



# **Configure StorageGRID connections (SG6000)**

StorageGRID

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# Configure StorageGRID connections (SG6000)

Before you can deploy a StorageGRID appliance as a Storage 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 SG6000-CN controller (the compute controller).

## Access StorageGRID Appliance Installer

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

### What you'll need

- You are using any management client that can connect to the StorageGRID Admin Network, or you have a service laptop.
- The client or service laptop has a supported web browser.
- The SG6000-CN controller is connected to all of the StorageGRID networks you plan to use.
- You know the IP address, gateway, and subnet for the SG6000-CN controller on these networks.
- You have configured the network switches you plan to use.

### About this task

To initially access the StorageGRID Appliance Installer, you can use the DHCP-assigned IP address for the Admin Network port on the SG6000-CN controller (assuming the controller is connected to the Admin Network), or you can connect a service laptop directly to the SG6000-CN controller.

### Steps

1. If possible, use the DHCP address for the Admin Network port on the SG6000-CN controller to access the StorageGRID Appliance Installer.



- a. Locate the MAC address label on the front of the SG6000-CN controller, 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://Appliance\_Controller\_IP:8443**

For *SG6000-CN\_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.

NetApp® StorageGRID® Appliance Installer

Home

Configure Networking ▾

Configure Hardware ▾

Monitor Installation

Advanced ▾

Home

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

This Node

Node type

Storage ▾

Node name

MM-2-108-SGA-lab25

Cancel

Save

Primary Admin Node connection

Enable Admin Node discovery

☐

Primary Admin Node IP

172.16.1.178

Connection state

Connection to 172.16.1.178 ready

Cancel

Save

Installation

Current state

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

Start Installation

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

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



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

The StorageGRID Appliance Installer Home page appears. The information and messages shown when you first access this page depend on how your appliance is currently connected.



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

### After you finish

After accessing the StorageGRID Appliance Installer:

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

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

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

### Related information

[Web browser requirements](#)

## Verify and upgrade StorageGRID Appliance Installer version

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

### What you'll need

You have accessed the StorageGRID Appliance Installer.

### About this task

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

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

### Steps

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

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

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

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

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

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

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

5. Follow the instructions on the Upgrade Firmware page of the [StorageGRID Appliance Installer](#) to perform these steps:
  - a. Upload the appropriate support file (firmware image) for your controller type and the checksum file.
  - b. Upgrade the inactive partition.
  - c. Reboot and swap partitions.
  - d. Upgrade the second (inactive) partition.

## Configure network links (SG6000 series)

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

### What you'll need

If you are cloning an appliance node, configure network links for the target appliance for all links used by the source appliance node.

If you plan to use the 25-GbE link speed:

- You are using SFP28 TwinAx cables, or you have installed SFP28 transceivers in the network ports you plan to use.
- You have connected the network ports to switches that can support these features.
- You understand how to configure the switches to use this higher speed.

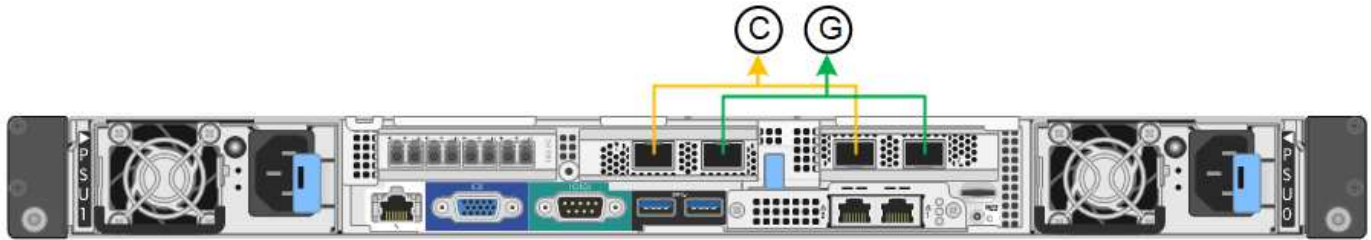
If you plan to use Aggregate port bond mode, LACP network bond mode, or VLAN tagging:

- 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.

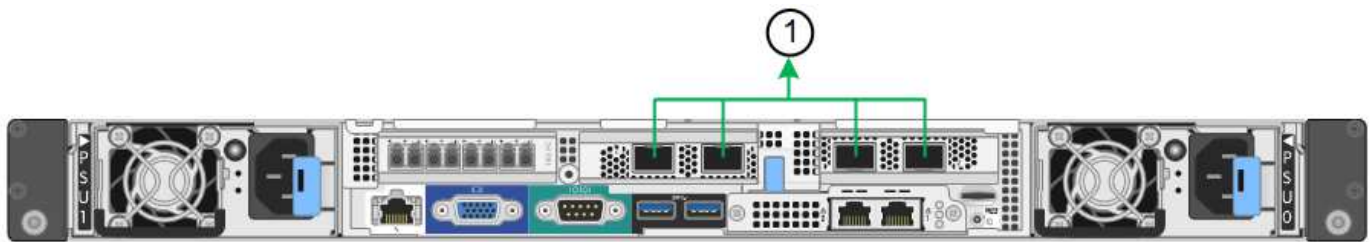
### About this task

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 tables summarize 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.

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

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

#### • Aggregate port bond mode

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

See [Port bond modes for SG6000-CN controller](#) for more information about port bond and network bond modes.

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



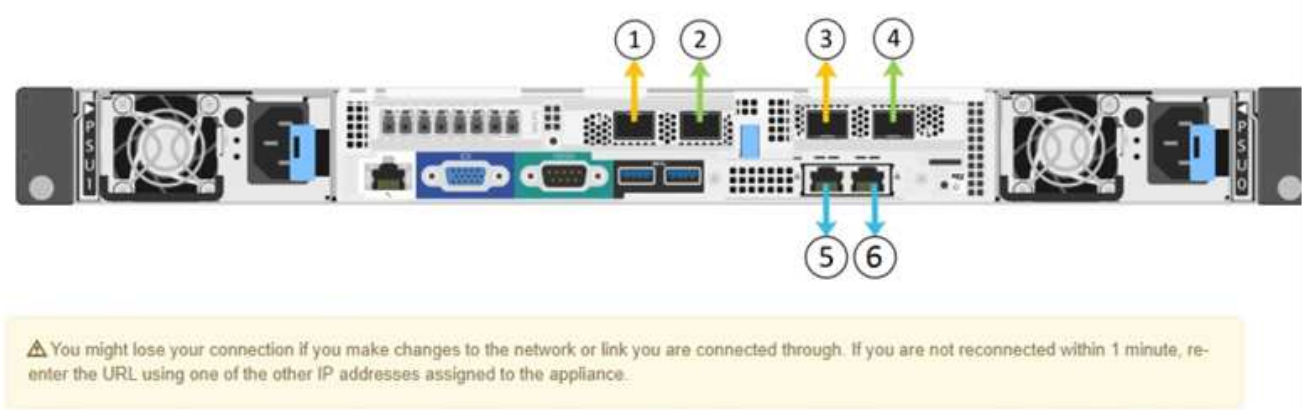
#### Steps

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

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



Network Link Configuration



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

Link Status

Link	State	Speed (Gbps)
1	Up	100
2	Up	100
3	Down	N/A
4	Down	N/A
5	Up	1
6	Up	1

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.

## Link Settings

Link speed

Auto

Port bond mode



Fixed



Aggregate

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

## Grid Network

Enable network



Network bond mode



Active-Backup



LACP (802.3ad)

Enable VLAN (802.1q)  
tagging



MAC Addresses

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

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

## Admin Network

Enable network



Network bond mode



Independent



Active-Backup

Connect the Admin Network to port 5. Leave port 6 unconnected. If necessary, you can make a temporary direct Ethernet connection to port 6 and use link-local IP address 169.254.0.1 for access.

MAC Addresses

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

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

## Client Network

Enable network



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

2. If you plan to use the 25-GbE link speed for the network ports, select **Auto** 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 SFP28 TwinAx cables or optical cables and SFP28 transceivers.

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

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

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

#### Admin Network

---

Enable network ☐

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

The Client Network settings for the network ports are now shown.

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

This example shows:

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

### Link Settings

Link speed

Port bond mode ☐ Fixed ☒ Aggregate

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

### Grid Network

Enable network ☒

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

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

Enable VLAN (802.1q) tagging ☒

VLAN (802.1q) tag

### Admin Network

Enable network ☒

Network bond mode ☐ Independent ☒ Active-Backup

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

### Client Network

Enable network ☒

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

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

Enable VLAN (802.1q) tagging ☒

VLAN (802.1q) tag

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



You might lose your connection if you made changes to the network or link you are connected through. If you are not reconnected within 1 minute, re-enter the URL for the StorageGRID Appliance Installer using one of the other [IP addresses](#) assigned to the appliance: **`https://SG6000-CN_Controller_IP:8443`**

## Configure StorageGRID IP addresses

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

### About this task

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

If you want to change the link configuration, see the [instructions for changing the link configuration of the SG6000-CN controller](#).

**Steps**

- 1. In the StorageGRID Appliance Installer, select **Configure Networking > IP Configuration**.  
  
The IP Configuration page appears.
- 2. To configure the Grid Network, select either **Static** or **DHCP** in the **Grid Network** section of the page.


**Grid Network**

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

IP Assignment ☒ Static ☐ DHCP

IPv4 Address (CIDR)

Gateway

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

Subnets (CIDR)  



MTU  

Cancel

Save

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

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

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

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



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



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

- d. Click **Save**.

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

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

**`https://services_appliance_IP:8443`**

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

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



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

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

- f. Click **Save**.

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

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

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

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

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

If you have grid subnets, the Grid Network gateway is required. All grid subnets specified must be reachable through this gateway. These Grid Network subnets must also be defined in the Grid Network

Subnet List on the primary Admin Node when you start StorageGRID installation.



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

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

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



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



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

d. Click **Save**.

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



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

## Admin Network

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

IP Assignment ☒ Static ☐ DHCP

IPv4 Address (CIDR)

Gateway

Subnets (CIDR)  **+**

MTU

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

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

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

- b. Enter the gateway.

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

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



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

- d. Click **Save**.

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

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



**`https://services_appliance:8443`**

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

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



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

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

- f. Click **Save**.

7. If you selected **DHCP**, follow these steps to configure the Admin Network:

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

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



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

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

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



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

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



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



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

- d. Click **Save**.

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



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

### Client Network

The Client Network is an open network used to provide access to client applications, including S3 and Swift. The Client Network enables grid nodes to communicate with any subnet reachable through the Client Network gateway. The Client Network does not become operational until you complete the StorageGRID configuration steps.

IP Assignment ☒ Static ☐ DHCP

IPv4 Address (CIDR)

Gateway

MTU

9. If you selected **Static**, follow these steps to configure the Client Network:

- Enter the static IPv4 address, using CIDR notation.
- Click **Save**.
- Confirm that the IP address for the Client Network gateway is correct.



If the Client Network is enabled, the default route is displayed. The default route uses the Client Network gateway and cannot be moved to another interface while the Client Network is enabled.

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



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

e. Click **Save**.

10. If you selected **DHCP**, follow these steps to configure the Client Network:

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

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

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

b. Confirm that the gateway is correct.



If the Client Network is enabled, the default route is displayed. The default route uses the Client Network gateway and cannot be moved to another interface while the Client Network is enabled.

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



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

## Verify network connections

You should confirm you can access the StorageGRID networks you are using from the appliance. To validate routing through network gateways, you should test connectivity between the StorageGRID Appliance Installer and IP addresses on different subnets. You can also verify the MTU setting.

### Steps

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

The Ping and MTU Test page appears.

## Ping and MTU Test

Use a ping request to check the appliance's connectivity to a remote host. Select the network you want to check connectivity through, and enter the IP address of the host you want to reach. To verify the MTU setting for the entire path through the network to the destination, select Test MTU.

### Ping and MTU Test

---

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

2. From the **Network** drop-down box, select the network you want to test: Grid, Admin, or Client.
3. Enter the IPv4 address or fully qualified domain name (FQDN) for a host on that network.

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

4. Optionally, select the **Test MTU** check box to verify the MTU setting for the entire path through the network to the destination.

For example, you can test the path between the appliance node and a node at a different site.

5. Click **Test Connectivity**.

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

## Ping and MTU Test

Use a ping request to check the appliance's connectivity to a remote host. Select the network you want to check connectivity through, and enter the IP address of the host you want to reach. To verify the MTU setting for the entire path through the network to the destination, select Test MTU.

### Ping and MTU Test

Network	<div>Grid</div>
Destination IPv4 Address or FQDN	<div>10.96.104.223</div>
Test MTU	<input checked="" type="checkbox"/>
<div>Test Connectivity</div>	

Ping test passed

#### Ping command output

```
PING 10.96.104.223 (10.96.104.223) 1472(1500) bytes of data.  
1480 bytes from 10.96.104.223: icmp_seq=1 ttl=64 time=0.318 ms  
  
--- 10.96.104.223 ping statistics ---  
1 packets transmitted, 1 received, 0% packet loss, time 0ms  
rtt min/avg/max/mdev = 0.318/0.318/0.318/0.000 ms  
  
Found MTU 1500 for 10.96.104.223 via br0
```

### Related information

[Configure network links \(SG6000\)](#)

[Change MTU setting](#)

## Verify port-level network connections

To ensure that access between the StorageGRID Appliance Installer and other nodes is not obstructed by firewalls, confirm that the StorageGRID Appliance Installer can connect to a specific TCP port or set of ports at the specified IP address or range of addresses.

### About this task

Using the list of ports provided in the StorageGRID Appliance Installer, you can test the connectivity between the appliance and the other nodes in your Grid Network.

Additionally, you can test connectivity on the Admin and Client Networks and on UDP ports, such as those used for external NFS or DNS servers. For a list of these ports, see the port reference in the StorageGRID networking guidelines.



The Grid Network ports listed in the port connectivity table are valid only for StorageGRID version 11.6.0. To verify which ports are correct for each node type, you should always consult the networking guidelines for your version of StorageGRID.

## Steps

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

The Port Connectivity Test page appears.

The port connectivity table lists node types that require TCP connectivity on the Grid Network. For each node type, the table lists the Grid Network ports that should be accessible to your appliance.

You can test the connectivity between the appliance ports listed in the table and the other nodes in your Grid Network.

2. From the **Network** drop-down, select the network you want to test: **Grid**, **Admin**, or **Client**.
3. Specify a range of IPv4 addresses for the hosts on that network.

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

Specify a range using a hyphen, as shown in the example.

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

### Port Connectivity Test

Network	<div>Grid ▼</div>
IPv4 Address Ranges	<div>10.224.6.160-161</div>
Port Ranges	<div>22,2022</div>
Protocol	<div><input checked="" type="radio"/> TCP <input type="radio"/> UDP</div>
<div>Test Connectivity</div>	

5. Click **Test Connectivity**.

- If the selected port-level network connections are valid, the “Port connectivity test passed” message appears in a green banner. The nmap command output is listed below the banner.

Port connectivity test passed

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

```
# Nmap 7.70 scan initiated Fri Nov 13 18:32:03 2020 as: /usr/bin/nmap -n -oN - -e br0 -p 22,2022 10.224.6.160-161
Nmap scan report for 10.224.6.160
Host is up (0.00072s latency).

PORT      STATE SERVICE
22/tcp    open  ssh
2022/tcp  open  down

Nmap scan report for 10.224.6.161
Host is up (0.00060s latency).

PORT      STATE SERVICE
22/tcp    open  ssh
2022/tcp  open  down

# Nmap done at Fri Nov 13 18:32:04 2020 -- 2 IP addresses (2 hosts up) scanned in 0.55 seconds
```

- If a port-level network connection is made to the remote host, but the host is not listening on one or more of the selected ports, the “Port connectivity test failed” message appears in a yellow banner. The nmap command output is listed below the banner.

Any remote port the host is not listening to has a state of “closed.” For example, you might see this yellow banner when the node you are trying to connect to is in a pre-installed state and the StorageGRID NMS service is not yet running on that node.

 Port connectivity test failed  
Connection not established. Services might not be listening on target ports.

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

```
# Nmap 7.70 scan initiated Sat May 16 17:07:02 2020 as: /usr/bin/nmap -n -oN - -e br0 -p 22,80,443,1504,1505,1506,1508,7443,9999
Nmap scan report for 172.16.4.71
Host is up (0.00020s latency).

PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http
443/tcp   open  https
1504/tcp  closed evb-elm
1505/tcp  open  funkproxy
1506/tcp  open  utcd
1508/tcp  open  diagmond
7443/tcp  open  oracleas-https
9999/tcp  open  abyss
MAC Address: 00:50:56:87:39:AE (VMware)

# Nmap done at Sat May 16 17:07:03 2020 -- 1 IP address (1 host up) scanned in 0.59 seconds
```

- If a port-level network connection cannot be made for one or more selected ports, the “Port connectivity test failed” message appears in a red banner. The nmap command output is listed below the banner.

The red banner indicates that a TCP connection attempt to a port on the remote host was made, but nothing was returned to the sender. When no response is returned, the port has a state of “filtered” and is likely blocked by a firewall.



Ports with “closed” are also listed.

❗ Port connectivity test failed  
Connection failed to one or more ports.

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

```
# Nmap 7.70 scan initiated Sat May 16 17:11:01 2020 as: /usr/bin/nmap -n -oN - -e br0 -p 22,79,80,443,1504,1505,1506,1508,7443,9999 172.16.4.71
Nmap scan report for 172.16.4.71
Host is up (0.00029s latency).

PORT      STATE      SERVICE
22/tcp    open       ssh
79/tcp    filtered   finger
80/tcp    open       http
443/tcp    open       https
1504/tcp   closed     evb-elm
1505/tcp   open       funkproxy
1506/tcp   open       utcd
1508/tcp   open       diagmond
7443/tcp   open       oracleas-https
9999/tcp   open       abyss
MAC Address: 00:50:56:87:39:AE (VMware)

# Nmap done at Sat May 16 17:11:02 2020 -- 1 IP address (1 host up) scanned in 1.60 seconds
```

## Related information

[Networking guidelines](#)

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