StorageGRID® 11.3

Hardware Installation and Maintenance Guide

For StorageGRID SG5600 Series Appliances

∩ NetApp®

Contents

StorageGRID appliance overview

The StorageGRID SG5600 appliance is an integrated storage and computing platform that operates as a Storage Node in a StorageGRID grid.

The StorageGRID SG5600 appliance includes the following components:

Component	Description
E5600SG controller	Compute server The E5600SG controller runs the Linux operating system and the StorageGRID software. This controller connects to the following: • The Admin, Grid, and Client Networks for the StorageGRID system • The E2700 controller, using dual SAS paths (active/active) with the E5600SG controller operating as the initiator
E2700 controller	Storage controller The E2700 controller operates as a standard E-Series storage array in simplex mode, and runs the SANtricity operating system (controller firmware). This controller connects to the following: • The management network where SANtricity Storage Manager is installed • The E5600SG controller, using dual SAS paths (active/active) with the E2700 controller operating as the target

The SG5600 appliance also includes the following components, depending on the model:

Component	Model SG5612	Model SG5660
Drives	12 NL-SAS drives	60 NL-SAS drives
Enclosure	DE1600 enclosure, a two rack-unit (2U) chassis that houses the drives and the controllers	DE6600 enclosure, a four rack-unit (4U) chassis that houses the drives and the controllers
Power supplies and fans	Two power-fan canisters	Two power supplies and two fans

Note: The E5600SG controller is highly customized for use in the StorageGRID appliance. All other components operate as described in E-Series documentation, except as indicated in these instructions.

The maximum raw storage available on each StorageGRID appliance Storage Node is fixed, based on the appliance model and configuration. You cannot expand the available storage by adding a shelf with additional drives.

StorageGRID appliance features

The StorageGRID SG5600 appliance provides an integrated storage solution for creating a new StorageGRID system or for expanding the capacity of an existing system.

The StorageGRID appliance provides the following features:

- Combines the StorageGRID Storage Node computing and storage elements into a single, efficient, integrated solution

- Simplifies the installation and configuration of a Storage Node, automating most of the process required

- Provides a high-density storage solution with two enclosure options: one that is 2U and one that is 4U

- Uses 10-GbE IP interfaces directly to the Storage Node, without the need for intermediate storage interfaces such as FC or iSCSI

- Can be used in a hybrid grid environment that uses StorageGRID appliances and virtual (software-based) Storage Nodes

- Includes preconfigured storage and comes preloaded with the StorageGRID Appliance Installer (on the E5600SG controller) for field-ready software deployment and integration

Hardware diagrams

The SG5612 and SG5660 models of the StorageGRID appliance both include an E2700 controller and an E5600SG controller. You should review the diagrams to learn the differences between the models and the controllers.

Model SG5612 2U: Rear view of the E2700 controller and E5600SG controller

1	E2700 controller
2	E5600SG controller

Model SG5660 4U: Rear view of the E2700 controller and E5600SG controller

The E2700 controller is above the E5600SG controller.

1	E2700 controller
2	E5600SG controller

Rear view of the E2700 controller

1	Management port 1 (Connect to the network where SANtricity Storage Manager is installed.)
2	Management port 2 (Use during installation to connect to a laptop.)
3	SAS interconnect port 1
4	SAS interconnect port 2
5	Serial connection port
6	Seven-segment display

Note: The two SAS ports labeled Drive Expansion (green) on the rear of the E2700 controller are not used. The StorageGRID appliance does not support expansion drive shelves.

Rear view of the E5600SG controller

1	Management port 1
	Connect to the Admin network for StorageGRID.
2	Management port 2
	Options:
	• Bond with management port 1 for a redundant connection to the Admin Network for StorageGRID.
	• Leave unwired and available for temporary local access (IP 169.254.0.1).
	• During installation, use for IP configuration if DHCP-assigned IP addresses are not available.
3	SAS interconnect port 1
4	SAS interconnect port 2
5	Fault and Active LEDs for 10-GbE network port 1
6	Fault and Active LEDs for 10-GbE network port 2
7	Fault and Active LEDs for 10-GbE network port 3
8	Fault and Active LEDs for 10-GbE network port 4
9	Needs Attention LED
10	Seven-segment display
11	10-GbE network port 1
12	10-GbE network port 2
13	10-GbE network port 3
14	10-GbE network port 4

Note: The host interface card (HIC) on the StorageGRID appliance E5600SG controller supports only 10-Gb Ethernet connections. It cannot be used for iSCSI connections.

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

2. Installing the hardware:

   - Registering the hardware

   - Installing the appliance into a cabinet or rack

   - Installing the drives (SG5660 only)

   - Cabling the appliance

   - Connecting the power cords and applying power

   - Viewing boot-up status codes

3. Configuring the hardware:

   - Accessing SANtricity Storage Manager, setting a static IP address for management port 1 on the E2700 controller, and configuring SANtricity Storage Manager settings

   - Accessing StorageGRID Appliance Installer and configuring the link and network IP settings required to connect to StorageGRID networks

4. Deploying the appliance as a Storage Node:

Task	Refer to
Deploying an appliance Storage Node in a new StorageGRID system	*Deploying an appliance Storage Node* on page 54
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 tasks

Preparing for installation on page 11
Installing the hardware on page 23
Configuring the hardware on page 33

Related information

Expanding a StorageGRID system

Recovery and maintenance

Preparing for installation

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.

Steps

Preparing the site

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

Steps

1. Confirm that the site meets the requirements for temperature, humidity, altitude range, airflow, heat dissipation, wiring, power, and grounding. See the NetApp Hardware Universe for more information.

2. 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
SG5612 (12 drives)	3.40 in. (8.64 cm)	19.0 in. (48.26 cm)	21.75 in. (55.25 cm)	59.5 lb (27 kg)
SG5660 (60 drives)	7.00 in. (17.78 cm)	17.75 in. (45.08 cm)	32.50 in. (82.55 cm)	236.2 lb. (107.1 kg)

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

Related information

NetApp Hardware Universe
NetApp Interoperability

Unpacking the boxes

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

SG5660 enclosure, a 4U chassis with 60 drives	SG5612 enclosure, a 2U chassis with 12 drives
4U bezel or 2U endcaps	NL-SAS drives. Drives are preinstalled in the 2U SG5612, but not in the 4U SG5660 for shipment safety.
E5600SG controller	E2700 controller
Mounting rails and screws	Enclosure handles (4U enclosures only)

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

The appliance ships with two AC power cords for connecting to an external power source, such as a wall plug. Your cabinet might have special power cords that you use instead of the power cords that ship with the appliance.	Two 0.5-meter SAS interconnect cables with mini-SAS-HD and mini-SAS connectors. The square connector plugs into the E2700 controller, and the rectangular connector plugs into the E5600SG controller.

Obtaining additional equipment and tools

Before installing the SG5600 appliance, confirm you have all of the additional equipment and tools that you need.

Phillips No. 2 screwdriver Medium flat-blade screwdrivers	ESD wrist strap
Ethernet cables	Ethernet switch
Management station service laptop	

Service laptop requirements

Before you install the StorageGRID appliance hardware, you should check to see if the service laptop has the minimum required resources.

The service laptop, which is needed for the hardware installation, must meet the following requirements:

- Microsoft Windows operating system

- Network port

- Supported web browser

- NetApp SANtricity Storage Manager version 11.40 or later

- SSH client (for example, PuTTY)

Related references

Web browser requirements on page 14

Related information

NetApp Documentation: SANtricity Storage Manager

Web browser requirements

You must use a supported web browser.

Web browser	Minimum supported version
Google Chrome	74
Microsoft Internet Explorer	11 (Native Mode)
Mozilla Firefox	67

You should set the browser window to a recommended width.

Browser width	Pixels
Minimum	1024
Optimum	1280

Reviewing appliance network connections

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

StorageGRID appliance networks

When you deploy a StorageGRID appliance as a Storage Node, 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 forStorageGRID**: 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 Storage Manager**: The E2700 controller connects to the management network where SANtricity Storage Manager is installed, 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.

  Note: 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 SG5660, with the E2700 controller on the top and the E5600SG controller on the bottom. In the SG5612, the E2700 controller is to the left of the E5600SG controller.

Item	Port	Type of port	Function
1	Management port 1 on the E2700 controller	1-Gb (RJ-45) Ethernet	Connects the E2700 controller to the network where SANtricity Storage Manager is installed.
2	Management port 2 on the E2700 controller	1-Gb (RJ-45) Ethernet	Connects the E2700 controller to a service laptop during installation.
3	Two SAS interconnect ports on each controller, labelled Ch 1 and Ch 2	E2700 controller: mini-SAS-HD E5600SG controller: mini-SAS	Connect the two controllers to each other.
4	Management port 1 on the E5600SG controller	1-Gb (RJ-45) Ethernet	Connects the E5600SG controller to the Admin Network for StorageGRID.

Item	Port	Type of port	Function
5	Management port 2 on the E5600SG controller	1-Gb (RJ-45) Ethernet	• Can be bonded with management port 1 if you want a redundant connection to the Admin Network. • Can be left unwired and available for temporary local access (IP 169.254.0.1). • Can be used to connect the E5600SG controller to a service laptop during installation, if a DHCP-assigned IP address is not available.
6	Four network ports on the E5600SG controller	10-GbE (optical)	Connect to the Grid Network and the Client Network for StorageGRID. See "10-GbE port connections for the E5600SG controller."

Related concepts

Related tasks

Related information

Grid primer
VMware installation
Red Hat Enterprise Linux or CentOS installation
Ubuntu or Debian installation

Port bond modes for the E5600SG controller ports

When configuring network links for the E5600SG controller ports, you can use port bonding for the 10-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 tasks

Network bond modes for the 10-GbE ports

The 10-GbE networking ports on the E5600SG 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-GbE networking ports.

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

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

- In active-backup mode (default), only one port is active at a time. If the active port fails, its backup port automatically provides a failover connection. Port 4 provides a backup path for port 2 (Grid Network), and port 3 provides a backup path for port 1 (Client Network).

- In LACP mode, each pair of ports forms a logical channel between the controller and the network, allowing for higher throughput. If one port fails, the other port continues to provide the channel. Throughput is reduced, but connectivity is not impacted.

  Note: 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 throughout 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-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-GbE ports fails.

> **Note:** 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 the 1-GbE management ports

For the two 1-GbE management ports on the E5600SG 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.

> **Note:** If you need to make a temporary local connection to the E5600SG 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.

Gathering installation information

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

Table 1: Information needed to connect the E2700 controller to SANtricity Storage Manager

You must connect the E2700 controller to the management network you will use for SANtricity Storage Manager.

Information needed	Your value
Ethernet switch port you will connect to management port 1	

Information needed	Your value
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 **Note:** If the network you will connect to the E2700 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 **Note:** You must make sure the Ethernet switch for the SANtricity Storage Manager management network is set to autonegotiate.	Must be: • Autonegotiate (default)
IP address format	Choose one: • IPv4 • IPv6
Static IP address you plan to use for the appliance on the management network	For IPv4: • IPv4 address: • Subnet mask: • Gateway: For IPv6: • IPv6 address: • Routable IP address: • E2700 controller router IP address:

Table 2: Information needed to connect the E5600SG controller to the 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 E5600SG controller.

Information needed	Your value
Admin Network enabled	Choose one: • No • Yes (default)
Network bond mode	Choose one: • Independent • Active-Backup
Switch port for management port 1 (P1)	

Information needed	Your value
Switch port for management port 2 (P2; Active-Backup network bond mode only)	
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 **Note:** If the Admin Network includes a DHCP server, the E5600SG 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.	• IPv4 address (CIDR): • Gateway:
Static IP address you plan to use for the appliance Storage Node on the Admin Network **Note:** If your network does not have a gateway, specify the same static IPv4 address for the gateway.	• IPv4 address (CIDR): • Gateway:
Admin Network subnets (CIDR)	

Table 3: Information needed to connect and configure the 10-GbE ports on the E5600SG controller

The four 10-GbE ports on the E5600SG controller connect to the StorageGRID Grid Network and Client Network.

> **Note:** See "10-GbE port connections for the E5600SG controller" for more information about the options for these ports.

Information needed	Your value
Port bond mode	Choose one: • Fixed (default) • Aggregate
Switch port for port 1 (Client Network for Fixed mode)	
Switch port for port 2 (Grid Network for Fixed mode)	
Switch port for port 3 (Client Network for Fixed mode)	
Switch port for port 4 (Grid Network for Fixed mode)	

Table 4: Information needed to connect the E5600SG controller to the 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-GbE ports on the E5600SG controller.

Note: See "10-GbE port connections for the E5600SG controller" for more information about the options for these ports.

Information needed	Your value
Network bond mode	Choose one: • Active-Backup (default) • LACP (802.3ad)
VLAN tagging enabled	Choose one: • No (default) • Yes
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 **Note:** If the Grid Network includes a DHCP server, the E5600SG controller displays the DHCP-assigned IP address for the Grid Network on its seven-segment display after it boots up.	• IPv4 address (CIDR): • Gateway:
Static IP address you plan to use for the appliance Storage Node on the Grid Network **Note:** If your network does not have a gateway, specify the same static IPv4 address for the gateway.	• IPv4 address (CIDR): • Gateway:
Grid Network subnets (CIDR) **Note:** If the Client Network is not enabled, the default route on the controller will use the gateway specified here.	

Table 5: Information needed to connect the E5600SG controller to the Client Network

The Client Network for StorageGRID is an optional network, used to provides client protocol access to the grid. The appliance connects to the Client Network using the 10-GbE ports on the E5600SG controller.

Note: See "10-GbE port connections for the E5600SG controller" for more information about the options for these ports.

Information needed	Your value
Client Network enabled	Choose one: • No (default) • Yes

Information needed	Your value
Network bond mode	Choose one: • Active-Backup (default) • LACP (802.3ad)
VLAN tagging enabled	Choose one: • No (default) • Yes
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	• IPv4 address (CIDR): • Gateway:
Static IP address you plan to use for the appliance Storage Node on the Client Network **Note:** If the Client Network is enabled, the default route on the controller will use the gateway specified here.	• IPv4 address (CIDR): • Gateway:

Related concepts

Port bond modes for the E5600SG controller ports on page 16

Related tasks

Configuring the hardware on page 33

Related references

Reviewing appliance network connections on page 14

Installing the hardware

Hardware installation includes several major tasks, including installing hardware components, cabling those components, and configuring ports.

Steps

1. Registering the hardware on page 23
2. Installing the appliance in a cabinet or rack on page 24
3. Cabling the appliance on page 25
4. Connecting the AC power cords on page 28
5. Turning power on on page 29
6. Viewing boot-up status and reviewing error codes on the controllers on page 29

Registering the 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.

   Serial 012345678101

2. Go to the NetApp Support Site at *mysupport.netapp.com*.

3. Determine whether you need to register the hardware:

If you are a...	Follow these steps...
Existing NetApp customer	**a.** Sign in with your username and password.
	b. Select **Products > My Products**.
	c. Confirm that the new serial number is listed.
	d. If it is not, follow the instructions for new NetApp customers.
New NetApp customer	**a.** Click **Register Now**, and create an account.
	b. Select **Products > Register Products**.
	c. Enter the product serial number and requested details.
	After your registration is approved, you can download any required software. The approval process might take up to 24 hours.

Installing the appliance in a cabinet or rack

You must install rails in your cabinet or rack and then slide the appliance onto the rails. If you have an SG5660, you must also install the drives after installing the appliance.

Before you begin

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

- You have the Installation and Setup Instructions for the appliance.

- You have the E-Series installation instructions for the hardware.

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

   Caution: The SG5612 weighs approximately 60 lb (27 kg) when fully loaded with drives. Two people or a mechanized lift are required to safely move the SG5612.

   Caution: The SG5660 weighs approximately 132 lb (60 kg) with no drives installed. Four people or a mechanized lift are required to safely move an empty SG5660.

   Caution: To avoid damaging the hardware, never move an SG5660 if drives are installed. You must remove all drives before moving the appliance.

About this task

Task	Description
Install the mounting rails	Install the mounting rails in the cabinet or rack.
	See the E-Series installation instructions for the E2700 or the E5600.
Install the appliance in the cabinet or rack	Slide the appliance into the cabinet or rack, and secure it.
	Note: If you are lifting the SG5660 by hand, attach the four handles to the sides of the chassis. You remove these handles as you slide the appliance onto the rails.

Task	Description
Install drives	If you have an SG5660, install 12 drives in each of the 5 drive drawers. You must install all 60 drives to ensure correct operation. 1. Put on the ESD wristband, and remove the drives from their packaging. 2. Release the levers on the top drive drawer, and slide the drawer out using the levers. 3. Raise the drive handle to vertical, and align the buttons on the drive with the notches on the drawer. 4. Pressing gently on the top of the drive, rotate the drive handle down until the drive snaps into place. 5. After installing the first 12 drives, slide the drawer back in by pushing on the center and closing both levers gently. 6. Repeat these steps for the other four drawers.
Attach the front bezel	**SG5612**: Attach the left and right end caps to the front. **SG5660**: Attach the bezel to the front.

Related information

[E2700 Controller-Drive Tray and Related Drive Trays Installation Guide](#)
[E5600 Controller-Drive Tray and Related Drive Trays Installation Guide](#)

Cabling the appliance

You must connect the two controllers to each other with SAS interconnect cables, connect the management ports to the appropriate management network, and connect the 10 GbE ports on the E5600SG controller to the Grid Network and optional Client Network for StorageGRID.

Before you begin

- You have Ethernet cables for connecting the management ports.

- You have optical cables for connecting the four 10-GbE ports (these are not provided with the appliance).

    Caution: 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

When connecting the cables, refer to the following diagram, which shows the E2700 controller on the top and the E5600SG controller on the bottom. The diagram shows the SG5660 model; the controllers in the SG5612 model are side by side instead of stacked.

Item	Port	Type of port	Function
1	Management port 1 on the E2700 controller	1-Gb (RJ-45) Ethernet	Connects the E2700 controller to the network where SANtricity Storage Manager is installed.
2	Management port 2 on the E2700 controller	1-Gb (RJ-45) Ethernet	Connects the E2700 controller to a service laptop during installation.
3	Two SAS interconnect ports on each controller, labelled Ch 1 and Ch 2	E2700 controller: mini-SAS-HD E5600SG controller: mini-SAS	Connect the two controllers to each other.
4	Management port 1 on the E5600SG controller	1-Gb (RJ-45) Ethernet	Connects the E5600SG controller to the Admin Network for StorageGRID.

Item	Port	Type of port	Function
5	Management port 2 on the E5600SG controller	1-Gb (RJ-45) Ethernet	• Can be bonded with management port 1 if you want a redundant connection to the Admin Network. • Can be left unwired and available for temporary local access (IP 169.254.0.1). • Can be used to connect the E5600SG controller to a service laptop during installation if DHCP-assigned IP addresses are not available.
6	Four network ports on the E5600SG controller	10-GbE (optical)	Connect the E5600SG controller to the Grid Network and to the Client Network (if used) for StorageGRID. The ports can be bonded together to provide redundant paths to the controller.

Steps

1. Connect the E2700 controller to the E5600SG controller, using the two SAS interconnect cables.

Connect this port...	To this port...
SAS interconnect port 1 (labeled Ch 1) on the E2700 controller	SAS interconnect port 1 (labeled Ch 1) on the E5600SG controller
SAS interconnect port 2 (labeled Ch 2) on the E2700 controller	SAS interconnect port 2 (labeled Ch 2) on the E5600SG controller

Use the square connector (mini-SAS HD) for the E2700 controller, and use the rectangular connector (mini-SAS) for the E5600SG controller.

> **Attention:** Make sure the pull tabs on the SAS connectors are at the bottom, and carefully insert each connector until it clicks into place. Do not push on the connector if there is any resistance. Verify the position of the pull tab before continuing.

2. Connect the E2700 controller to the management network where SANtricity Storage Manager software is installed, using an Ethernet cable.

Connect this port...	To this port...
Port 1 on the E2700 controller (the RJ-45 port on the left)	Switch port on the management network used for SANtricity Storage Manager
Port 2 on the E2700 controller	Service laptop, if not using DHCP

3. If you plan to use the Admin Network for StorageGRID, connect the E5600SG controller, using an Ethernet cable.

Connect this port...	To this port...
Port 1 on the E5600SG controller (the RJ-45 port on the left)	Switch port on the Admin Network for StorageGRID

Connect this port...	To this port...
Port 2 on the E5600SG controller	Service laptop, if not using DHCP

4. Connect the 10-GbE ports on the E5600SG controller to the appropriate network switches, using optical cables and SFP+ transceivers.

- 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 concepts

Port bond modes for the E5600SG controller ports on page 16

Related tasks

Accessing the StorageGRID Appliance Installer on page 33

Connecting the AC power cords

You must connect the AC power cords to the external power source and to the AC power connector on each controller. After you have connected the power cords, you can turn the power on.

Before you begin

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

About this task

- You should use separate power sources for each power supply.
  Connecting to independent power sources maintains power redundancy.

- You can use the power cords shipped with the controller with typical outlets used in the destination country, such as wall receptacles of an uninterrupted power supply (UPS). However, these power cords are not intended for use in most EIA-compliant cabinets.

Steps

1. Turn off the power switches in the enclosure or chassis.

2. Turn off the power switches on the controllers.

3. Connect the primary power cords from the cabinet to the external power sources.

4. Connect the power cords to the AC power connector on each controller.

Turning power on

Powering on the enclosure provides power to both controllers.

Steps

1. Turn on the two power supply switches at the rear of the enclosure.

While the power is being applied, the LEDs on the controllers go on and off intermittently.

The power-on process can take up to ten minutes to complete. The controllers reboot several times during the initial startup sequence, which causes the fans to ramp up and down and the LEDs to flash.

2. Check the Power LED and the Host Link Active LEDs on each controller to verify that the power was turned on.

3. Wait for all drives to show a persistent green LED, indicating that they have come online.

4. Check for green LEDs on the front and rear of the enclosure.

If you see any amber LEDs, make a note of their locations.

5. Look at the seven-segment display for the E5600SG controller.

This display shows **HO**, followed by a repeating sequence of two digits.

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

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.

> **Note:** If an IP address could not be assigned using DHCP, 0.0.0.0 is displayed.

Viewing boot-up status and reviewing error codes on the controllers

The seven-segment display on each controller shows status and error codes when the appliance powers up, while the hardware is initializing, and when the hardware fails and must back out of the initialization. If you are monitoring the progress or troubleshooting, you should watch the sequence of the codes as they appear.

About this task

The status and error codes for the E5600SG controller are not the same as those for the E2700 controller.

Steps

1. During boot-up, view the codes shown on the seven-segment displays to monitor progress.

2. To review error codes for the E5600SG controller, see the seven-segment display status and error code information.

3. To review error codes for the E2700 controller, see the E2700 controller documentation on the Support Site.

Related references

Related information

NetApp Documentation: E2700 Series

E5600SG controller seven-segment display codes

The seven-segment display on the E5600SG controller shows status and error codes while the appliance powers up and while the hardware is initializing. You can use these codes to determine status and troubleshoot errors.

When reviewing status and error codes on the E5600SG controller, you should look at the following types of codes:

General boot-up codes

Represent the standard boot-up events.

Normal boot-up codes

Represent the normal boot-up events that occur in the appliance.

Error codes

Indicate issues during the boot-up events.

StorageGRID controls only the following LEDs on the E5600SG controller and only after the StorageGRID Appliance Installer has started:

- Service Action Allowed LED

- Service Action Required LED

- Seven-segment display

The decimal points on the seven-segment display are not used by the StorageGRID appliance:

- The upper decimal point adjacent to the least significant digit is the platform diagnostic LED. This is turned on during reset and initial hardware configuration. Otherwise, it is turned off.

- The lower decimal point adjacent to the most significant digit is turned off.

To diagnose other issues, you might want to look at these resources:

• To see all other hardware and environmental diagnostic information, see the E-Series operating system hardware diagnostics.
 This includes looking for hardware issues such as power, temperature, and disk drives. The appliance relies on the E-Series operating system to monitor all platform environmental statuses.

• To determine firmware and driver issues, look at the link lights on the SAS and network ports.
 For details, see the E-Series E5600 documentation.

General boot-up codes

During boot-up or after a hard reset of the hardware, the Service Action Allowed and the Service Action Required LEDs come on while the hardware is initializing. The seven-segment display shows a sequence of codes that are the same for E-Series hardware and not specific to the E5600SG controller.

During boot-up, the Field Programmable Gate Array (FPGA) controls the functions and initialization on the hardware.

Code	Indication
19	FPGA initialization.
68	FPGA initialization.
...	FPGA initialization. This is a quick succession of codes.
AA	Platform BIOS booting.
FF	Bios boot-up complete. This is an intermediate state before E5600SG controller initializes and manages LEDs to indicate status.

After the AA and FF codes appear, either the normal boot-up codes appear or error codes appear. Additionally, the Service Action Allowed and the Service Action Required LEDs are turned off.

Normal boot-up codes

These codes represent the normal boot-up events that occur in the appliance, in chronological order.

Code	Indication
HI	The master boot script has started.
PP	The platform FPGA firmware is checking for updates.
HP	The host interface card (HIC) is checking for updates.
RB	After firmware updates, the system is rebooting, if necessary.
FP	The firmware update checks have been completed. Starting the process (utmagent) to communicate with and manage the E2700 controller. This process facilitates appliance provisioning.
HE	The system is synchronizing with the E-Series operating system.
HC	The StorageGRID installation is being checked.
HO	Installation management and active interfacing are occurring.
HA	The Linux operating system and StorageGRID are running.

E5600SG controller error codes

These codes represent error conditions that might be shown on the E5600SG 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	Indication
22	No master boot record found on any boot device.
23	No SATA drive installed.
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.
EA	DDR3 training failed.
E8	No memory installed.
EU	The installation script was not found.
EP	"ManageSGA" code indicates that pregrid communication with the E2700 controller failed.

Related references

Troubleshooting the hardware installation on page 57

Related information

NetApp Support

Configuring the hardware

After applying power to the appliance, you must configure SANtricity Storage 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.

Configuring StorageGRID connections

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 E5600SG controller (the compute controller in the appliance).

Steps

Accessing the 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).

Before you begin

- 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:

- 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 E5600SG controller, next to the port.

- Look at the seven-segment display on the E5600SG controller. If management port 1 and 10-GbE ports 2 and 4 on the E5600SG 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 E5600SG 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-GbE ports 2 and 4 when you first apply power to the appliance.

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

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://_E5600SG_Controller_IP_:8443

      For *E5600SG_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.

3. If the E5600SG controller could not acquire an IP address using DHCP:

a. Connect the service laptop to management port 2 on the E5600SG 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.

> **Note:** 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 references

Configuring network links

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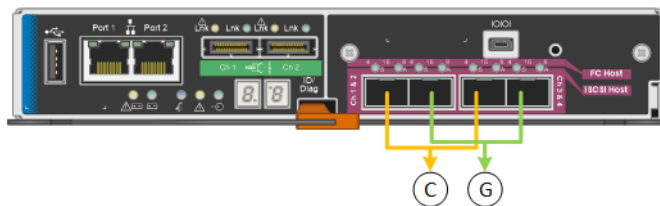
Before you begin

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

- You have connected the 10-GbE ports on the appliance to switches that can support VLAN and LACP.

- If multiple switches are participating in the LACP bond, the switches support multi-chassis link aggregation groups (MLAG), or equivalent.

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

- You know the unique VLAN tag to use for each network. This VLAN tag will be added to each network packet to ensure that network traffic is routed to the correct network.

About this task

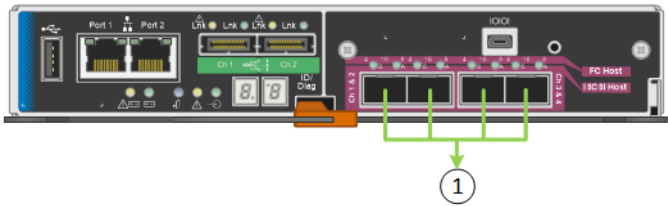This figure shows how the four 10-GbE ports are bonded in fixed port bond mode (default configuration).

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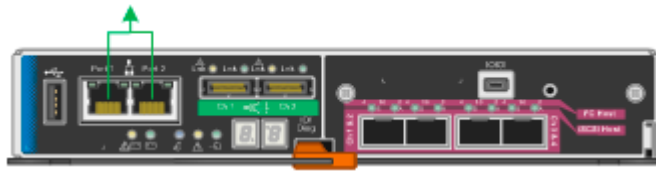
Callout	Which ports are bonded
1	All four ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

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

Port bond mode	Network bond mode	Client Network disabled (default)	Client Network enabled
Fixed (default)	**Active-Backup (default)**	• **Ports 2 and 4 use an active-backup bond for the Grid Network.** • **Ports 1 and 3 are not used.** • **A VLAN tag is optional.**	• Ports 2 and 4 use an active-backup bond for the Grid Network. • Ports 1 and 3 use an active-backup bond for the Client Network. • VLAN tags can be specified for both networks for the convenience of the network administrator.
	LACP (802.3ad)	• Ports 2 and 4 use an LACP bond for the Grid Network. • Ports 1 and 3 are not used. • A VLAN tag is optional.	• Ports 2 and 4 use an LACP bond for the Grid Network. • Ports 1 and 3 use an LACP bond for the Client Network. • VLAN tags can be specified for both networks for the convenience of the network administrator.
Aggregate	LACP (802.3ad) only	• Ports 1-4 use a single LACP bond for the Grid Network. • A single VLAN tag identifies Grid Network packets.	• Ports 1-4 use a single LACP bond for the Grid Network and the Client Network. • Two VLAN tags allow Grid Network packets to be segregated from Client Network packets.

See "10-GbE port connections for the E5600SG controller" for more information about port bond and network bond modes.

This figure shows how the two 1-GbE management ports on the E5600SG 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 appears. The first time you access this page:

   - **Link Speed** is set to **10GbE**. This is the only link speed available for the E5600SG controller.

   - **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   10GbE

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. 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-GbE ports are now shown.

3. 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	10GbE ▾
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	328

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	332

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

Note: 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://E5600SG_Controller_IP:8443
```

Related concepts

Port bond modes for the E5600SG controller ports on page 16

Setting the 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.

Additionally, if you want to change the link configuration of a StorageGRID appliance, see "Changing the link configuration of the StorageGRID appliance."

Steps

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

   The IP Configuration page appears. This example shows the Grid Network section of the page with **IP Assignment** set to DHCP.

   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)	172.16.7.237/21
Gateway	172.16.0.1

   ⚠ 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)	172.20.0.0/24	✖
	172.17.0.0/21	✖
	172.18.0.0/21	✖
	192.168.0.0/21	✖
	47.0.0.0/8	✚ ✖

   Cancel
   Save

2. Configure the Grid Network.

   a. If you plan to use a static IP address for the appliance on the Grid Network, select **Static**.

b. Enter the static IPv4 address, using CIDR notation.

c. Enter the gateway.

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

d. Click **Save**.

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

If you are using the DHCP address for the Grid Network to access the StorageGRID Appliance Installer, your web browser should be automatically redirected to the new IP address. If you lose your connection, re-enter the URL but use the new static IP address:

`https://E5600SG_Controller_IP:8443`

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

If you have multiple 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.

> **Note:** 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 ✖.

f. Click **Save**.

3. Configure the Admin Network.

This section of the page appears if the Admin Network is enabled 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)	10.224.0.60/21	
Gateway	10.224.0.1	
Subnets (CIDR)	10.113.0.0/16	✖
	172.21.0.0/16	✚✖
	Cancel Save	

When you configure the Admin Network, you specify the IP address, gateway, and subnets used for Management Port 1 on the controller (the leftmost 1-GbE RJ45 port).

a. If you plan to use a static IP address for the appliance on the Admin Network, select **Static**.

b. Enter the static IPv4 address, using CIDR notation.

c. Enter the gateway.

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

d. Click **Save**.

If you are using the DHCP address for the Admin Network to access the StorageGRID Appliance Installer, your web browser should be automatically redirected to the new IP address. If you lose your connection, re-enter the URL but use the new static IP address:

`https://E5600SG_Controller_IP:8443`

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

You must verify that all subnets can be reached using the gateway provided above.

> **Note:** The default route cannot be added to this network.

- To add a subnet, click the insert icon ✚ to the right of the last entry.

- To remove an unused subnet, click the delete icon ✖.

f. Click **Save**.

4. Configure the Client Network.

This section of the page appears if the Client Network is enabled 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)	47.47.7.251/21	
Gateway	47.47.0.1	
	Cancel	
	Save	

a. If you plan to use a static IP address for the appliance on the Client Network, select **Static**.

b. Enter the static IPv4 address, using CIDR notation.

c. Click **Save**.

d. Confirm that the IP address for the Client Network gateway is correct.

> **Note:** If the Client Network is 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.

e. Click **Save**.

Related tasks

Verifying 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.

Steps

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

   The Ping Test page appears.

   Ping 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.

   Ping Test

Network	Grid ▾
Destination IPv4 Address	0.0.0.0

   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 for a host on that network.

   For example, you might want to ping the gateway on the network or the primary Admin Node.

4. Click **Test Connectivity**.

   If the network connection is valid, the "Ping test passed" message appears, with the ping command output listed.

   Ping 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.

   Ping Test

Network	Grid ▾
Destination IPv4 Address	192.168.0.1

   Test Connectivity

   Ping test passed

   Ping command output

   ```
   PING 192.168.0.1 (192.168.0.1) from 192.168.7.196 br0: 56(84) bytes of data.
   64 bytes from 192.168.0.1: icmp_seq=1 ttl=64 time=0.144 ms
   64 bytes from 192.168.0.1: icmp_seq=2 ttl=64 time=0.154 ms
   64 bytes from 192.168.0.1: icmp_seq=3 ttl=64 time=0.183 ms

   --- 192.168.0.1 ping statistics ---
   3 packets transmitted, 3 received, 0% packet loss, time 1998ms
   rtt min/avg/max/mdev = 0.144/0.160/0.183/0.019 ms
   ```

Verifying 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.

Steps

1. From the menu bar of the StorageGRID Appliance Installer, click **Configure Networking > Port Connectivity Test (nmap)**.

    The Port Connectivity Test page appears.

2. From the **Network** drop-down box, 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 ping 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

    The port connectivity test uses the nmap command to check connectivity to remote hosts and ports. Select the network you want to check connectivity through, one or more IPv4 addresses or address ranges, and one or more ports or port ranges you want to connect to.

    Port Connectivity Test

Network	Grid
IPv4 Address Ranges	10.0.0.0-24
TCP Port Ranges	80,443

    Test Connectivity

5. Click **Test Connectivity**.

    If the port-level network connection is valid, the "Port connectivity test passed" message appears, with the nmap command output listed.

Port Connectivity Test

Network   Grid ▾

IPv4 Address
Ranges   172.16.5.220

TCP Port Ranges   9999

Test Connectivity

Port connectivity test passed

Nmap command output. Note: Unreachable hosts will not appear in the output.

```
# Nmap 7.40 scan initiated Wed Oct 24 18:18:15 2018 as: /usr/bin/nmap -n -oN - -e br0 -p 9999 172.16.5.220
Nmap scan report for 172.16.5.220
Host is up (0.00024s latency).
PORT     STATE SERVICE
9999/tcp open  abyss
MAC Address: 00:50:56:87:BD:1D (VMware)

# Nmap done at Wed Oct 24 18:18:16 2018 -- 1 IP address (1 host up) scanned in 0.63 seconds
```

Configuring SANtricity Storage Manager

You can use SANtricity Storage Manager to monitor the status of the storage disks and hardware components in your StorageGRID appliance. To access this software, you must know the IP address of management port 1 on the E2700 controller (the storage controller in the appliance).

Steps

1. Setting the IP address for the E2700 controller on page 46
2. Adding the appliance to SANtricity Storage Manager on page 48
3. Setting up SANtricity Storage Manager on page 49

Setting the IP address for the E2700 controller

Management port 1 on the E2700 controller connects the appliance to the management network for SANtricity Storage Manager. You must set a static IP address for the E2700 controller to ensure that you do not lose your management connection to the hardware and the controller firmware in the StorageGRID appliance.

Before you begin

You are using a supported web browser.

About this task

DHCP-assigned addresses could change at any time. Assign a static IP address to the controller to ensure consistent accessibility.

Steps

1. From the client, enter the URL for the StorageGRID Appliance Installer:

   https://*E5600SG_Controller_IP*:8443

For `E5600SG_Controller_IP`, use the IP address for the appliance on any StorageGRID network.

The StorageGRID Appliance Installer Home page appears.

2. Select **Hardware Configuration > 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 this port.

> **Note:** It might take a few minutes for the DHCP values to appear.

5. Optionally, set a static IP address for the E2700 controller management port.

> **Note:** You should either assign a static IP for the management port or assign a permanent lease for the address on the DHCP server.

   a. Select **Static**.

   b. Enter the IPv4 address, using CIDR notation.

   c. Enter the default gateway.

   d. Click **Save**.

   It might take a few minutes for your changes to be applied.

   When you connect to SANtricity Storage Manager, you will use the new static IP address as the URL:

   https://E2700_Controller_IP

   .

Related information

[NetApp Documentation: SANtricity Storage Manager](#)

Adding the appliance to SANtricity Storage Manager

You connect the E2700 controller in the appliance to SANtricity Storage Manager and then add the appliance as a storage array.

Before you begin

- You are using a supported web browser.

About this task

For detailed instructions, see the SANtricity Storage Manager documentation.

Steps

1. Open a web browser, and enter the IP address as the URL for SANtricity Storage Manager:

   https://*E2700_Controller_IP*

   The login page for SANtricity Storage Manager appears.

2. On the **Select Addition Method** page, select **Manual**, and click **OK**.

3. Select **Edit > Add Storage Array**.

   The Add New Storage Array - Manual page appears.

4. In the **Out-of-band management** box, enter one of the following values:

   - **Using DHCP:** The IP address assigned by the DHCP server to management port 1 on the E2700 controller

   - **Not using DHCP:** 192.168.128.101

     Note: Only one of the appliance's controllers is connected to SANtricity Storage Manager, so you only need to enter one IP address.

5. Click **Add**.

Related information

[NetApp Documentation: SANtricity Storage Manager](#)

Setting up SANtricity Storage Manager

After accessing SANtricity Storage Manager, you can use it to configure hardware settings. Typically, you configure these settings before deploying the appliance as a Storage Node in a StorageGRID system.

Steps

1. Configuring AutoSupport on page 49
2. Verifying receipt of AutoSupport on page 50
3. Configuring email and SNMP trap alert notifications on page 50
4. Setting passwords for SANtricity Storage Manager on page 51

Configuring AutoSupport

The AutoSupport tool collects data in a customer support bundle from the appliance and automatically sends the data to technical support. Configuring AutoSupport assists technical support with remote troubleshooting and problem analysis.

Before you begin

- The AutoSupport feature must be enabled and activated on the appliance.
  The AutoSupport feature is activated and deactivated globally on a storage management station.

- The Storage Manager Event Monitor must be running on at least one machine with access to the appliance and, preferably, on no more than one machine.

About this task

All of the data is compressed into a single compressed archive file format (`.7z`) at the location you specify.

AutoSupport provides the following types of messages:

Message types	Description
Event messages	- Sent when a support event on the managed appliance occurs - Include system configuration and diagnostic information
Daily messages	- Sent once every day during a user configurable time interval in the local time of the appliance - Include the current system event logs and performance data
Weekly messages	- Sent once every week during a user configurable time interval in the local time of the appliance - Include configuration and system state information

Steps

1. From the Enterprise Management Window in SANtricity Storage Manager, select the **Devices** tab, and then select **Discovered Storage Arrays**.

2. Select **Tools > AutoSupport > Configuration**.

3. Use SANtricity Storage Manager online help, if needed, to complete the task.

Related information

NetApp Documentation: SANtricity Storage Manager

Verifying receipt of AutoSupport

You should verify that technical support is receiving your AutoSupport messages. You can find the status of AutoSupport for your systems on the Active IQ portal. Verifying receipt of these messages ensures that technical support has your information if you need assistance.

About this task

AutoSupport can show one of the following statuses:

ON

An ON status indicates that technical support is currently receiving AutoSupport messages from the system.

OFF

An OFF status suggests that you might have disabled AutoSupport because technical support has not received a Weekly Log from the system in the last 15 calendar days or there might have been a change in your environment or configuration (as an example).

DECLINE

A DECLINE status means that you have notified technical support that you will not enable AutoSupport.

After technical support receives a Weekly Log from the system, the AutoSupport status changes to ON.

Steps

1. Go to the NetApp Support Site at mysupport.netapp.com, and sign in to the Active IQ portal.

2. If the AutoSupport status is OFF, and you believe that is incorrect, complete the following:

   a. Check your system configuration to ensure that you have turned AutoSupport on.

   b. Check your network environment and configuration to ensure that the system can send messages to technical support.

Configuring email and SNMP trap alert notifications

SANtricity Storage Manager can notify you when the status of the appliance or one of its components changes. This is called an alert notification. You can receive alert notifications by two different methods: email and SNMP traps. You must configure the alert notifications you want to receive.

Steps

1. From the Enterprise Management Window in SANtricity Storage Manager, select the **Devices** tab, and then select a node.

2. Select **Edit > Configure Alerts**.

3. Select the **Email** tab to configure email alert notifications.

4. Select the **SNMP** tab to configure SNMP trap alert notifications.

5. Use SANtricity Storage Manager online help, if needed, to complete the task.

Setting passwords for SANtricity Storage Manager

You can set the passwords used for the appliance in SANtricity Storage Manager. Setting passwords maintains system security.

Steps

1. From the Enterprise Management Window in SANtricity Storage Manager, double-click the controller.

2. From the Array Management Window, select the **Storage Array** menu, and select **Security > Set Password**.

3. Configure the passwords.

4. Use SANtricity Storage Manager online help, if needed, to complete the task.

Optional: Changing to RAID6 mode (SG5660 only)

If you have an SG5660 with 60 drives, you can change the volume configuration from its default and recommended setting, Dynamic Disk Pools (DDP), to RAID6. You can only change the mode before deploying the StorageGRID appliance Storage Node.

Before you begin

- You have an SG5660. The SG5612 does not support RAID6. If you have an SG5612, you must use DDP mode.

    Attention: 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.

About this task

Before deploying a StorageGRID appliance Storage Node, you can choose from two volume configuration options:

- **Dynamic Disk Pools (DDP)** – This is the default and recommended setting. DDP is an enhanced hardware data protection scheme that delivers better system performance, reduced rebuild times after drive failures, and ease of management.

- **RAID6** – This is a hardware protection scheme that uses parity stripes on each disk, and allows for two disk failures within the RAID set before any data is lost.

    Attention: Using RAID6 is not recommended for most StorageGRID environments. Although RAID6 can increase storage efficiency to 88% (compared to 80% for DDP), DDP mode provides more efficient recovery from drive failures.

Steps

1. Using the service laptop, open a web browser and access the StorageGRID Appliance Installer:

https://*E5600SG_Controller_IP*:8443

E5600SG_Controller_IP is any of the IP addresses for the E5600SG controller.

2. From the menu bar, select **Advanced > RAID Mode**.

3. On the **Configure RAID Mode** page, select **RAID6** from the Mode drop-down list.

4. Click **Save**.

Optional: Remapping network ports for the 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.

Before you begin

- You have previously accessed the StorageGRID Appliance Installer.

- You have not configured and do not plan to configure load balancer endpoints.

    Attention: 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 the recovery and maintenance instructions for removing 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.

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

7. Click **Add Rule**.

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

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

Related information

Recovery and maintenance

Deploying an appliance Storage Node

After installing and configuring the storage appliance, you can deploy it as a Storage Node in a StorageGRID system. When you deploy an appliance as a Storage Node, you use the StorageGRID Appliance Installer included on the appliance..

Before you begin

- 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.

  Note: 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. This script applies only to Storage Nodes.

  Note: 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.

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	a. Unselect the **Enable Admin Node discovery** check box.
	b. Enter the IP address manually.
	c. Click **Save**.
	d. Wait for the connection state for the new IP address to become ready.

Option	Description
Automatic discovery of all connected primary Admin Nodes	**a.** Select the **Enable Admin Node discovery** check box.
	b. Wait for the list of discovered IP addresses to be displayed.
	c. Select the primary Admin Node for the grid where this appliance Storage Node will be deployed.
	d. Click **Save**.
	e. Wait for the connection state for the new IP address to become ready.

4. 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.

5. 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.

6. From the StorageGRID Appliance Installer home page, click **Start Installation**.

The Current state changes to "Installation is in progress," and the Monitor Installation page is displayed.

> **Note:** If you need to access the Monitor Installation page manually, click **Monitor Installation** from the menu bar.

7. If your grid includes multiple appliance Storage Nodes, repeat these steps for each appliance.

> **Note:** 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. This script applies only to Storage Nodes.

Related information

Expanding a StorageGRID system
Recovery and maintenance

Troubleshooting the hardware installation

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

Related references

Hardware setup appears to hang

The StorageGRID Appliance Installer might not be available if hardware faults or cabling errors prevent the E5600SG controller from completing its boot-up processing.

1. Check the Needs Attention LED on either controller and look for a flashing error code.

    During power up, the Service Action Allowed and Service Action Required LEDs are turned on while the hardware is initializing. The upper decimal point of the lower digit, called the *diagnostic LED*, also illuminates. The seven-segment display runs through a sequence of codes that are common for both controllers. This is normal and is not an indication of an error. When the hardware boots successfully, the Service Action LEDs are turned off, and the displays are driven by the firmware.

2. Review the codes on the seven-segment display for the E5600SG controller.

    Note: 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
E5600SG controller	• "HE error: Error synchronizing with SANtricity OS Software" • "E5600SG controller seven-segment display codes"
E2700 controller	E-Series documentation **Note:** The codes described for the E-Series E5600 controller do not apply to the E5600SG controller in the appliance.

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

Related tasks

Related references

Related information

E2700 Controller-Drive Tray and Related Drive Trays Installation Guide
NetApp Documentation: E2700 Series

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 integrity of the two SAS interconnect cables, and confirm they are securely connected.

2. As required, replace one or both of the cables, and try again.

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

Troubleshooting connection issues

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

Unable to connect to StorageGRID appliance over the network

Issue

You cannot connect to the appliance.

Cause

This could occur if there is a network issue or the hardware installation did not complete successfully.

Corrective action

1. Ping the appliance:

   `ping <E5600_controller_IP>`

2. Access the StorageGRID Appliance Installer by opening a browser and entering the following: **`https://<Management_Port_IP>:8443`**

   For `Management_Port_IP`, enter the IP address for management port 1 on the E5600SG controller (provisioned during the physical installation).

3. Click **Configure Admin network**, and check the IP.

4. If you receive a response from the ping, check that port 8443 is open in the firewalls.

5. Reboot the appliance.

6. Refresh the installation web page.

7. If this does not resolve the connection issue, contact technical support from the NetApp Support Site at *mysupport.netapp.com*.

Related references

E5600SG controller seven-segment display codes on page 30

Rebooting the controller while the 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.
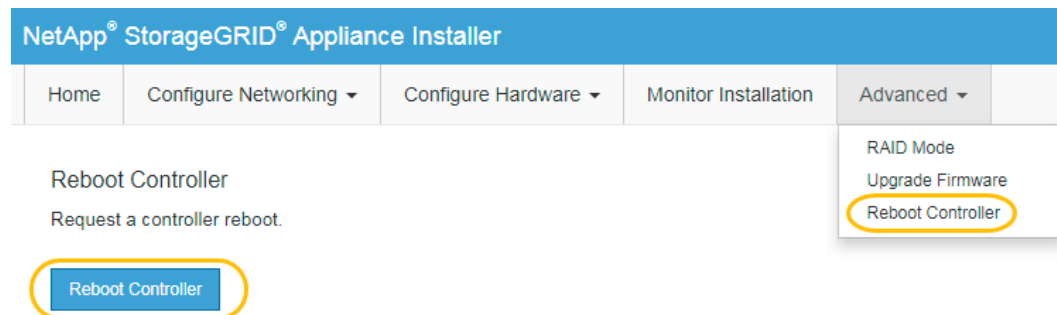
About this task

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 menu bar of the StorageGRID Appliance Installer, click **Advance > Reboot Controller**.

   The Reboot Controller page appears.

2. Click **Reboot Controller**.

   A confirm dialog box appears.

3. Confirm you want to reboot the controller.

   The controller is rebooted.

Maintaining the SG5600 appliance

You might need to upgrade the SANtricity OS Software on the E2700 controller, replace the E2700 controller or the E5600SG 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.

Choices

Upgrading SANtricity OS Software on the E2700 controller

You might need to upgrade the SANtricity OS controller software on the E2700 controller if the controller is operational but not functioning optimally.

Before you begin

> **Attention:** Do not upgrade the SANtricity OS Software or NVSRAM in the E-Series controller unless directed to do so by technical support. Without the guidance of technical support, your StorageGRID appliance could become inoperable. Technical support will help you consult the NetApp Interoperability Matrix Tool (IMT) to determine which versions of SANtricity are compatible with your appliance.

- You have contacted technical support to confirm that you need to upgrade the SANtricity OS Software or NVSRAM and to obtain the compatible files.

- You must have specific access permissions. For details, see the instructions for administering StorageGRID.

- You must be signed in to the Grid Manager using a supported browser.

About this task

Before you can apply a SANtricity OS Software upgrade, you must place the E5600SG controller into maintenance mode, which interrupts the connection to the E2700 controller. Putting a StorageGRID appliance into maintenance mode might make the appliance unavailable for remote access.

> **Attention:** Do not upgrade the SANtricity OS Software or NVSRAM in the E-Series controller on more than one StorageGRID appliance at a time. Doing so may cause data unavailability, depending on your deployment model and ILM policies.

Steps

1. If the StorageGRID appliance is running in a StorageGRID system, place the E5600SG controller into maintenance mode.

   a. From the Grid Manager, select **Nodes**.

   b. Select the appliance node.

c. Select the **Tasks** tab.

SGA-106-15 (Storage Node)

| Overview | Hardware | Network | Storage | Objects | ILM | Events | Tasks |

Reboot

Shuts down and restarts the node.

[Reboot]

Maintenance Mode

Places the appliance's compute controller into maintenance mode.

[Maintenance Mode]

d. Click **Maintenance Mode**.

A confirmation dialog box appears.

⚠ Enter Maintenance Mode on SGA-106-15

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 click OK.
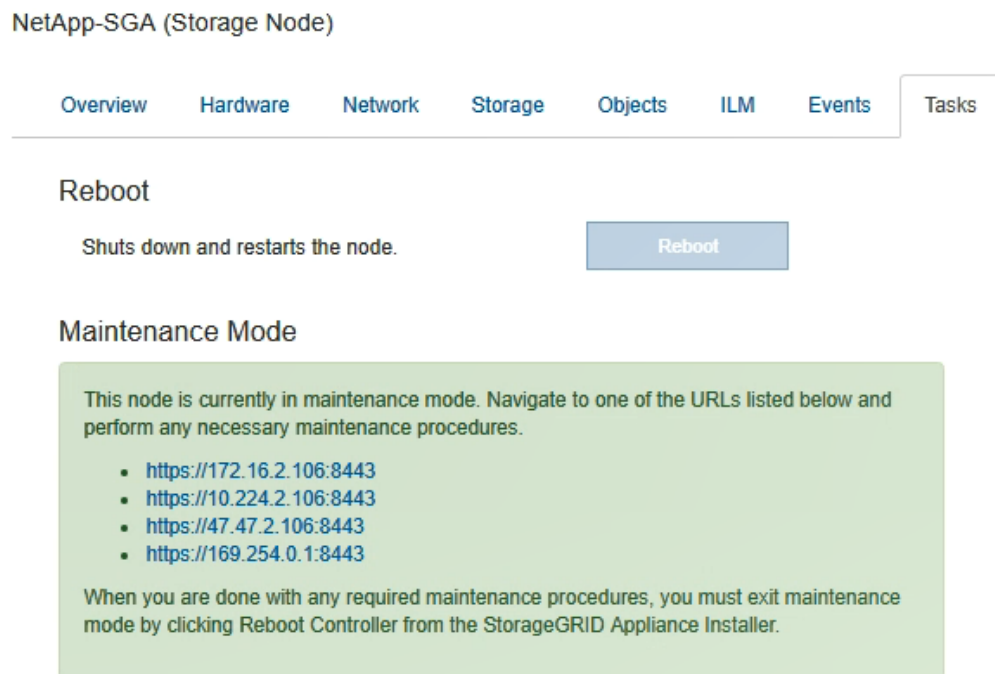
Provisioning Passphrase [   ]

[Cancel] [OK]

e. Enter the provisioning passphrase, and click **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.

NetApp-SGA (Storage Node)

| Overview | Hardware | Network | Storage | Objects | ILM | Events | Tasks |

Reboot

Shuts down and restarts the node.   Reboot

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.**

[progress bar]   Request Sent

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

NetApp-SGA (Storage Node)

| Overview | Hardware | Network | Storage | Objects | ILM | Events | Tasks |

Reboot

Shuts down and restarts the node.   Reboot

Maintenance Mode

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

- https://172.16.2.106:8443
- https://10.224.2.106:8443
- https://47.47.2.106:8443
- https://169.254.0.1:8443

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

f. Browse to any of the URLs displayed.

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

   Note: Accessing `https://169.254.0.1:8443` requires a direct connection to the local management port.

g. Confirm that the appliance is in maintenance mode by noting the maintenance mode message on the StorageGRID Appliance Installer home page.

⚠ This node is in maintenance mode. Perform any required maintenance procedures, then reboot the node to resume normal operation.

2. From a service laptop or management client, access SANtricity Storage Manager, and sign in.

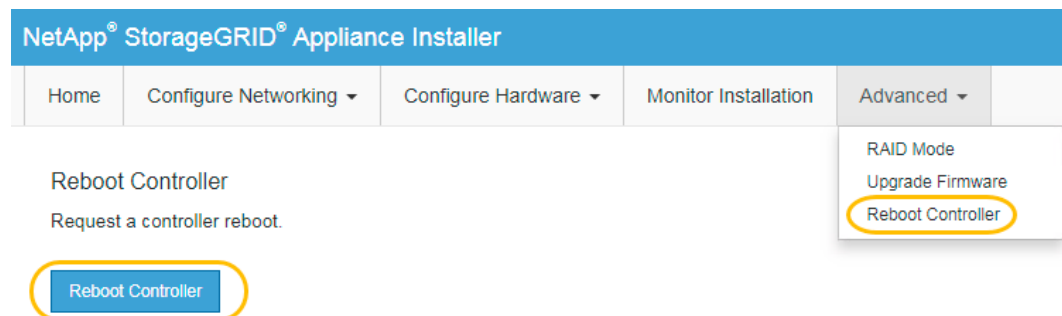3. Download the new SANtricity OS Software file and NVSRAM file to the management client.

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

4. Follow the instructions in the *E2700 and E5600 SANtricity Software and Firmware Upgrade Guide* or the SANtricity Storage Manager online help, and upgrade the E2700 controller's firmware, NVSRAM, or both.

   Attention: If you need to upgrade the NVSRAM in the E2700 controller, you must confirm that the SANtricity OS file you downloaded was designated as compatible with StorageGRID appliances.

   Note: Activate the upgrade files immediately. Do not defer activation.

5. Once the upgrade operation has completed, return the appliance to normal operating mode:

   a. From the StorageGRID Appliance Installer, select **Advanced > Reboot Controller**.

   b. Click **Reboot Controller**.

   During the reboot, the following screen appears:

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

c. On the **Nodes** page, verify that the appliance node returns to the expected status by viewing the icon to the left of the node name.

When the reboot is complete, the **Tasks** tab looks like the following screenshot:

Related information

NetApp E-Series Systems Documentation Center

NetApp Downloads: SANtricity OS

Monitoring and troubleshooting StorageGRID

Replacing the E2700 controller

You might need to replace the E2700 controller if it is not functioning optimally or it has failed.

Before you begin

- You have a replacement controller with the same part number as the controller you are replacing.

- You have labels to identify each cable that is connected to the controller.

- You have antistatic protection.

- You must have specific access permissions. For details, see the instructions for administering StorageGRID.

- You must be signed in to the Grid Manager using a supported browser.

About this task

You can determine if you have a failed controller by checking the amber Service Action Required LED on the controller (shown as 1 in the illustration). If this LED is on, the controller should be replaced.

The appliance Storage Node will not be accessible when you replace the controller. If the E2700 controller is functioning sufficiently, you can place the E5600SG controller into maintenance mode. Putting a StorageGRID appliance into maintenance mode might make the appliance unavailable for remote access.

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

Steps

1. Prepare to remove the controller.

   You use SANtricity Storage 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.

      Attention: 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.

      Note: 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 E5600SG controller into maintenance mode.

   a. From the Grid Manager, select **Nodes**.

   b. Select the appliance node.

   c. Select the **Tasks** tab.

d. Click **Maintenance Mode**.

A confirmation dialog box appears.

e. Enter the provisioning passphrase, and click **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.

NetApp-SGA (Storage Node)

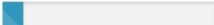| Overview	Hardware	Network	Storage	Objects	ILM	Events	Tasks

Reboot

Shuts down and restarts the node.   [Reboot]

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.**

[████   ]   Request Sent

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

NetApp-SGA (Storage Node)

Overview	Hardware	Network	Storage	Objects	ILM	Events	Tasks

Reboot

Shuts down and restarts the node.   [Reboot]

Maintenance Mode

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

- https://172.16.2.106:8443
- https://10.224.2.106:8443
- https://47.47.2.106:8443
- https://169.254.0.1:8443

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

f. Browse to any of the URLs displayed.

   Note: If possible, use the URL containing the IP address of the appliance's Admin Network port.
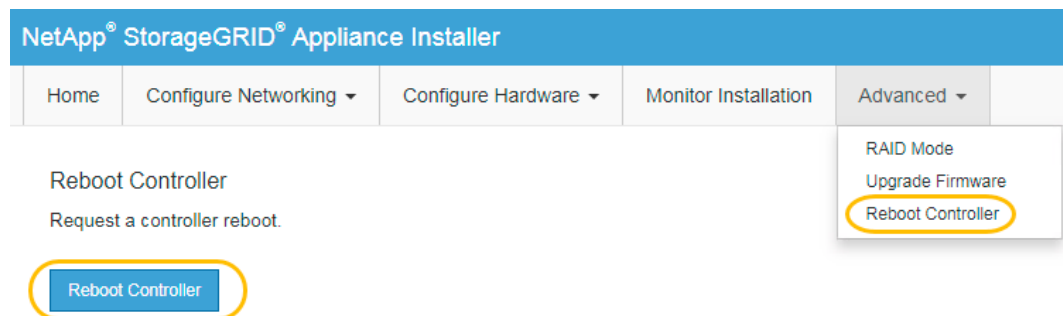
   Note: Accessing `https://169.254.0.1:8443` requires a direct connection to the local management port.

g. Confirm that the appliance is in maintenance mode by noting the maintenance mode message on the StorageGRID Appliance Installer home page.

⚠ This node is in maintenance mode. Perform any required maintenance procedures, then reboot the node to resume normal operation.

3. If the E2700 controller is functioning sufficiently to allow for a controlled shutdown, confirm that all operations have completed.

    a. From the title bar of the Array Management Window, select **Monitor > Reports > Operations in Progress**.

    b. Confirm that all operations have completed.

4. Follow the instructions in the replacement procedure for a simplex E2700 controller to complete these steps:

    a. Label the cables and then disconnect the cables.

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

    b. Remove the failed controller from the appliance.

    c. Remove the controller cover.

    d. Unscrew the thumbscrew and remove the battery from the failed controller.

    e. Install the battery in the replacement controller, and replace the controller cover.

    f. Install the replacement controller into the appliance.

    g. Replace the cables.

    h. Wait for the E2700 controller to reboot. Verify that the seven-segment display shows a state of `99`.

5. If the appliance uses secured drives, import the drive security key.

6. Return the appliance to normal operating mode:

    a. From the StorageGRID Appliance Installer, select **Advanced > Reboot Controller**.

    b. Click **Reboot Controller**.

        During the reboot, the following screen appears:

NetApp-SGA (Storage Node)

| Overview | Hardware | Network | Storage | Objects | ILM | Events | Tasks |

Reboot

Shuts down and restarts the node.

[Reboot]

Maintenance Mode

This node is rebooting from maintenance mode to rejoin the grid. Monitor the node status to determine when the node has successfully rejoined the grid.

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

c. On the **Nodes** page, verify that the appliance node returns to the expected status by viewing the icon to the left of the node name.

When the reboot is complete, the **Tasks** tab looks like the following screenshot:

NetApp-SGA (Storage Node)

| Overview | Hardware | Network | Storage | Objects | ILM | Events | Tasks |

Reboot

Shuts down and restarts the node.

[Reboot]

Maintenance Mode

Places the appliance's compute controller into maintenance mode.

[Maintenance Mode]

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

Related information

NetApp E-Series and EF-Series Hardware Replacement Procedures
NetApp Documentation: E2700 Series

Replacing the E5600SG controller

You might need to replace the E5600SG controller.

Before you begin

You must have access to the following resources:

- E-Series hardware replacement information on the NetApp Support Site at *mysupport.netapp.com*

- E5600 documentation on the Support Site

About this task

If both controllers are functioning sufficiently to allow for a controlled shutdown, you can shut down the E5600SG controller first to interrupt the connectivity to the E2700 controller.

Note: 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. Use antistatic protection.

2. Label each cable that is attached to the E5600SG controller, so you can reconnect the cables correctly.

    Attention: To prevent degraded performance, do not twist, fold, pinch, or step on the cables. Do not bend the cables tighter than a 5-cm (2-in) radius.

3. If the StorageGRID appliance is running in a StorageGRID system, shut down the E5600SG 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. Stop all StorageGRID services:

        service servermanager stop

    c. Shut down the E5600SG controller:

        shutdown -h now

4. Turn off the power to the enclosure, and wait until all LED and seven-segment display activity on the rear of the controller has stopped.

5. Remove the cables.

6. Remove the controller, as described in the E5600SG controller documentation.

7. Insert the new controller, as described in the E5600SG controller documentation.

8. Replace all cables.

9. Turn the power back on to the enclosure.

10. Monitor the seven-segment codes.

    *   E2700 controller:
        The final LED state is 99.

- E5600SG controller:

  The final LED state is HA.

11. Monitor the status of the appliance Storage Node in the Grid Manager.

    Verify that the appliance Storage Nodes returns to the expected status.

Related information

NetApp E-Series and EF-Series Hardware Replacement Procedures

NetApp Documentation: E5600 Series

Replacing other hardware components

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

Before you begin

You have the E-Series hardware replacement procedure.

About this task

To replace a drive, power-fan canister, fan canister, power canister, battery, or drive drawer, refer to the standard procedures for the E2700 and E5600 storage arrays. Focus on the step-by-step instructions for removing and replacing the hardware itself; many of the SANtricity Storage Manager procedures do not apply to an appliance.

Model	FRU	See
SG5612	Drive	*Replacing a Drive in E2600, E2700, E5400, E5500, E5600 or 12-Drive or 24-Drive Trays*
	Power-fan canister	*Replacing a Failed Power-Fan Canister in the E5612 or the E5624 Controller-Drive Tray*
	Battery in the E2700 controller (requires removing the controller)	Follow the steps in *Replacing the E2700 controller* on page 64, but install the new battery in the existing controller.
SG5660	Drive	*Replacing a Drive in E2660, E2760, E5460, E5560, or E5660 Trays*
	Power canister	*Replacing a Failed Power Canister in the E5660 Controller-Drive Tray*
	Fan canister	*Replacing a Failed Fan Canister in the E5660 Controller-Drive Tray*
	Battery in the E2700 controller (requires removing the controller)	Follow the steps in *Replacing the E2700 controller* on page 64, but install the new battery in the existing controller.

Related information

NetApp E-Series and EF-Series Hardware Replacement Procedures

NetApp Documentation: E2700 Series

NetApp Documentation: E5600 Series

Changing the link configuration of the E5600SG controller

You can change the Ethernet link configuration of the E5600SG controller. You can change the port bond mode, the network bond mode, and the link speed.

Before you begin

- You must have specific access permissions. For details, see the instructions for administering StorageGRID.

- You must be signed in to the Grid Manager using a supported browser.

About this task

Options for changing the Ethernet link configuration of the E5600SG 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

Before changing the link configuration, you must place the E5600SG controller into maintenance mode. Putting a StorageGRID appliance into maintenance mode might make the appliance unavailable for remote access.

Steps

1. Follow these steps to place the E5600SG controller into maintenance mode.

    a. From the Grid Manager, select **Nodes**.

    b. Select the appliance node.

    c. Select the **Tasks** tab.

    SGA-106-15 (Storage Node)

    | Overview | Hardware | Network | Storage | Objects | ILM | Events | Tasks |

    Reboot

    Shuts down and restarts the node.   Reboot

    Maintenance Mode

    Places the appliance's compute controller   Maintenance Mode
    into maintenance mode.

    d. Click **Maintenance Mode**.

        A confirmation dialog box appears.

⚠ **Enter Maintenance Mode on SGA-106-15**

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 click OK.

Provisioning Passphrase [   ]

[Cancel] [OK]

e. Enter the provisioning passphrase, and click **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.

NetApp-SGA (Storage Node)

| Overview | Hardware | Network | Storage | Objects | ILM | Events | Tasks |

Reboot

Shuts down and restarts the node.   [Reboot]

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.**

[▓▓░░░░] Request Sent

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

f. Browse to any of the URLs displayed.

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

> **Note:** Accessing `https://169.254.0.1:8443` requires a direct connection to the local management port.

g. Confirm that the appliance is in maintenance mode by noting the maintenance mode message on the StorageGRID Appliance Installer home page.

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

3. Make the desired changes to the link configuration.

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

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

> **Note:** 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://E5600SG_Controller_IP:8443`

5. From the StorageGRID Appliance Installer, select **Configure Networking > Ping Test**.

6. Use the Ping Test tool to check connectivity to IP addresses on any networks that may have been affected by the link configuration changes you made in step *3*.

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.

7. Once you are satisfied that your link configuration changes are working, return the StorageGRID appliance to normal operating mode:

a. From the StorageGRID Appliance Installer, select **Advanced > Reboot Controller**.

b. Click **Reboot Controller**.

During the reboot, the following screen appears:

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

c. On the **Nodes** page, verify that the appliance node returns to the expected status by viewing the icon to the left of the node name.

When the reboot is complete, the **Tasks** tab looks like the following screenshot:

Related tasks

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