NetApp

Network procedures

StorageGRID software

NetApp
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Network procedures

Update subnets for Grid Network

StorageGRID maintains a list of the network subnets used to communicate between grid nodes on the Grid Network (eth0). These entries include the subnets used for the Grid Network by each site in your StorageGRID system as well as any subnets used for NTP, DNS, LDAP, or other external servers accessed through the Grid Network gateway. When you add grid nodes or a new site in an expansion, you might need to update or add subnets to the Grid Network.

Before you begin

- You are signed in to the Grid Manager using a [supported web browser](#).
- You have the [Maintenance or Root access permission](#).
- You have the provisioning passphrase.
- You have the network addresses, in CIDR notation, of the subnets you want to configure.

About this task

If you are performing an expansion activity that includes adding a new subnet, you must add a new subnet to the Grid Network subnet list before you start the expansion procedure. Otherwise, you will have to cancel the expansion, add the new subnet, and start the expansion again.

> ℹ️ Do not use subnets that contain the following IPv4 addresses for the Grid Network, Admin Network, or Client Network of any node:
>
> - 192.168.130.101
> - 192.168.131.101
> - 192.168.130.102
> - 192.168.131.102
> - 198.51.100.2
> - 198.51.100.4
>
> For example, do not use the following subnet ranges for the Grid Network, Admin Network, or Client Network of any node:
>
> - 192.168.130.0/24 because this subnet range contains the IP addresses 192.168.130.101 and 192.168.130.102
> - 192.168.131.0/24 because this subnet range contains the IP addresses 192.168.131.101 and 192.168.131.102
> - 198.51.100.0/24 because this subnet range contains the IP addresses 198.51.100.2 and 198.51.100.4

Add a subnet

Steps

1. Select **MAINTENANCE** > **Network** > **Grid Network**.

2. Select **Add another subnet** to add a new subnet in CIDR notation.

   For example, enter `10.96.104.0/22.`

3. Enter the provisioning passphrase, and select **Save**.

4. Wait until the changes are applied, then download a new Recovery Package.

   a. Select **MAINTENANCE** > **System** > **Recovery package**.

   b. Enter the **Provisioning Passphrase**.

> ⚠ The Recovery Package file must be secured because it contains encryption keys and passwords that can be used to obtain data from the StorageGRID system. It is also used to recover the primary Admin Node.

The subnets you have specified are configured automatically for your StorageGRID system.

Edit a subnet

Steps

1. Select **MAINTENANCE** > **Network** > **Grid Network**.

2. Select the subnet you want to edit and make the necessary changes.

3. Enter the Provisioning passphrase, and select **Save**.

4. Select **Yes** in the confirmation dialog box.

5. Wait until the changes are applied, then download a new Recovery Package.

   a. Select **MAINTENANCE** > **System** > **Recovery package**.

   b. Enter the **Provisioning Passphrase**.

Delete a subnet

Steps

1. Select **MAINTENANCE** > **Network** > **Grid Network**.

2. Select the delete icon ✕ next to the subnet.

3. Enter the Provisioning passphrase, and select **Save**.

4. Select **Yes** in the confirmation dialog box.

5. Wait until the changes are applied, then download a new Recovery Package.

   a. Select **MAINTENANCE** > **System** > **Recovery package**.

   b. Enter the **Provisioning Passphrase**.

Configure IP addresses

IP address guidelines

You can perform network configuration by configuring IP addresses for grid nodes using the Change IP tool.

You must use the Change IP tool to make most changes to the networking configuration that was initially set during grid deployment. Manual changes using standard Linux networking commands and files might not propagate to all StorageGRID services, and might not persist across upgrades, reboots, or node recovery procedures.

> **ⓘ** The IP change procedure can be a disruptive procedure. Parts of the grid might be unavailable until the new configuration is applied.

> **ⓘ** If you are making changes to the Grid Network Subnet List only, use the Grid Manager to add or change the network configuration. Otherwise, use the Change IP tool if the Grid Manager is inaccessible due to a network configuration issue, or you are performing both a Grid Network routing change and other network changes at the same time.

> **💡** If you want to change the Grid Network IP address for all nodes in the grid, use the special procedure for grid-wide changes.

Ethernet interfaces

The IP address assigned to eth0 is always the grid node's Grid Network IP address. The IP address assigned to eth1 is always the grid node's Admin Network IP address. The IP address assigned to eth2 is always the grid node's Client Network IP address.

Note that on some platforms, such as StorageGRID appliances, eth0, eth1, and eth2 might be aggregate interfaces composed of subordinate bridges or bonds of physical or VLAN interfaces. On these platforms, the **SSM** > **Resources** tab might show the Grid, Admin, and Client Network IP address assigned to other interfaces in addition to eth0, eth1, or eth2.

DHCP

You can only set up DHCP during the deployment phase. You can't set up DHCP during configuration. You must use the IP address change procedures if you want to change IP addresses, subnet masks, and default gateways for a grid node. Using the Change IP tool will cause DHCP addresses to become static.

High availability (HA) groups

- If a Client Network interface is contained in an HA group, you can't change the Client Network IP address for that interface to an address that is outside of the subnet configured for the HA group.
- You can't change the Client Network IP address to the value of an existing virtual IP address assigned to an HA group configured on the Client Network interface.
- If a Grid network interface is contained in an HA group, you can't change the Grid network IP address for that interface to an address that is outside of the subnet configured for the HA group.
- You can't change the Grid Network IP address to the value of an existing virtual IP address assigned to an HA group configured on the Grid Network interface.

Change node network configuration

You can change the network configuration of one or more nodes using the Change IP tool. You can change the configuration of the Grid Network, or add, change, or remove the Admin or Client Networks.

Before you begin

You have the `Passwords.txt` file.

About this task

Linux: If you are adding a grid node to the Admin Network or Client Network for the first time, and you did not previously configure ADMIN_NETWORK_TARGET or CLIENT_NETWORK_TARGET in the node configuration file, you must do so now.

See the StorageGRID installation instructions for your Linux operating system:

- Install StorageGRID on Red Hat Enterprise Linux
- Install StorageGRID on Ubuntu or Debian

Appliances: On StorageGRID appliances, if the Client or Admin Network was not configured in the StorageGRID Appliance Installer during the initial installation, the network can't be added by using only the Change IP tool. First, you must place the appliance in maintenance mode, configure the links, return the appliance to normal operating mode, and then use the Change IP tool to modify the network configuration. See the procedure for configuring network links.

You can change the IP address, subnet mask, gateway, or MTU value for one or more nodes on any network.

You can also add or remove a node from a Client Network or from an Admin Network:

- You can add a node to a Client Network or to an Admin Network by adding an IP address/subnet mask on that network to the node.
- You can remove a node from a Client Network or from an Admin Network by deleting the IP address/subnet mask for the node on that network.

  Nodes can't be removed from the Grid Network.

ⓘ	IP address swaps aren't allowed. If you must exchange IP addresses between grid nodes, you must use a temporary intermediate IP address.
ⓘ	If single sign-on (SSO) is enabled for your StorageGRID system and you are changing the IP address of an Admin Node, be aware that any relying party trust that was configured using the Admin Node's IP address (instead of its fully qualified domain name, as recommended) will become invalid. You will no longer be able to sign in to the node. Immediately after changing the IP address, you must update or reconfigure the node's relying party trust in Active Directory Federation Services (AD FS) with the new IP address. See the instructions for configuring SSO.
ⓘ	Any changes you make to the network using the Change IP tool are propagated to the installer firmware for the StorageGRID appliances. That way, if StorageGRID software is reinstalled on an appliance, or if an appliance is placed into maintenance mode, the networking configuration will be correct.

Steps

1. Log in to the primary Admin Node:

   a. Enter the following command: `ssh admin@primary_Admin_Node_IP`

   b. Enter the password listed in the `Passwords.txt` file.

   c. Enter the following command to switch to root: `su -`

d. Enter the password listed in the `Passwords.txt` file.

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

2. Start the Change IP tool by entering the following command: `change-ip`

3. Enter the provisioning passphrase at the prompt.

   The main menu appears.

```
Welcome to the StorageGRID IP Change Tool.

Selected nodes: all

1:     SELECT NODES to edit
2:     EDIT IP/mask, gateway and MTU
3:     EDIT admin network subnet lists
4:     EDIT grid network subnet list
5:     SHOW changes
6:     SHOW full configuration, with changes highlighted
7:     VALIDATE changes
8:     SAVE changes, so you can resume later
9:     CLEAR all changes, to start fresh
10:    APPLY changes to the grid
0:     Exit

Selection: █
```

4. Optionally select **1** to choose which nodes to update. Then select one of the following options:

   ◦ **1**: Single node — select by name

   ◦ **2**: Single node — select by site, then by name

   ◦ **3**: Single node — select by current IP

   ◦ **4**: All nodes at a site

   ◦ **5**: All nodes in the grid

   Note: If you want to update all nodes, allow "all" to remain selected.

   After you make your selection, the main menu appears, with the **Selected nodes** field updated to reflect your choice. All subsequent actions are performed only on the nodes displayed.

5. On the main menu, select option **2** to edit IP/mask, gateway, and MTU information for the selected nodes.

   a. Select the network where you want to make changes:

      ▪ **1**: Grid network

      ▪ **2**: Admin network

      ▪ **3**: Client network

      ▪ **4**: All networks

   After you make your selection, the prompt shows the node name, network name (Grid, Admin, or Client), data type (IP/mask, Gateway, or MTU), and current value.

   Editing the IP address, prefix length, gateway, or MTU of a DHCP-configured interface will change the interface to static. When you select to change an interface configured by DHCP, a warning is displayed to inform you that the interface will change to static.

Interfaces configured as `fixed` can't be edited.

   b. To set a new value, enter it in the format shown for the current value.

   c. To leave the current value unchanged, press **Enter**.

   d. If the data type is `IP/mask`, you can delete the Admin or Client Network from the node by entering **d** or **0.0.0.0/0**.

   e. After editing all nodes you want to change, enter **q** to return to the main menu.

   Your changes are held until cleared or applied.

6. Review your changes by selecting one of the following options:

   ◦ **5**: Shows edits in output that is isolated to show only the changed item. Changes are highlighted in green (additions) or red (deletions), as shown in the example output:

```
================================================================
Site: RTP
================================================================
username-x Grid    IP      [     172.16.0.239/21 ]: 172.16.0.240/21
username-x Grid    MTU     [             1400 ]: 9000
username-x Grid    MTU     [             1400 ]: 9000
username-x Grid    MTU     [             1400 ]: 9000
username-x Grid    MTU     [             1400 ]: 9000
username-x Grid    MTU     [             1400 ]: 9000
username-x Grid    MTU     [             1400 ]: 9000
username-x Grid    MTU     [             1400 ]: 9000
username-x Admin   IP      [   10.224.0.244/21 ]: 0.0.0.0/0
username-x Admin   IP      [   10.224.0.245/21 ]: 0.0.0.0/0
username-x Admin   IP      [   10.224.0.240/21 ]: 0.0.0.0/0
username-x Admin   IP      [   10.224.0.241/21 ]: 0.0.0.0/0
username-x Admin   IP      [   10.224.0.242/21 ]: 0.0.0.0/0
username-x Admin   IP      [   10.224.0.243/21 ]: 0.0.0.0/0
username-x Admin   Gateway [      10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [      10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [      10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [      10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [      10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [      10.224.0.1 ]: 0.0.0.0
username-x Admin   MTU     [             1400 ]: 0
username-x Admin   MTU     [             1400 ]: 0
username-x Admin   MTU     [             1400 ]: 0
username-x Admin   MTU     [             1400 ]: 0
username-x Admin   MTU     [             1400 ]: 0
username-x Admin   MTU     [             1400 ]: 0
Press Enter to continue
```

   ◦ **6**: Shows edits in output that displays the full configuration. Changes are highlighted in green (additions) or red (deletions).

    (i) Certain command line interfaces might show additions and deletions using strikethrough formatting. Proper display depends on your terminal client supporting the necessary VT100 escape sequences.

7. Select option **7** to validate all changes.

   This validation ensures that the rules for the Grid, Admin, and Client Networks, such as not using overlapping subnets, aren't violated.

   In this example, validation returned errors.

```
Validating new networking configuration... FAILED.

 DK-10-224-5-20-G1: The admin subnet 172.18.0.0/16 overlaps the 172.18.0.0/21 grid network.
 DK-10-224-5-22-S1: Duplicate Grid IP 172.16.5.18 (also in use by DK-10-224-5-21-ADM1)

You must correct these errors before you can apply any changes.
Checking for Grid Network IP address swaps... PASSED.

Press Enter to continue
```

In this example, validation passed.

```
Validating new networking configuration... PASSED.
Checking for Grid Network IP address swaps... PASSED.

Press Enter to continue
```

8. After validation passes, choose one of the following options:

   ◦ **8**: Save unapplied changes.

     This option allows you to quit the Change IP tool and start it again later, without losing any unapplied changes.

   ◦ **10**: Apply the new network configuration.

9. If you selected option **10**, choose one of the following options:

   ◦ **apply**: Apply the changes immediately and automatically restart each node if necessary.

     If the new network configuration does not require any physical networking changes, you can select **apply** to apply the changes immediately. Nodes will be restarted automatically, if necessary. Nodes that need to be restarted will be displayed.

   ◦ **stage**: Apply the changes the next time the nodes are restarted manually.

     If you need to make physical or virtual networking configuration changes for the new network configuration to function, you must use the **stage** option, shut down the affected nodes, make the necessary physical networking changes, and restart the affected nodes. If you select **apply** without first making these networking changes, the changes will usually fail.

     > (i) If you use the **stage** option, you must restart the node as soon as possible after staging to minimize disruptions.

   ◦ **cancel**: Don't make any network changes at this time.

     If you were unaware that the proposed changes require nodes to be restarted, you can defer the changes to minimize user impact. Selecting **cancel** returns you to the main menu and preserves your changes so you can apply them later.

     When you select **apply** or **stage**, a new network configuration file is generated, provisioning is performed, and nodes are updated with new working information.

     During provisioning, the output displays the status as updates are applied.

```
Generating new grid networking description file...

Running provisioning...

Updating grid network configuration on Name
```

After you apply or stage changes, a new Recovery Package is generated as a result of the grid configuration change.

10. If you selected **stage**, follow these steps after provisioning is complete:

    a. Make the physical or virtual networking changes that are required.

       Physical networking changes: Make the necessary physical networking changes, safely shutting down the node if necessary.

       Linux: If you are adding the node to an Admin Network or Client Network for the first time, ensure that you have added the interface as described in Linux: Add interfaces to existing node.

    b. Restart the affected nodes.

11. Select **0** to exit the Change IP tool after your changes are complete.

12. Download a new Recovery Package from the Grid Manager.

    a. Select **MAINTENANCE** > **System** > **Recovery package**.

    b. Enter the provisioning passphrase.

Add to or change subnet lists on Admin Network

You can add, delete, or change the subnets in the Admin Network Subnet List of one or more nodes.

Before you begin

- You have the `Passwords.txt` file.

You can add, delete, or change subnets to all nodes on the Admin Network Subnet List.

Do not use subnets that contain the following IPv4 addresses for the Grid Network, Admin Network, or Client Network of any node:

- 192.168.130.101
- 192.168.131.101
- 192.168.130.102
- 192.168.131.102
- 198.51.100.2
- 198.51.100.4

For example, do not use the following subnet ranges for the Grid Network, Admin Network, or Client Network of any node:

- 192.168.130.0/24 because this subnet range contains the IP addresses 192.168.130.101 and 192.168.130.102
- 192.168.131.0/24 because this subnet range contains the IP addresses 192.168.131.101 and 192.168.131.102
- 198.51.100.0/24 because this subnet range contains the IP addresses 198.51.100.2 and 198.51.100.4

Steps

1. Log in to the primary Admin Node:

    a. Enter the following command: `ssh admin@primary_Admin_Node_IP`

    b. Enter the password listed in the `Passwords.txt` file.

    c. Enter the following command to switch to root: `su -`

    d. Enter the password listed in the `Passwords.txt` file.

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

2. Start the Change IP tool by entering the following command: `change-ip`

3. Enter the provisioning passphrase at the prompt.

    The main menu appears.

```
Welcome to the StorageGRID IP Change Tool.

Selected nodes: all

1:   SELECT NODES to edit
2:   EDIT IP/mask, gateway and MTU
3:   EDIT admin network subnet lists
4:   EDIT grid network subnet list
5:   SHOW changes
6:   SHOW full configuration, with changes highlighted
7:   VALIDATE changes
8:   SAVE changes, so you can resume later
9:   CLEAR all changes, to start fresh
10:  APPLY changes to the grid
0:   Exit

Selection:
```

4. Optionally, limit the networks/nodes on which operations are performed. Choose one of the following:

   ◦ Select the nodes to edit by choosing **1**, if you want to filter on specific nodes on which to perform the operation. Select one of the following options:

      ▪ **1**: Single node (select by name)

      ▪ **2**: Single node (select by site, then by name)

      ▪ **3**: Single node (select by current IP)

      ▪ **4**: All nodes at a site

      ▪ **5**: All nodes in the grid

      ▪ **0**: Go back

   ◦ Allow "all" to remain selected. After the selection is made, the main menu screen appears. The Selected nodes field reflects your new selection, and now all operations selected will only be performed on this item.

5. On the main menu, select the option to edit subnets for the Admin Network (option **3**).

6. Choose one of the following:

   ◦ Add a subnet by entering this command: `add CIDR`

   ◦ Delete a subnet by entering this command: `del CIDR`

   ◦ Set the list of subnets by entering this command: `set CIDR`

   ⓘ For all commands, you can enter multiple addresses using this format: `add CIDR, CIDR`

   Example: `add 172.14.0.0/16, 172.15.0.0/16, 172.16.0.0/16`

   💡 You can reduce the amount of typing required by using "up arrow" to recall previously typed values to the current input prompt, and then edit them if necessary.

   The example input below shows adding subnets to the Admin Network Subnet List:

```
Editing: Admin Network Subnet List for node DK-10-224-5-20-G1

Press <enter> to use the list as shown
Use up arrow to recall a previously typed value, which you can then edit
Use 'add <CIDR> [, <CIDR>]' to add subnets <CIDR> [, <CIDR>] to the list
Use 'del <CIDR> [, <CIDR>]' to delete subnets <CIDR> [, <CIDR>] from the list
Use 'set <CIDR> [, <CIDR>]' to set the list to the given list
Use q to complete the editing session early and return to the previous menu

DK-10-224-5-20-G1
   10.0.0.0/8
   172.19.0.0/16
   172.21.0.0/16
   172.20.0.0/16

[add/del/set/quit <CIDR>, ...]: add 172.14.0.0/16, 172.15.0.0/16
```

7. When ready, enter **q** to go back to the main menu screen. Your changes are held until cleared or applied.

   ⓘ If you selected any of the "all" node selection modes in step 2, press **Enter** (without **q**) to get to the next node in the list.

8. Choose one of the following:

  ◦ Select option **5** to show edits in output that is isolated to show only the changed item. Changes are highlighted in green (additions) or red (deletions), as shown in the example output below:

```
================================================================================
Site: Data Center 1
================================================================================
DC1-ADM1-105-154 Admin    Subnets                         add 172.17.0.0/16
                                                          del 172.16.0.0/16
                                  [      172.14.0.0/16 ]
                                  [      172.15.0.0/16 ]
                                  [      172.17.0.0/16 ]
                                  [      172.19.0.0/16 ]
                                  [      172.20.0.0/16 ]
                                  [      172.21.0.0/16 ]

Press Enter to continue
```

  ◦ Select option **6** to show edits in output that displays the full configuration. Changes are highlighted in green (additions) or red (deletions). **Note:** Certain terminal emulators might show additions and deletions using strikethrough formatting.

  When you attempt to change the subnet list, the following message is displayed:

  > CAUTION: The Admin Network subnet list on the node might contain /32 subnets derived from automatically applied routes that aren't persistent. Host routes (/32 subnets) are applied automatically if the IP addresses provided for external services such as NTP or DNS aren't reachable using default StorageGRID routing, but are reachable using a different interface and gateway. Making and applying changes to the subnet list will make all automatically applied subnets persistent. If you don't want that to happen, delete the unwanted subnets before applying changes. If you know that all /32 subnets in the list were added intentionally, you can ignore this caution.

  If you did not specifically assign the NTP and DNS server subnets to a network, StorageGRID creates a host route (/32) for the connection automatically. If, for example, you would rather have a /16 or /24 route for outbound connection to a DNS or NTP server, you should delete the automatically created /32 route and add the routes you want. If you don't delete the automatically created host route, it will be persisted after you apply any changes to the subnet list.

  (i) Although you can use these automatically discovered host routes, in general you should manually configure the DNS and NTP routes to ensure connectivity.

9. Select option **7** to validate all staged changes.

   This validation ensures that the rules for the Grid, Admin, and Client Networks are followed, such as using overlapping subnets.

10. Optionally, select option **8** to save all staged changes and return later to continue making changes.

    This option allows you to quit the Change IP tool and start it again later, without losing any unapplied

changes.

11. Do one of the following:

- ◦ Select option **9** if you want to clear all changes without saving or applying the new network configuration.

- ◦ Select option **10** if you are ready to apply changes and provision the new network configuration. During provisioning, the output displays the status as updates are applied as shown in the following example output:

```
Generating new grid networking description file...

Running provisioning...

Updating grid network configuration on Name
```

12. Download a new Recovery Package from the Grid Manager.

   a. Select **MAINTENANCE** > **System** > **Recovery package**.

   b. Enter the provisioning passphrase.

Add to or change subnet lists on Grid Network

You can use the Change IP tool to add or change subnets on the Grid Network.

Before you begin

- You have the `Passwords.txt` file.

You can add, delete, or change subnets in the Grid Network Subnet List. Changes will affect routing on all nodes in the grid.

> (i) If you are making changes to the Grid Network Subnet List only, use the Grid Manager to add or change the network configuration. Otherwise, use the Change IP tool if the Grid Manager is inaccessible due to a network configuration issue, or you are performing both a Grid Network routing change and other network changes at the same time.

Do not use subnets that contain the following IPv4 addresses for the Grid Network, Admin Network, or Client Network of any node:

- 192.168.130.101
- 192.168.131.101
- 192.168.130.102
- 192.168.131.102
- 198.51.100.2
- 198.51.100.4

For example, do not use the following subnet ranges for the Grid Network, Admin Network, or Client Network of any node:

- 192.168.130.0/24 because this subnet range contains the IP addresses 192.168.130.101 and 192.168.130.102
- 192.168.131.0/24 because this subnet range contains the IP addresses 192.168.131.101 and 192.168.131.102
- 198.51.100.0/24 because this subnet range contains the IP addresses 198.51.100.2 and 198.51.100.4

Steps

1. Log in to the primary Admin Node:

   a. Enter the following command: `ssh admin@primary_Admin_Node_IP`

   b. Enter the password listed in the `Passwords.txt` file.

   c. Enter the following command to switch to root: `su -`

   d. Enter the password listed in the `Passwords.txt` file.

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

2. Start the Change IP tool by entering the following command: `change-ip`

3. Enter the provisioning passphrase at the prompt.

   The main menu appears.

```
Welcome to the StorageGRID IP Change Tool.

Selected nodes: all

1:    SELECT NODES to edit
2:    EDIT IP/mask, gateway and MTU
3:    EDIT admin network subnet lists
4:    EDIT grid network subnet list
5:    SHOW changes
6:    SHOW full configuration, with changes highlighted
7:    VALIDATE changes
8:    SAVE changes, so you can resume later
9:    CLEAR all changes, to start fresh
10:   APPLY changes to the grid
0:    Exit

Selection: 
```

4. On the main menu, select the option to edit subnets for the Grid Network (option **4**).

> ⓘ Changes to the Grid Network Subnet List are grid-wide.

5. Choose one of the following:

   - Add a subnet by entering this command: `add CIDR`

   - Delete a subnet by entering this command: `del CIDR`

   - Set the list of subnets by entering this command: `set CIDR`

   > ⓘ For all commands, you can enter multiple addresses using this format: `add CIDR, CIDR`

   Example: `add 172.14.0.0/16, 172.15.0.0/16, 172.16.0.0/16`

   > 💡 You can reduce the amount of typing required by using "up arrow" to recall previously typed values to the current input prompt, and then edit them if necessary.

   The example input below shows setting subnets for the Grid Network Subnet List:

```
Editing: Grid Network Subnet List

Press <enter> to use the list as shown
Use up arrow to recall a previously typed value, which you can then edit
Use 'add <CIDR> [, <CIDR>]' to add subnets <CIDR> [, <CIDR>] to the list
Use 'del <CIDR> [, <CIDR>]' to delete subnets <CIDR> [, <CIDR>] from the list
Use 'set <CIDR> [, <CIDR>]' to set the list to the given list
Use q to complete the editing session early and return to the previous menu

Grid Network Subnet List
  172.16.0.0/21
  172.17.0.0/21
  172.18.0.0/21
  192.168.0.0/21

[add/del/set/quit <CIDR>, ...]: set 172.30.0.0/21, 172.31.0.0/21, 192.168.0.0/21
```

6. When ready, enter **q** to go back to the main menu screen. Your changes are held until cleared or applied.

7. Choose one of the following:

   - Select option **5** to show edits in output that is isolated to show only the changed item. Changes are highlighted in green (additions) or red (deletions), as shown in the example output below:

```
==================================================================
Grid Network Subnet List (GNSL)
==================================================================
                                            add 172.30.0.0/21
                                            add 172.31.0.0/21
                                            del 172.16.0.0/21
                                            del 172.17.0.0/21
                                            del 172.18.0.0/21

                       [     172.30.0.0/21 ]
                       [     172.31.0.0/21 ]
                       [    192.168.0.0/21 ]
Press Enter to continue
```

◦ Select option **6** to show edits in output that displays the full configuration. Changes are highlighted in green (additions) or red (deletions).

> (i) Certain command line interfaces might show additions and deletions using strikethrough formatting.

8. Select option **7** to validate all staged changes.

   This validation ensures that the rules for the Grid, Admin, and Client Networks are followed, such as using overlapping subnets.

9. Optionally, select option **8** to save all staged changes and return later to continue making changes.

   This option allows you to quit the Change IP tool and start it again later, without losing any unapplied changes.

10. Do one of the following:

    ◦ Select option **9** if you want to clear all changes without saving or applying the new network configuration.

    ◦ Select option **10** if you are ready to apply changes and provision the new network configuration. During provisioning, the output displays the status as updates are applied as shown in the following example output:

    ```
    Generating new grid networking description file...


    Running provisioning...


    Updating grid network configuration on Name
    ```

11. If you selected option **10** when making Grid Network changes, select one of the following options:

    ◦ **apply**: Apply the changes immediately and automatically restart each node if necessary.

      If the new network configuration will function simultaneously with the old network configuration without any external changes, you can use the **apply** option for a fully automated configuration change.

    ◦ **stage**: Apply the changes the next time the nodes are restarted.

      If you need to make physical or virtual networking configuration changes for the new network configuration to function, you must use the **stage** option, shut down the affected nodes, make the necessary physical networking changes, and restart the affected nodes.

      > (i) If you use the **stage** option, restart the node as soon as possible after staging to minimize disruptions.

    ◦ **cancel**: Don't make any network changes at this time.

      If you were unaware that the proposed changes require nodes to be restarted, you can defer the changes to minimize user impact. Selecting **cancel** returns you to the main menu and preserves your changes so you can apply them later.

After you apply or stage changes, a new Recovery Package is generated as a result of the grid configuration change.

12. If configuration is stopped due to errors, the following options are available:

    ◦ To terminate the IP change procedure and return to the main menu, enter **a**.

    ◦ To retry the operation that failed, enter **r**.

    ◦ To continue to the next operation, enter **c**.

      The failed operation can be retried later by selecting option **10** (Apply Changes) from the main menu. The IP change procedure will not be complete until all operations have completed successfully.

    ◦ If you had to manually intervene (to reboot a node, for example) and are confident that the action the tool thinks has failed was actually completed successfully, enter **f** to mark it as successful and move to the next operation.

13. Download a new Recovery Package from the Grid Manager.

    a. Select **MAINTENANCE** > **System** > **Recovery package**.

    b. Enter the provisioning passphrase.

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

Change IP addresses for all nodes in grid

If you need to change the Grid Network IP address for all nodes in the grid, you must follow this special procedure. You can't do a grid-wide Grid Network IP change using the procedure to change individual nodes.

Before you begin

- You have the `Passwords.txt` file.

To ensure that the grid starts up successfully, you must make all the changes at the same time.

> ℹ️ This procedure applies to the Grid Network only. You can't use this procedure to change IP addresses on the Admin or Client Networks.

If you want to change the IP addresses and MTU for the nodes at one site only, follow the Change node network configuration instructions.

Steps

1. Plan ahead for changes that you need to make outside of the Change IP tool, such as changes to DNS or NTP, and changes to the single sign-on (SSO) configuration, if used.

   > ℹ️ If the existing NTP servers will not be accessible to the grid on the new IP addresses, add the new NTP servers before you perform the change-ip procedure.

   > ℹ️ If the existing DNS servers will not be accessible to the grid on the new IP addresses, add the new DNS servers before you perform the change-ip procedure.

> **(i)** If SSO is enabled for your StorageGRID system and any relying party trusts were configured using Admin Node IP addresses (instead of fully qualified domain names, as recommended), be prepared to update or reconfigure these relying party trusts in Active Directory Federation Services (AD FS) immediately after you change IP addresses. See Configure single sign-on.

> **(i)** If necessary, add the new subnet for the new IP addresses.

2. Log in to the primary Admin Node:

   a. Enter the following command: `ssh admin@primary_Admin_Node_IP`

   b. Enter the password listed in the `Passwords.txt` file.

   c. Enter the following command to switch to root: `su -`

   d. Enter the password listed in the `Passwords.txt` file.

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

3. Start the Change IP tool by entering the following command: `change-ip`

4. Enter the provisioning passphrase at the prompt.

   The main menu appears. By default, the `Selected nodes` field is set to `all`.

```
Welcome to the StorageGRID IP Change Tool.

Selected nodes: all

1:    SELECT NODES to edit
2:    EDIT IP/mask, gateway and MTU
3:    EDIT admin network subnet lists
4:    EDIT grid network subnet list
5:    SHOW changes
6:    SHOW full configuration, with changes highlighted
7:    VALIDATE changes
8:    SAVE changes, so you can resume later
9:    CLEAR all changes, to start fresh
10:   APPLY changes to the grid
0:    Exit

Selection: █
```

5. On the main menu, select **2** to edit IP/subnet mask, gateway, and MTU information for all the nodes.

   a. Select **1** to make changes to the Grid Network.

      After you make your selection, the prompt shows the node names, Grid Network name, data type (IP/mask, Gateway, or MTU), and current values.

      Editing the IP address, prefix length, gateway, or MTU of a DHCP-configured interface will change the interface to static. A warning is displayed before each interface configured by DHCP.

      Interfaces configured as `fixed` can't be edited.

   b. To set a new value, enter it in the format shown for the current value.

   c. After editing all nodes you want to change, enter **q** to return to the main menu.

Your changes are held until cleared or applied.

6. Review your changes by selecting one of the following options:

   ◦ **5**: Shows edits in output that is isolated to show only the changed item. Changes are highlighted in green (additions) or red (deletions), as shown in the example output:

```
===============================================================================
Site: RTP
===============================================================================
username-x Grid    IP      [    172.16.0.239/21 ]: 172.16.0.240/21
username-x Grid    MTU     [            1400 ]: 9000
username-x Grid    MTU     [            1400 ]: 9000
username-x Grid    MTU     [            1400 ]: 9000
username-x Grid    MTU     [            1400 ]: 9000
username-x Grid    MTU     [            1400 ]: 9000
username-x Grid    MTU     [            1400 ]: 9000
username-x Grid    MTU     [            1400 ]: 9000
username-x Admin   IP      [    10.224.0.244/21 ]: 0.0.0.0/0
username-x Admin   IP      [    10.224.0.245/21 ]: 0.0.0.0/0
username-x Admin   IP      [    10.224.0.240/21 ]: 0.0.0.0/0
username-x Admin   IP      [    10.224.0.241/21 ]: 0.0.0.0/0
username-x Admin   IP      [    10.224.0.242/21 ]: 0.0.0.0/0
username-x Admin   IP      [    10.224.0.243/21 ]: 0.0.0.0/0
username-x Admin   Gateway [       10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [       10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [       10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [       10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [       10.224.0.1 ]: 0.0.0.0
username-x Admin   Gateway [       10.224.0.1 ]: 0.0.0.0
username-x Admin   MTU     [            1400 ]: 0
username-x Admin   MTU     [            1400 ]: 0
username-x Admin   MTU     [            1400 ]: 0
username-x Admin   MTU     [            1400 ]: 0
username-x Admin   MTU     [            1400 ]: 0
username-x Admin   MTU     [            1400 ]: 0
Press Enter to continue
```

   ◦ **6**: Shows edits in output that displays the full configuration. Changes are highlighted in green (additions) or red (deletions).

   (i) Certain command line interfaces might show additions and deletions using strikethrough formatting. Proper display depends on your terminal client supporting the necessary VT100 escape sequences.

7. Select option **7** to validate all changes.

   This validation ensures that the rules for the Grid Network, such as not using overlapping subnets, aren't violated.

   In this example, validation returned errors.

```
Validating new networking configuration... FAILED.

  DK-10-224-5-20-G1: The admin subnet 172.18.0.0/16 overlaps the 172.18.0.0/21 grid network.
  DK-10-224-5-22-S1: Duplicate Grid IP 172.16.5.18 (also in use by DK-10-224-5-21-ADM1)

You must correct these errors before you can apply any changes.
Checking for Grid Network IP address swaps... PASSED.

Press Enter to continue
```

   In this example, validation passed.

```
Validating new networking configuration... PASSED.
Checking for Grid Network IP address swaps... PASSED.

Press Enter to continue█
```

8. After validation passes, select **10** to apply the new network configuration.

9. Select **stage** to apply the changes the next time the nodes are restarted.

> ℹ️ You must select **stage**. Don't perform a rolling restart, either manually or by selecting **apply** instead of **stage**; the grid will not start up successfully.

10. After your changes are complete, select **0** to exit the Change IP tool.

11. Shut down all nodes simultaneously.

> ℹ️ The entire grid must be shut down, so that all nodes are down at the same time.

12. Make the physical or virtual networking changes that are required.

13. Verify that all grid nodes are down.

14. Power on all nodes.

15. After the grid starts up successfully:

    a. If you added new NTP servers, delete the old NTP server values.

    b. If you added new DNS servers, delete the old DNS server values.

16. Download the new Recovery Package from the Grid Manager.

    a. Select **MAINTENANCE** > **System** > **Recovery package**.

    b. Enter the provisioning passphrase.

Related information

- Add to or change subnet lists on Grid Network
- Shut down grid node

Add interfaces to existing node

Linux: Add Admin or Client interfaces to an existing node

Use these steps to add an interface on the Admin Network or the Client Network to a Linux node after it has been installed.

If you did not configure ADMIN_NETWORK_TARGET or CLIENT_NETWORK_TARGET in the node configuration file on the Linux host during installation, use this procedure to add the interface. For more information about the node configuration file, see the instructions for your Linux operating system:

- Install StorageGRID on Red Hat Enterprise Linux
- Install StorageGRID on Ubuntu or Debian

You perform this procedure on the Linux server hosting the node that needs the new network assignment, not

inside the node. This procedure only adds the interface to the node; a validation error occurs if you attempt to specify any other network parameters.

To provide addressing information, you must use the Change IP tool. See Change node network configuration.

Steps

1. Log in to the Linux server hosting the node.

2. Edit the node configuration file: `/etc/storagegrid/nodes/node-name.conf`.

   > ⓘ Don't specify any other network parameters, or a validation error will result.

   a. Add an entry for the new network target. For example:

      `CLIENT_NETWORK_TARGET = bond0.3206`

   b. Optional: Add an entry for the MAC address. For example:

      `CLIENT_NETWORK_MAC = aa:57:61:07:ea:5c`

3. Run the node validate command:

   `sudo storagegrid node validate node-name`

4. Resolve all validation errors.

5. Run the node reload command:

   `sudo storagegrid node reload node-name`

Linux: Add trunk or access interfaces to a node

You can add extra trunk or access interfaces to a Linux node after it has been installed. The interfaces you add are displayed on the VLAN interfaces page and the HA groups page.

Before you begin

- You have access to the instructions for installing StorageGRID on your Linux platform.
  - Install StorageGRID on Red Hat Enterprise Linux
  - Install StorageGRID on Ubuntu or Debian
- You have the `Passwords.txt` file.
- You have specific access permissions.

> ⚠ Don't attempt to add interfaces to a node while a software upgrade, recovery procedure, or expansion procedure is active.

About this task

Use these steps to add one or more extra interfaces to a Linux node after the node has been installed. For example, you might want to add a trunk interface to an Admin or Gateway Node, so you can use VLAN interfaces to segregate the traffic belonging to different applications or tenants. Or, you might want to add an

access interface to use in a high availability (HA) group.

If you add a trunk interface, you must configure a VLAN interface in StorageGRID. If you add an access interface, you can add the interface directly to an HA group; you don't need to configure a VLAN interface.

The node is unavailable for a brief time when you add interfaces. You should perform this procedure on one node at a time.

Steps

1. Log in to the Linux server hosting the node.

2. Using a text editor such as vim or pico, edit the node configuration file:

   `/etc/storagegrid/nodes/`*node-name*`.conf`

3. Add an entry to the file to specify the name and, optionally, the description of each extra interface you want to add to the node. Use this format.

   `INTERFACE_TARGET_nnnn=`*value*

   For *nnnn*, specify a unique number for each `INTERFACE_TARGET` entry you are adding.

   For *value*, specify the name of the physical interface on the bare-metal host. Then, optionally, add a comma and provide a description of the interface, which is displayed on the VLAN interfaces page and the HA groups page.

   For example:

   `INTERFACE_TARGET_0001=ens256, Trunk`

   > ⓘ Don't specify any other network parameters, or a validation error will result.

4. Run the following command to validate your changes to the node configuration file:

   `sudo storagegrid node validate `*node-name*

   Address any errors or warnings before proceeding to the next step.

5. Run the following command to update the node's configuration:

   `sudo storagegrid node reload `*node-name*

After you finish

- If you added one or more trunk interfaces, go to configure VLAN interfaces to configure one or more VLAN interfaces for each new parent interface.
- If you added one or more access interfaces, go to configure high availability groups to add the new interfaces directly to HA groups.

VMware: Add trunk or access interfaces to a node

You can add a trunk or access interface to a VM node after the node has been installed. The interfaces you add are displayed on the VLAN interfaces page and the HA groups

page.

Before you begin

- You have access to the instructions for installing StorageGRID on your VMware platform.

- You have Admin Node and Gateway Node VMware virtual machines.

- You have a network subnet that is not being used as Grid, Admin, or Client Network.

- You have the `Passwords.txt` file.

- You have specific access permissions.

> ⚠️ Don't attempt to add interfaces to a node while a software upgrade, recovery procedure, or expansion procedure is active.

About this task

Use these steps to add one or more extra interfaces to a VMware node after the node has been installed. For example, you might want to add a trunk interface to an Admin or Gateway Node, so you can use VLAN interfaces to segregate the traffic belonging to different applications or tenants. Or you might want to add an access interface to use in a high availability (HA) group.

If you add a trunk interface, you must configure a VLAN interface in StorageGRID. If you add an access interface, you can add the interface directly to an HA group; you don't need to configure a VLAN interface.

The node might be unavailable for a brief time when you add interfaces.

Steps

1. In vCenter, add a new network adapter (type VMXNET3) to an Admin Node and Gateway Node VM. Select **Connected** and **Connect At Power On** checkboxes.

2. Use SSH to log in to the Admin Node or Gateway Node.

3. Use `ip link show` to confirm the new network interface ens256 is detected.

```
ip link show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode
DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1400 qdisc mq state UP
mode DEFAULT group default qlen 1000
    link/ether 00:50:56:a0:4e:5b brd ff:ff:ff:ff:ff:ff
3: eth1: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode
DEFAULT group default qlen 1000
    link/ether 00:50:56:a0:fa:ce brd ff:ff:ff:ff:ff:ff
4: eth2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1400 qdisc mq state UP
mode DEFAULT group default qlen 1000
    link/ether 00:50:56:a0:d6:87 brd ff:ff:ff:ff:ff:ff
5: ens256: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq master
ens256vrf state UP mode DEFAULT group default qlen 1000
    link/ether 00:50:56:a0:ea:88 brd ff:ff:ff:ff:ff:ff
```

After you finish

- If you added one or more trunk interfaces, go to configure VLAN interfaces to configure one or more VLAN interfaces for each new parent interface.

- If you added one or more access interfaces, go to configure high availability groups to add the new interfaces directly to HA groups.

Configure DNS servers

You can add, update, and remove DNS servers, so that you can use fully qualified domain name (FQDN) hostnames rather than IP addresses.

To use fully qualified domain names (FQDNs) instead of IP addresses when specifying hostnames for external destinations, specify the IP address of each DNS server you will use. These entries are used for AutoSupport, alert emails, SNMP notifications, platform services endpoints, Cloud Storage Pools, and more.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.

- You have the Maintenance or Root access permission.

- You have the IP addresses of the DNS servers to configure.

About this task

To ensure proper operation, specify two or three DNS servers. If you specify more than three, it is possible that only three will be used because of known OS limitations on some platforms. If you have routing restrictions in your environment, you can customize the DNS server list for individual nodes (typically all nodes at a site) to use a different set of up to three DNS servers.

If possible, use DNS servers that each site can access locally to ensure that an islanded site can resolve the FQDNs for external destinations.

Add a DNS server

Follow these steps to add a DNS server.

Steps

1. Select **MAINTENANCE** > **Network** > **DNS servers**.
2. Select **Add another server** to add a DNS server.
3. Select **Save**.

Modify a DNS server

Follow these steps to modify a DNS server.

Steps

1. Select **MAINTENANCE** > **Network** > **DNS servers**.
2. Select the IP address of the server name you want to edit and make the necessary changes.
3. Select **Save**.

Delete a DNS server

Follow these steps to delete an IP address of a DNS server.

Steps

1. Select **MAINTENANCE** > **Network** > **DNS servers**.
2. Select the delete icon ✕ next to the IP address.
3. Select **Save**.

Modify DNS configuration for single grid node

Rather than configure the DNS globally for the entire deployment, you can run a script to configure DNS differently for each grid node.

In general, you should use the **MAINTENANCE** > **Network** > **DNS servers** option on the Grid Manager to configure DNS servers. Only use the following script if you need to use different DNS servers for different grid nodes.

Steps

1. Log in to the primary Admin Node:

    a. Enter the following command: `ssh admin@primary_Admin_Node_IP`

    b. Enter the password listed in the `Passwords.txt` file.

    c. Enter the following command to switch to root: `su -`

    d. Enter the password listed in the `Passwords.txt` file.

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

    e. Add the SSH private key to the SSH agent. Enter: `ssh-add`

f. Enter the SSH Access Password listed in the `Passwords.txt` file.

2. Log in to the node you want to update with a custom DNS configuration: ssh *node_IP_address*

3. Run the DNS setup script: `setup_resolv.rb`.

   The script responds with the list of supported commands.

```
Tool to modify external name servers

available commands:
  add search <domain>
                add a specified domain to search list
                e.g.> add search netapp.com
  remove search <domain>
                remove a specified domain from list
                e.g.> remove search netapp.com
  add nameserver <ip>
                add a specified IP address to the name server list
                e.g.> add nameserver 192.0.2.65
  remove nameserver <ip>
                remove a specified IP address from list
                e.g.> remove nameserver 192.0.2.65
  remove nameserver all
                remove all nameservers from list
  save          write configuration to disk and quit
  abort         quit without saving changes
  help          display this help message


Current list of name servers:
    192.0.2.64
Name servers inherited from global DNS configuration:
    192.0.2.126
    192.0.2.127
Current list of search entries:
    netapp.com

Enter command [`add search <domain>|remove search <domain>|add
nameserver <ip>`]
                [`remove nameserver <ip>|remove nameserver
all|save|abort|help`]
```

4. Add the IPv4 address of a server that provides domain name service for your network: add <nameserver IP_address>

5. Repeat the `add nameserver` command to add name servers.

6. Follow instructions as prompted for other commands.

7. Save your changes and exit the application: `save`

8. Close the command shell on the server: `exit`

9. For each grid node, repeat the steps from logging into the node through closing the command shell.

10. When you no longer require passwordless access to other servers, remove the private key from the SSH agent. Enter: `ssh-add -D`

Manage NTP servers

You can add, update, or remove Network Time Protocol (NTP) servers to ensure that data is synchronized accurately between grid nodes in your StorageGRID system.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.

- You have the Maintenance or Root access permission.

- You have the provisioning passphrase.

- You have the IPv4 addresses of the NTP servers to configure.

How StorageGRID uses NTP

The StorageGRID system uses the Network Time Protocol (NTP) to synchronize time between all grid nodes in the grid.

At each site, at least two nodes in the StorageGRID system are assigned the primary NTP role. They synchronize to a suggested minimum of four, and a maximum of six, external time sources and with each other. Every node in the StorageGRID system that is not a primary NTP node acts as an NTP client and synchronizes with these primary NTP nodes.

The external NTP servers connect to the nodes to which you previously assigned primary NTP roles. For this reason, specifying at least two nodes with primary NTP roles is recommended.

NTP server guidelines

Follow these guidelines to protect against timing issues:

- The external NTP servers connect to the nodes to which you previously assigned primary NTP roles. For this reason, specifying at least two nodes with primary NTP roles is recommended.

- Make sure at least two nodes at each site can access at least four external NTP sources. If only one node at a site can reach the NTP sources, timing issues will occur if that node goes down. In addition, designating two nodes per site as primary NTP sources ensures accurate timing if a site is isolated from the rest of the grid.

- The specified external NTP servers must use the NTP protocol. You must specify NTP server references of Stratum 3 or better to prevent issues with time drift.

When specifying the external NTP source for a production-level StorageGRID installation, don't use the Windows Time (W32Time) service on a version of Windows earlier than Windows Server 2016. The time service on earlier versions of Windows is not sufficiently accurate and is not supported by Microsoft for use in high-accuracy environments, including StorageGRID. For details, see Support boundary to configure the Windows Time service for high-accuracy environments.

Configure NTP servers

Follow these steps to add, update, or remove NTP servers.

Steps

1. Select **MAINTENANCE** > **Network** > **NTP servers**.

2. In the Servers section, add, update, or remove NTP server entries, as necessary.

   You should include at least four NTP servers, and you can specify up to six servers.

3. Enter the provisioning passphrase for your StorageGRID system, then select **Save**.

   The page is disabled until the configuration updates are complete.

   > If all of your NTP servers fail the connection test after you save the new NTP servers, don't proceed. Contact technical support.

Resolve NTP server issues

If you encounter problems with the stability or availability of the NTP servers originally specified during installation, you can update the list of external NTP sources that the StorageGRID system uses by adding additional servers, or updating or removing existing servers.

Restore network connectivity for isolated nodes

Under certain circumstances, one or more groups of nodes might not be able to contact the rest of the grid. For example, site- or grid-wide IP address changes can result in isolated nodes.

About this task

Node isolation is indicated by:

- Alerts, such as **Unable to communicate with node** (**Alerts** > **Current**)

- Connectivity-related diagnostics (**SUPPORT** > **Tools** > **Diagnostics**)

Some of the consequences of having isolated nodes include the following:

- If multiple nodes are isolated, you might not be able to sign in to or access the Grid Manager.

- If multiple nodes are isolated, the storage usage and quota values shown on the dashboard for the Tenant Manager might be out of date. The totals will be updated when network connectivity is restored.

To resolve the isolation issue, you run a command line utility on each isolated node or on one node in a group (all nodes in a subnet that does not contain the primary Admin Node) that is isolated from the grid. The utility

provides the nodes with the IP address of a non-isolated node in the grid, which allows the isolated node or group of nodes to contact the entire grid again.

> ⓘ If the multicast domain name system (mDNS) is disabled in the networks, you might have to run the command line utility on each isolated node.

Steps

This procedure does not apply when only some services are offline or reporting communication errors.

1. Access the node and check `/var/local/log/dynip.log` for isolation messages.

   For example:

   ```
   [2018-01-09T19:11:00.545] UpdateQueue - WARNING -- Possible isolation,
   no contact with other nodes.
   If this warning persists, manual action might be required.
   ```

   If you are using the VMware console, it will contain a message that the node might be isolated.

   On Linux deployments, isolation messages would appear in `/var/log/storagegrid/node/<nodename>.log` files.

2. If the isolation messages are recurring and persistent, run the following command:

   `add_node_ip.py <address>`

   where `<address>` is the IP address of a remote node that is connected to the grid.

   ```
   # /usr/sbin/add_node_ip.py  10.224.4.210

   Retrieving local host information
   Validating remote node at address 10.224.4.210
   Sending node IP hint for 10.224.4.210 to local node
   Local node found on remote node. Update complete.
   ```

3. Verify the following for each node that was previously isolated:

   ◦ The node's services have started.

   ◦ The status of the Dynamic IP service is "Running" after you run the `storagegrid-status` command.

   ◦ On the Nodes page, the node no longer appears disconnected from the rest of the grid.

   > ⓘ If running the `add_node_ip.py` command does not solve the problem, there could be other networking issues that need to be resolved.