StorageGRID® 11.3

Hardware Installation and Maintenance Guide

For StorageGRID SG1000 Appliances

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NetApp®

Contents

SG1000 appliance overview

The StorageGRID SG1000 services appliance can operate as a Gateway Node or an Admin Node to provide high availability load balancing services in a StorageGRID system.

Appliance features

The SG1000 appliance provides the following features:

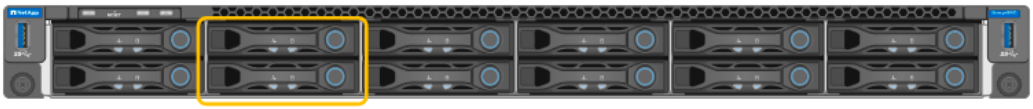
- Provides Gateway Node or Admin Node functions for a StorageGRID system.
- Includes the StorageGRID Appliance Installer to simplify node deployment and configuration.

  Note: StorageGRID software can be automatically retrieved from the Admin Node when you deploy the appliance, or manually uploaded from a local drive. To further simplify the deployment process, a recent version of the software is preloaded onto the appliance during manufacturing.

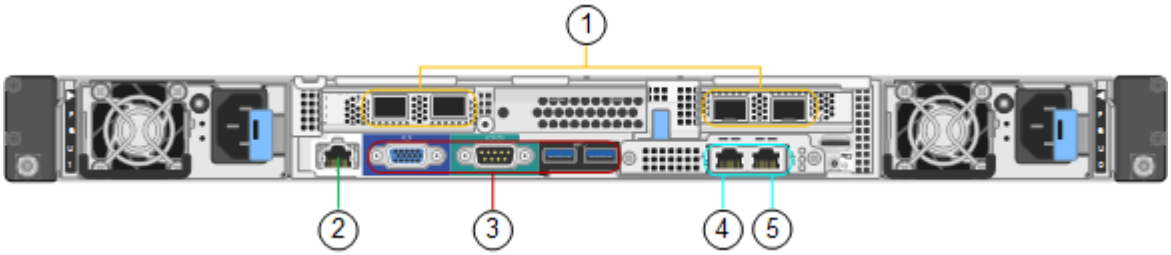
- Includes a baseboard management controller (BMC) for monitoring and diagnosing some of the appliance hardware.
- Can connect to all three StorageGRID networks, including the Grid Network, the Admin Network, and the Client Network. Supports up to four 10-, 25-, 40-, or 100-GbE connections to the Grid Network and Client Network.

SG1000 diagrams

This figure shows the front of the SG1000 with the bezel removed. The two solid-state drives (SSDs), indicated by the orange outline, are used for storing the StorageGRID operating system and are mirrored using RAID1 for redundancy. The remaining drive slots are blank. When the SG1000 is configured as an Admin Node, the drives are used to store audit logs, metrics, and database tables.



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



	Port	**Type**	**Use**
1	Network ports 1-4	10/25/40/100-GbE, based on cable or QSFP transceiver type, switch speed, and configured link speed	Connect to the Grid Network and the Client Network for StorageGRID.
2	BMC management port	1-GbE (RJ-45)	Connect to the SG1000 baseboard management controller.
3	Diagnostic and support ports	• VGA • Serial, 115200 8-N-1 • USB	Reserved for technical support use.
4	Admin Network port 1	1-GbE (RJ-45)	Connect the SG1000 to the Admin Network for StorageGRID.
5	Admin Network port 2	1-GbE (RJ-45)	Options: • Bond with management port 1 for a redundant connection to the Admin Network for StorageGRID. • Leave disconnected and available for temporary local access (IP 169.254.0.1). • During installation, use port 2 for IP configuration if DHCP-assigned IP addresses are not available.

SG1000 applications

You can configure the StorageGRID SG1000 services appliance in various ways to provide gateway services as well as redundancy of some grid administration services.

The SG1000 can be added to a new or existing grid as a Gateway Node. It can be added to a new grid as a primary or non-primary Admin Node, or to an existing grid as a non-primary Admin Node.

The SG1000 facilitates the use of high availability (HA) groups and intelligent load balancing for S3 or Swift data path connections.

The following examples describe how you can maximize the capabilities of the SG1000:

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

  Attention: If you use Admin Nodes and Gateway Nodes in the same HA group, CLB ports and Admin Node-only ports will not fail over.

The SG1000 enables deployment of appliance-only grids with no dependencies on external hypervisors or compute hardware.

Installation and deployment overview

You can install one or more StorageGRID services appliances when you first deploy StorageGRID, or you can add services appliance nodes later as part of an expansion.

Before you begin

Your StorageGRID system is using the required version of StorageGRID software.

Installation and deployment tasks

Preparing and adding a StorageGRID appliance to the grid includes two primary phases.

1. Installing and configuring appliance hardware

Installing and configuring the StorageGRID appliance hardware includes the following steps:

1. Preparing for installation:
   - Preparing the installation site
   - Unpacking the boxes and checking the contents
   - Obtaining additional equipment and tools
   - Verifying network configuration
2. Installing the hardware:
   - Registering the hardware
   - Installing the appliance into a cabinet or rack
   - Cabling the appliance
   - Connecting the power cord and applying power
   - Viewing boot-up status codes
3. Configuring the hardware:
   - Accessing StorageGRID Appliance Installer and configuring the link and network IP settings required to connect to StorageGRID networks
   - Accessing the baseboard management controller (BMC) interface on the SG1000

2. Deploying an appliance Gateway or Admin Node

After the appliance hardware has been installed and configured, you can deploy the appliance as a Gateway Node or an Admin Node in a StorageGRID system.

Task	Instructions
Deploying an appliance Gateway or Admin Node in a new StorageGRID system	*Deploying a services appliance node* on page 48
Adding an appliance Gateway or Admin Node to an existing StorageGRID system	Instructions for expanding a StorageGRID system
Deploying an appliance Gateway or Admin Node as part of a node recovery operation	Instructions for recovery and maintenance

Related tasks

Preparing for installation on page 10
Installing the hardware on page 24
Configuring StorageGRID connections on page 30

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

1. Preparing the site on page 10
2. Unpacking the boxes on page 11
3. Obtaining additional equipment and tools on page 11
4. Web browser requirements on page 12
5. Preparing networks on page 13
6. Gathering installation information on page 19

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. Confirm that your location provides 120-volt AC power.
3. Obtain a 19-inch (48.3-cm) cabinet or rack to fit shelves of this size (without cables):

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

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

Related information

NetApp Hardware Universe
NetApp Interoperability Matrix Tool

Unpacking the boxes

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

SG1000 hardware

 SG1000	 Rail kit with instructions

Power cords

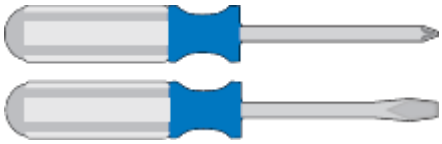
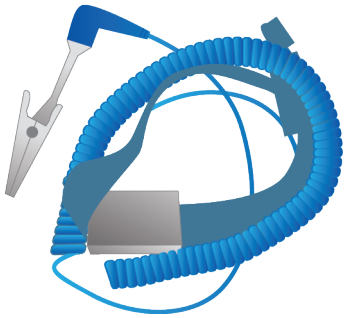
The shipment for the StorageGRID appliance includes the following power cords:

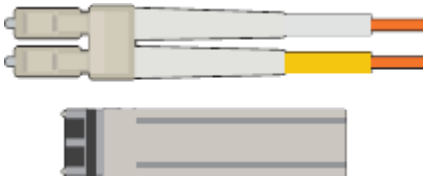
 Two power cords for your country Your cabinet might have special power cords that you use instead of the power cords that ship with the appliance.

Obtaining additional equipment and tools

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

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

 Phillips No. 2 screwdriver Medium flat-blade screwdriver	 ESD wrist strap



- Cable
  - TwinAx/Copper (1 to 4)
    or
  - Fibre/Optical (1 to 4)
- Network equipment based on link speed (mixed speeds are not supported)

Link speed (GbE)	Required equipment
10	QSA adapter and SFP+ transceiver
25	QSA adapter and SFP28 transceiver
40	QSFP+ transceiver
100	QFSP28 transceiver

RJ-45 (Cat5/Cat5e/Cat6) Ethernet cables (four minimum)

Service laptop

Supported web browser
1-GbE (RJ-45) port

Optional tools

Power drill with Phillips head bit
Flashlight

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

Preparing networks

When preparing to install an appliance-only StorageGRID system or one that contains a mixture of appliance nodes and software-based nodes, you must verify that the networking infrastructure and configuration are in place.

For more information about StorageGRID system architecture and topology, see the *Grid primer*.

Reviewing appliance network connections

Before installing the StorageGRID appliance, you should understand which networks can be connected to the appliance.

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

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

Related tasks

Gathering installation information on page 19
Cabling the appliance on page 26

Related information

Grid primer

Port bond modes for the SG1000 controller

When configuring network links for the SG1000 controller, you can use port bonding for the ports that connect to the Grid Network and optional Client Network, and the 1-GbE management ports that

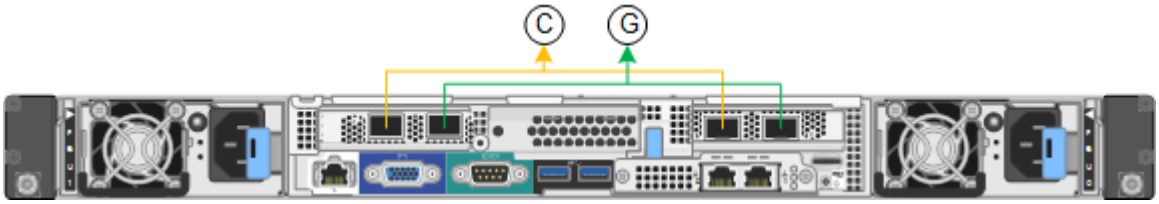
connect to the optional Admin Network. Port bonding helps protect your data by providing redundant paths between StorageGRID networks and the appliance.

Network bond modes

The networking ports on the SG1000 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 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.

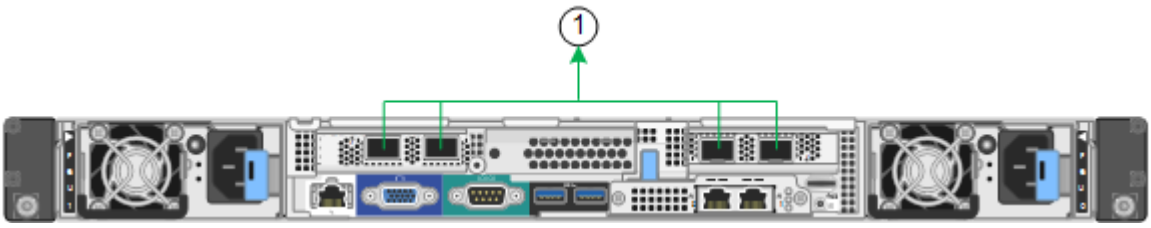
When using Fixed port bond mode, the ports can be bonded using active-backup mode or Link Aggregation Control Protocol mode (LACP 802.3ad).

- 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 SG1000 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 ports, you can use one, two, or three ports. Using more than one port maximizes the chance that some network connectivity will remain available if one of the ports fails.

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.

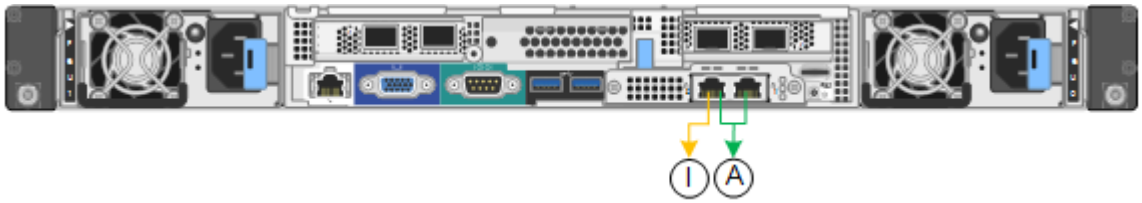
Network bond modes for the management ports

For the two 1-GbE management ports on the SG1000, you can choose Independent network bond mode or Active-Backup network bond mode to connect to the optional Admin Network.

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

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

Note: If you need to make a temporary local connection to the SG1000 when the 1-GbE management ports are configured for Active-Backup mode, remove the cables from both management ports, plug your temporary cable into the management port on the right, and access the appliance using IP address 169.254.0.1.



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

Networking guidelines

Follow these guidelines when configuring StorageGRID networks.

Grid Network guidelines

- You configure the Grid Network Subnet List using the Grid Manager to enable static route generation between subnets on the Grid Network.
- Each node must be attached to the Grid Network and must be able to communicate with the primary Admin Node using the networking configuration you specify when deploying the node.

Subnet guidelines

Note: The following restrictions are enforced by the Grid Manager during deployment. They are provided here to assist in pre-deployment network planning.

- The subnet mask for any network IP address cannot be 255.255.255.254 or 255.255.255.255 (/31 or /32 in CIDR notation).
- The subnets defined by a given node's IP/mask (CIDR) values for all networks it uses cannot overlap each other.
- The subnet defined by a given node's Admin Network IP/mask (CIDR) value cannot overlap any subnet in the Grid Network Subnet List.
- The subnet defined by a given node's Client Network IP/mask (CIDR) value cannot overlap any subnet in the Grid Network Subnet List, nor any subnet present in that node's Admin Network External Subnet List (A-ESL).
- The subnet defined by the Grid Network IP/mask (CIDR) value of any given node in the grid must be contained within at least one subnet present in the Grid Network Subnet List.
- No subnet in the Grid Network Subnet List can overlap with any subnet in any node's Admin Network External Subnet List (A-ESL).

Gateway guidelines

- If set, the gateway for a given network must lie within the subnet defined by the node's IP/mask (CIDR) value for that network.
- If you configure an interface using static addressing, you must specify a gateway address other than 0.0.0.0.
- If you do not have a gateway, best practice is to set the gateway address to be equal to the Grid Network IP address or to the .1 address on the subnet.

General guidelines

- At least one NTP server must be reachable by the primary Admin Node, using the networking configuration you specified when deploying the primary Admin Node.
- If you are not ready to configure the optional Admin and Client Networks during deployment, you can configure these networks when you approve grid nodes during the configuration steps.
- Admin Nodes must always be secured from untrusted clients, such as those on the open internet. You must ensure that no untrusted client can access any Admin Node on the Grid Network, the Admin Network, or the Client Network.

If you are using a Client Network, you can help secure StorageGRID from hostile attacks by accepting inbound client traffic only on explicitly configured endpoints. See the information about managing untrusted Client Networks in the instructions for administering StorageGRID.

- Admin Nodes and Gateway Nodes that you intend to add to high availability groups must be configured with a static IP address.

Using network address translation (NAT)

You can use network address translation (NAT) between external clients and grid nodes, such as to provide a public IP address for a Gateway Node. However, you must not use NAT on the Grid Network between grid nodes or between StorageGRID sites. When you use private IPv4 addresses for the Grid Network, those addresses must be directly routable from every grid node at every site. Using NAT to bridge a public network segment is supported only when you employ a tunneling application that is transparent to all nodes in the grid, meaning the grid nodes require no knowledge of public IP addresses.

Post-configuration guidelines

After completing configuration:

- If DHCP was used to assign IP addresses, you should configure a DHCP reservation for each IP address on these networks. You can only set up DHCP during the deployment phase. You cannot set up DHCP during configuration.

  Attention: Because nodes reboot when their IP addresses change, outages can occur if a DHCP address change affects multiple nodes at once.

- You must use the IP address change procedures if you want to change IP addresses, subnet masks, and default gateways for a grid node. See information about configuring IP addresses in the recovery and maintenance instructions.
- If you make networking configuration changes, including routing and gateway changes, client connectivity to the primary Admin Node and other grid nodes might be lost. Depending on the networking changes applied, you might need to re-establish these connections.

For more information about StorageGRID system architecture and topology, review the networking topics in the *Grid primer*.

Related information

Grid primer
Administering StorageGRID
Recovery and maintenance

Network installation and provisioning

You must understand how the Grid Network and the optional Admin and Client Networks are used during node deployment and grid configuration.

When you first deploy a node, you must attach the node to the Grid Network and ensure it has access to the primary Admin Node. If the Grid Network is isolated, you can configure the Admin Network on the primary Admin Node for configuration and installation access from outside the Grid Network. A Grid Network with a gateway configured becomes the default gateway for a node during deployment. The default gateway allows grid nodes on separate subnets to communicate with the primary Admin Node before the grid has been configured.

After the nodes are deployed, they register themselves with the primary Admin Node using the Grid Network. You can then use the Grid Manager, the `configure-storagegrid.py` Python script, or the Installation API to configure the grid and approve the registered nodes. During grid configuration,

you can configure multiple grid subnets. Static routes to these subnets through the Grid Network gateway will be created on each node when you complete grid configuration. If necessary, subnets containing NTP servers or requiring access to the Grid Manager or API can also be configured as grid subnets.

If you want to disable the Admin Network or Client Network, you can remove the configuration from them during the node approval process.

Note: When using the Client Network, keep in mind that a node's default gateway will switch from the Grid Network to the Client Network when you complete the grid configuration steps. For all nodes, you must ensure that the node does not lose access to external NTP servers when the gateway switches. For Admin Nodes, you must also ensure that browsers or API clients do not lose access to the Grid Manager. To maintain access, perform one of the following steps:

- When configuring the node, route Grid Manager traffic (Admin Nodes only) and NTP traffic through the Admin Network.
- Add subnets to the Grid Network Subnet List (GNSL) that include the IPs of remote clients and servers that should communicate with the grid over the Grid Network.
- Ensure that both the Grid and Client Network gateways can route traffic to and from the external NTP servers and browsers or other Grid Manager API clients.

If you are creating...	Behavior	Recommended configuration
Grid Network only	All Grid, Admin, and Client traffic flows over the Grid Network. The Grid Network gateway is the node default gateway.	
Grid Network and Admin Network	Grid and Client traffic flows over the Grid Network. Administrative traffic flows over the Admin Network. The Grid Network gateway is the node default gateway.	
Grid Network and Client Network (no Admin Network)	When a node is deployed, the Grid Network gateway is the node default gateway. Subnets providing access to the Grid Manager and NTP servers should be included as Grid Network subnets during configuration. When you complete the grid configuration steps, the Client Network gateway becomes the node default gateway.	Allow NTP and installer client access through both the Grid and Client Network gateways. *or* Add the NTP or installer Client subnets, or both, as Grid Networks.

If you are creating...	Behavior	Recommended configuration
All three networks (Grid, Admin, and Client)	When a node is deployed, the Grid Network gateway is the node default gateway. Subnets providing access to the Grid Manager and NTP servers should be included on the Grid Network subnets or as Admin Network subnets during configuration. When you complete the grid configuration steps, the Client Network gateway becomes the node default gateway.	Allow NTP and installer client access through both the Grid and Client Network gateways. *or* Add the NTP or installer client subnets, or both, as Grid Networks (so explicit routes will be created). *or* Add NTP and installer client subnets to the Admin Network External Subnet List (AESL).
Client Network, but at a later time	Subnets providing access to the Grid Manager and NTP servers should be included as Grid Networks or as Admin subnets. The Client Network gateway will become the node default gateway	Allow NTP and installer client access through both the Grid and Client Network gateways. *or* Add the NTP or installer client subnets, or both, as Grid Networks (so explicit routes will be created). *or* Add NTP and installer client subnets to the AESL.

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 the required 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 SG1000 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 following 1-GbE management ports on the SG1000.

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

Information needed	Your value
Network bond mode	Choose one: • Independent (default) • Active-Backup
Switch port for the left port circled in the diagram (default active port for Independent network bond mode)	
Switch port for the right port circled in the diagram (Active-Backup network bond mode only)	
MAC address for the Admin Network port **Note:** The MAC address label on the front of the SG1000 lists the MAC address for the BMC management port. To determine the MAC address for the Admin Network port, you must add **2** to the hexadecimal number on the label. For example, if the MAC address on the label ends in **09**, the MAC address for the Admin Port would end in **0B**. If the MAC address on the label ends in **(*y*)FF**, the MAC address for the Admin Port would end in **(*y*+1)01**. You can easily make this calculation by opening Calculator in Windows, setting it to Programmer mode, selecting Hex, typing the MAC address, then typing **+ 2 =**.	
DHCP-assigned IP address for the Admin Network port, if available after power on **Note:** You can 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 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 2: Information needed to connect and configure the networking ports on the SG1000

The four ports on the SG1000 connect to the StorageGRID Grid Network and the optional Client Network.

Information needed	Your value
Link speed	Choose one: • Auto (default) • 10 GbE • 25 GbE • 40 GbE • 100 GbE
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 3: Information needed to connect the SG1000 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 10/25/40/100-GbE ports on the SG1000.

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	• IPv4 address (CIDR): • Gateway:

Information needed	Your value
Static IP address you plan to use for the appliance 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 (CIDRs)	

Table 4: Information needed to connect the SG1000 to the Client Network

The Client Network for StorageGRID is an optional network, typically used to provide client protocol access to the grid. The appliance connects to the Client Network using the 10/25/40/100-GbE ports on the SG1000.

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

Table 5: Information needed to connect the SG1000 to the BMC management network

You can access the BMC interface on the SG1000 using the 1-GbE management port circled in the diagram. This port supports remote management of the controller hardware over Ethernet using the Intelligent Platform Management Interface (IPMI) standard.

Information needed	Your value
Ethernet switch port you will connect to the BMC management port (circled in the diagram)	
DHCP-assigned IP address for the BMC management network, if available after power on	• IPv4 address (CIDR): • Gateway:
Static IP address you plan to use for the BMC management port	• IPv4 address (CIDR): • Gateway:

Related concepts

SG1000 appliance overview on page 5

Related tasks

Cabling the appliance on page 26
Configuring StorageGRID IP addresses on page 38

Installing the hardware

Hardware installation entails installing the SG1000 into a cabinet or rack, connecting the cables, and applying power.

Steps

1. Registering the hardware on page 24
2. Installing the appliance into a cabinet or rack on page 25
3. Cabling the appliance on page 26
4. Connecting power cords and applying power on page 28
5. Viewing status indicators on the SG1000 on page 28

Registering the hardware

Registering the appliance hardware provides support benefits.

Steps

1. Locate the chassis serial number for the appliance.

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

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

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 into a cabinet or rack

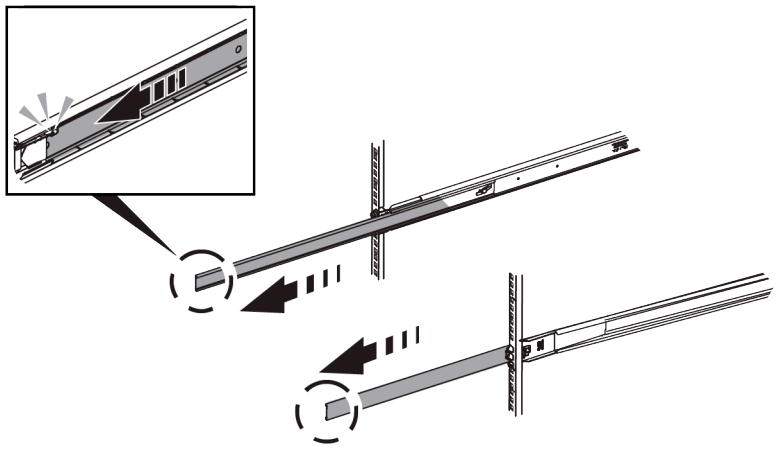
You must install a set of rails for the SG1000 in your cabinet or rack, and then slide the controller onto the rails.

Before you begin

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

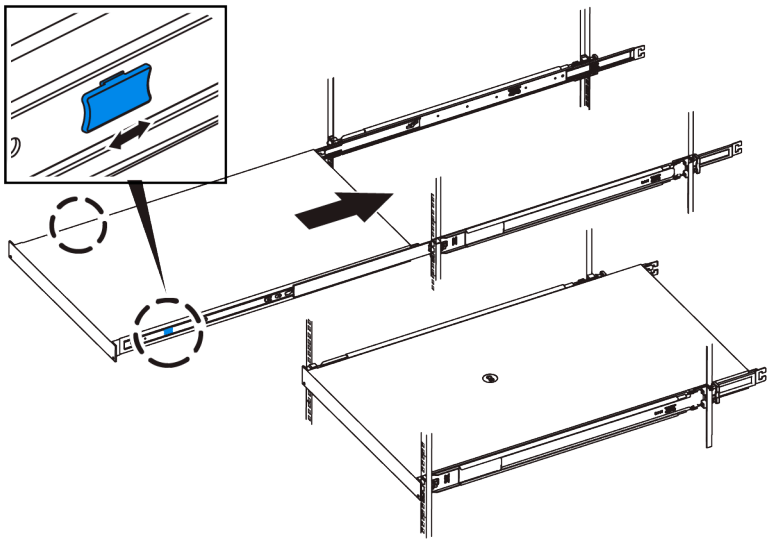
Steps

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



3. Insert the SG1000 into the rails.
4. Slide the controller into the cabinet or rack.

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



Note: Do not attach the front bezel until after you power on the controller.

Cabling the appliance

You must connect the management port on the SG1000 to the service laptop and connect the network ports on the SG1000 to the Grid Network and optional Client Network for StorageGRID.

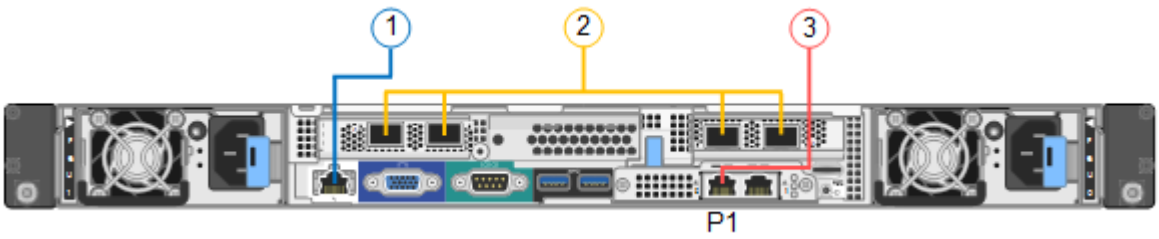
Before you begin

- You have an RJ-45 Ethernet cable for connecting the management port.
- You have one of the following options for the network ports. These items are not provided with the appliance.
  - One to four TwinAx cables for connecting the four network ports.
  - One to four QSFP+ or QSFP28 transceivers if you plan to use optical cables for the ports.

Caution: Risk of exposure to laser radiation – Do not disassemble or remove any part of a QSFP transceiver. You might be exposed to laser radiation.

About this task

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



	Port	Type of port	Function
1	BMC management port on the SG1000	1-GbE (RJ-45)	Connects to the network where you access the BMC interface.
2	Four network ports on the SG1000	10/25/40/100-GbE	Connect to the Grid Network and the Client Network for StorageGRID.
3	Admin Network port on the SG1000 (labelled P1 in the figure)	1-GbE (RJ-45) **Attention:** This port operates only at 1000 baseT/full and does not support 10- or 100-megabit speeds.	Connects the SG1000 to the Admin Network for StorageGRID.
	Rightmost RJ-45 port on the SG1000	1-GbE (RJ-45) **Attention:** This port operates only at 1000 baseT/full and does not support 10- or 100-megabit speeds.	• Can be bonded with management port 1 if you want a redundant connection to the Admin Network. • Can be left disconnected and available for temporary local access (IP 169.254.0.1). • During installation, can be used to connect the SG1000 to a service laptop if DHCP-assigned IP addresses are not available.

Steps

1. Connect the BMC management port on the SG1000 to the management network, using an Ethernet cable.

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

2. Connect the network ports on the SG1000 to the appropriate network switches, using TwinAx cables or optical cables and QSFP+ or QSFP28 transceivers.

   Note: The four network ports must use the same link speed. See the following table for the equipment required based on your link speed.

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

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

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

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

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

3. If you plan to use the Admin Network for StorageGRID, connect the Admin Network port on the SG1000 to the Admin Network, using an Ethernet cable.

Connecting power cords and applying power

After connecting the network cables, you are ready to apply power to the SG1000.

Steps

1. Connect a power cord to each of the two power supply units in the SG1000.
2. Connect these two power cords to two different power distribution units (PDUs) in the cabinet or rack.
3. If the power button on the front of the SG1000 is not currently illuminated blue, press the button to turn on power to the controller.

   Do not press the power button again during the power-on process.
4. If errors occur, correct any issues.
5. Attach the front bezel to the SG1000.

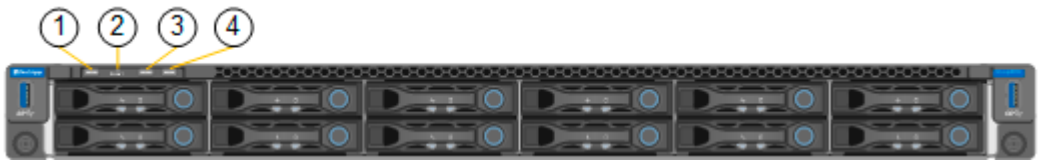
Related references

Viewing status indicators on the SG1000 on page 28

Viewing status indicators on the SG1000

The SG1000 includes indicators that help you determine the status of the SG1000 controller and the two SSDs.

Controller indicators and buttons



	Display	State	Description
1	Power button	Blue	The controller is powered on.
		Off	The controller is powered off.

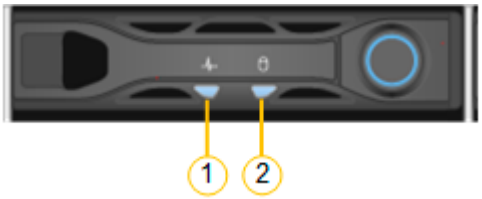
	Display	State	Description
2	Reset button	*Not applicable*	Use this button to perform a hard reset of the controller.
3	Identify button	Blue, blinking	Identifies the controller in the cabinet or rack. This button can be set to Blink, On (Solid), or Off.
		Blue, solid	
		Off	The controller is not visually identifiable in the cabinet or rack.
4	Alarm LED	Amber, solid	An error has occurred. **Note:** To view the boot-up and error codes, you must access the BMC interface.
		Off	No errors are present.

General boot-up codes

During boot-up or after a hard reset of the SG1000, the following occurs:

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

SSD indicators



LED	Display	State	Description
1	Drive status/ fault	Blue, solid	Drive is online
		Amber, blinking	Drive failure
		Off	Slot is empty
2	Drive active	Blue, blinking	Drive is being accessed

Related tasks

Configuring the BMC interface on page 43

Related references

Troubleshooting the hardware installation on page 58

Configuring StorageGRID connections

Before you can deploy the services appliance as a node in a StorageGRID system, 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 pre-installed on the SG1000.

Steps

1. Accessing the StorageGRID Appliance Installer on page 30
2. Configuring network links on page 32
3. Configuring StorageGRID IP addresses on page 38
4. Verifying network connections on page 40
5. Verifying port-level network connections on page 41

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 any management client that can connect to the StorageGRID Admin Network, or you have a service laptop.
- The client or service laptop has a supported web browser.
- The SG1000 is connected to all of the StorageGRID networks you plan to use.
- You know the IP address, gateway, and subnet for the SG1000 on these networks.
- You have configured the network switches you plan to use.

About this task

To initially access the StorageGRID Appliance Installer, you can use the DHCP-assigned IP address for the Admin Network port on the SG1000 (assuming the controller is connected to the Admin Network), or you can connect a service laptop directly to the SG1000.

Steps

1. If possible, use the DHCP address for the Admin Network port on the SG1000 to access the StorageGRID Appliance Installer.

   a. Locate the MAC address label on the front of the SG1000, and determine the MAC address for the Admin Network port.

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

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

b. Provide the MAC address to your network administrator, so they can look up the DHCP address for the appliance on the Admin Network.

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

`https://SG1000_Controller_IP:8443`

For *`SG1000_Controller_IP`*, use the DHCP address.

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

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

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

2. Alternatively, if you cannot obtain an IP address using DHCP, use a link-local connection to access the StorageGRID Appliance Installer.

a. Connect a service laptop directly to the rightmost RJ-45 port on the SG1000, using an Ethernet cable.

b. Open a web browser on the service laptop.

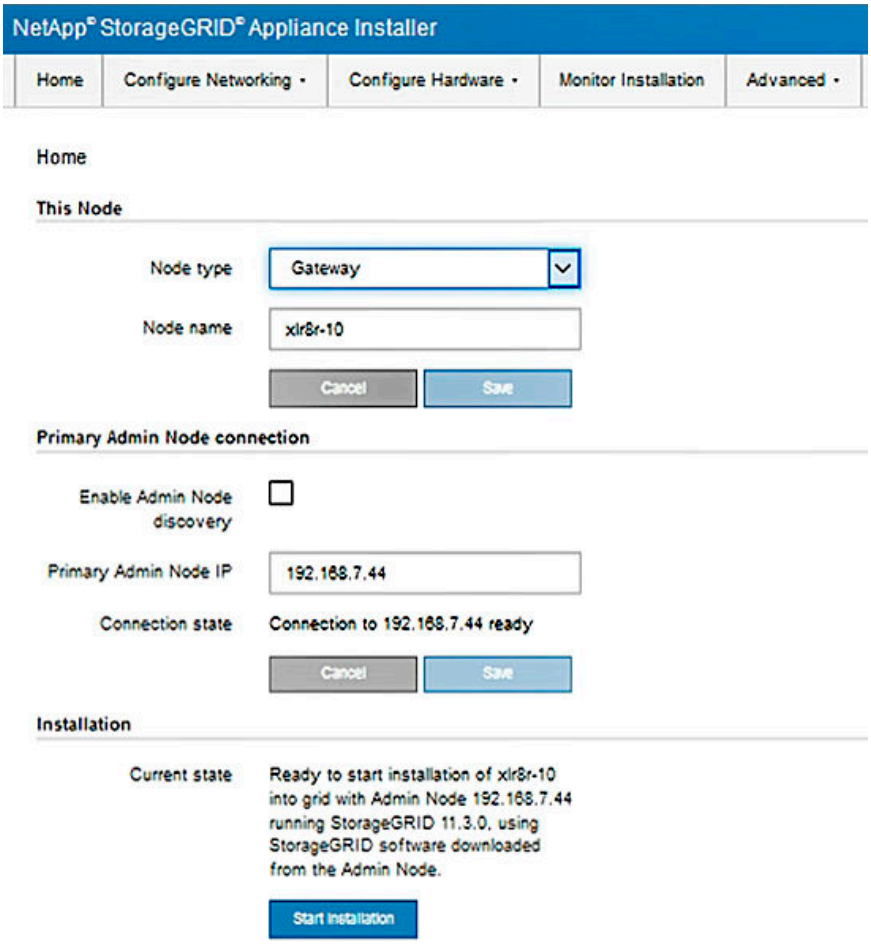
c. Enter this URL for the StorageGRID Appliance Installer:

`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 to StorageGRID networks. Error messages might appear that will be resolved in later steps.

> **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.

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



Related references

Web browser requirements on page 12

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

- You have obtained the additional equipment required for your cable type and link speed.
- You have connected the network ports to switches that support your chosen speed.

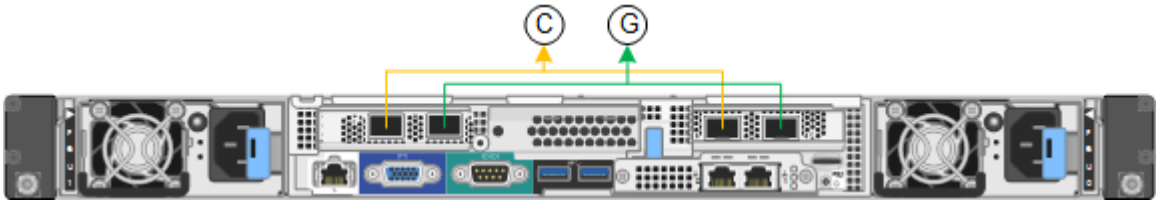
If you plan to use Aggregate port bond mode, LACP network bond mode, or VLAN tagging:

- You have connected the network ports on the appliance to switches that can support VLAN and LACP.
- If multiple switches are participating in the LACP bond, the switches support multi-chassis link aggregation groups (MLAG), or equivalent.
- You understand how to configure the switches to use VLAN, LACP, and MLAG or equivalent.

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

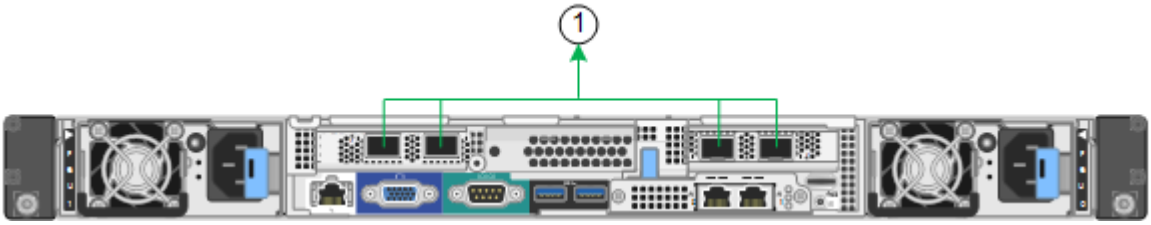
About this task

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



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

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



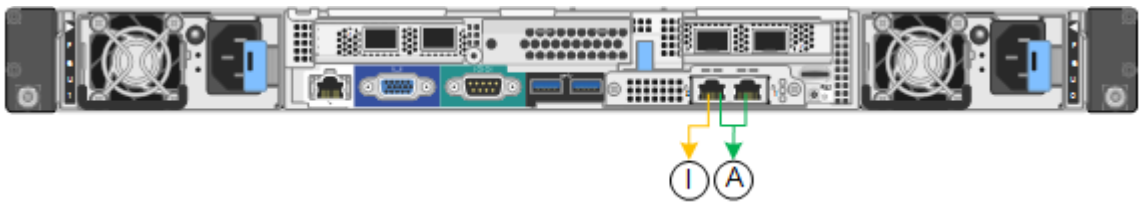
Callout	Which ports are bonded
1	All four ports are grouped in a single LACP bond, allowing all ports to be used for Grid Network and Client Network traffic.

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

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.

For additional details, see the topic about GbE port connections for the SG1000.

This figure shows how the two 1-GbE management ports on the SG1000 are bonded in Active-Backup network bond mode for the Admin Network.



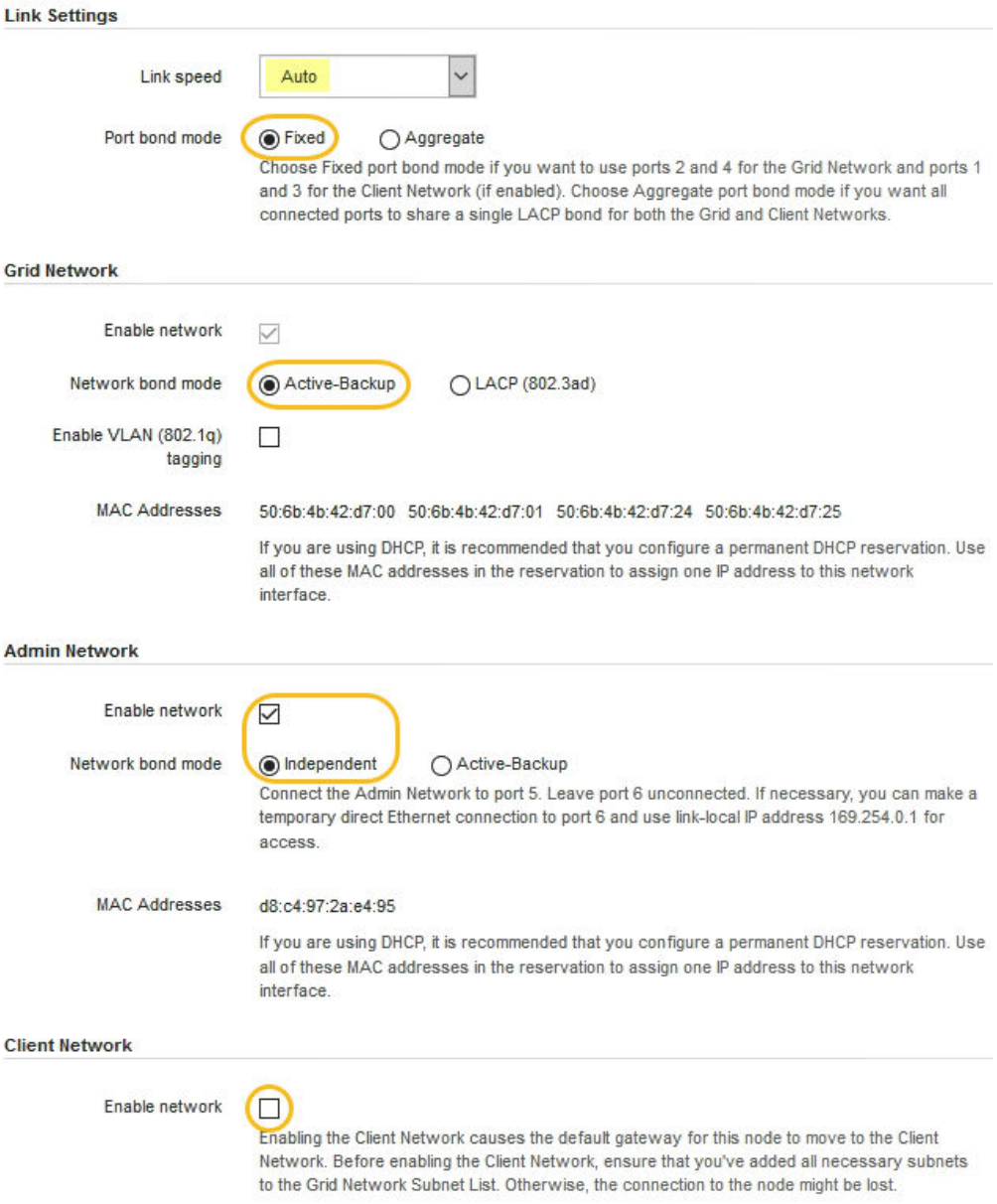
Steps

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 **Auto**.

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



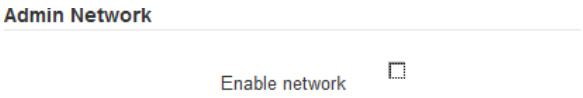
2. Select the link speed for the network ports from the **Link speed** drop-down list.

   The network switches you are using for the Grid Network and the Client Network must also support and be configured for this speed. You must use the appropriate adapters or transceivers for the configured link speed.

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

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

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



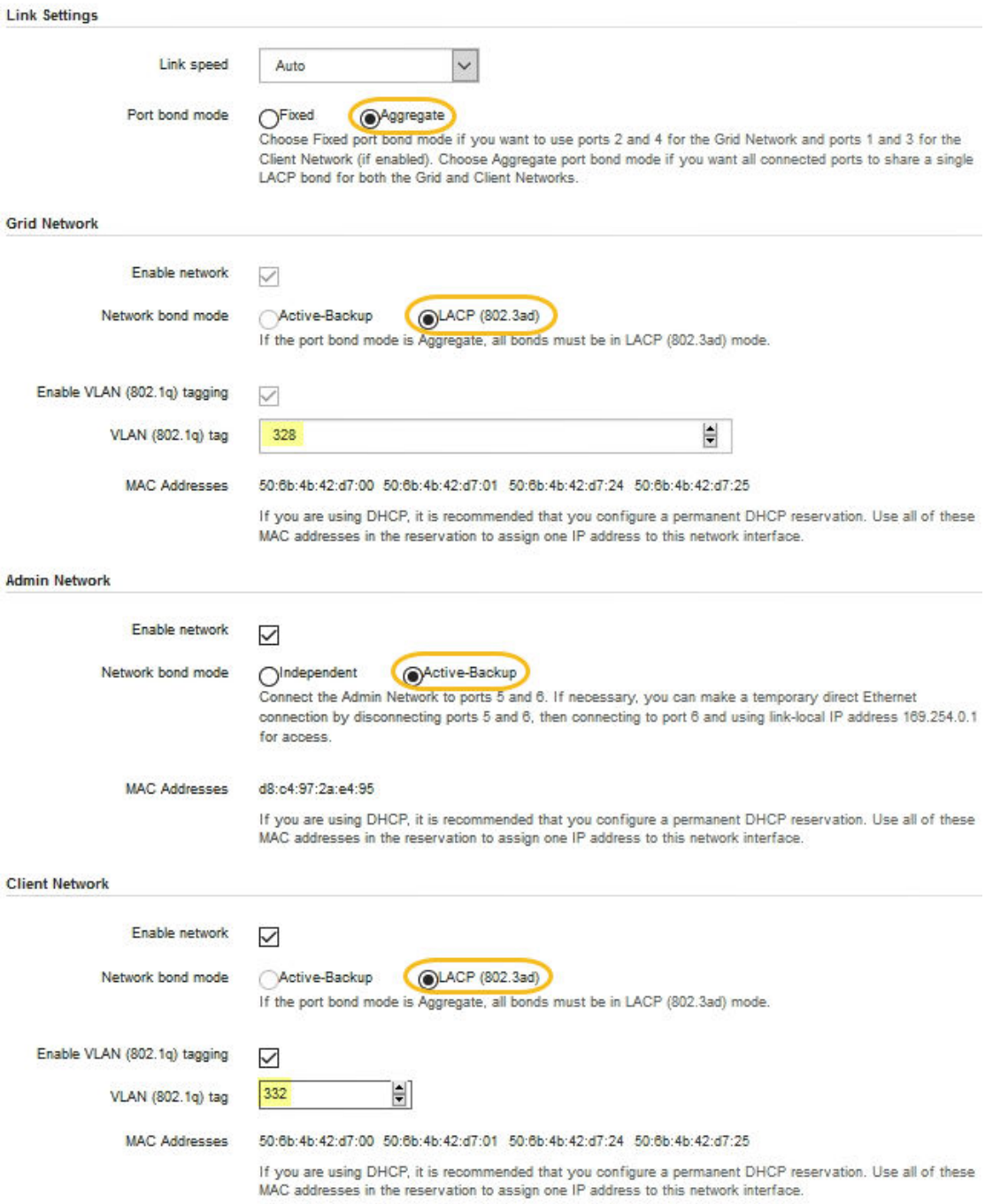
b. If the appliance is connected to the Client Network, select the **Enable network** check box for the Client Network.

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

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

This example shows:

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



5. 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://SG1000_Controller_IP:8443`

Related references

Obtaining additional equipment and tools on page 11

Configuring StorageGRID IP addresses

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

About this task

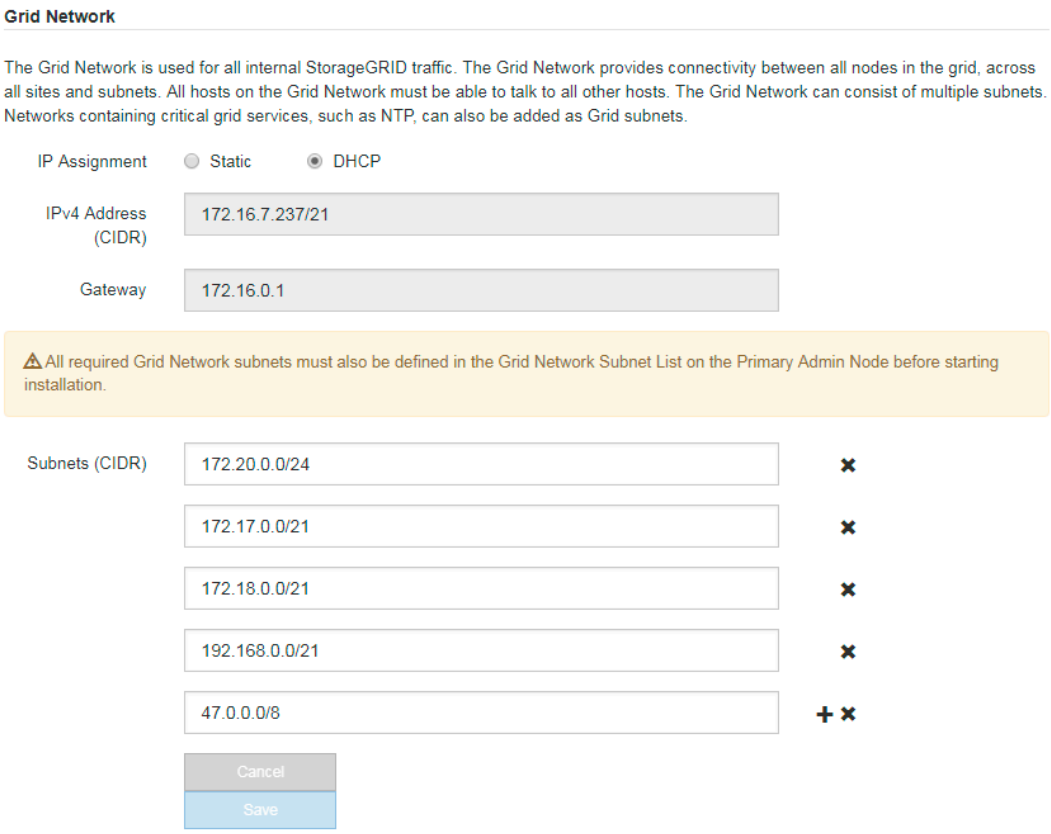
You must either assign a static IP for the appliance on each connected network or assign a permanent lease for the address on the DHCP server.

Additionally, if you want to change the link configuration of a StorageGRID appliance, see the instructions for changing the link configuration of the SG1000.

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.



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://SG1000_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.

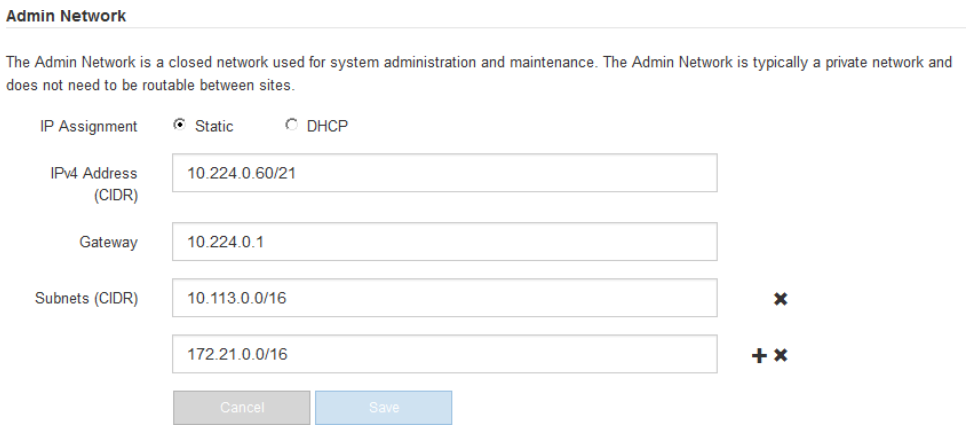
Note: The default route is not listed. If the Client Network is not enabled, the default route will use the Grid Network gateway.

- 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.



When you configure the Admin Network, you specify the IP address, gateway, and subnets used for Management Port 1 on the controller. Management Port 1 is the left of the two 1-GbE RJ45 ports on the right end of the controller.

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://SG1000_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.

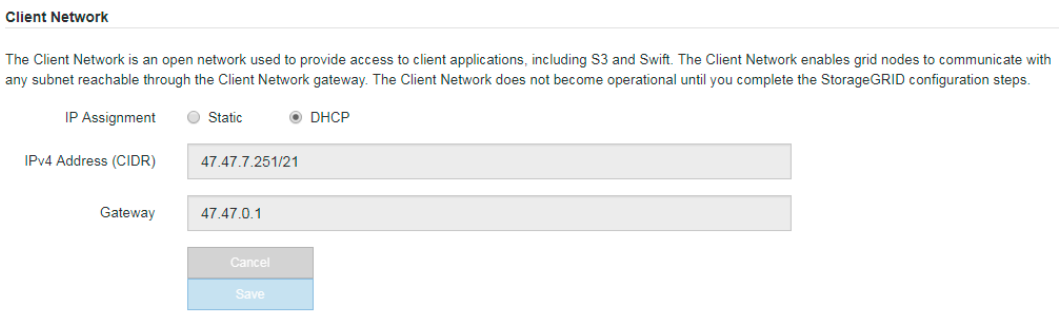
Note: The default route cannot be made to use the Admin Network gateway.

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

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.



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**.

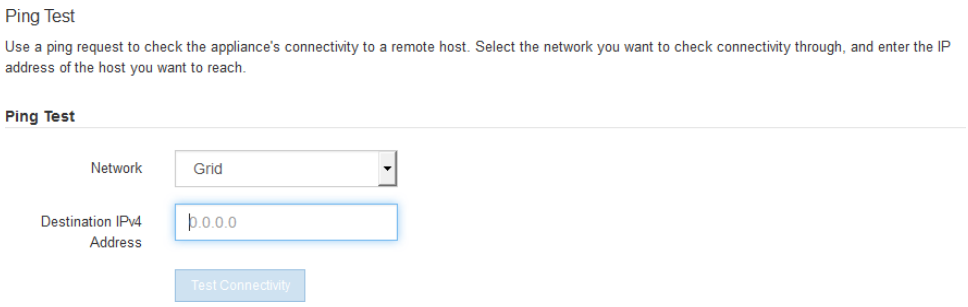
Verifying network connections

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**.

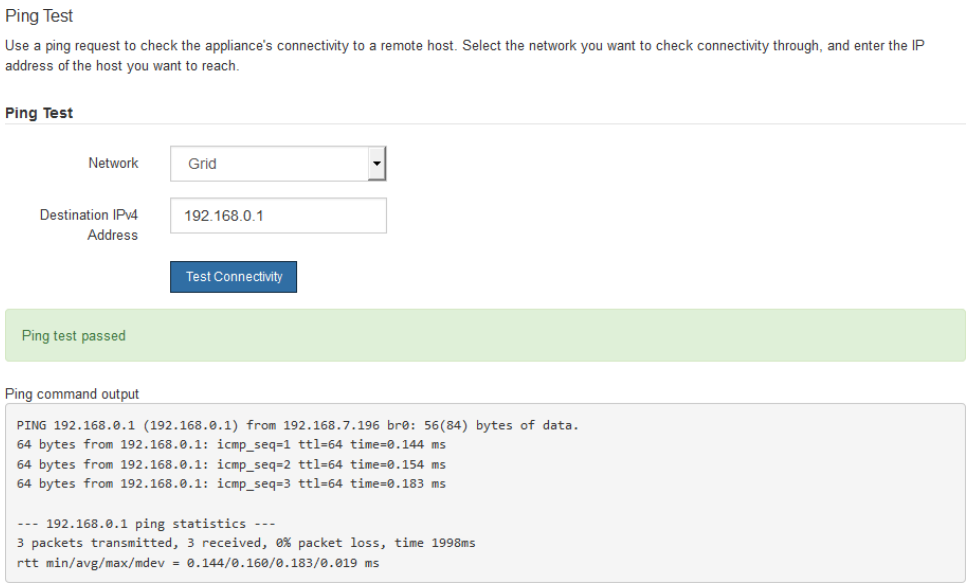
The Ping Test page appears.



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.



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.

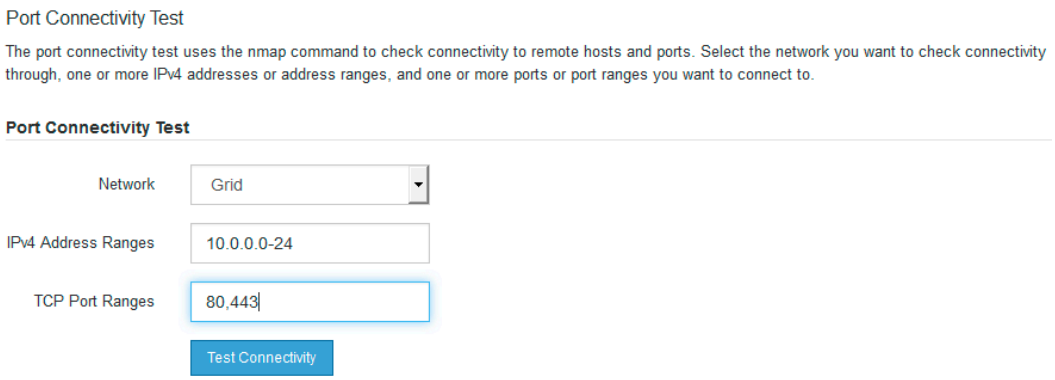
Steps

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.

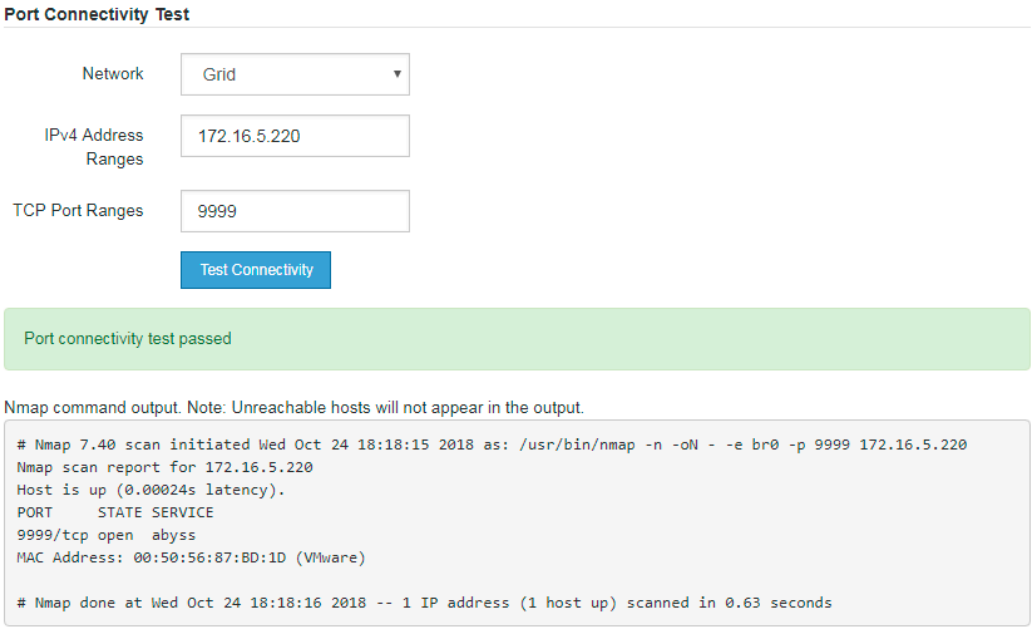
For example, you might want to ping the gateway on the network or the primary Admin Node. Specify a range using a hyphen, as shown in the example.

4. Enter a TCP port number, a list of ports separated by commas, or a range of ports.



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.



Configuring the BMC interface

The user interface for the baseboard management controller (BMC) on the SG1000 provides status information about the hardware and allows you to configure SNMP settings and other options for the SG1000.

Steps

1. Changing the root password for the BMC interface on page 43
2. Setting the IP address for the BMC management port on page 44
3. Accessing the BMC interface on page 46
4. Configuring SNMP settings for the SG1000 on page 47

Changing the root password for the BMC interface

For security, you must change the password for the BMC's root user.

Before you begin

The management client is using a supported web browser.

Steps

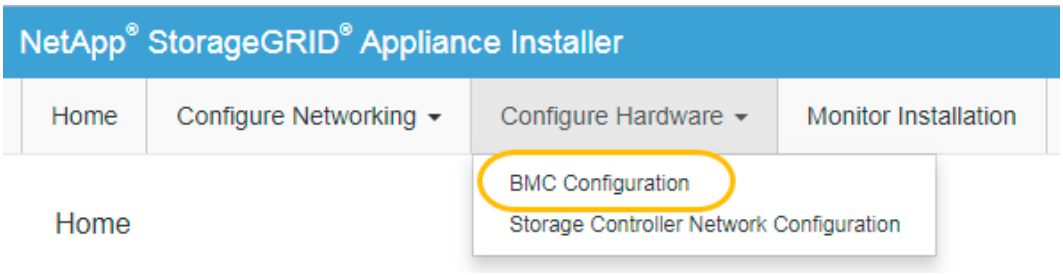
1. From the client, enter the URL for the StorageGRID Appliance Installer:

   `https://SG1000_IP:8443`

   For *`SG1000_IP`*, use the IP address for the appliance on any StorageGRID network.

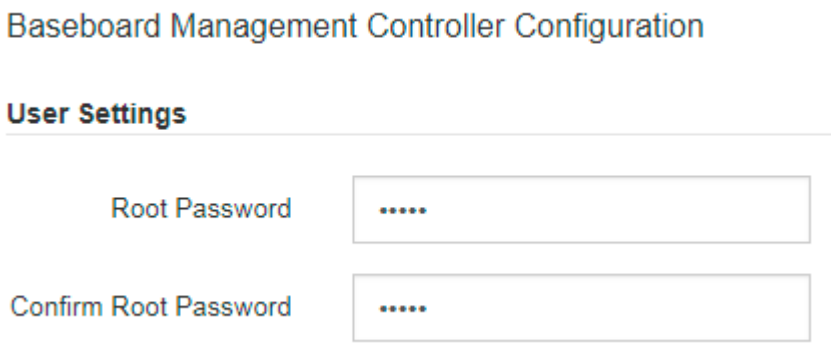
   The StorageGRID Appliance Installer Home page appears.

2. Select **Configure Hardware** > **BMC Configuration**.



   The Baseboard Management Controller Configuration page appears.

3. Enter a new password for the root account in the two fields provided.



4. Click **Save**.

Setting the IP address for the BMC management port

Before you can access the BMC interface, you must configure the IP address for the BMC management port on the SG1000.

Before you begin

- The management client is using a supported web browser.
- You are using any management client that can connect to a StorageGRID network.
- The BMC management port is connected to the management network you plan to use.

About this task

Attention: For support purposes, the BMC management port allows low-level hardware access. You should only connect this port to a secure, trusted, internal management network. If no such network is available, leave the BMC port unconnected or blocked, unless a BMC connection is requested by technical support.

Steps

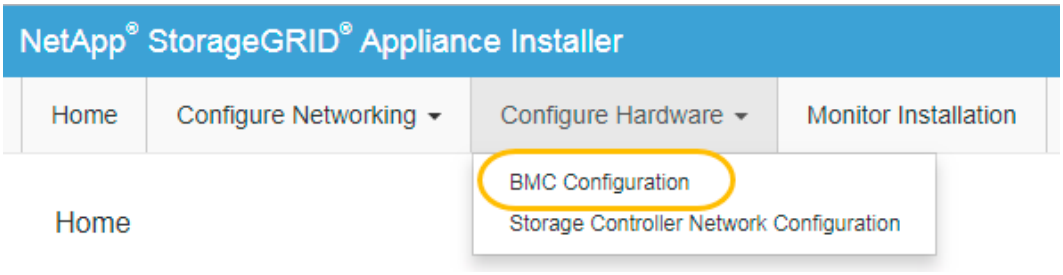
1. From the client, enter the URL for the StorageGRID Appliance Installer:

   `https://SG1000_IP:8443`

   For `SG1000_Controller_IP`, use the IP address for the appliance on any StorageGRID network.

   The StorageGRID Appliance Installer Home page appears.

2. Select **Configure Hardware** > **BMC Configuration**.

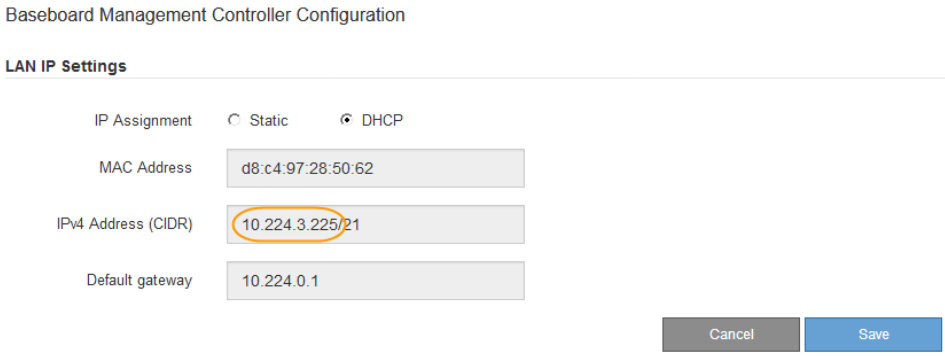


The Baseboard Management Controller Configuration page appears.

3. Make a note of the IPv4 address that is automatically displayed.

   DHCP is the default method for assigning an IP address to this port.

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



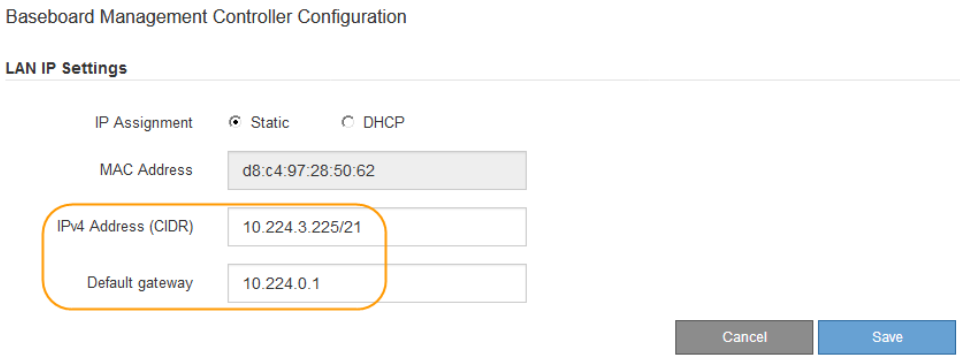
4. Optionally, set a static IP address for the BMC management port.

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

   a. Select **Static**.

   b. Enter the IPv4 address, using CIDR notation.

   c. Enter the default gateway.



   d. Click **Save**.

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

Accessing the BMC interface

You can access the BMC interface on the SG1000 using the DHCP or static IP address for the BMC management port.

Before you begin

- The BMC management port on the SG1000 is connected to the management network you plan to use.

- The management client is using a supported web browser.

Steps

1. Enter the URL for the BMC interface:

   `https://BMC_Port_IP`

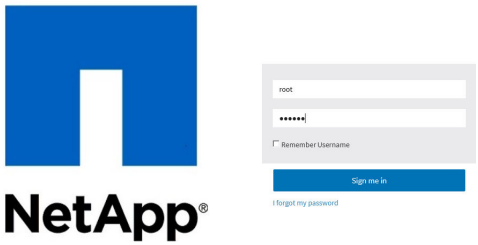
   For *`BMC_Port_IP`*, use the DHCP or static IP address for the BMC management port.

   The BMC sign-in page appears.

2. Enter the root username and password, using the password you set when you changed the default root password:

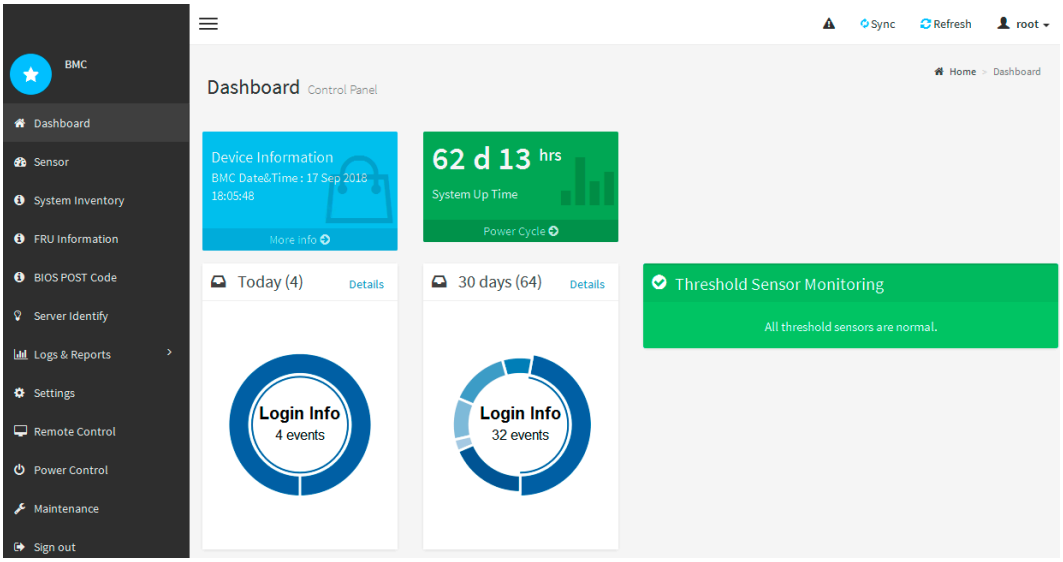
   `root`

   `<password>`



3. Click **Sign me in**

   The BMC dashboard appears.



4. Optionally, create additional users by selecting **Settings > User Management** and clicking on any “disabled” user.

Related tasks

Changing the root password for the BMC interface on page 43

Configuring SNMP settings for the SG1000

If you are familiar with configuring SNMP for hardware, you can use the BMC interface to configure the SNMP settings for the SG1000. You can provide secure community strings, enable SNMP Trap, and specify up to five SNMP destinations.

Before you begin

- You know how to access the BMC dashboard.
- You have experience in configuring SNMP settings for SNMPv1-v2c equipment.

Steps

1. From the BMC dashboard, select **Settings > SNMP Settings**.
2. On the SNMP Settings page, select the **Enable SNMP V1/V2** checkbox, and provide a Read-Only Community String and a Read-Write Community String.

   The Read-Only Community String is like a user ID or password. You should change this value to prevent intruders from getting information about your network setup. The Read-Write Community String protects the device against unauthorized changes.
3. Optionally, select **Enable Trap**, and enter the required information.

   Enable traps if you want the SG1000 to send immediate notifications to an SNMP console when it is in an unusual state. Traps might indicate link up/down conditions, temperatures exceeding certain thresholds, or high traffic.
4. Optionally, click **Send Test Trap** to test your settings.
5. If the settings are correct, click **Save**.

Deploying a services appliance node

You can deploy a services appliance as a primary Admin Node, a non-primary Admin Node, or a Gateway Node.

Choices

- Deploying a services appliance as a primary Admin Node on page 48
- Deploying a services appliance as a Gateway or non-primary Admin Node on page 52
- Monitoring StorageGRID appliance installation on page 56

Deploying a services appliance as a primary Admin Node

When you deploy a services appliance as a primary Admin Node, you use the StorageGRID Appliance Installer included on the appliance to install the StorageGRID software, or you upload the software version you want to install. You must configure and deploy the primary Admin Node before you deploy any other appliance node types. Only one primary Admin Node is allowed per grid.

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.

  Note: If you have remapped any ports, you cannot use the same ports to configure load balancer endpoints. Follow the steps in the recovery and maintenance instructions for removing port remaps.

- You have a service laptop with a supported web browser.
- You know one of the IP addresses assigned to the appliance. You can use the IP address for any attached StorageGRID network.

About this task

A primary Admin Node can connect to the Grid Network, the Admin Network, and the Client Network.

To deploy a services appliance as the primary Admin Node in a StorageGRID system:

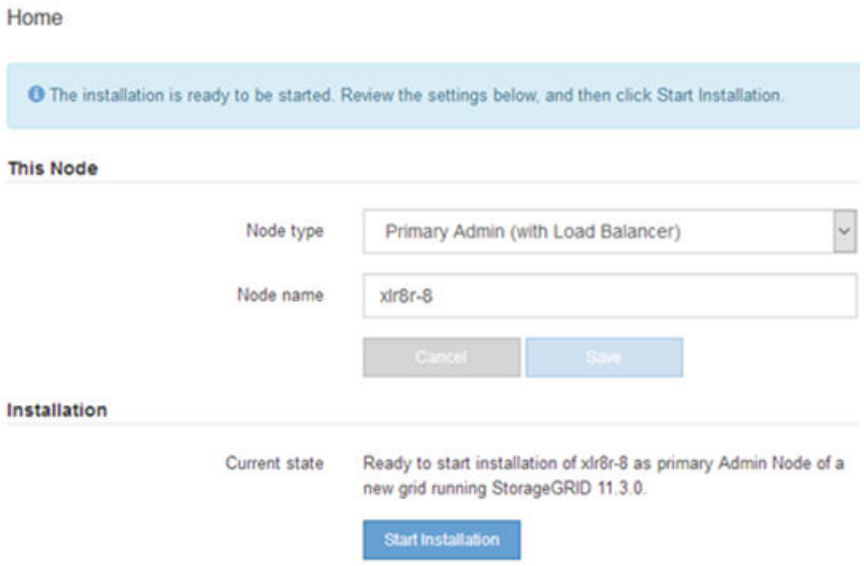
- You use the StorageGRID Appliance Installer to install the StorageGRID software. If you want to install a different version of the software, you first upload it using the StorageGRID Appliance Installer.
- You use the Grid Manager to complete the installation process and deploy the appliance as the primary Admin Node for a grid.

Steps

1. Open a browser, and enter one of the IP addresses for the appliance.

   `https://Controller_IP:8443`

   The StorageGRID Appliance Installer Home page appears.



2. In the **This Node** section, select **Primary Admin (with Load Balancer)**.

   Note: All Admin Nodes (and Gateway Nodes) include the Load Balancer service. You can choose whether you want to implement load balancing for a particular node.

3. In the **Node name** field, enter the name you want to use for this appliance node, and click **Save**.

   The node name is assigned to this appliance node in the StorageGRID system. It is shown on the Nodes page in the Grid Manager.

4. Optionally, to install a different version of the StorageGRID software, follow these steps:

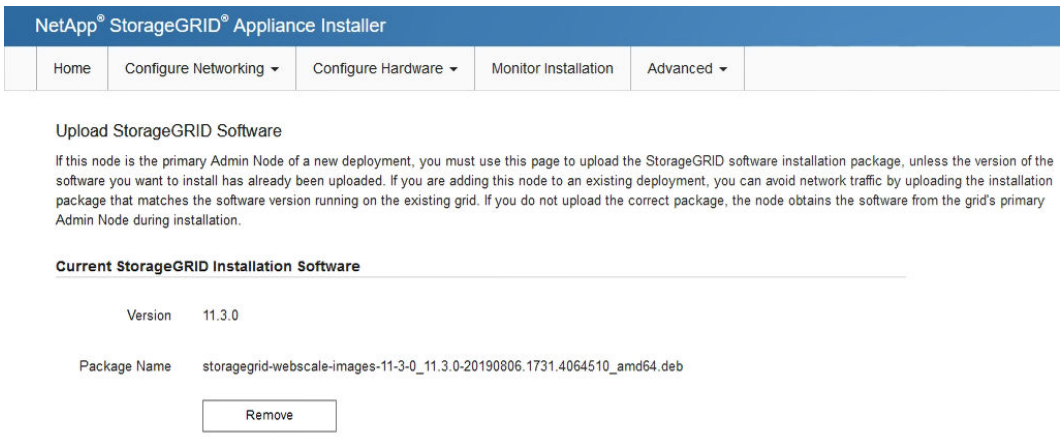
   a. Download the installation archive from the NetApp Downloads page for StorageGRID.

   NetApp Downloads: StorageGRID

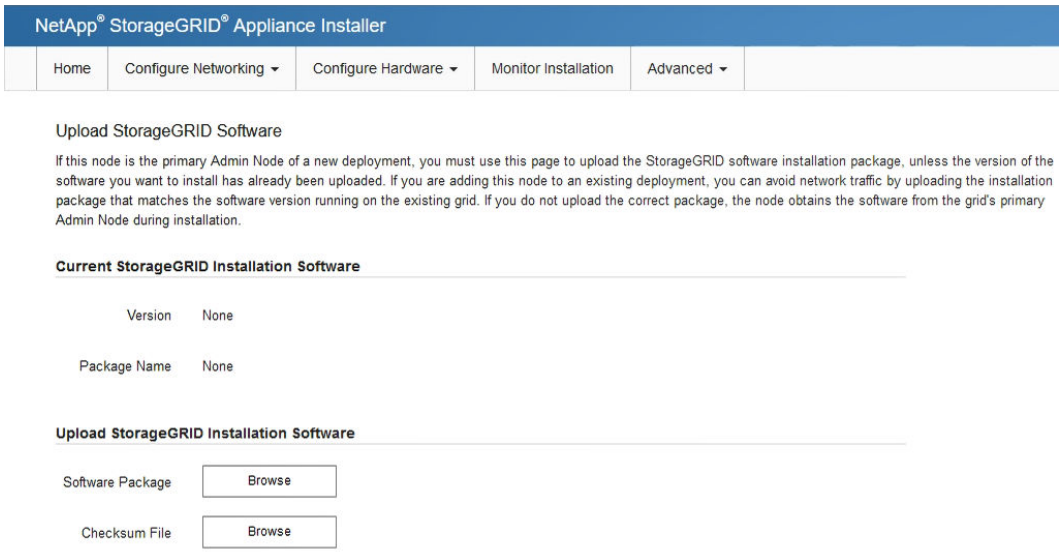
   b. Extract the archive.

   c. From the StorageGRID Appliance Installer, select **Advanced > Upload StorageGRID Software**.

   d. Click **Remove** to remove the current software package.



   e. Click **Browse** for the software package you downloaded and extracted, and then click **Browse** for the checksum file.



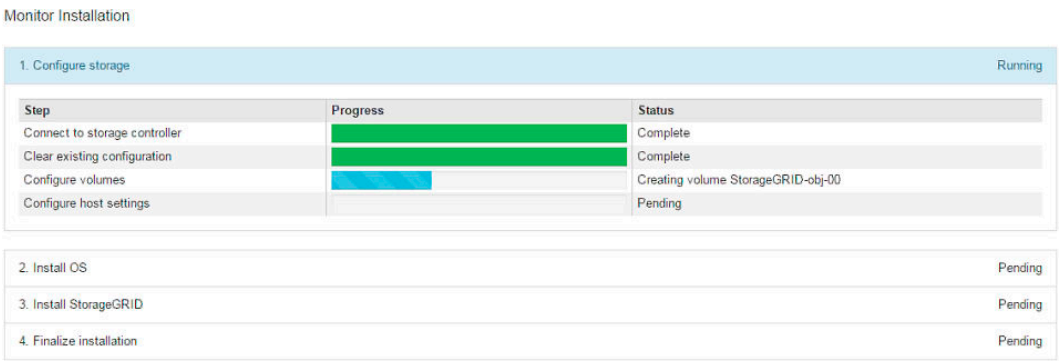
f. Select **Home** to return to the Home page.

5. Confirm that the current state is "Ready to start installation of *`primary Admin Node name`* with software version *`x.y`*" and that the **Start Installation** button is enabled.

6. 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.



   The blue status bar indicates which task is currently in progress. Green status bars indicate tasks that have completed successfully.

   Note: The installer ensures that tasks completed in a previous install are not re-run. If you are re-running an installation, any tasks that do not need to be re-run are shown with a green status bar and a status of "Skipped."

7. Review the progress of the first two installation stages.

   1. Configure storage

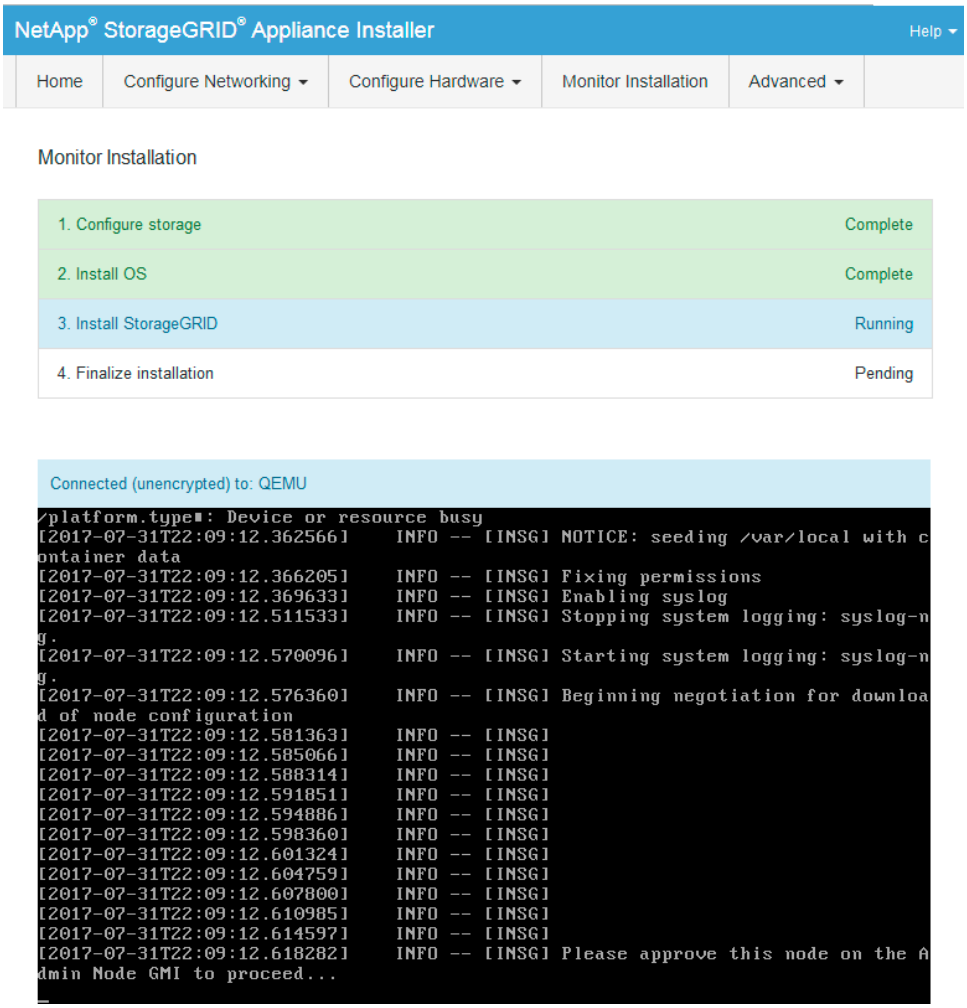
   The installer configures host settings. If there is an existing configuration, that configuration is cleared first.

2. Install OS

The installer copies the base operating system image for StorageGRID to the appliance.

8. Monitor the additional installation stage for primary Admin Nodes.

   During installation of an appliance primary Admin Node, an additional stage appears after stage 2. If the stage is in progress for more than 10 minutes, refresh the web page manually.



9. Go to the Grid Manager and follow the prompts to complete the following installation procedures:

   - Specify license information
   - Add sites
   - Specify Grid Network subnets
   - Approve pending grid nodes
   - Specify Network Time Protocol server information
   - Specify Domain Name System server information
   - Specify system passwords
   - Review the configuration and complete the installation

Related tasks

Deploying a services appliance as a Gateway or non-primary Admin Node on page 52

Deploying a services appliance as a Gateway or non-primary Admin Node

When you deploy a services appliance as a Gateway Node or non-primary Admin Node, you use the StorageGRID Appliance Installer included on the appliance.

Before you begin

- The appliance has been installed in a rack or cabinet, connected to your networks, and powered on.
- Network links, IP addresses, and port remapping (if necessary) have been configured for the appliance using the StorageGRID Appliance Installer.

  Note: If you have remapped any ports, you cannot use the same ports to configure load balancer endpoints. Follow the steps in the recovery and maintenance instructions for removing port remaps.

- The primary Admin Node for the StorageGRID system has been deployed.
- All Grid Network subnets listed on the IP Configuration page of the StorageGRID Appliance Installer have been defined in the Grid Network Subnet List on the primary Admin Node.
- You have a service laptop with a supported web browser.
- You know the IP address assigned to the appliance. You can use the IP address for any attached StorageGRID network.

About this task

To deploy a services appliance as a Gateway Node or non-primary Admin Node in a StorageGRID system:

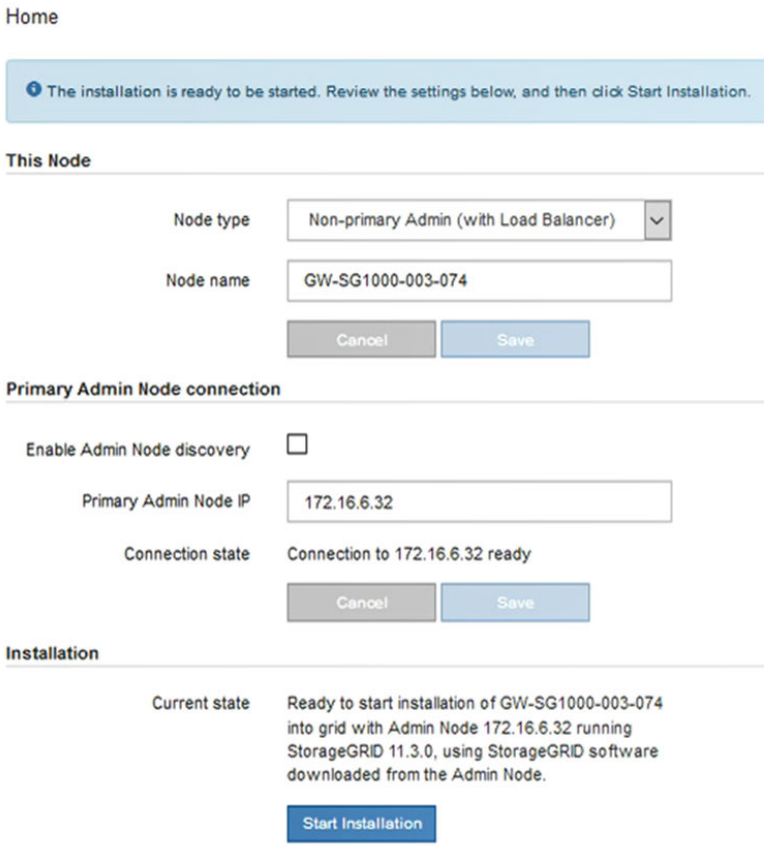
- You specify or confirm the IP address of the primary Admin Node and the name of the appliance node.
- You start the installation and wait as the StorageGRID software is installed.
- You use the Grid Manager to complete the StorageGRID installation process and deploy the appliance as a Gateway Node or non-primary Admin Node.

Steps

1. Open a browser, and enter the IP address for the appliance.

   `https://Controller_IP:8443`

   The StorageGRID Appliance Installer Home page appears.



2. In the **Node type** field, select one of the following node types:

   - Non-primary Admin (with Load Balancer)
   - Gateway

   Note: “Primary Admin node (with Load Balancer)” is one of the choices in the **Node type** list. If you make this choice, follow the instructions for deploying a primary Admin Node. Only one primary Admin Node is allowed per grid.

   Note: All Gateway Nodes and Admin Nodes include the Load Balancer service. You can choose whether you want to implement load balancing for a particular node.

3. In the **Node name** field, enter the name you want to use for this appliance node, and click **Save**.

   The node name is assigned to this appliance node in the StorageGRID system. It is shown on the Nodes page (Overview tab) in the Grid Manager. If required, you can change the name when you approve the node.

4. 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.

5. 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.
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.

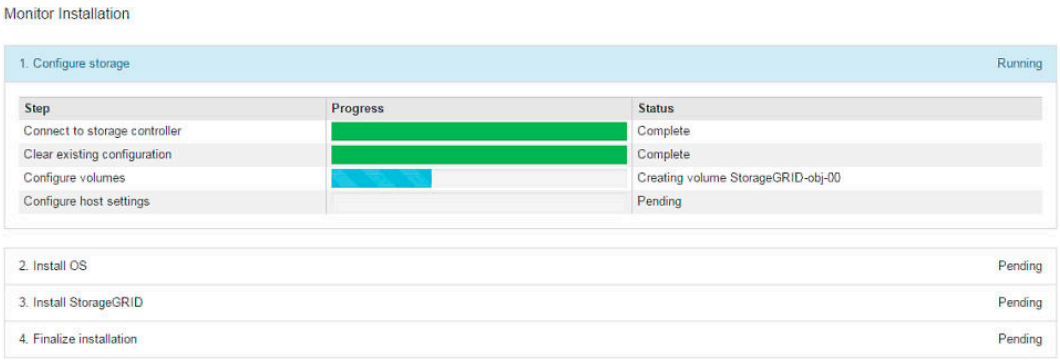
6. In the **Installation** section, confirm that the current state is "Ready to start installation of *`node name`* into grid with primary Admin Node *`admin_ip`*" and that the **Start Installation** button is enabled.

   If the **Start Installation** button is not enabled, you might need to change the network configuration or port settings. For instructions, see the installation and maintenance instructions for your appliance.

7. 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.



   The blue status bar indicates which task is currently in progress. Green status bars indicate tasks that have completed successfully.

   Note: The installer ensures that tasks completed in a previous install are not re-run. If you are re-running an installation, any tasks that do not need to be re-run are shown with a green status bar and a status of "Skipped."

8. Review the progress of the first two installation stages.

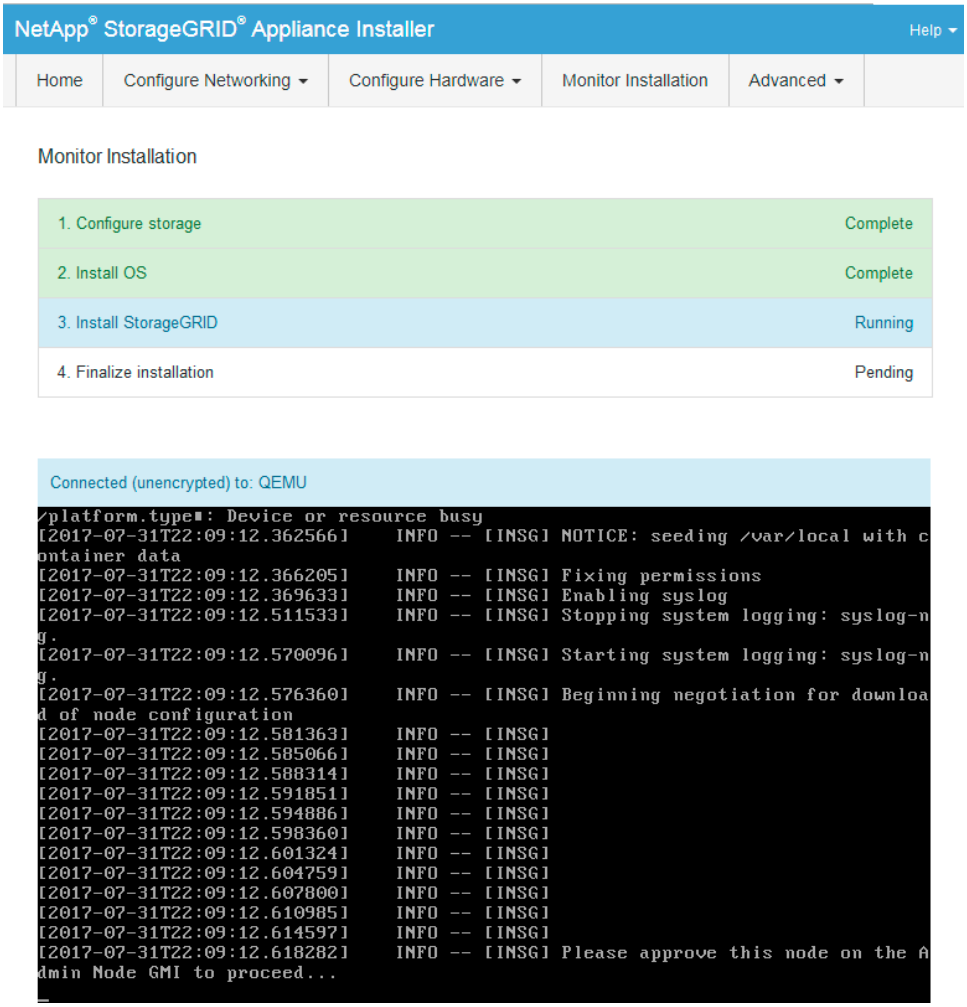
1. Configure storage

The installer configures host settings. If there is an existing configuration, that configuration is cleared first.

2. Install OS

During this stage, the installer copies the base operating system image for StorageGRID to the appliance.

9. Continue monitoring the installation progress until the **Install StorageGRID** stage pauses and a message appears on the embedded console, prompting you to approve this node from the primary Admin Node using the Grid Manager.



10. Go to the Grid Manager, approve the pending grid node, and complete the StorageGRID installation process.

    When you click **Install** from the Grid Manager, Stage 3 completes and stage 4, **Finalize Installation**, begins. When stage 4 completes, the controller is rebooted.

11. If your grid includes multiple appliance nodes that you want to deploy as Gateway Nodes or Admin Nodes, repeat the previous steps for each appliance.

    If you need to deploy any storage appliances as Storage Nodes, follow the instructions for the storage appliance.

Related tasks

Deploying a services appliance as a primary Admin Node on page 48

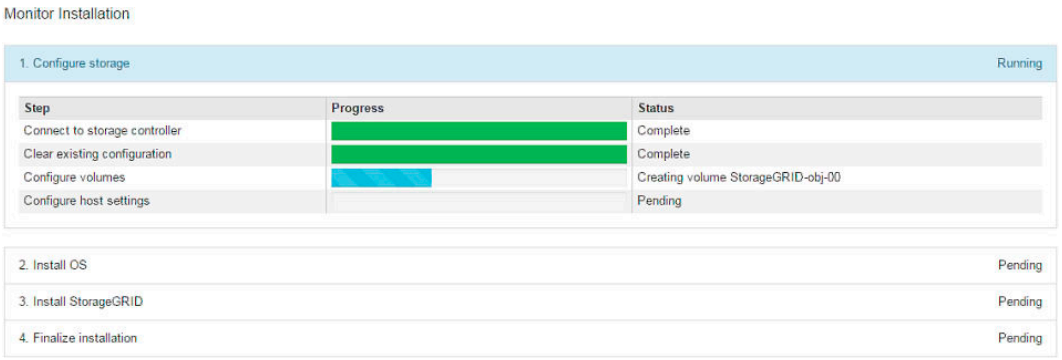
Monitoring StorageGRID appliance installation

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

Steps

1. To monitor the installation progress, click **Monitor Installation** from the menu bar.

   The Monitor Installation page shows the installation progress.



   The blue status bar indicates which task is currently in progress. Green status bars indicate tasks that have completed successfully.

   Note: The installer ensures that tasks completed in a previous install are not re-run. If you are re-running an installation, any tasks that do not need to be re-run are shown with a green status bar and a status of “Skipped.”

2. Review the progress of first two installation stages.

   1. Configure storage

   During this stage, one of the following processes occurs, depending on the appliance type:

   - For an appliance Storage Node, the installer connects to the storage controller, clears any existing configuration, communicates with SANtricity software to configure volumes, and configures host settings.
   - For an appliance Admin Node or Gateway Node, the installer clears any existing configuration from the drives in the compute controller, and configures host settings.

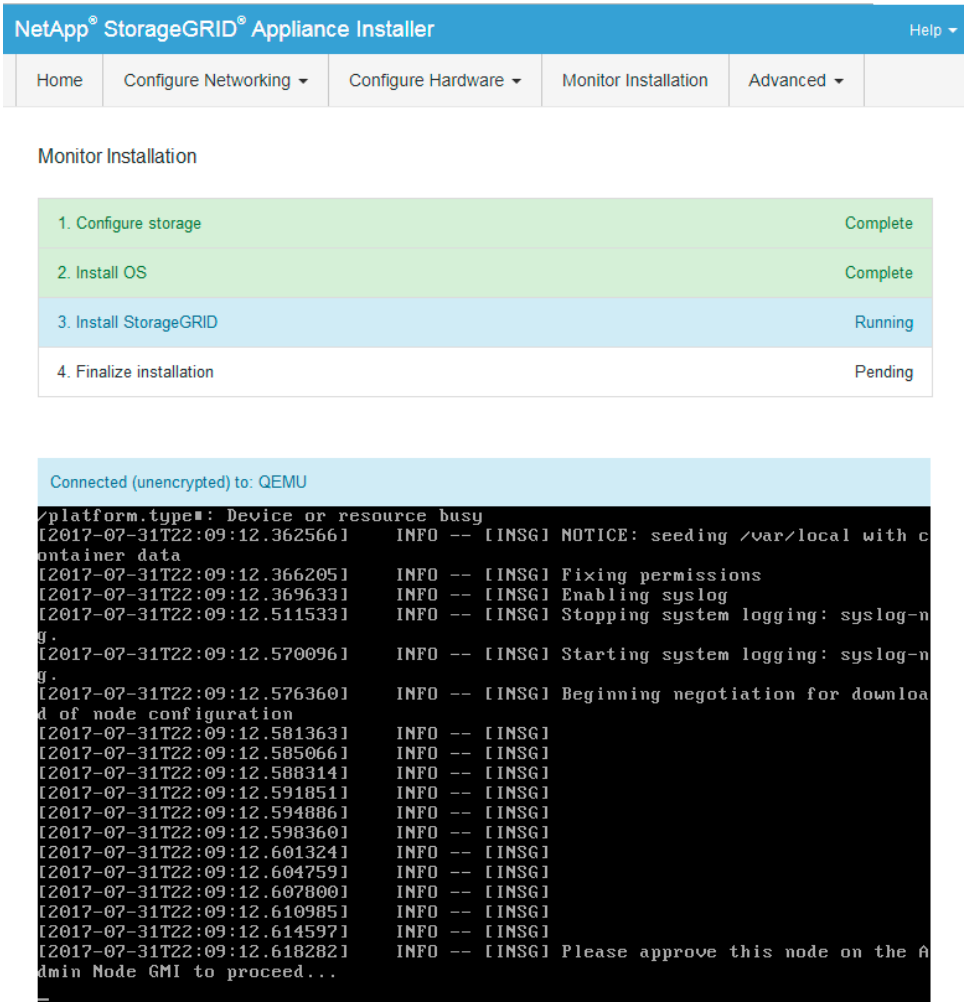
   2. Install OS

   During this stage, the installer copies the base operating system image for StorageGRID to the appliance.

3. Continue monitoring the installation progress until one of the following processes occurs:

   - For all appliance nodes except the primary Admin Node, the **Install StorageGRID** stage pauses and a message appears on the embedded console, prompting you to approve this node on the Admin Node using the Grid Manager. Go to the next step.
   - For appliance primary Admin Node installation, you do not need to approve the node. The controller is rebooted. You can skip the next step.

Note: During installation of an appliance primary Admin Node, a fifth phase appears (see the example screen shot showing four phases). If the fifth phase is in progress for more than 10 minutes, refresh the web page manually.



4. Go to the Grid Manager, approve the pending grid node, and complete the StorageGRID installation process.

   When you click **Install** from the Grid Manager, Stage 3 completes and stage 4, **Finalize Installation**, begins. When stage 4 completes, the controller is rebooted.

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 tasks

Hardware setup appears to hang on page 61

Related references

Troubleshooting connection issues on page 62

Viewing boot-up codes for the SG1000

When you apply power to the appliance, the BMC logs a series of boot-up codes for the SG1000. You can view these codes on a graphical console that is connected to the BMC management port.

Before you begin

- You know how to access the BMC dashboard.
- If you want to use a kernel-based virtual machine (KVM), you have experience deploying and using KVM applications.
- If you want to use serial-over-LAN (SOL), you have experience using IPMI SOL console applications.

Steps

1. Select one of the following methods for viewing the boot-up codes for the appliance controller, and gather the required equipment.

Method	Required equipment
VGA console	• VGA-capable monitor • VGA cable
KVM	• KVM application • RJ-45 cable
Serial port	• DB-9 serial cable • Virtual serial terminal
SOL	• Virtual serial terminal

2. If you are using a VGA console, perform these steps:
   a. Connect a VGA-capable monitor to the VGA port on the back of the appliance.
   b. View the codes displayed on the monitor.
3. If you are using BMC KVM, perform these steps:

a. Connect to the BMC management port and log into the BMC web interface.

b. Select **Remote Control**.

c. Launch the KVM.

d. View the codes on the virtual monitor.

4. If you are using a serial port and terminal, perform these steps:

a. Connect to the DB-9 serial port on the back of the appliance.

b. Use settings `115200 8-N-1`.

c. View the codes printed over the serial terminal.

5. If you are using SOL, perform these steps:

a. Connect to the IPMI SOL using the BMC IP address and login credentials.

Example

```
ipmitool -I lanplus -H 10.224.3.91 -U root -P calvin sol activate
```

b. View the codes on the virtual serial terminal.

6. Use the table to look up the codes for your appliance.

Code	Indicates
HI	The master boot script has started.
HP	The system is checking to see if the network interface card (NIC) firmware needs to be updated.
RB	The system is rebooting after applying firmware updates.
FP	The hardware subsystem firmware update checks have been completed. Inter-controller communication services are starting.
HE	For an appliance Storage Node only: The system is awaiting connectivity with the storage controllers and synchronizing with the SANtricity operating system. **Note:** If the boot-up procedure does not progress past this stage, perform these steps: **a.** Confirm that the four interconnect cables between the SG6000-CN controller and the two storage controllers are securely connected. **b.** As required, replace one or more of the cables, and try again. **c.** If this does not resolve the issue, contact technical support.
HC	The system is checking for existing StorageGRID installation data.
HO	The StorageGRID Appliance Installer is running.
HA	StorageGRID is running.

Related tasks

Accessing the BMC interface on page 46

Viewing error codes for the SG1000

If a hardware error occurs when the SG1000 is booting up, the BMC logs an error code. As required, you can view these error codes using the BMC interface, and then work with technical support to resolve the issue.

Before you begin

- You know how to access the BMC dashboard.

Steps

1. From the BMC dashboard, select **BIOS POST Code**.
2. Review the information displayed for Current Code and the Previous Code.

   If any of the following error codes are shown, work with technical support to resolve the issue.

Code	Indicates
0x0E	Microcode not found
0x0F	Microcode not loaded
0x50	Memory initialization error. Invalid memory type or incompatible memory speed.
0x51	Memory initialization error. SPD reading has failed.
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected.
0x54	Unspecified memory initialization error
0x55	Memory not installed
0x56	Invalid CPU type or speed
0x57	CPU mismatch
0x58	CPU self-test failed, or possible CPU cache error
0x59	CPU micro-code is not found, or micro-code update failed
0x5A	Internal CPU error
0x5B	Reset PPI is not available
0x5C	PEI phase BMC self-test failure
0xD0	CPU initialization error
0xD1	North bridge initialization error
0xD2	South bridge initialization error
0xD3	Some architectural protocols are not available
0xD4	PCI resource allocation error. Out of resources.
0xD5	No space for legacy option ROM
0xD6	No console output devices are found

Code	Indicates
0xD7	No console input devices are found
0xD8	Invalid password
0xD9	Error loading boot option (LoadImage returned error)
0xDA	Boot option failed (StartImage returned error)
0xDB	Flash update failed
0xDC	Reset protocol is not available
0xDD	DXE phase BMC self-test failure
0xE8	MRC: ERR_NO_MEMORY
0xE9	MRC: ERR_LT_LOCK
0xEA	MRC: ERR_DDR_INIT
0xEB	MRC: ERR_MEM_TEST
0xEC	MRC: ERR_VENDOR_SPECIFIC
0xED	MRC: ERR_DIMM_COMPAT
0xEE	MRC: ERR_MRC_COMPATIBILITY
0xEF	MRC: ERR_MRC_STRUCT
0xF0	MRC: ERR_SET_VDD
0xF1	MRC: ERR_IOT_MEM_BUFFER
0xF2	MRC: ERR_RC_INTERNAL
0xF3	MRC: ERR_INVALID_REG_ACCESS
0xF4	MRC: ERR_SET_MC_FREQ
0xF5	MRC: ERR_READ_MC_FREQ
0x70	MRC: ERR_DIMM_CHANNEL
0x74	MRC: ERR_BIST_CHECK
0xF6	MRC: ERR_SMBUS
0xF7	MRC: ERR_PCU
0xF8	MRC: ERR_NGN
0xF9	MRC: ERR_INTERLEAVE_FAILURE

Hardware setup appears to hang

The StorageGRID Appliance Installer might not be available if hardware faults or cabling errors prevent the SG1000 from completing its boot-up processing.

Steps

1. Review the LEDs on the SG1000 and the boot-up and error codes displayed in the BMC.
2. If you need help resolving an issue, contact technical support.

Related tasks

Viewing boot-up codes for the SG1000 on page 58
Viewing error codes for the SG1000 on page 60

Related references

Viewing status indicators on the SG1000 on page 28

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 the appliance

If you cannot connect to the services appliance, there might be a network issue, or the hardware installation might not have been completed successfully.

Steps

1. Try to ping the appliance using the IP address for the SG1000 :

   `ping SG1000_Controller_IP`

2. If you receive no response from the ping, confirm you are using the correct IP address.

   You can use the IP address of the appliance on the Grid Network, the Admin Network, or the Client Network.

3. If the IP address is correct, check appliance cabling, QSFP transceivers, and the network setup.

   If that does not resolve the issue, contact technical support.

4. If the ping was successful, open a web browser.

5. Enter the URL for the StorageGRID Appliance Installer:

   `https://SG1000_Controller_IP:8443`

   The Home page appears.

Rebooting the SG1000 while the StorageGRID Appliance Installer is running

You might need to reboot the SG1000 while the StorageGRID Appliance Installer is running. For example, you might need to reboot the controller if the installation fails.

About this task

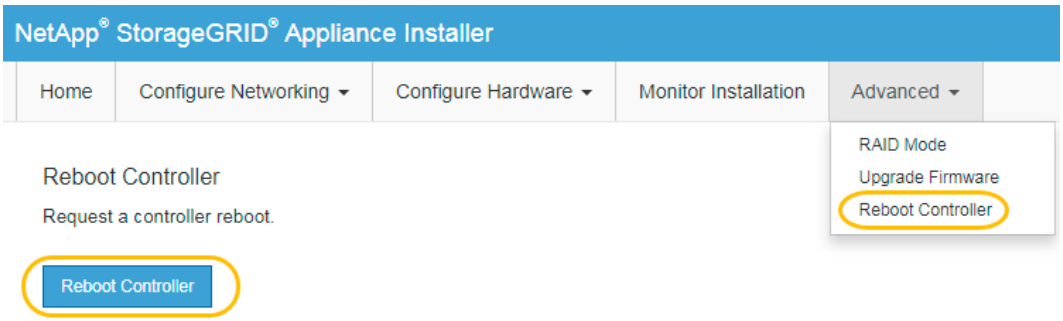
This procedure only applies when the SG1000 is running the StorageGRID Appliance Installer. Once the installation is completed, this step no longer works because the StorageGRID Appliance Installer is no longer available.

Steps

1. From the menu bar of the StorageGRID Appliance Installer, click **Advanced > 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 SG1000 is rebooted.

Maintaining the SG1000 appliance

You might need to perform maintenance procedures on the SG1000 appliance. The procedures in this section assume that the appliance has already been deployed as a Gateway Node or an Admin Node in a StorageGRID system.

Steps

Replacing the SG1000

You might need to replace the SG1000 if it is not functioning optimally or if it has failed.

Before you begin

- You have a replacement appliance with the same part number as the appliance you are replacing.
- You have labels to identify each cable that is connected to the appliance.

About this task

The appliance node will not be accessible while you replace the SG1000 appliance. If the SG1000 is functioning sufficiently, you can perform a controlled shutdown at the start of this procedure.

Note: If you are replacing the appliance 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 appliance 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. If the SG1000 is functioning sufficiently to allow for a controlled shutdown, shut down the SG1000.

   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 SG1000:

```
shutdown -h now
```

2. Use one of two methods to verify that the power for the SG1000 is off:

   - The power indicator LED on the front of the appliance is off.
   - The Power Control page of the BMC interface indicates that the appliance is off.

3. If the StorageGRID networks attached to the appliance use DHCP servers, update DNS/network and IP address settings.

   a. Locate the MAC address label on the front of the SG1000, and determine the MAC address for the Admin Network port.

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

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

   b. Ask your network administrator to associate the DNS/network and IP address for the appliance you removed with the MAC address for the replacement appliance.

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

   Note: If the original appliance used static IP address, the new appliance will automatically adopt the IP addresses of the appliance you removed.

4. Remove and replace the SG1000:

   a. Label the cables and then disconnect the cables and any network transceivers.

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

   b. Remove the failed appliance from the cabinet or rack.

   c. Transfer the two power supplies, eight cooling fans, and two SSDs from the failed appliance to the replacement appliance.

      Follow the instructions provided for replacing these components.

   d. Install the replacement appliance into the cabinet or rack.

   e. Replace the cables and any QSFP+ or QSFP28 transceivers.

   f. Power on the appliance and monitor the appliance LEDs and boot-up codes.

      Use the BMC interface to monitor boot-up status.

5. Confirm that the appliance node appears in the Grid Manager and that no alarms appear.

Related tasks

Installing the appliance into a cabinet or rack on page 25
Viewing boot-up codes for the SG1000 on page 58

Related references

Viewing status indicators on the SG1000 on page 28

Replacing a power supply in the SG1000

The SG1000 has two power supplies for redundancy. If one of the power supplies fails, you must replace it as soon as possible to ensure that the appliance has redundant power.

Before you begin

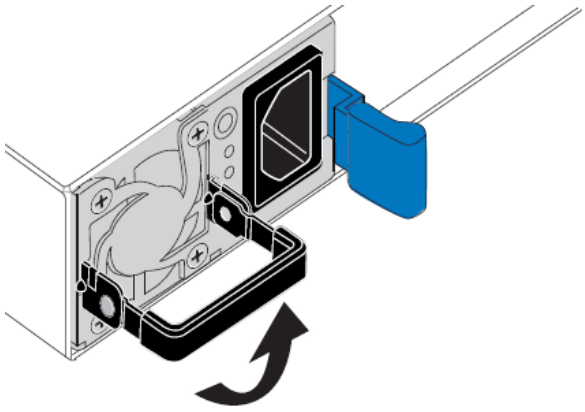
- You have unpacked the replacement power supply unit.
- You can confirmed that the other power supply is installed and running.

About this task

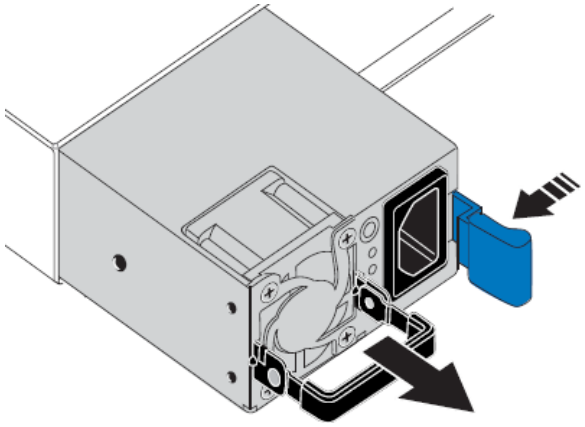
The figure shows the two power supply units for the SG1000, which are accessible from the back of the controller.

Steps

1. Unplug the power cord from the power supply.
2. Lift the cam handle.

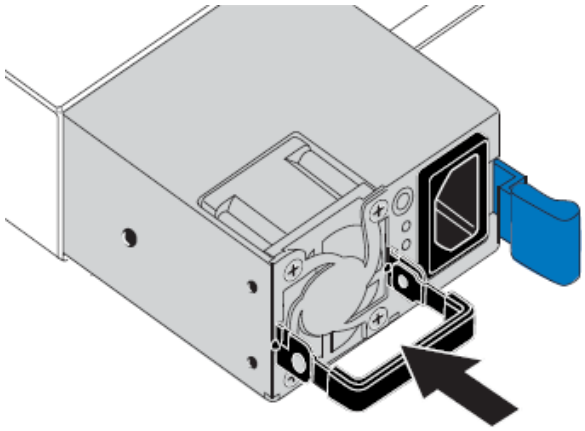


3. Press the blue latch and pull the power supply out.



4. Slide the replacement power supply into the chassis.

   Ensure that the blue latch is on the right side when you slide the unit in.



5. Push the cam handle down to secure the power supply.
6. Attach the power cord to the power supply, and ensure that the green LED comes on.

Replacing a fan in the SG1000

The SG1000 has eight cooling fans. If one of the fans fails, you must replace it as soon as possible to ensure that the appliance has proper cooling.

Before you begin

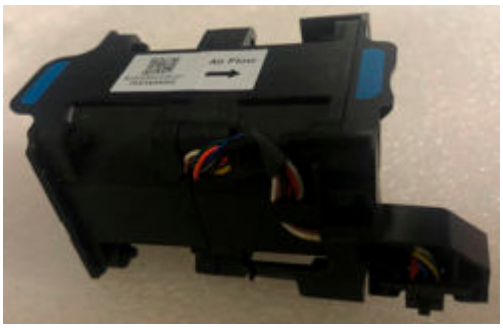
- You have unpacked the replacement fan.
- You have confirmed that the other fans are installed and running.

About this task

The appliance node will not be accessible while you replace the fan.

The photograph shows a fan for the SG1000. The cooling fans are accessible after you take the top cover off of the appliance.

Note: Each of the two power supply units also contain a fan. Those fans are not included in this procedure.



Steps

1. Shut down the SG1000.
   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 `#`.

   a. Stop all StorageGRID services:

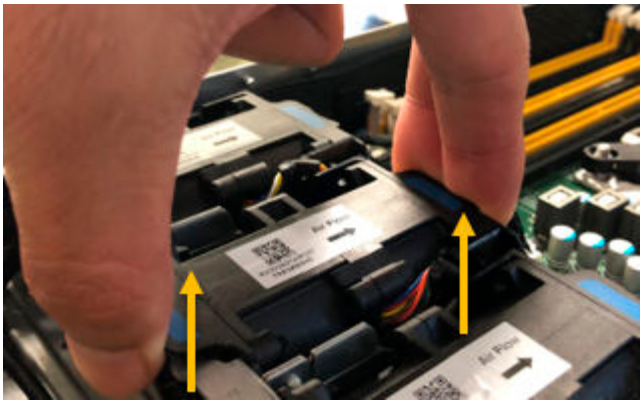
      ```
      service servermanager stop
      ```

   b. Shut down the SG1000:

      ```
      shutdown -h now
      ```

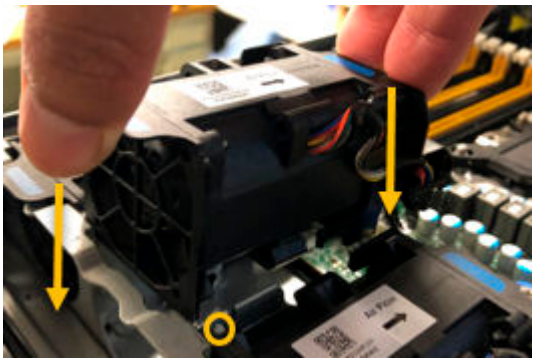
2. Use one of two methods to verify that the power for the SG1000 is off:
   - The power indicator LED on the front of the controller is off.
   - The Power Control page of the BMC interface indicates that the controller is off.
3. Lift the latch on the top cover and remove the cover from the appliance.
4. Locate the fan that failed.

5. Lift the failed fan out of the chassis.

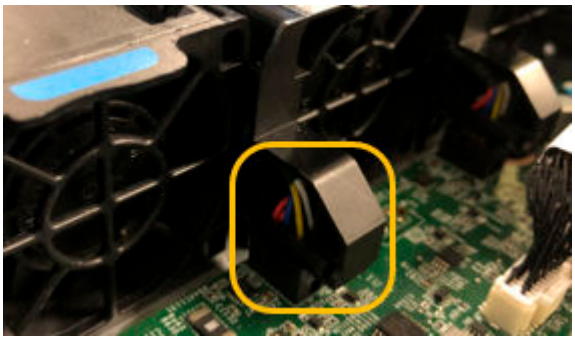


6. Slide the replacement fan into the open slot in the chassis.

   Line up the edge of the fan with the guide pin. The pin is circled in the photograph.



7. Press the fan's connector firmly into the circuit board.



8. Put the top cover back on the appliance, and press the latch down to secure the cover in place.
9. Power on the appliance and monitor the controller LEDs and boot-up codes.

   Use the BMC interface to monitor boot-up status.
10. Confirm that the appliance node appears in the Grid Manager and that no alarms appear.

Replacing a drive in the SG1000

The SSDs in the SG1000 contain the StorageGRID operating system. Additionally, when the SG1000 is configured as an Admin Node, the SSDs also contain audit logs, metrics, and database tables. The drives are mirrored using RAID1 for redundancy. If one of the drives fails, you must replace it as soon as possible to ensure redundancy.

Before you begin

- You have verified which drive has failed by noting that its left LED is blinking amber.

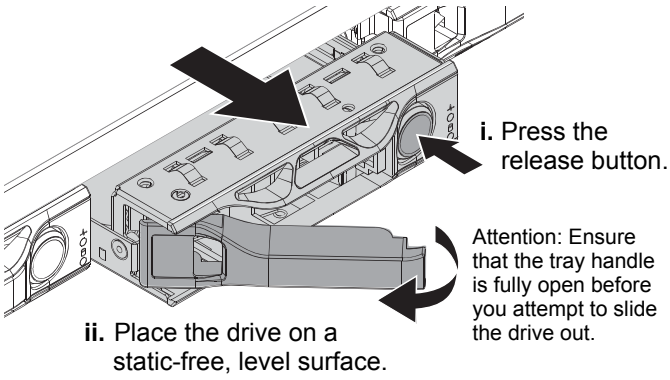
  Attention: If you remove the working drive, you will bring down the appliance node. See the information about viewing status indicators to verify the failure.
- You have obtained the replacement drive.
- You have obtained proper ESD protection.

Steps

1. Verify that the drive's left LED is blinking amber.

   You can also use the Grid Manager to monitor the status of the SSDs. Select **Nodes**. Then select ***`Appliance Node`*** > **Hardware**. If a drive has failed, the Storage RAID Mode field contains a message about which drive has failed.
2. Wrap the strap end of the ESD wristband around your wrist, and secure the clip end to a metal ground to prevent static discharge.
3. Unpack the replacement drive, and set it on a static-free, level surface near the appliance.

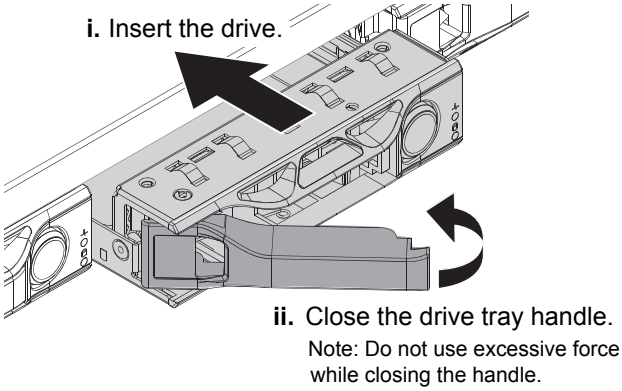
   Save all packing materials.
4. Press the release button on the failed drive.



The handle on the drive springs open partially, and the drive releases from the slot.

5. Open the handle, slide the drive out, and place it on a static-free, level surface.
6. Press the release button on the replacement drive before you insert it into the drive slot.

   The latch springs open.



7. Insert the replacement drive in the slot, and then close the drive handle.

   Attention: Do not use excessive force while closing the handle.

   When the drive is fully inserted, you hear a click.

   The drive is automatically rebuilt with mirrored data from the working drive. You can check the status of the rebuild by using the Grid Manager. Select **Nodes**. Then select ***`Appliance Node`*** > **Hardware**. The Storage RAID Mode field contains a “rebuilding” message until the drive is completely rebuilt.
8. Contact technical support about the drive replacement.

   Technical support will provide instructions for returning the failed drive.

Changing the link configuration of the SG1000

You can change the Ethernet link configuration of the SG1000. 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

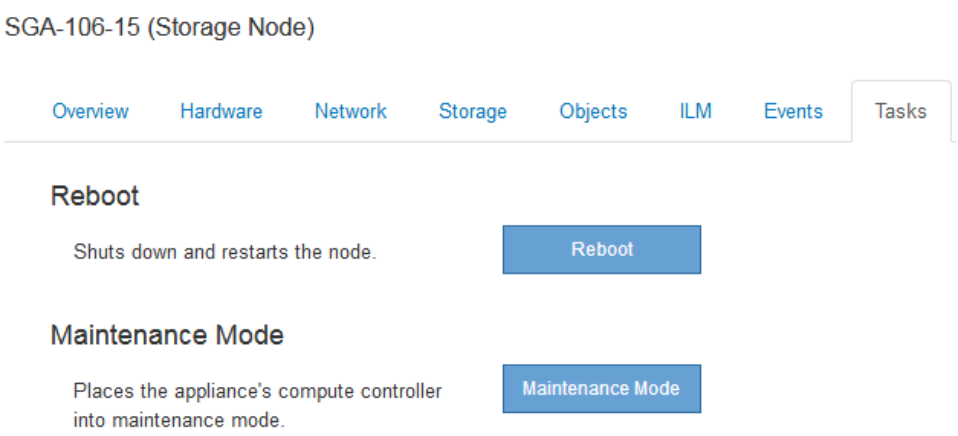
Options for changing the Ethernet link configuration of the SG1000 include:

- 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

Before changing the link configuration, you must place the SG1000 into maintenance mode. Putting a StorageGRID appliance into maintenance mode might make the appliance unavailable for remote access.

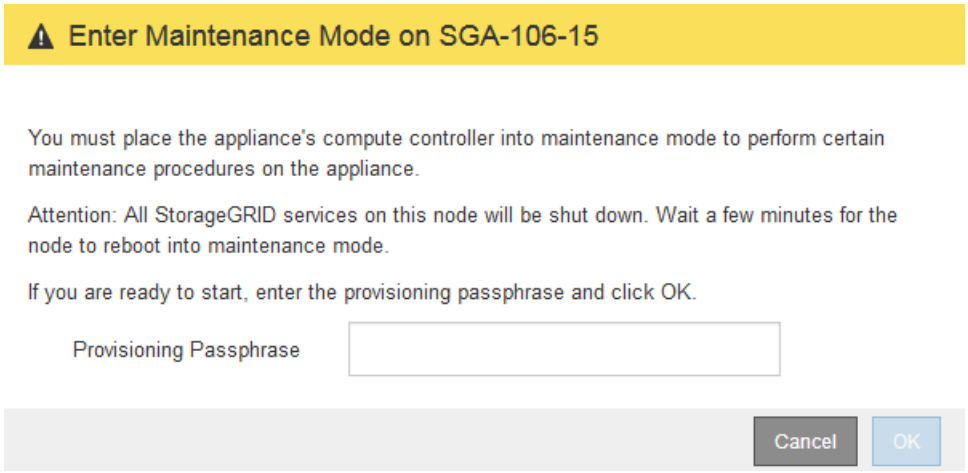
Steps

1. Follow these steps to place the SG1000 into maintenance mode:
   a. From the Grid Manager, select **Nodes**.
   b. Select the appliance node.
   c. Select the **Tasks** tab.



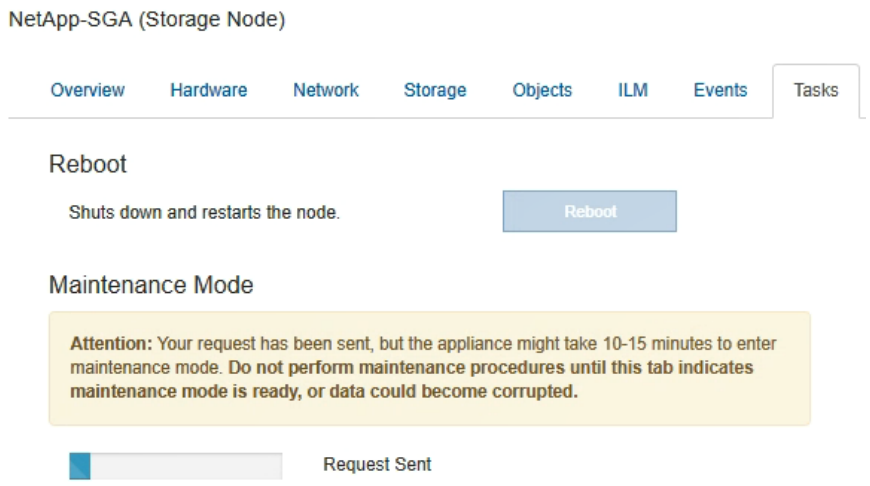
   d. Click **Maintenance Mode**.

      A confirmation dialog box appears.

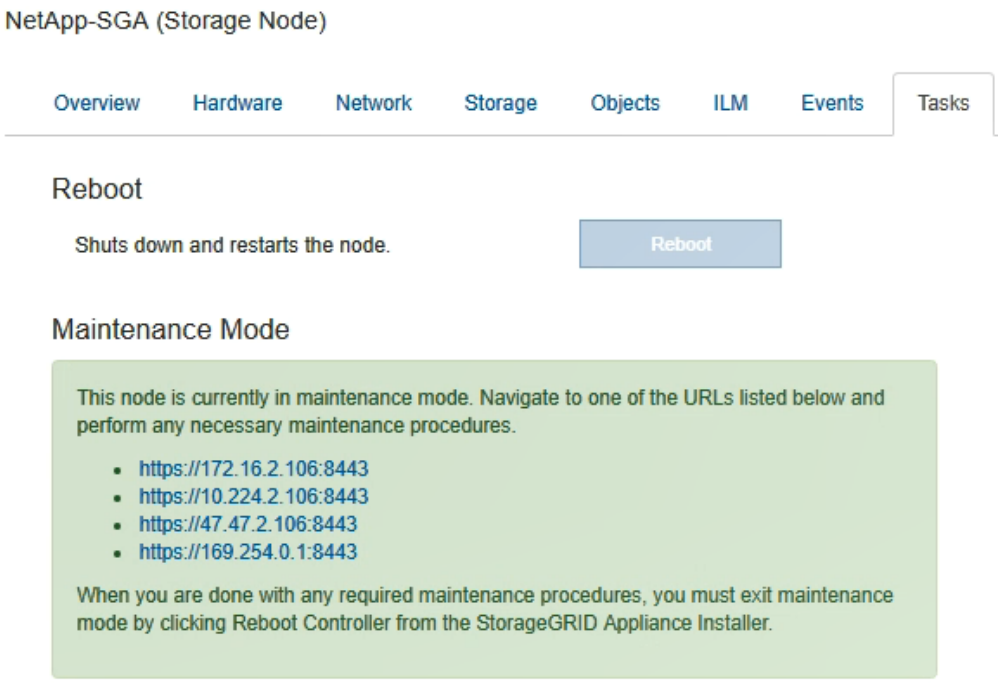


e. Enter the provisioning passphrase, and click **OK**.

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.



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

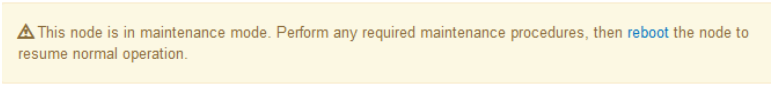


f. Browse to any of the URLs displayed.

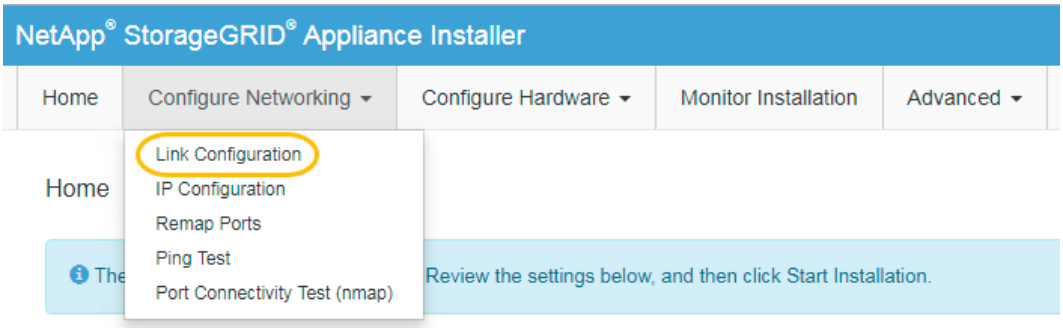
Note: If possible, use the URL containing the IP address of the appliance's Admin Network port.

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. From the StorageGRID Appliance Installer, select **Configure Networking > Link Configuration**.



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://SG1000_Controller_IP:8443`

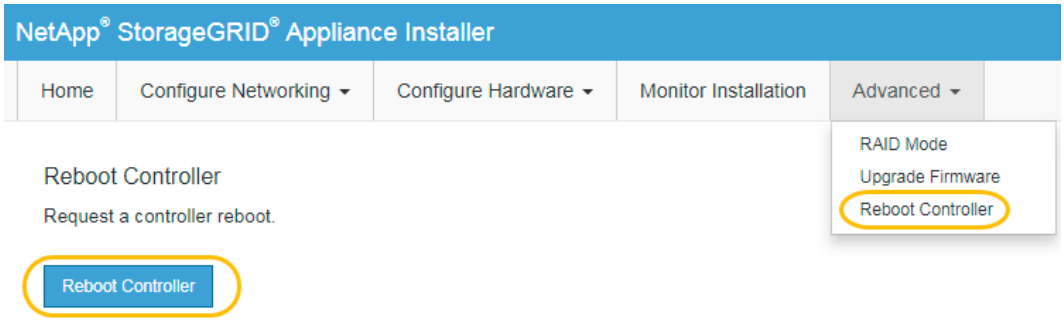
5. Select **Configure Networking > Ping Test** from the menu.

6. Use the Ping Test tool to check connectivity to IP addresses on any networks that might have been affected by the link configuration changes you made when configuring the appliance.

   In addition to any other tests you choose to perform, confirm that you can ping the Grid Network IP address of the primary Admin Node, and the Grid Network IP address of at least one other node. If necessary, return to the instructions for configuring network links, and correct any issues.

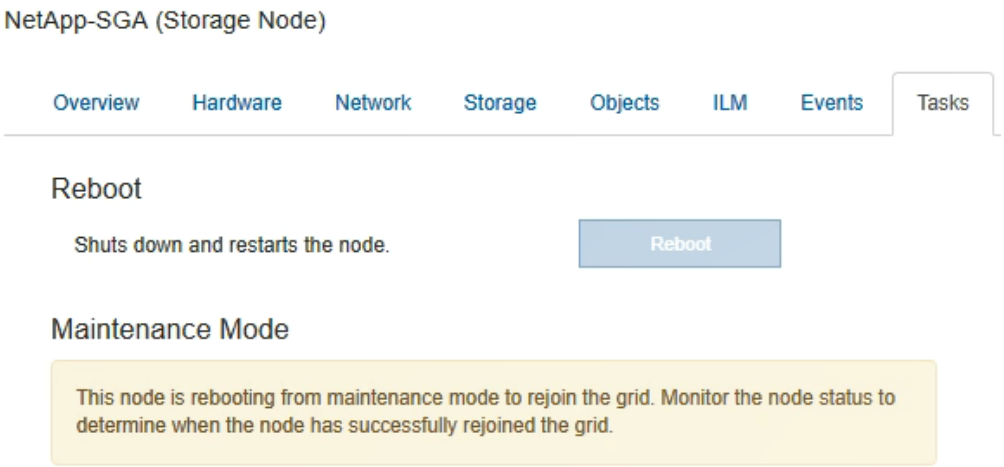
7. Once you are satisfied that your link configuration changes are working, return the appliance to normal operating mode:

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



   b. Click **Reboot Controller**.

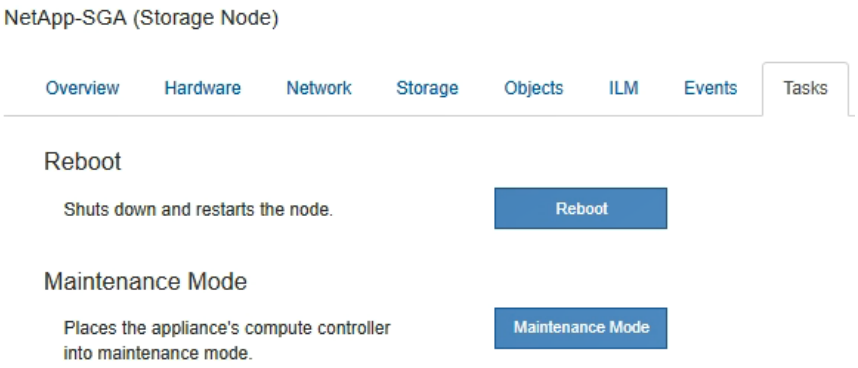
   During the reboot, the following screen appears:



   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:



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