Maintain appliance configuration

StorageGRID

NetApp
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Maintain appliance configuration

Common procedures for node maintenance: Overview

Use these instructions to maintain your StorageGRID system.

About these instructions

These instructions describe procedures common to all nodes such as how to apply a software hotfix, recover grid nodes, recover a failed site, decommission grid nodes or an entire site, perform network maintenance, perform host-level and middleware maintenance procedures, and perform grid node procedures.

> In these instructions, “Linux” refers to a Red Hat® Enterprise Linux®, Ubuntu®, CentOS, or Debian® deployment. Use the NetApp Interoperability Matrix Tool (IMT) to get a list of supported versions.

Before you begin

- You have a broad understanding of the StorageGRID system.
- You have reviewed your StorageGRID system’s topology and you understand the grid configuration.
- You understand that you must follow all instructions exactly and heed all warnings.
- You understand that maintenance procedures not described aren’t supported or require a services engagement.

Maintenance procedures for appliances

Specific maintenance procedures for each type of StorageGRID appliance are in the appliance maintenance sections:

- Maintain SGF6112 appliance
- Maintain SG6000 appliance
- Maintain SG5700 appliance
- Maintain SG100 and SG1000 appliances

Place appliance into maintenance mode

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

Before you begin

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

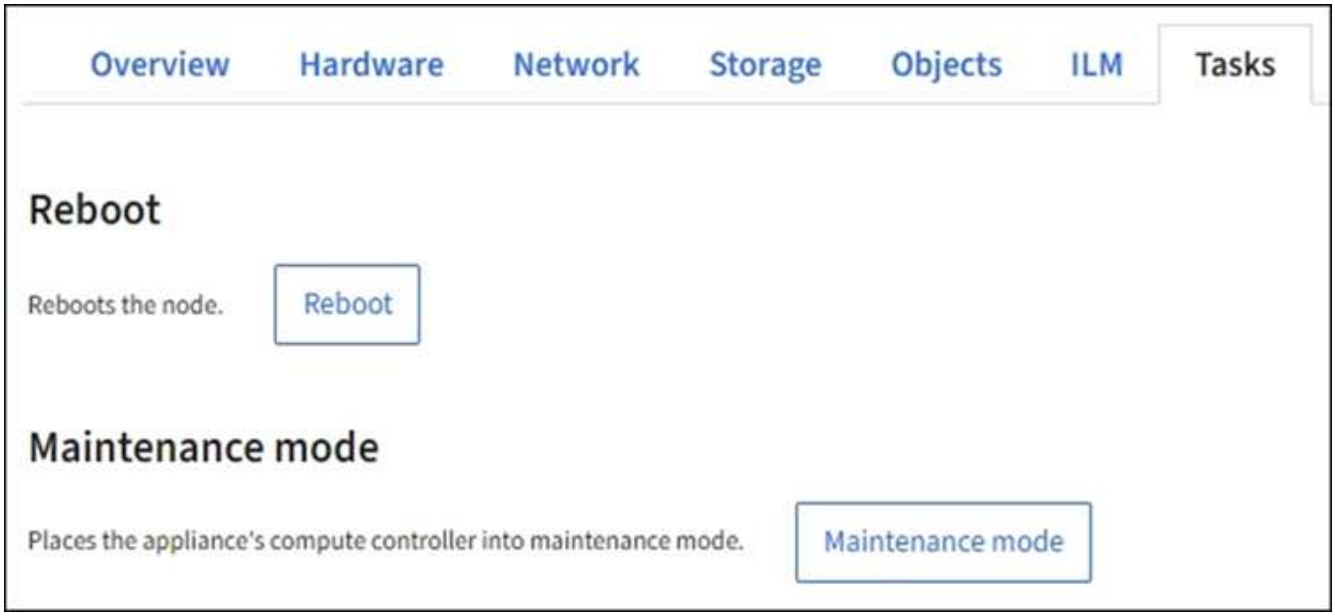
About this task

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

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

Steps

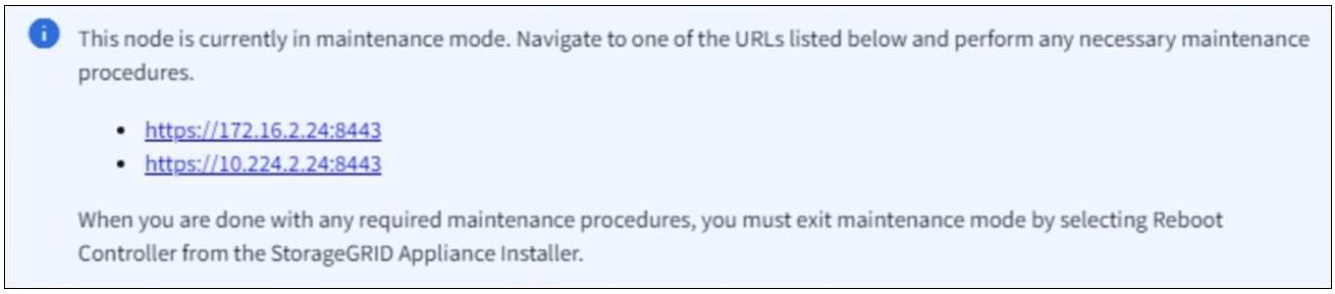
1. From the Grid Manager, select **NODES**.
2. From the tree view of the Nodes page, select the appliance Storage Node.
3. Select **Tasks**.



4. Select **Maintenance mode**. A confirmation dialog box appears.
5. Enter the provisioning passphrase, and select **OK**.

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

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



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

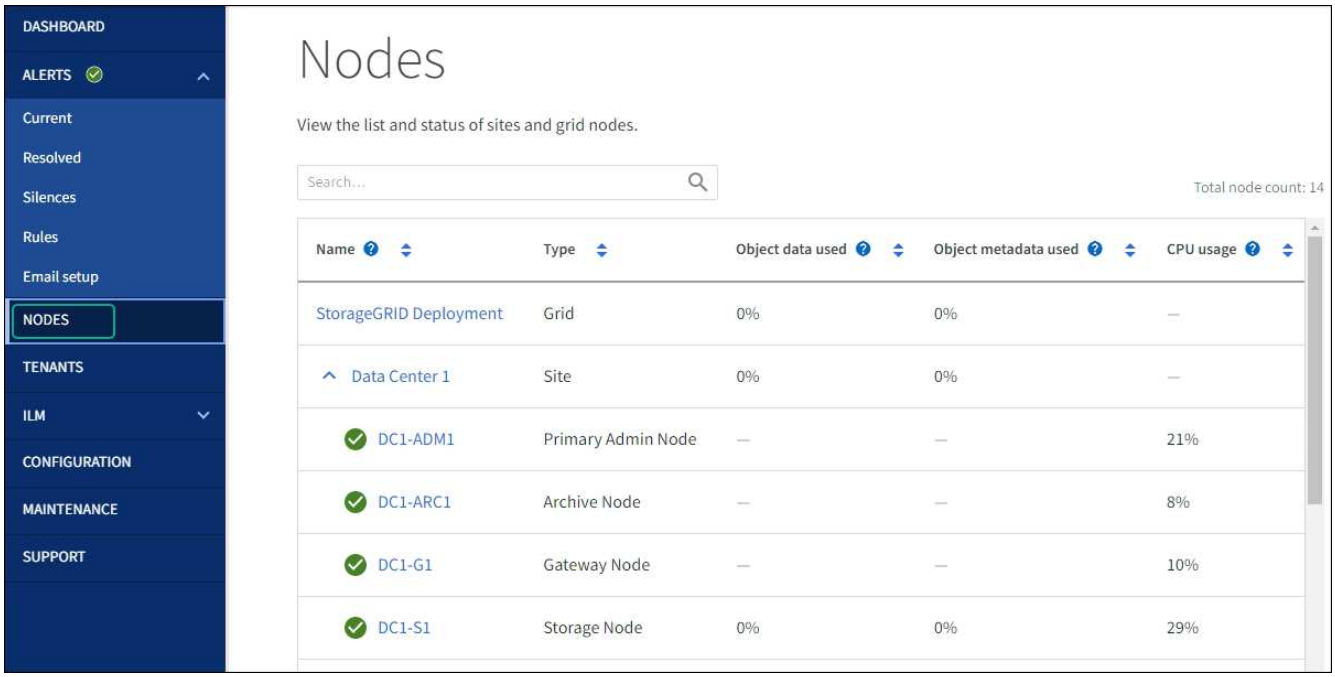
   If possible, use the URL containing the IP address of the appliance's Admin Network port.

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

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

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

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



Change MTU setting

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

About this task

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

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

To change the MTU setting without rebooting the appliance node, use the Change IP tool.

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

Change the MTU setting using the Change IP tool

Before you begin

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

Steps

Access the Change IP tool and update the MTU settings as described in Change node network configuration.

Change the MTU setting using maintenance mode

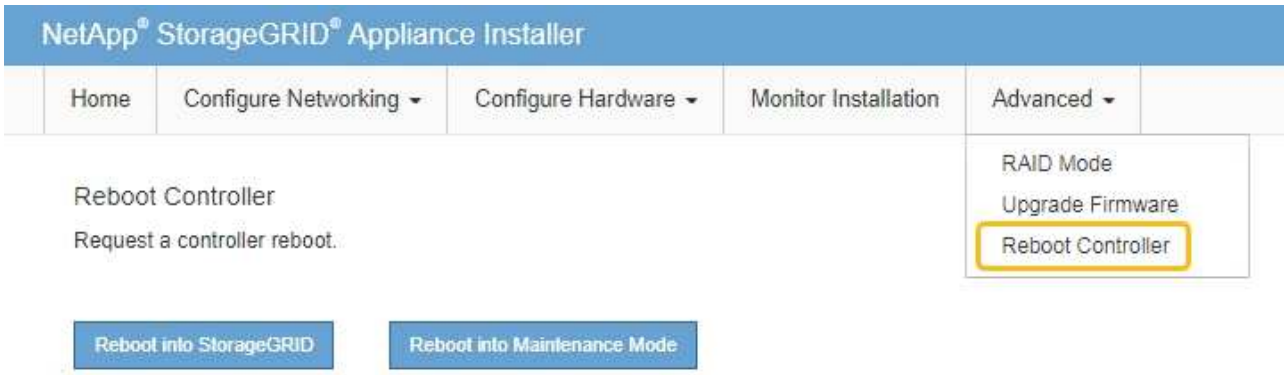
Change the MTU setting using maintenance mode if you are unable to access these settings using the Change IP tool.

Before you begin

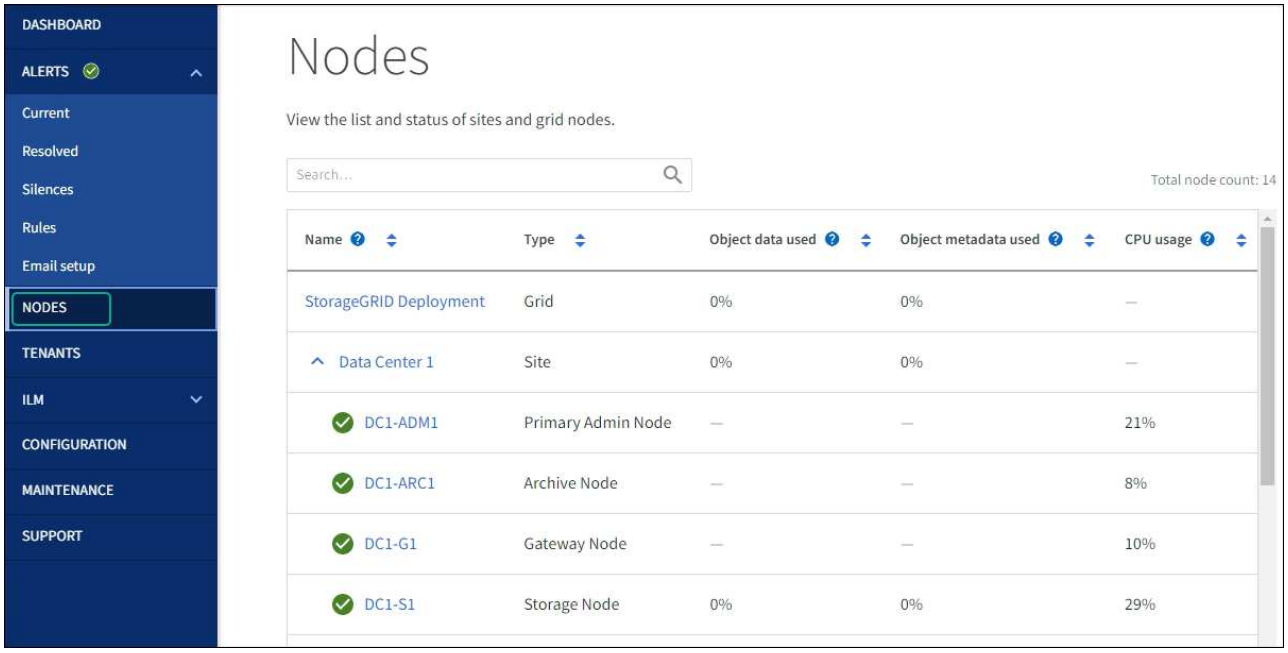
The appliance has been placed maintenance mode.

Steps

1. From the StorageGRID Appliance Installer, select **Configure Networking** > **IP Configuration**.
2. Make the desired changes to the MTU settings for the Grid Network, Admin Network, and Client Network.
3. When you are satisfied with the settings, select **Save**.
4. If this procedure completed successfully and you have additional procedures to perform while the node is in maintenance mode, perform them now. When you are done, or if you experienced any failures and want to start over, select **Advanced** > **Reboot Controller**, and then select one of these options:
   - Select **Reboot into StorageGRID**
   - Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. Select this option if you experienced any failures during the procedure and want to start over. After the node finishes rebooting into maintenance mode, restart from the appropriate step in the procedure that failed.



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



Check DNS server configuration

You can check and temporarily change the DNS servers that are currently in use by this appliance node.

Before you begin

The appliance has been placed maintenance mode.

About this task

You might need to change the DNS server settings if an encrypted appliance can't connect to the key management server (KMS) or KMS cluster because the hostname for the KMS was specified as a domain name instead of an IP address. Any changes that you make to the DNS settings for the appliance are

temporary and are lost when you exit maintenance mode. To make these changes permanent, specify the DNS servers in Grid Manager (**MAINTENANCE** > **Network** > **DNS servers**).

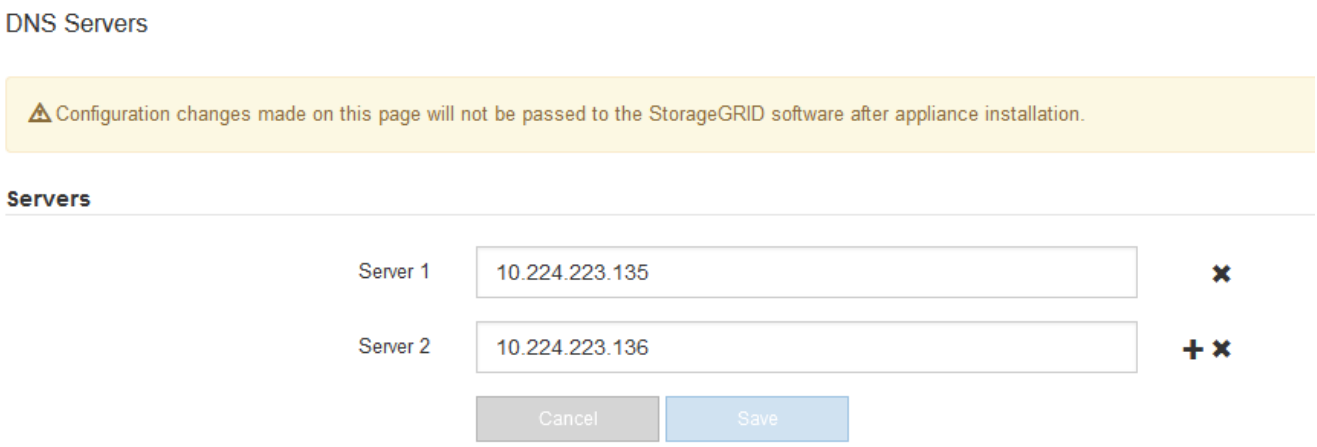
- Temporary changes to the DNS configuration are necessary only for node-encrypted appliances where the KMS server is defined using a fully qualified domain name, instead of an IP address, for the hostname.
- When a node-encrypted appliance connects to a KMS using a domain name, it must connect to one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

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

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

Steps

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



3. If required, change the DNS servers.

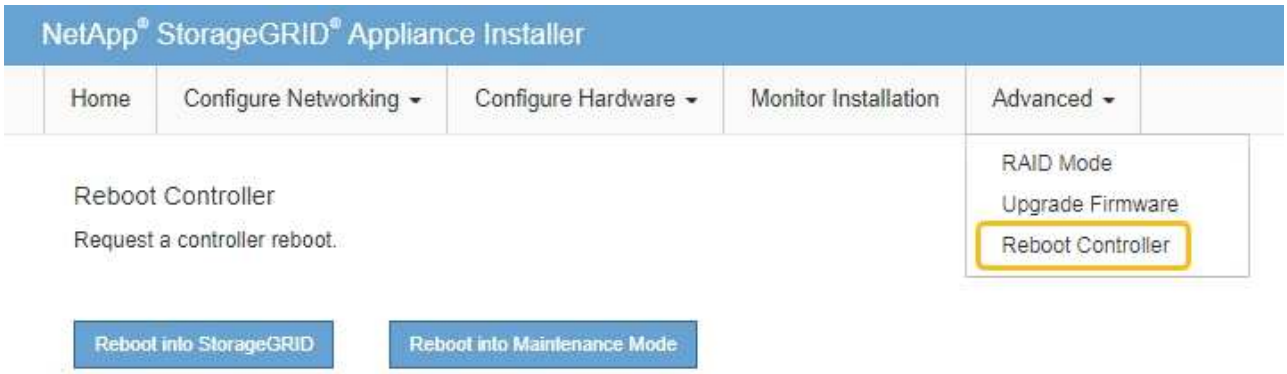
> Changes made to the DNS settings are temporary and are lost when you exit maintenance mode.

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

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

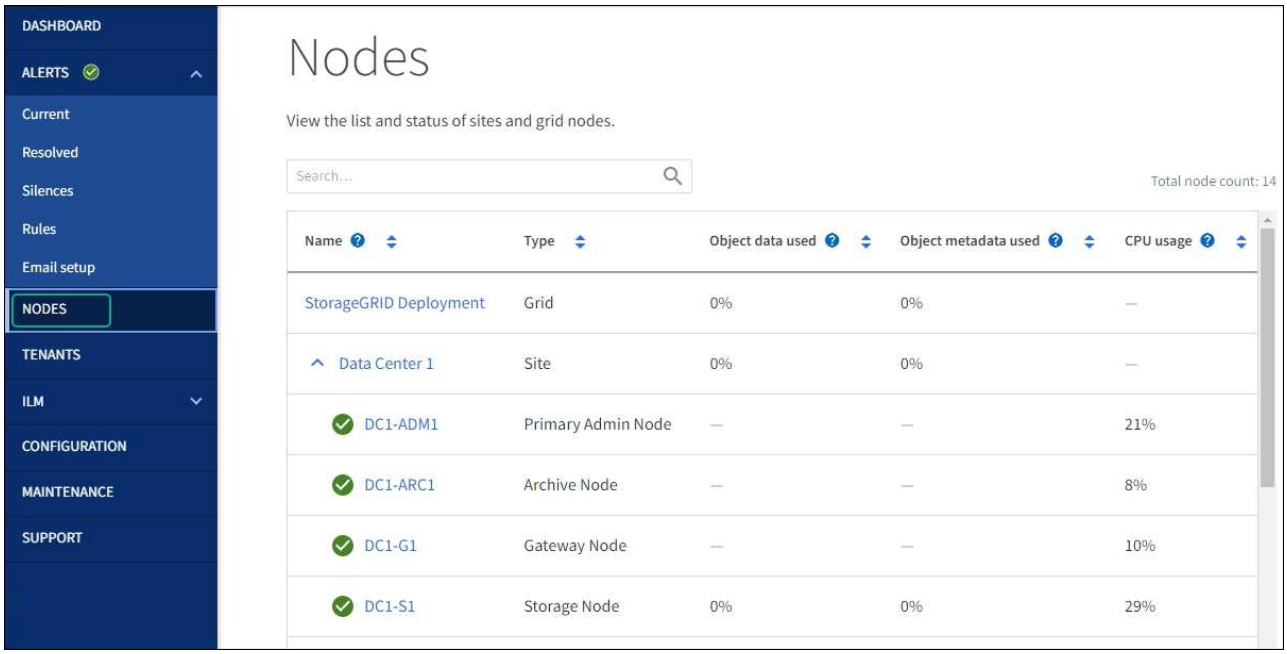
5. After node data is decrypted, reboot the node. From the StorageGRID Appliance Installer, select **Advanced** > **Reboot Controller**, and then select one of these options:

- Select **Reboot into StorageGRID** to reboot the controller with the node rejoining the grid. Select this option if you are done working in maintenance mode and are ready to return the node to normal operation.
- Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. (This option is available only when the controller is in maintenance mode.) Select this option if there are additional maintenance operations you need to perform on the node before rejoining the grid.



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

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



Update MAC address references

In some cases you might need to update MAC address references after the replacement of an appliance.

About this task

If any of the network interfaces on an appliance you are replacing are configured for DHCP, you might need to update the permanent DHCP lease assignments on the DHCP servers to reference the MAC addresses of the replacement appliance. The update ensures the replacement appliance is assigned the expected IP addresses.

Steps

1. Locate the label on the front of the appliance. The label lists the MAC address for the BMC management port of the appliance.
2. 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 =**.

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

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

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

Monitor node encryption in maintenance mode

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

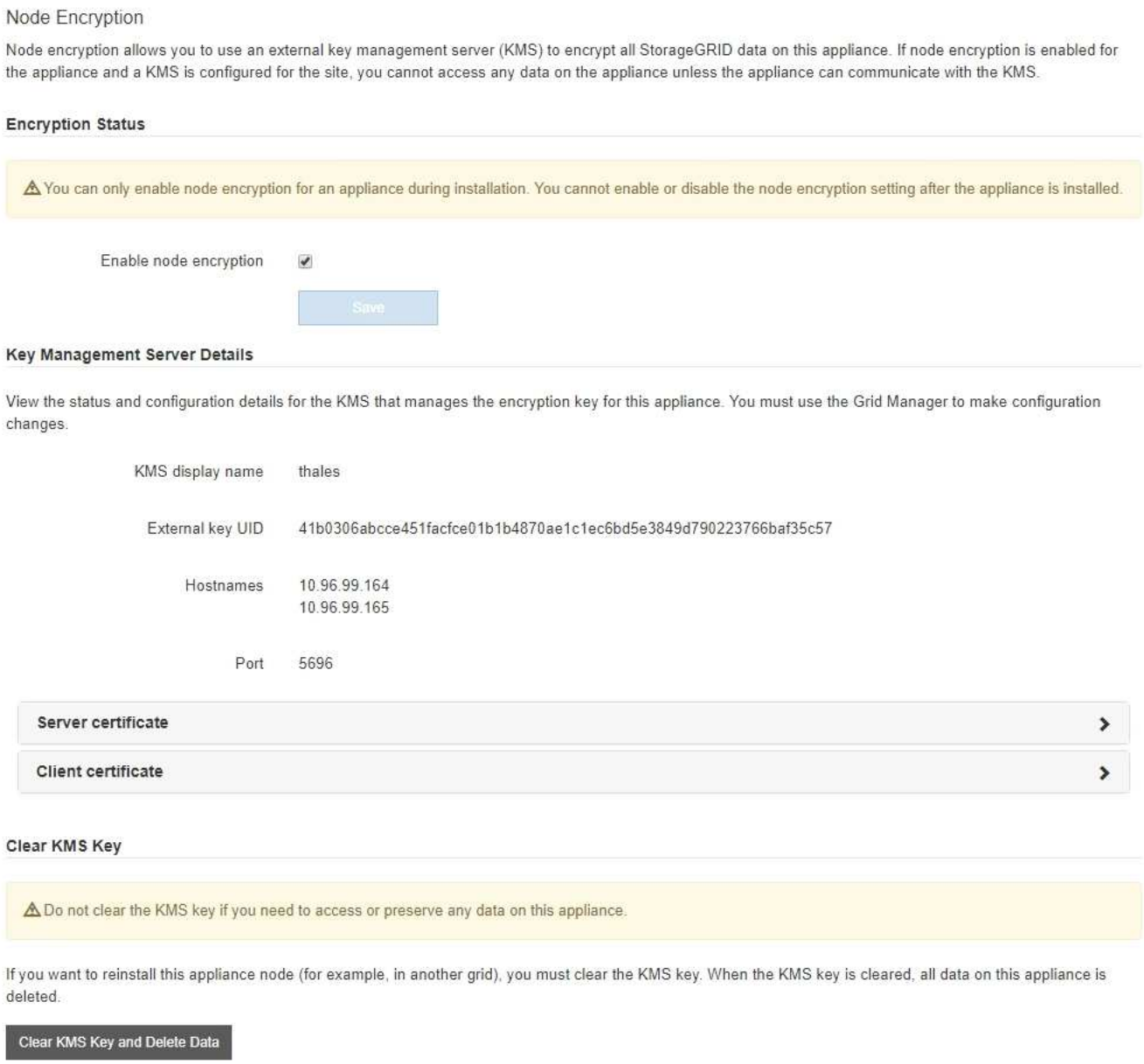
See Configure key management servers for information about implementing KMS for StorageGRID appliances.

Before you begin

- You enabled node encryption for the appliance during installation. You can't enable node encryption after the appliance is installed.
- You have placed the appliance into maintenance mode.

Steps

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



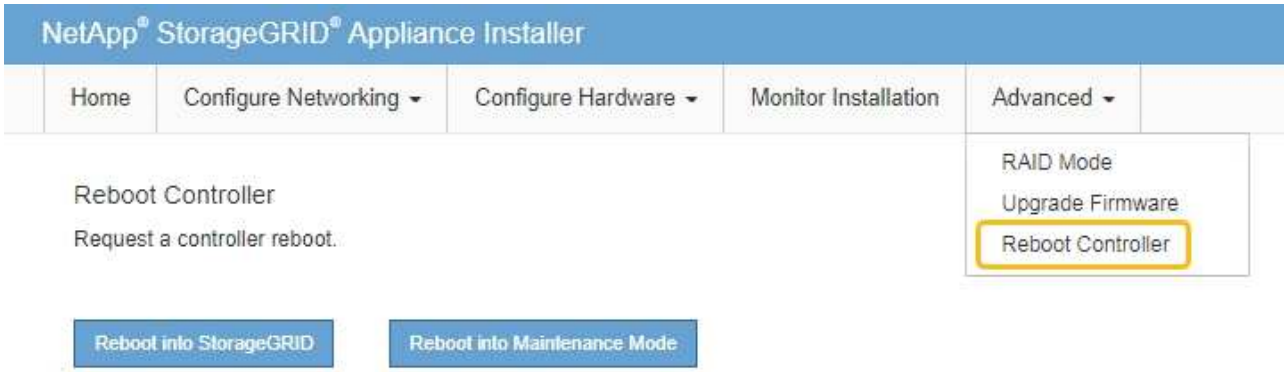
The Node Encryption page includes three sections:

- Encryption Status shows whether node encryption is enabled or disabled for the appliance.
- Key Management Server Details shows information about the KMS being used to encrypt the appliance. You can expand the server and client certificate sections to view certificate details and status.
  - To address issues with the certificates themselves, such as renewing expired certificates, see the instructions for configuring KMS.
  - If there are unexpected problems connecting to KMS hosts, verify that the DNS servers are correct and that appliance networking is correctly configured.
  - If you are unable to resolve your certificate issues, contact technical support.
- Clear KMS Key disables node encryption for the appliance, removes the association between the appliance and the key management server that was configured for the StorageGRID site, and deletes all data from the appliance. You must clear the KMS key before you can install the appliance into

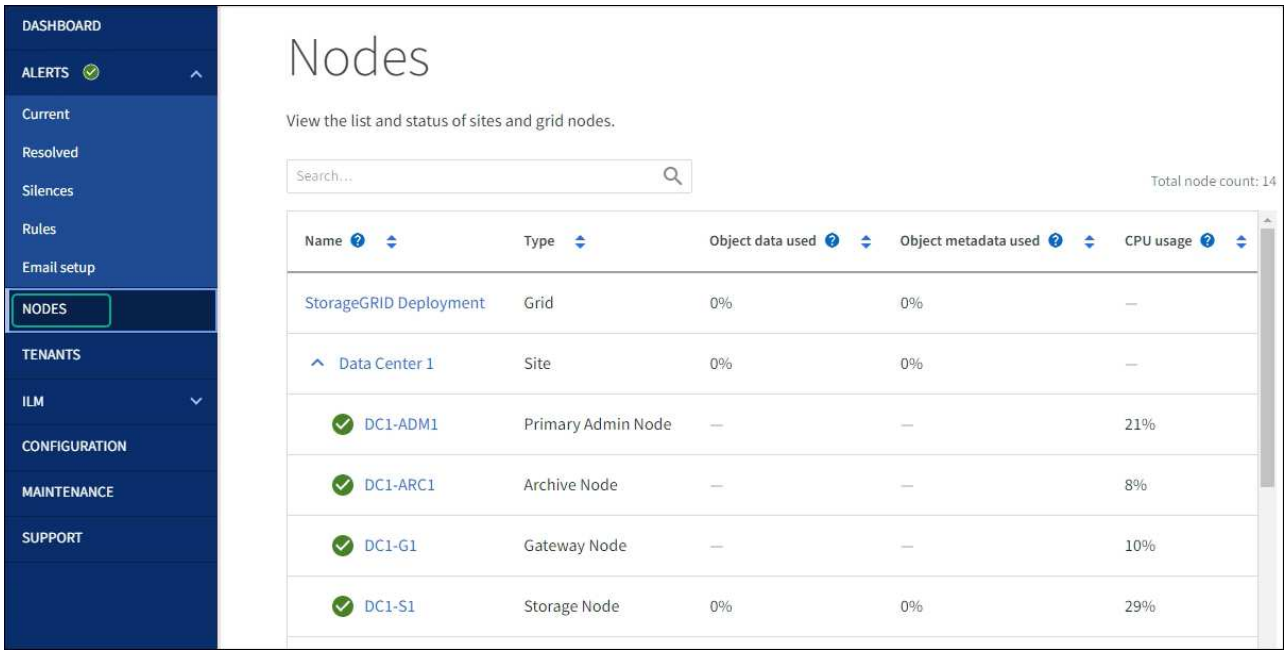
another StorageGRID system.

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

2. When you are done checking node-encryption status, reboot the node. From the StorageGRID Appliance Installer, select **Advanced** > **Reboot Controller**, and then select one of these options:
   - Select **Reboot into StorageGRID** to reboot the controller with the node rejoining the grid. Select this option if you are done working in maintenance mode and are ready to return the node to normal operation.
   - Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. (This option is available only when the controller is in maintenance mode.) Select this option if there are additional maintenance operations you need to perform on the node before rejoining the grid.



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



Clear key management server configuration

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

Before you begin

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

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

Decommission the node to move any data it contains to other nodes in StorageGRID.

About this task

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

You must clear the KMS configuration:

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

  > Don't clear the KMS configuration if you plan to reinstall an appliance node in a StorageGRID system that uses the same KMS key.

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

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

Steps

1. Open a browser, and enter one of the IP addresses for the appliance's compute controller.

   `https://`*`Controller_IP`*`:8443`

   `Controller_IP` is the IP address of the compute controller (not the storage controller) on any of the three StorageGRID networks.

   The StorageGRID Appliance Installer Home page appears.

2. Select **Configure Hardware** > **Node Encryption**.

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

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

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

5. Open a browser, and enter one of the IP addresses for the appliance's compute controller.
   `https://`*`Controller_IP`*`:8443`

   `Controller_IP` is the IP address of the compute controller (not the storage controller) on any of the three StorageGRID networks.

   The StorageGRID Appliance Installer Home page appears.

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

   Node encryption can't be reenabled on the appliance until it is reinstalled in a grid.

After you finish

After the appliance reboots and you have verified that KMS has been cleared and that the appliance is in a pre-install state, you can physically remove the appliance from your StorageGRID system. See the instructions for preparing the appliance for reinstallation.

Appliance node cloning

Appliance node cloning: Overview

You can clone an appliance node in StorageGRID to use an appliance of newer design or

increased capabilities. Cloning transfers all information about the existing node to the new appliance, provides a hardware-upgrade process that is easy to perform, and provides an alternative to decommissioning and expansion for replacing appliances.

Appliance node cloning lets you easily replace an existing appliance node (source) in your grid with a compatible appliance (target) that is part of the same logical StorageGRID site. The process transfers all data to the new appliance, placing it in service to replace the old appliance node and leaving the old appliance in a pre-install state.

Why clone an appliance node?

You can clone an appliance node if you need to:

- Replace appliances that are reaching end-of-life.
- Upgrade existing nodes to take advantage of improved appliance technology.
- Increase grid storage capacity without changing the number of Storage Nodes in your StorageGRID system.
- Improve storage efficiency, such as by changing the RAID mode from DDP-8 to DDP-16, or to RAID-6.
- Efficiently implement node encryption to allow the use of external key management servers (KMS).

Which StorageGRID network is used?

Cloning transfers data from the source node directly to the target appliance over any of the three StorageGRID networks. The Grid Network is typically used, but you can also use the Admin Network or the Client Network if the source appliance is connected to these networks. Choose the network to use for cloning traffic that provides the best data-transfer performance without degrading StorageGRID network performance or data availability.

When you install the replacement appliance, you must specify temporary IP addresses for StorageGRID connection and data transfer. Because the replacement appliance will be part of the same networks as the appliance node it replaces, you must specify temporary IP addresses for each of these networks on the replacement appliance.

Target appliance compatibility

Replacement appliances must be the same type as the source node they are replacing and both must be part of the same logical StorageGRID site.

- A replacement services appliance can be different than the Admin Node or Gateway Node it is replacing.
  - You can clone an SG100 source node appliance to an SG1000 services target appliance to give the Admin Node or Gateway Node greater capability.
  - You can clone an SG1000 source node appliance to an SG100 services target appliance to redeploy the SG1000 for a more demanding application.

    For example, if an SG1000 source node appliance is being used as an Admin Node and you want to use it as a dedicated load-balancing node.

  - Replacing an SG1000 source node appliance with an SG100 services target appliance reduces the maximum speed of the network ports from 100-GbE to 25-GbE.
  - The SG100 and SG1000 appliances have different network connectors. Changing the appliance type might require replacing the cables or SFP modules.

- A replacement storage appliance must have greater capacity than the Storage Node it is replacing.
  - If the target storage appliance has the same number of drives as the source node, the drives in the target appliance must have greater capacity (in TB).
  - If you plan to use the same RAID mode on the target node as was used on the source node, or a less storage efficient RAID mode (for example, switching from RAID 6 to DDP), the drives in the target appliance must be larger (in TB) than the drives in the source appliance.
  - If the number of standard drives installed in a target storage appliance is less than the number of drives in the source node, due to installation of solid-state drives (SSDs), the overall storage capacity of the standard drives in the target appliance (in TB) must exceed the total functional drive capacity of all drives in the source Storage Node.

    For example, when cloning an SG5760 source Storage Node appliance with 60 drives to an SG6060 target appliance with 58 standard drives, larger drives should be installed in the SG6060 target appliance before cloning to maintain storage capacity. (The two drive slots containing SSDs in the target appliance aren't included in the total appliance-storage capacity.)

    However, if a 60-drive SG5760 source node appliance is configured with SANtricity Dynamic Disk Pools DDP-8, configuring a 58-drive same-size-drive SG6060 target appliance with DDP-16 might make the SG6060 appliance a valid clone target due to its improved storage efficiency.

    You can view information about the current RAID mode of the source appliance node on the **NODES** page in Grid Manager. Select the **Storage** tab for the appliance.
- The number of volumes in a target storage appliance must be greater than or equal to the number of volumes in the source node. You cannot clone a source node with 16 object store volumes (rangedb) to a target storage appliance with 12 object store volumes even if the target appliance has larger capacity than the source node. Most storage appliances have 16 object store volumes, except the SGF6112 storage appliance that has only 12 object store volumes.

What information is not cloned?

The following appliance configurations don't transfer to the replacement appliance during cloning. You must configure them during initial set up of the replacement appliance.

- BMC interface
- Network links
- Node encryption status
- SANtricity System Manager (for Storage Nodes)
- RAID mode (for Storage Nodes)

What issues prevent cloning?

If any of the following issues are encountered while cloning, the cloning process halts and an error message is generated:

- Wrong network configuration
- Lack of connectivity between the source and target appliances
- Source and target appliance incompatibility
- For Storage Nodes, a replacement appliance of insufficient capacity

You must resolve each issue for cloning to continue.

Considerations and requirements for appliance node cloning

Before cloning an appliance node, you must understand the considerations and requirements.

Hardware requirements for the replacement appliance

Ensure that the replacement appliance meets the following criteria:

- The source node (appliance being replaced) and the target (new) appliance must be the same type of appliance:
  - You can only clone an Admin Node appliance or a Gateway Node appliance to a new services appliance.
  - You can only clone a Storage Node appliance to a new storage appliance.
- For Admin Node or Gateway Node appliances, the source node appliance and the target appliance don't need to be the same type of appliance; however, changing the appliance type might require replacing the cables or SFP modules.

  For example, you can replace a SG1000 node appliance with a SG100 or replace a SG100 appliance with a SG1000 appliance.

- For Storage Node appliances, the source node appliance and the target appliance don't need to be the same type of appliance; however:
  - The target appliance must have greater storage capacity than the source appliance.

    For example, you can replace a SG5700 node appliance with a SG6000 appliance.

  - The target appliance must have an equal or greater number of object storage volumes than the source appliance.

    For example, you cannot replace a SG6000 node appliance (16 object store volumes) with a SGF6112 appliance (12 object store volumes).

Contact your StorageGRID sales representative for help choosing compatible replacement appliances to clone specific appliance nodes in your StorageGRID installation.

Prepare to clone an appliance node

You must have the following information before you clone an appliance node:

- Obtain a temporary IP address for the Grid Network from your network administrator for use with the target appliance during initial installation. If the source node belongs to an Admin Network or Client Network, obtain temporary IP addresses for these networks.

  Temporary IP addresses are normally on the same subnet as the source node appliance being cloned and aren't needed after cloning completes. The source and target appliances must both connect to the primary Admin Node of your StorageGRID to establish a cloning connection.

- Determine which network to use for cloning data-transfer traffic that provides the best data-transfer performance without degrading StorageGRID network performance or data availability.

> Using the 1-GbE Admin Network for clone data transfer results in slower cloning.

- Determine if node encryption using a key management server (KMS) will be used on the target appliance, so that you can enable node encryption during initial target appliance installation before cloning. You can check if node encryption is enabled on the source appliance node as described in the enabling node encryption.

  The source node and target appliance can have different node-encryption settings. Data decryption and encryption is performed automatically during data transfer and when the target node restarts and joins the grid.

- Determine if the RAID mode on the target appliance should be changed from its default setting, so you can specify this information during initial target appliance installation before cloning. You can view information about the current RAID mode of the source appliance node on the **NODES** page in Grid Manager. Select the **Storage** tab for the appliance.

  The source node and target appliance can have different RAID settings.

- Plan for sufficient time to complete the node cloning process. Several days might be required to transfer data from an operational Storage Node to a target appliance. Schedule cloning at a time that minimizes the impact to your business.
- You should only clone one appliance node at a time. Cloning can prevent you from performing other StorageGRID maintenance functions at the same time.
- After you have cloned an appliance node, you can use the source appliance that was returned to a pre-install state as the target to clone another compatible node appliance.

Clone appliance node

The cloning process might take several days to transfer data between the source node (appliance being replaced) and the target (new) appliance.

Before you begin

- You have installed the compatible target appliance into a cabinet or rack, connected all cables, and applied power.
- You have verified that the StorageGRID Appliance Installer version on the replacement appliance matches the software version of your StorageGRID system, upgrading the StorageGRID Appliance Installer firmware, if necessary.
- You have configured the target appliance, including configuring StorageGRID connections, SANtricity System Manager (storage appliances only), and the BMC interface.
  - When configuring StorageGRID connections, use the temporary IP addresses.
  - When configuring network links, use the final link configuration.

> Leave the StorageGRID Appliance Installer open after you complete initial target appliance configuration. You will return to the target appliance's installer page after you start the node cloning process.

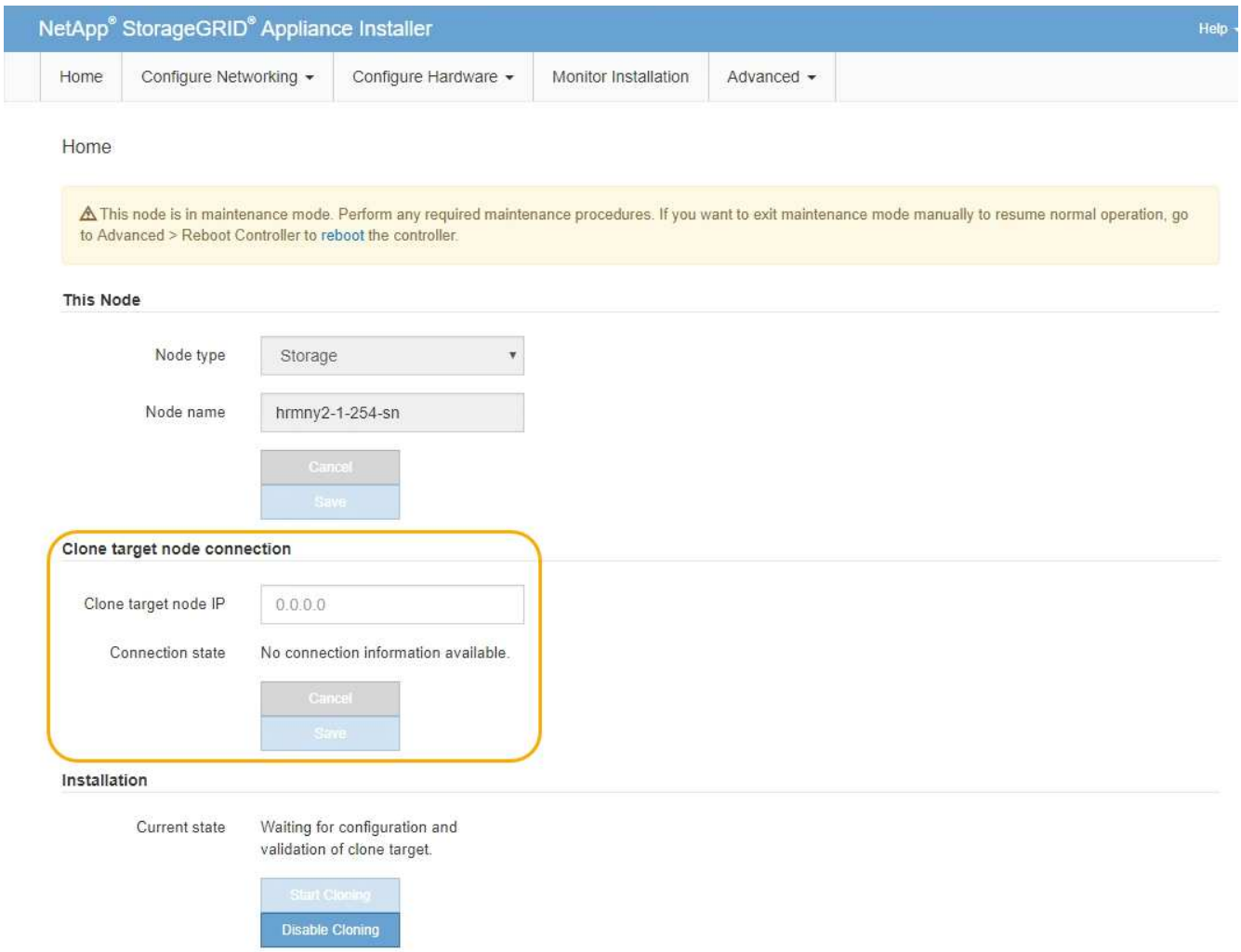
- You have optionally enabled node encryption for the target appliance.
- You have optionally set the RAID mode for the target appliance (storage appliances only).
- You have reviewed the considerations and requirements for appliance node cloning.

You should clone only one appliance node at a time to maintain StorageGRID network performance and data availability.

Steps

1. Place the source node you are cloning into maintenance mode.
2. From the StorageGRID Appliance Installer on the source node, in the Installation section of the Home page, select **Enable Cloning**.

   The Primary Admin Node connection section is replaced with the Clone target node connection section.



3. For **Clone target node IP**, enter the temporary IP address assigned to the target node for the network to use for clone data-transfer traffic, and then select **Save**.

   Typically, you enter the IP address for the Grid Network, but if you need to use a different network for clone data-transfer traffic, enter the IP address of the target node on that network.

   > Using the 1-GbE Admin Network for clone data transfer results in slower cloning.

   After the target appliance is configured and validated, in the Installation section, **Start Cloning** is enabled on the source node.

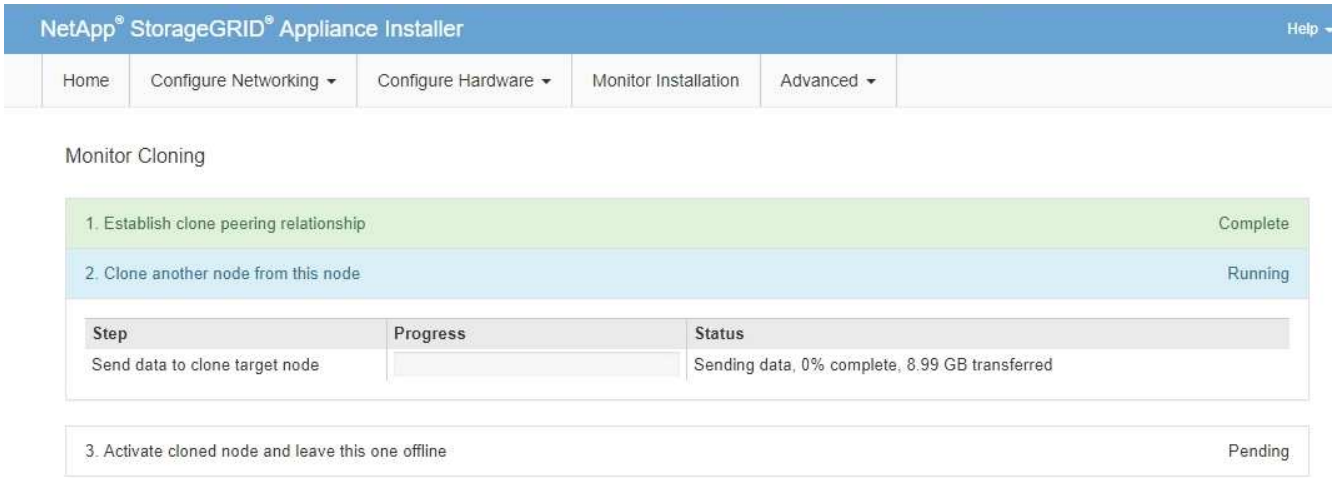
   If issues exist that prevent cloning, **Start Cloning** is not enabled and issues that you must resolve are

listed as the **Connection state**. These issues are listed on the StorageGRID Appliance Installer Home page of both the source node and the target appliance. Only one issue displays at a time and the state automatically updates as conditions change. Resolve all cloning issues to enable **Start Cloning**.

When **Start Cloning** is enabled, the **Current state** indicates the StorageGRID network that was selected for cloning traffic, along with information about using that network connection. See Considerations and requirements for appliance node cloning.

4. Select **Start Cloning** on the source node.
5. Monitor the cloning progress using the StorageGRID Appliance Installer on either the source or target node.

   The StorageGRID Appliance Installer on both the source and target nodes indicates the same status.



   The Monitor Cloning page provides detailed progress for each stage of the cloning process:

   - **Establish clone peering relationship** shows the progress of cloning set up and configuration.
   - **Clone another node from this node** shows the progress of data transfer. (This part of the cloning process can take several days to complete.)
   - **Activate cloned node and leave this one offline** shows the progress of transferring control to the target node and placing the source node in a pre-install state, after data transfer is complete.
6. If you need to terminate the cloning process and return the source node to service before cloning is complete, on the source node go to the StorageGRID Appliance Installer Home page and select **Advanced** > **Reboot Controller**, and then select **Reboot into StorageGRID**.

   If the cloning process is terminated:

   - The source node exits maintenance mode and rejoins StorageGRID.
   - The target node remains in the pre-install state. To restart cloning the source node, start the cloning process again from step 1.

When cloning successfully completes:

- The source and target nodes swap IP addresses:
  - The target node now uses the IP addresses originally assigned to the source node for the Grid, Admin, and Client Networks.

    - The source node now uses the temporary IP address initially assigned to the target node.
- The target node exits maintenance mode and joins StorageGRID, replacing the source node.
- The source appliance is in a pre-installed state, as if you had prepared it for reinstallation.

> If the appliance does not rejoin the grid, go to the StorageGRID Appliance Installer Home page for the source node, select **Advanced** > **Reboot Controller**, and then select **Reboot into Maintenance Mode**. After the source node reboots in maintenance mode, repeat the node cloning procedure.

- User data remains on the source appliance as a recovery option if an unexpected issue occurs with the target node. After the target node has successfully rejoined StorageGRID, user data on the source appliance is outdated and is no longer needed.

  Outdated user data is overwritten when you install or expand the source appliance as a new node in another grid.

  You can also reset the controller configuration on the source appliance to make this data inaccessible:

  1. Open the StorageGRID Appliance Installer for the source appliance using the temporary IP address initially assigned to the target node.
  2. Select **Help** > **Support and Debug Tools**.
  3. Select **Reset Storage Controller Configuration**.

  > If needed, contact technical support for assistance resetting the storage controller configuration.

  > Overwriting the data or resetting the controller configuration makes the outdated data difficult or impossible to retrieve; however, neither method securely removes the data from the source appliance. If a secure erase is required, use a data-wiping tool or service to permanently and securely remove data from the source appliance.

You can:

- Use the source appliance as a target for additional cloning operations: no additional configuration is required. This appliance already has the temporary IP address assigned that were originally specified for the first clone target.
- Install and set up the source appliance as a new appliance node.
- Discard the source appliance if it is no longer of use with StorageGRID.