition before you can upgrade the firmware.

- **Exclusive operations (other than background media/parity scan) currently running on any volume groups**

If one or more exclusive operations are in progress, the operations must complete before the firmware can be upgraded. Use System Manager to monitor the progress of the operations.

- **Missing volumes**

You must correct the missing volume condition before the firmware can be upgraded.

- **Either controller in a state other than Optimal**

One of the storage array controllers needs attention. This condition must be corrected before the firmware can be upgraded.

- **Mismatched Storage Partition information between Controller Object Graphs**

An error occurred while validating the data on the controllers. Contact technical support to resolve

this issue.

- **SPM Verify Database Controller check fails**

A storage partitions mapping database error occurred on a controller. Contact technical support to resolve this issue.

- **Configuration Database Validation (If supported by the storage array's controller version)**

A configuration database error occurred on a controller. Contact technical support to resolve this issue.

- **MEL Related Checks**

Contact technical support to resolve this issue.

- **More than 10 DDE Informational or Critical MEL events were reported in the last 7 days**

Contact technical support to resolve this issue.

- **More than 2 Page 2C Critical MEL Events were reported in the last 7 days**

Contact technical support to resolve this issue.

- **More than 2 Degraded Drive Channel Critical MEL events were reported in the last 7 days**

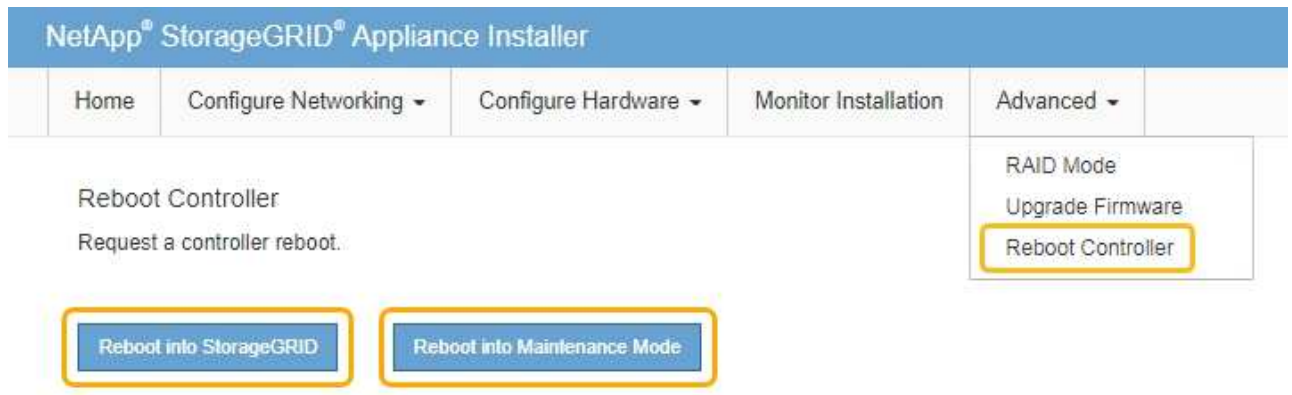
Contact technical support to resolve this issue.

- **More than 4 critical MEL entries in the last 7 days**

Contact technical support to resolve this issue.

6. . If this procedure completed successfully and you have additional procedures to perform while the node is in maintenance mode, perform them now. When you are done, or if you experienced any failures and want to start over, select **Advanced > Reboot Controller**, and then select one of these options:

- Select **Reboot into StorageGRID**
- Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. Select this option if you experienced any failures during the procedure and want to start over. After the node finishes rebooting into maintenance mode, restart from the appropriate step in the procedure that failed.



It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The Nodes page should display a normal status (no icons to the left of the node name) for the appliance node, indicating that no alerts are active and the node is connected to the grid.

## Nodes

View the list and status of sites and grid nodes.

Search...

Total node count: 14

Name	Type	Object data used	Object metadata used	CPU usage
StorageGRID Deployment	Grid	0%	0%	—
▲ Data Center 1	Site	0%	0%	—
DC1-ADM1	Primary Admin Node	—	—	5%
DC1-ARC1	Archive Node	—	—	2%
DC1-G1	Gateway Node	—	—	2%
DC1-S1	Storage Node	0%	0%	12%
DC1-S2	Storage Node	0%	0%	11%
DC1-S3	Storage Node	0%	0%	11%

### Related information

[Upgrade SANtricity OS on the storage controller](#)

### Replace E2800 controller

You might need to replace the E2800 controller if it is not functioning optimally or if it has failed.

### About this task

- You have a replacement controller with the same part number as the controller you are replacing.
- You have downloaded the instructions for replacing the simplex configuration of a failed E2800 controller canister.



Refer to the E-Series instructions only when directed or if you need more details to perform a specific step. Do not rely on the E-Series instructions to replace a controller in the StorageGRID appliance, because the procedures are not the same.

- You have labels to identify each cable that is connected to the controller.
- If all drives are secured, you have reviewed the steps in the simplex E2800 controller replacement procedure, which include downloading and installing E-Series SANtricity Storage Manager from the NetApp Support Site and then using the Enterprise Management Window (EMW) to unlock the secured drives after you have replaced the controller.



You will not be able to use the appliance until you unlock the drives with the saved key.

- You must have specific access permissions.
- You must be signed in to the Grid Manager using a [supported web browser](#).

### About this task

You can determine if you have a failed controller canister in two ways:

- The Recovery Guru in SANtricity System Manager directs you to replace the controller.
- The amber Attention LED on the controller is on, indicating that the controller has a fault.

The appliance Storage Node will not be accessible when you replace the controller. If the E2800 controller is functioning sufficiently, you can [place the E5700SG controller into maintenance mode](#).

When you replace a controller, you must remove the battery from the original controller and install it in the replacement controller.



The E2800 controller in the appliance does not include a host interface card (HIC).

### Steps

1. Follow the instructions in the E2800 controller replacement procedure to prepare to remove the controller.

You use SANtricity System Manager to perform these steps.

- a. Make a note of which version of SANtricity OS software is currently installed on the controller.
- b. Make a note of which version of NVSRAM is currently installed.
- c. If the Drive Security feature is enabled, be sure a saved key exists and that you know the pass phrase required to install it.



**Possible loss of data access --** If all drives in the appliance are security enabled, the new controller will not be able to access the appliance until you unlock the secured drives using the Enterprise Management Window in SANtricity Storage Manager.

- d. Back up the configuration database.

If a problem occurs when you remove a controller, you can use the saved file to restore your configuration.

- e. Collect support data for the appliance.



Collecting support data before and after replacing a component ensures you can send a full set of logs to technical support in case the replacement does not resolve the problem.

2. If the StorageGRID appliance is running in a StorageGRID system, [place the E5700SG controller into maintenance mode](#).
3. If the E2800 controller is functioning sufficiently to allow for a controlled shutdown, confirm that all operations have completed.
  - a. From the home page of SANtricity System Manager, select **View Operations in Progress**.
  - b. Confirm that all operations have completed.
4. Remove the controller from the appliance:
  - a. Put on an ESD wristband or take other antistatic precautions.
  - b. Label the cables and then disconnect the cables and SFPs.



To prevent degraded performance, do not twist, fold, pinch, or step on the cables.

- c. Release the controller from the appliance by squeezing the latch on the cam handle until it releases, and then open the cam handle to the right.
    - d. Using two hands and the cam handle, slide the controller out of the appliance.
- 
- Always use two hands to support the weight of the controller.
- e. Place the controller on a flat, static-free surface with the removable cover facing up.
    - f. Remove the cover by pressing down on the button and sliding the cover off.
  5. Remove the battery from the failed controller, and install it into the replacement controller:
    - a. Confirm that the green LED inside the controller (between the battery and the DIMMs) is off.

If this green LED is on, the controller is still using battery power. You must wait for this LED to go off before removing any components.

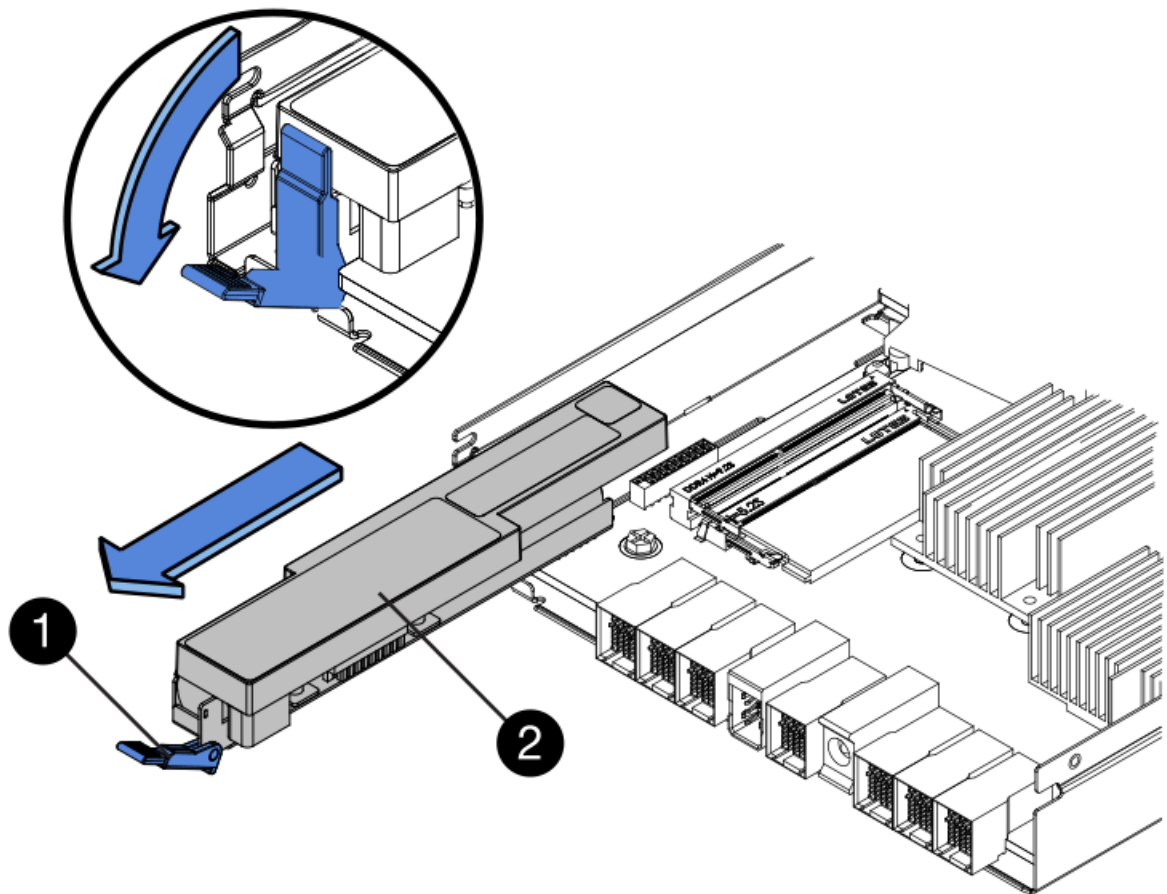


Item	Description
1	Internal Cache Active LED
2	Battery

b. Locate the blue release latch for the battery.

c. Unlatch the battery by pushing the release latch down and away from the controller.





Item	Description
1	Battery release latch
2	Battery

- d. Lift up on the battery, and slide it out of the controller.
- e. Remove the cover from the replacement controller.
- f. Orient the replacement controller so that the slot for the battery faces toward you.
- g. Insert the battery into the controller at a slight downward angle.

You must insert the metal flange at the front of the battery into the slot on the bottom of the controller, and slide the top of the battery beneath the small alignment pin on the left side of the controller.

- h. Move the battery latch up to secure the battery.

When the latch clicks into place, the bottom of the latch hooks into a metal slot on the chassis.

- i. Turn the controller over to confirm that the battery is installed correctly.



**Possible hardware damage** — The metal flange at the front of the battery must be completely inserted into the slot on the controller (as shown in the first figure). If the battery is not installed correctly (as shown in the second figure), the metal flange might contact the controller board, causing damage.

- **Correct** — The battery's metal flange is completely inserted into the slot on the controller:



- **Incorrect** — The battery's metal flange is not inserted into the slot on the controller:



j. Replace the controller cover.

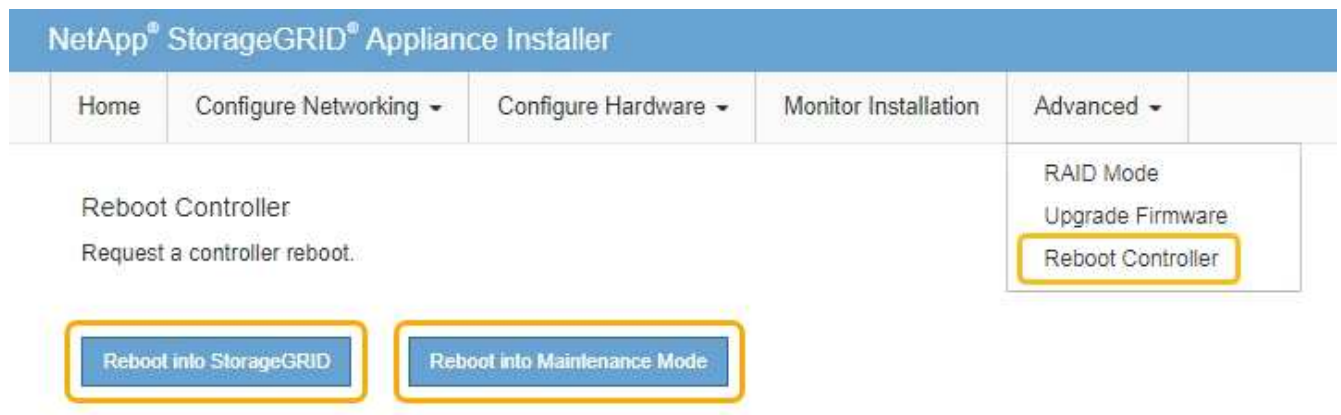
6. Install the replacement controller into the appliance.

- Turn the controller over, so that the removable cover faces down.
- With the cam handle in the open position, slide the controller all the way into the appliance.
- Move the cam handle to the left to lock the controller in place.
- Replace the cables and SFPs.
- Wait for the E2800 controller to reboot. Verify that the seven-segment display shows a state of 99.
- Determine how you will assign an IP address to the replacement controller.

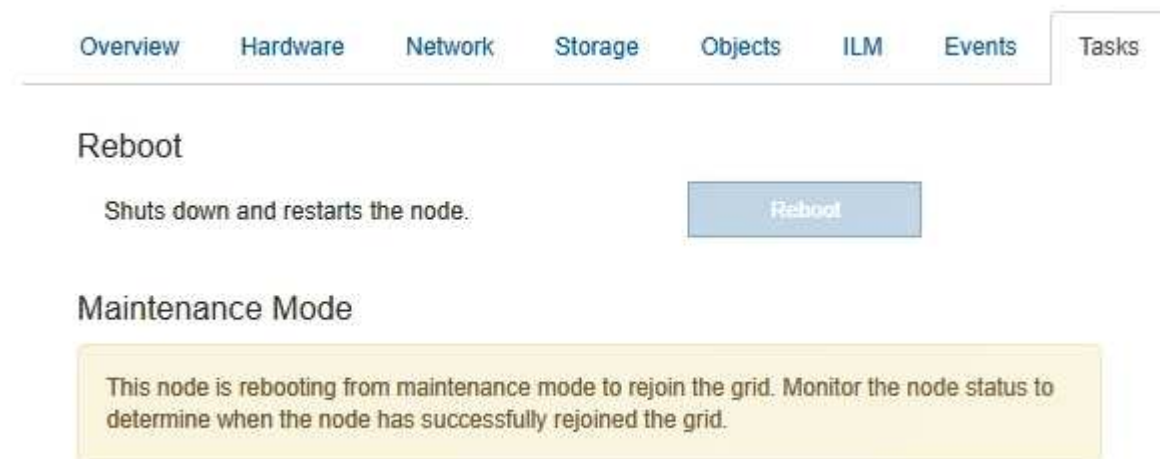


The steps for assigning an IP address to the replacement controller depend on whether you connected management port 1 to a network with a DHCP server and on whether all drives are secured.

- If management port 1 is connected to a network with a DHCP server, the new controller will obtain its IP address from the DHCP server. This value might be different than the original controller's IP address.
  - If all drives are secured, you must use the Enterprise Management Window (EMW) in SANtricity Storage Manager to unlock the secured drives. You cannot access the new controller until you unlock the drives with the saved key. See the E-Series instructions for replacing a simplex E2800 controller.
7. If the appliance uses secured drives, follow the instructions in the E2800 controller replacement procedure to import the drive security key.
  8. Return the appliance to normal operating mode. From the StorageGRID Appliance Installer, select **Advanced > Reboot Controller**, and then select **Reboot into StorageGRID**.



During the reboot, the following screen appears:



The appliance reboots and rejoins the grid. This process can take up to 20 minutes.

9. Confirm that the reboot is complete and that the node has rejoined the grid. In the Grid Manager, verify that

the Nodes page displays a normal status (no icons to the left of the node name) for the appliance node, indicating that no alerts are active and the node is connected to the grid.

# Nodes

View the list and status of sites and grid nodes.

Q

Total node count: 14

Name	Type	Object data used	Object metadata used	CPU usage
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DC1-ARC1	Archive Node	—	—	2%
DC1-G1	Gateway Node	—	—	2%
DC1-S1	Storage Node	0%	0%	12%
DC1-S2	Storage Node	0%	0%	11%
DC1-S3	Storage Node	0%	0%	11%

10. From SANtricity System Manager, confirm that the new controller is Optimal, and collect support data.

## Related information

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

## Replace E5700SG controller

You might need to replace the E5700SG controller if it is not functioning optimally or if it has failed.

### What you'll need

- You have a replacement controller with the same part number as the controller you are replacing.
- You have downloaded the E-Series instructions for replacing a failed E5700 controller.



Use the E-Series instructions for reference only if you need more details to perform a specific step. Do not rely on the E-Series instructions to replace a controller in the StorageGRID appliance, because the procedures are not the same. For example, the E-Series instructions for the E5700 controller describe how to remove the battery and the host interface card (HIC) from a failed controller and install them in a replacement controller. These steps do not apply to the E5700SG controller.

- You have labels to identify each cable that is connected to the controller.
- The appliance has been [placed maintenance mode](#).

## About this task

The appliance Storage Node will not be accessible when you replace the controller. If the E5700SG controller is functioning sufficiently, you can perform a controlled shutdown at the start of this procedure.



If you are replacing the controller before installing StorageGRID software, you might not be able to access the StorageGRID Appliance Installer immediately after completing this procedure. While you can access the StorageGRID Appliance Installer from other hosts on the same subnet as the appliance, you cannot access it from hosts on other subnets. This condition should resolve itself within 15 minutes (when any ARP cache entries for the original controller time out), or you can clear the condition immediately by purging any old ARP cache entries manually from the local router or gateway.

## Steps

1. When the appliance has been placed maintenance mode, shut down the E5700SG controller.

a. Log in to the grid node:

- i. Enter the following command: `ssh admin@grid_node_IP`
- ii. Enter the password listed in the `Passwords.txt` file.
- iii. Enter the following command to switch to root: `su -`
- iv. Enter the password listed in the `Passwords.txt` file.

When you are logged in as root, the prompt changes from `$` to `#`.

b. Shut down the E5700SG controller:

**`shutdown -h now`**

c. Wait for any data in cache memory to be written to the drives.

The green Cache Active LED on the back of the E2800 controller is on when cached data needs to be written to the drives. You must wait for this LED to turn off.

2. Turn off the power.

- a. From the home page of SANtricity System Manager, select **View Operations in Progress**.
- b. Confirm that all operations have completed.
- c. Turn off both power switches on the appliance.
- d. Wait for all LEDs to turn off.

3. If the StorageGRID networks attached to the controller use DHCP servers:

- a. Note the MAC addresses for the ports on the replacement controller (located on labels on the controller).
- b. Ask your network administrator to update the IP address settings for the original controller to reflect the MAC addresses for the replacement controller.



You must ensure that the IP addresses for the original controller have been updated before you apply power to the replacement controller. Otherwise, the controller will obtain new DHCP IP addresses when it boots up and might not be able to reconnect to StorageGRID. This step applies to all StorageGRID networks that are attached to the controller.

4. Remove the controller from the appliance:
  - a. Put on an ESD wristband or take other antistatic precautions.
  - b. Label the cables and then disconnect the cables and SFPs.



To prevent degraded performance, do not twist, fold, pinch, or step on the cables.

- c. Release the controller from the appliance by squeezing the latch on the cam handle until it releases, and then open the cam handle to the right.
  - d. Using two hands and the cam handle, slide the controller out of the appliance.



Always use two hands to support the weight of the controller.

5. Install the replacement controller into the appliance.
  - a. Turn the controller over, so that the removable cover faces down.
  - b. With the cam handle in the open position, slide the controller all the way into the appliance.
  - c. Move the cam handle to the left to lock the controller in place.
  - d. Replace the cables and SFPs.
6. Power on the appliance, and monitor the controller LEDs and seven-segment displays.

After the controllers have successfully booted up, the seven-segment displays should show the following:

- E2800 controller:

The final state is 99.

- E5700SG controller:

The final state is HA.

7. Confirm that the appliance Storage Node appears in the Grid Manager and that no alarms appear.

#### Related information

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

## Replace other hardware components

You might need to replace a controller battery, drive, fan, or power supply, in the StorageGRID appliance.

#### What you'll need

- You have the E-Series hardware replacement procedure.
- The appliance has been [placed maintenance mode](#) if the component replacement procedure requires that you shut down the appliance.

#### About this task

To replace the battery in the E2800 controller, see the instructions in these instructions for replacing the E2800 controller. Those instructions describe how to remove the controller from the appliance, remove the battery from the controller, install the battery, and replace the controller.

To replace a drive, power-fan canister, fan canister, power canister, or drive drawer in the appliance, access the E-Series procedures for maintaining E2800 hardware.

### SG5712 component replacement instructions

FRU	See E-Series instructions for
Drive	Replacing a drive in E2800 12-drive or 24-drive shelves
Power-fan canister	Replacing a power-fan canister in E2800 shelves

### SG5760 component replacement instructions

FRU	See E-Series instructions for
Drive	Replacing a drive in E2860 shelves
Power canister	Replacing a power canister in E2860 shelves
Fan canister	Replacing a fan canister in E2860 shelves
Drive drawer	Replacing a drive drawer in E2860 shelves

#### Related information

[Replace E2800 controller](#)

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

## Change link configuration of E5700SG controller

You can change the Ethernet link configuration of the E5700SG controller. You can change the port bond mode, the network bond mode, and the link speed.

#### What you'll need

[Place E5700SG controller into maintenance mode.](#)



In rare instances, placing a StorageGRID appliance into maintenance mode might make the appliance unavailable for remote access.

#### About this task

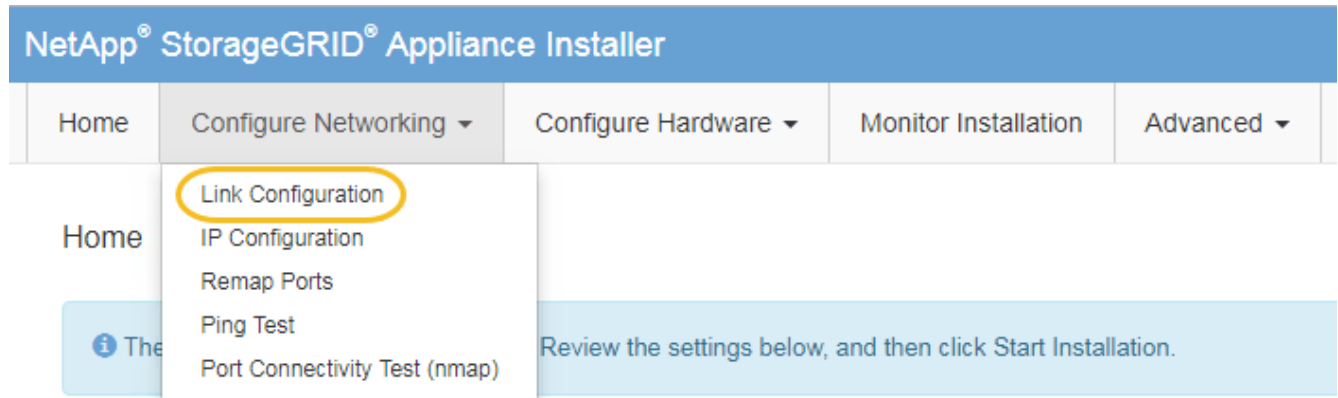
Options for changing the Ethernet link configuration of the E5700SG controller include:

- Changing **Port bond mode** from Fixed to Aggregate, or from Aggregate to Fixed
- Changing **Network bond mode** from Active-Backup to LACP, or from LACP to Active-Backup
- Enabling or disabling VLAN tagging, or changing the value of a VLAN tag
- Changing the link speed from 10-GbE to 25-GbE, or from 25-GbE to 10-GbE



## Steps

1. Select **Configure Networking > Link Configuration** from the menu.



2. Make the desired changes to the link configuration.

For more information on the options, see “Configuring network links.”

3. 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 are not 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://E5700SG_Controller_IP:8443`**

If you made changes to the VLAN settings, the subnet for the appliance might have changed. If you need to change the IP addresses for the appliance, follow the [set IP configuration](#) instructions.

4. From the StorageGRID Appliance Installer, select **Configure Networking > Ping Test**.
5. Use the Ping Test tool to check connectivity to IP addresses on any networks that might have been affected by the link configuration changes you made in the [Change link configuration](#) step.

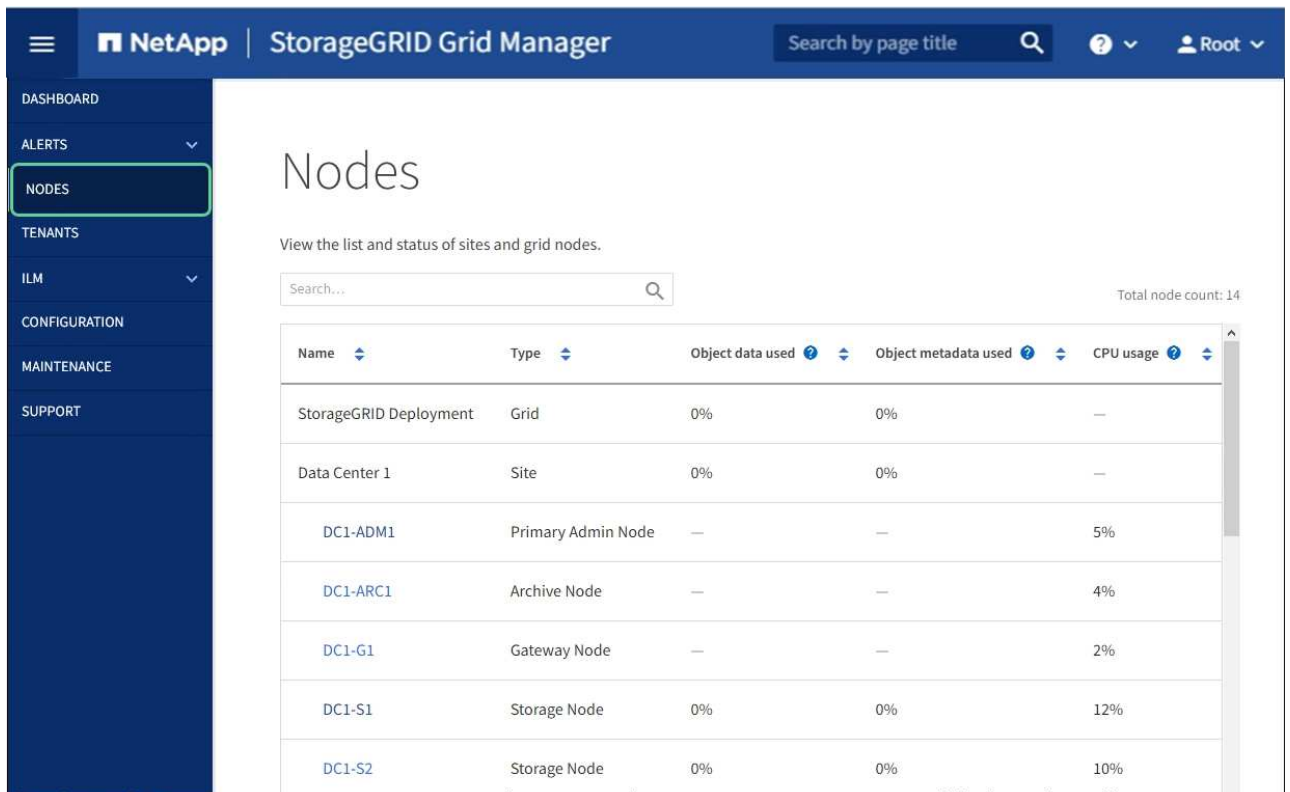
In addition to any other tests you choose to perform, confirm that you can ping the grid IP address of the primary Admin Node, and the grid IP address of at least one other Storage Node. If necessary, correct any link configuration issues.

6. Once you are satisfied that your link configuration changes are working, reboot the node. From the StorageGRID Appliance Installer, select **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.





It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The **NODES** page should display a normal status (no icon) for the appliance node, indicating that no alerts are active and the node is connected to the grid.



## Related information

[Configure network links \(SG5700\)](#)

## Change MTU setting

You can change the MTU setting that you assigned when you configured IP addresses for the appliance node.



#### About this task

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 do not have to be the same for all network types.

To change the MTU setting without rebooting the appliance node, [use the Change IP tool](#).

If the Client or Admin Network was not configured in the StorageGRID Appliance Installer during the initial installation, [change the MTU setting using maintenance mode](#).

### Change the MTU setting using the Change IP tool

#### What you'll need

You have the `Passwords.txt` file to use the Change IP tool.

#### Steps

Access the Change IP tool and update the MTU settings as described in [Change node network configuration](#).

### Change the MTU setting using maintenance mode

Change the MTU setting using maintenance mode if you are unable to access these settings using the Change IP tool.

#### What you'll need

The appliance has been [placed maintenance mode](#).

#### Steps

1. From the StorageGRID Appliance Installer, select **Configure Networking > IP Configuration**.
2. Make the desired changes to the MTU settings for the Grid Network, Admin Network, and Client Network.

## Grid Network

The Grid Network is used for all internal StorageGRID traffic. The Grid Network provides connectivity between all nodes in the grid, across all sites and subnets. All hosts on the Grid Network must be able to talk to all other hosts. The Grid Network can consist of multiple subnets. Networks containing critical grid services, such as NTP, can also be added as Grid subnets.

IP Assignment ☒ Static ☐ DHCP

IPv4 Address (CIDR)

Gateway

 All required Grid Network subnets must also be defined in the Grid Network Subnet List on the Primary Admin Node before starting installation.

Subnets (CIDR)

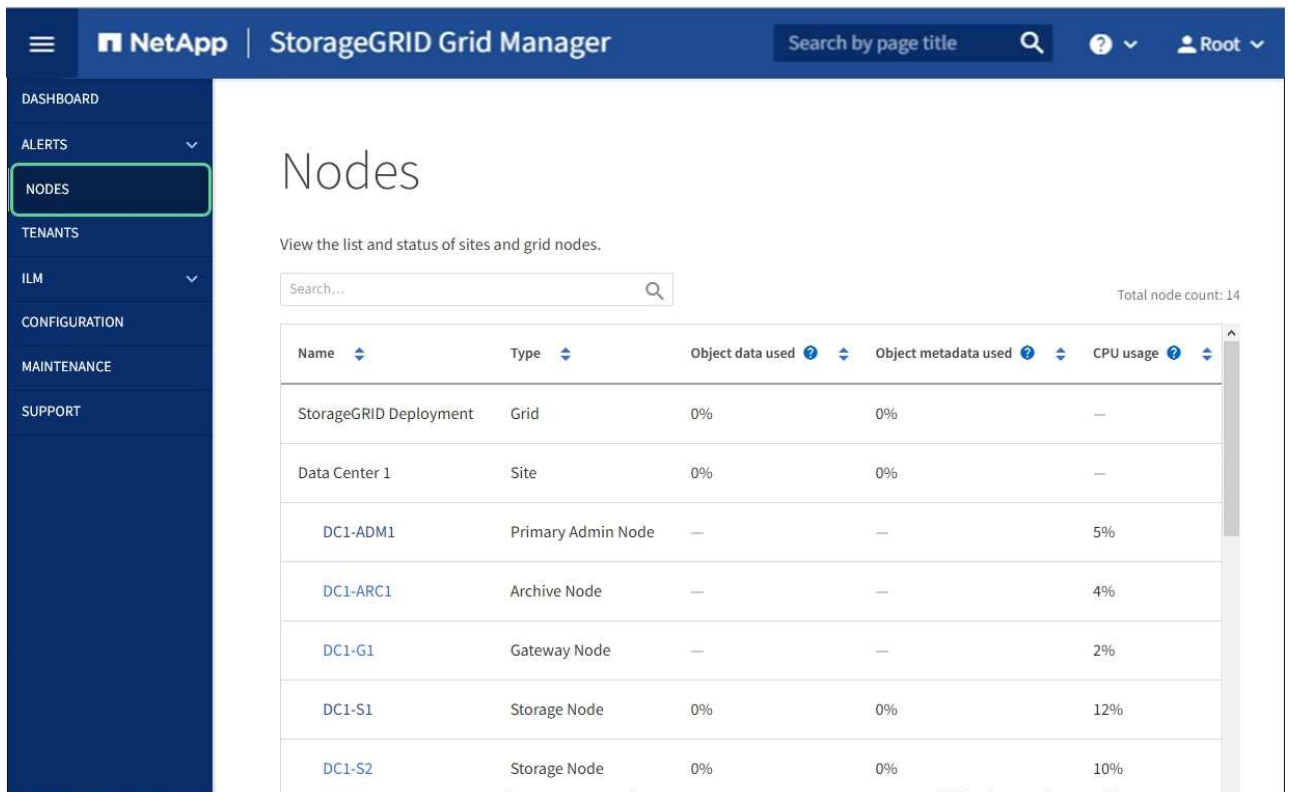
<input type="text" value="172.18.0.0/21"/>	✕
<input type="text" value="172.18.0.0/21"/>	✕
<input type="text" value="192.168.0.0/21"/>	+ ✕

MTU

- When you are satisfied with the settings, select **Save**.
- If this procedure completed successfully and you have additional procedures to perform while the node is in maintenance mode, perform them now. When you are done, or if you experienced any failures and want to start over, select **Advanced > Reboot Controller**, and then select one of these options:
  - Select **Reboot into StorageGRID**
  - Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. Select this option if you experienced any failures during the procedure and want to start over. After the node finishes rebooting into maintenance mode, restart from the appropriate step in the procedure that failed.



It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The **NODES** page should display a normal status (no icon) for the appliance node, indicating that no alerts are active and the node is connected to the grid.



## Related information

[Administer StorageGRID](#)

## Check DNS server configuration

You can check and temporarily change the domain name system (DNS) servers that are currently in use by this appliance node.

## What you'll need

The appliance has been [placed maintenance mode](#).

### About this task

You might need to change the DNS server settings if an encrypted appliance cannot connect to the key management server (KMS) or KMS cluster because the hostname for the KMS was specified as a domain name instead of an IP address. Any changes that you make to the DNS settings for the appliance are temporary and are lost when you exit maintenance mode. To make these changes permanent, specify the DNS servers in Grid Manager (**MAINTENANCE > Network > DNS servers**).

- Temporary changes to the DNS configuration are necessary only for node-encrypted appliances where the KMS server is defined using a fully qualified domain name, instead of an IP address, for the hostname.
- When a node-encrypted appliance connects to a KMS using a domain name, it must connect to one of the DNS servers defined for the grid. One of these DNS servers then translates the domain name into an IP address.
- If the node cannot reach a DNS server for the grid, or if you changed the grid-wide DNS settings when a node-encrypted appliance node was offline, the node is unable to connect to the KMS. Encrypted data on the appliance cannot be decrypted until the DNS issue is resolved.


To resolve a DNS issue preventing KMS connection, specify the IP address of one or more DNS servers in the StorageGRID Appliance Installer. These temporary DNS settings allow the appliance to connect to the KMS and decrypt data on the node.

For example, if the DNS server for the grid changes while an encrypted node was offline, the node will not be able to reach the KMS when it comes back online, since it is still using the previous DNS values. Entering the new DNS server IP address in the StorageGRID Appliance Installer allows a temporary KMS connection to decrypt the node data.




### Steps

1. From the StorageGRID Appliance Installer, select **Configure Networking > DNS Configuration**.
2. Verify that the DNS servers specified are correct.

#### DNS Servers

 Configuration changes made on this page will not be passed to the StorageGRID software after appliance installation.

#### Servers

Server 1	<input type="text" value="10.224.223.135"/>	
Server 2	<input type="text" value="10.224.223.136"/>	 
<div><input type="button" value="Cancel"/> <input type="button" value="Save"/></div>		

3. If required, change the DNS servers.

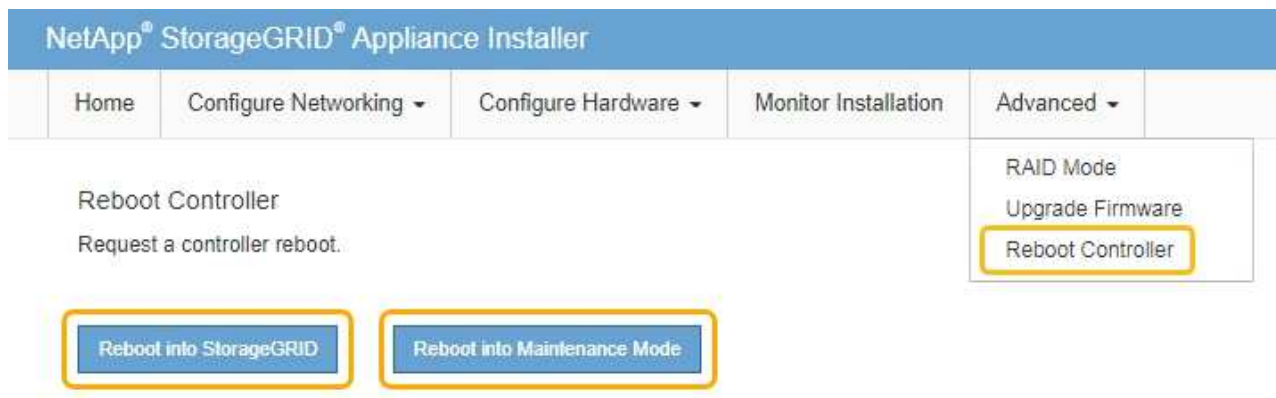


Changes made to the DNS settings are temporary and are lost when you exit maintenance mode.

4. When you are satisfied with the temporary DNS settings, select **Save**.

The node uses the DNS server settings specified on this page to reconnect to the KMS, allowing data on the node to be decrypted.

5. After node data is decrypted, reboot the node. From the StorageGRID Appliance Installer, select **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.



When the node reboots and rejoins the grid, it uses the system-wide DNS servers listed in the Grid Manager. After rejoining the grid, the appliance will no longer use the temporary DNS servers specified in the StorageGRID Appliance Installer while the appliance was in maintenance mode.

It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The **NODES** page should display a normal status (no icon) for the appliance node, indicating that no alerts are active and the node is connected to the grid.

**NetApp | StorageGRID Grid Manager**

Search by page title

Root

**DASHBOARD**

**ALERTS**

**NODES**

**TENANTS**

**ILM**

**CONFIGURATION**

**MAINTENANCE**

**SUPPORT**

## Nodes

View the list and status of sites and grid nodes.

Search...

Total node count: 14

Name	Type	Object data used	Object metadata used	CPU usage
StorageGRID Deployment	Grid	0%	0%	—
Data Center 1	Site	0%	0%	—
DC1-ADM1	Primary Admin Node	—	—	5%
DC1-ARC1	Archive Node	—	—	4%
DC1-G1	Gateway Node	—	—	2%
DC1-S1	Storage Node	0%	0%	12%
DC1-S2	Storage Node	0%	0%	10%

## Monitor node encryption in maintenance mode (SG5700)

If you enabled node encryption for the appliance during installation, you can monitor the node-encryption status of each appliance node, including the node-encryption state and key management server (KMS) details.

### What you'll need

- Node encryption must have been enabled for the appliance during installation. You cannot enable node encryption after the appliance is installed.
- The appliance has been [placed into maintenance mode](#).

### Steps

1. From the StorageGRID Appliance Installer, select **Configure Hardware > Node Encryption**.

## 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

View the status and configuration details for the KMS that manages the encryption key for this appliance. You must use the Grid Manager to make configuration changes.

KMS display name	thales
External key UID	41b0306abcce451facfce01b1b4870ae1c1ec6bd5e3849d790223766baf35c57
Hostnames	10.96.99.164 10.96.99.165
Port	5696


Server certificate



Client certificate



### Clear KMS Key

 Do not clear the KMS key if you need to access or preserve any data on this appliance.

If you want to reinstall this appliance node (for example, in another grid), you must clear the KMS key. When the KMS key is cleared, all data on this appliance is deleted.

Clear KMS Key and Delete Data

The Node Encryption page includes these three sections:

- Encryption Status shows whether node encryption is enabled or disabled for the appliance.
- Key Management Server Details shows information about the KMS being used to encrypt the appliance. You can expand the server and client certificate sections to view certificate details and status.
  - To address issues with the certificates themselves, such as renewing expired certificates, see the information about KMS in the instructions for administering StorageGRID.
  - If there are unexpected problems connecting to KMS hosts, verify that the domain name system (DNS) servers are correct and that appliance networking is correctly configured.  
[Check DNS server configuration](#)
- Clear KMS Key disables node encryption for the appliance, removes the association between the appliance and the key management server that was configured for the StorageGRID site, and deletes



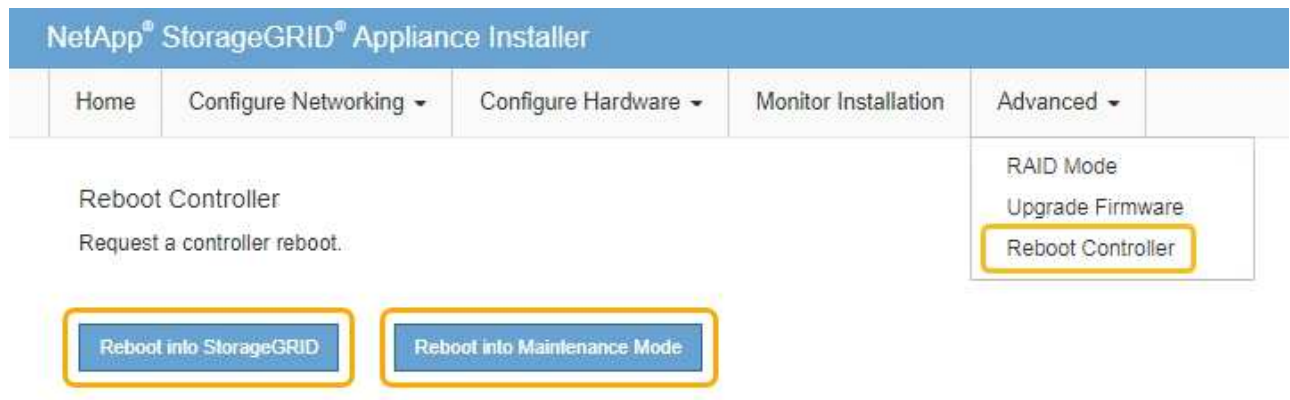
all data from the appliance. You must clear the KMS key before you can install the appliance into another StorageGRID system.

#### Clear key management server configuration



Clearing the KMS configuration deletes data from the appliance, rendering it permanently inaccessible. This data is not recoverable.

2. When you are done checking node-encryption status, reboot the node. From the StorageGRID Appliance Installer, select **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.



It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The **NODES** page should display a normal status (no icon) for the appliance node, indicating that no alerts are active and the node is connected to the grid.

**Nodes**

View the list and status of sites and grid nodes.

Search...

Total node count: 14

Name	Type	Object data used	Object metadata used	CPU usage
StorageGRID Deployment	Grid	0%	0%	—
Data Center 1	Site	0%	0%	—
DC1-ADM1	Primary Admin Node	—	—	5%
DC1-ARC1	Archive Node	—	—	4%
DC1-G1	Gateway Node	—	—	2%
DC1-S1	Storage Node	0%	0%	12%
DC1-S2	Storage Node	0%	0%	10%

## Related information

[Administer StorageGRID](#)

## Clear key management server configuration

Clearing the key management server (KMS) configuration disables node encryption on your appliance. After clearing the KMS configuration, the data on your appliance is permanently deleted and is no longer accessible. This data is not recoverable.

### What you'll need

If you need to preserve data on the appliance, you must either perform a node decommission procedure or clone the node before you clear the KMS configuration.



When KMS is cleared, data on the appliance will be permanently deleted and no longer accessible. This data is not recoverable.

[Decommission the node](#) to move any data it contains to other nodes in StorageGRID.

### About this task

Clearing the appliance KMS configuration disables node encryption, removing the association between the appliance node and the KMS configuration for the StorageGRID site. Data on the appliance is then deleted and the appliance is left in a pre-install state. This process cannot be reversed.

You must clear the KMS configuration:

- Before you can install the appliance into another StorageGRID system, that does not use a KMS or that uses a different KMS.



Do not clear the KMS configuration if you plan to reinstall an appliance node in a StorageGRID system that uses the same KMS key.

- Before you can recover and reinstall a node where the KMS configuration was lost and the KMS key is not recoverable.
- Before returning any appliance that was previously in use at your site.
- After decommissioning a appliance that had node encryption enabled.



Decommission the appliance before clearing KMS to move its data to other nodes in your StorageGRID system. Clearing KMS before decommissioning the appliance will result in data loss and might render the appliance inoperable.

## 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 **Configure Hardware > Node Encryption**.

## 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

View the status and configuration details for the KMS that manages the encryption key for this appliance. You must use the Grid Manager to make configuration changes.

KMS display name    thales

External key UID    41b0306abcce451facfce01b1b4870ae1c1ec6bd5e3849d790223766baf35c57

Hostnames    10.96.99.164  
10.96.99.165

Port    5696


Server certificate



Client certificate



### Clear KMS Key

 Do not clear the KMS key if you need to access or preserve any data on this appliance.

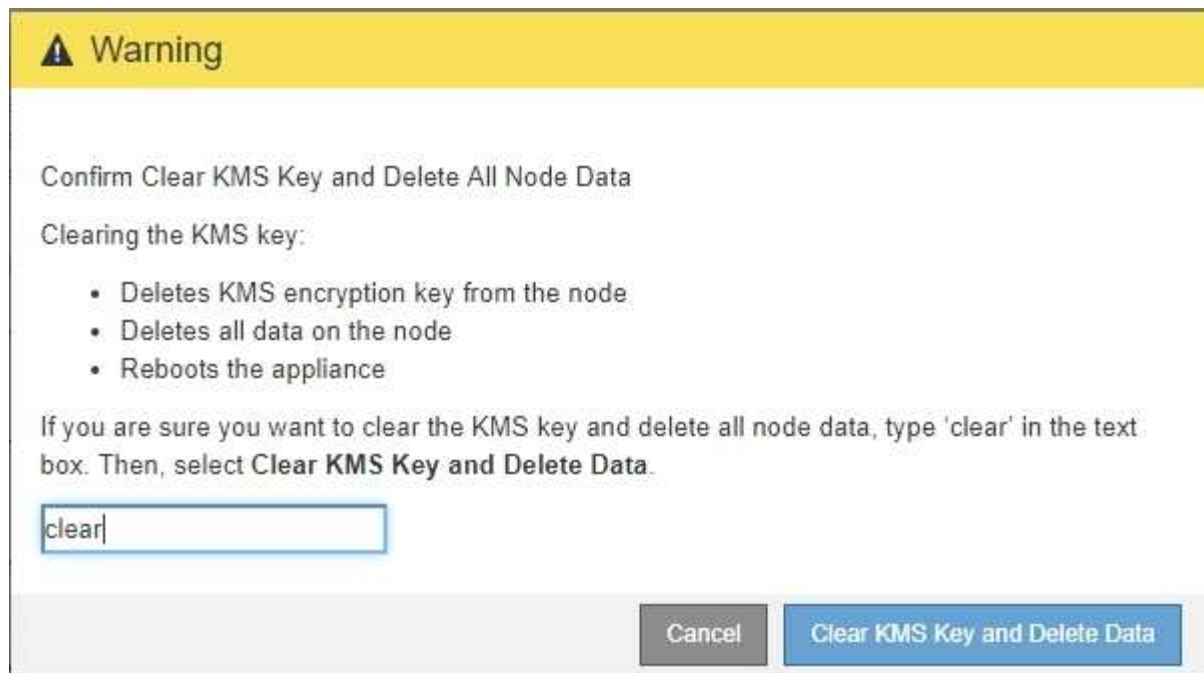
If you want to reinstall this appliance node (for example, in another grid), you must clear the KMS key. When the KMS key is cleared, all data on this appliance is deleted.

Clear KMS Key and Delete Data



If the KMS configuration is cleared, data on the appliance will be permanently deleted. This data is not recoverable.

3. At the bottom of the window, select **Clear KMS Key and Delete Data**.
4. If you are sure that you want to clear the KMS configuration, type **clear** and select **Clear KMS Key and Delete Data**.



The KMS encryption key and all data are deleted from the node, and the appliance reboots. This can take up to 20 minutes.

5. 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.

6. Select **Configure Hardware > Node Encryption**.
7. Verify that node encryption is disabled and that the key and certificate information in **Key Management Server Details** and the **Clear KMS Key and Delete Data** control are removed from the window.

Node encryption cannot be reenabled on the appliance until it is reinstalled in a grid.

### After you finish

After the appliance reboots and you have verified that KMS has been cleared and that the appliance is in a pre-install state, you can physically remove the appliance from your StorageGRID system. See the recovery and maintenance instructions for information about [Prepare appliance for reinstallation](#).

### Related information

[Administer StorageGRID](#)

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