Add grid nodes or site

StorageGRID

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Add grid nodes or site

Add grid nodes to existing site or add new site

Follow this procedure to add grid nodes to existing sites or to add a new site. You can only perform one type of expansion at a time.

Before you begin

- You have the Root access or Maintenance permission.
- All existing nodes in the grid are up and running across all sites.
- Any previous expansion, upgrade, decommissioning, or recovery procedures are complete.

> ⓘ You are prevented from starting an expansion while another expansion, upgrade, recovery, or active decommission procedure is in progress. However, if necessary, you can pause a decommission procedure to start an expansion.

Steps

1. Update subnets for Grid Network.
2. Deploy new grid nodes.
3. Perform expansion.

Update subnets for Grid Network

When you add grid nodes or a new site in an expansion, you might need to update or add subnets to the 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.

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 any of the new nodes has a Grid Network IP address on a subnet not previously used, you must add the new subnet to the Grid Network subnet list before starting the expansion. Otherwise, you will have to cancel the expansion, add the new subnet, and start the procedure again.

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. 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.

Deploy new grid nodes

The steps for deploying new grid nodes in an expansion are the same as the steps used when the grid was first installed. You must deploy all new grid nodes before you can perform the expansion.

When you expand a grid, the nodes you add don't have to match the existing node types. You can add VMware nodes, Linux container-based nodes, or appliance nodes.

VMware: Deploy grid nodes

You must deploy a virtual machine in VMware vSphere for each VMware node you want to add in the expansion.

Steps

1. Deploy the new node as virtual machine and connect it to one or more StorageGRID networks.

   When you deploy the node, you can optionally remap node ports or increase CPU or memory settings.

2. After you have deployed all new VMware nodes, perform the expansion procedure.

Linux: Deploy grid nodes

You can deploy grid nodes on new Linux hosts or on existing Linux hosts. If you need additional Linux hosts to support the CPU, RAM, and storage requirements of the StorageGRID nodes you want to add to your grid, you prepare them in the same way you prepared the hosts when you first installed them. Then, you deploy the expansion nodes in the same way you deployed grid nodes during installation.

Before you begin

- You have the instructions for installing StorageGRID for your version of Linux, and you have reviewed the hardware and storage requirements.
  - Install StorageGRID on Red Hat Enterprise Linux
  - Install StorageGRID on Ubuntu or Debian
- If you plan to deploy new grid nodes on existing hosts, you have confirmed the existing hosts have enough CPU, RAM, and storage capacity for the additional nodes.
- You have a plan to minimize failure domains. For example, you should not deploy all Gateway Nodes on a single physical host.

  > In a production deployment, don't run more than one Storage Node on a single physical or virtual host. Using a dedicated host for each Storage Node provides an isolated failure domain.

- If the StorageGRID node uses storage assigned from a NetApp ONTAP system, confirm that the volume does not have a FabricPool tiering policy enabled. Disabling FabricPool tiering for volumes used with StorageGRID nodes simplifies troubleshooting and storage operations.

Steps

1. If you are adding new hosts, access the installation instructions for deploying StorageGRID nodes.
2. To deploy the new hosts, follow the instructions for preparing the hosts.
3. To create node configuration files and to validate the StorageGRID configuration, follow the instructions for deploying grid nodes.
4. If you are adding nodes to a new Linux host, start the StorageGRID host service.
5. If you are adding nodes to an existing Linux host, start the new nodes using the storagegrid host service CLI:`sudo storagegrid node start [<node name\>]`

After you finish

After deploying all new grid nodes, you can perform the expansion.

Appliances: Deploying Storage, Gateway, or non-primary Admin Nodes

To install the StorageGRID software on an appliance node, you use the StorageGRID Appliance Installer, which is included on the appliance. In an expansion, each storage appliance functions as a single Storage Node, and each services appliance functions as a single Gateway Node or non-primary Admin Node. Any appliance can connect to the Grid Network, the Admin Network, and the Client Network.

Before you begin

- The appliance has been installed in a rack or cabinet, connected to your networks, and powered on.
- You have completed the Set up hardware steps.

  Setting up appliance hardware includes the required steps for configuring StorageGRID connections (network links and IP addresses) as well the optional steps for enabling node encryption, changing the RAID mode, and remapping network ports.

- All Grid Network subnets listed on the IP Configuration page of the StorageGRID Appliance Installer have been defined in the Grid Network Subnet List on the primary Admin Node.
- The StorageGRID Appliance Installer firmware on the replacement appliance is compatible with the StorageGRID software version currently running on your grid. If the versions aren't compatible, you must upgrade the StorageGRID Appliance Installer firmware.
- You have a service laptop with a supported web browser.
- You know one of the IP addresses assigned to the appliance's compute controller. You can use the IP address for any attached StorageGRID network.

About this task

The process of installing StorageGRID on an appliance node has the following phases:

- You specify or confirm the IP address of the primary Admin Node and the name of the appliance node.
- You start the installation and wait as volumes are configured and the software is installed.

  Partway through appliance installation tasks, the installation pauses. To resume the installation, you sign into the Grid Manager, approve all grid nodes, and complete the StorageGRID installation process.

> If you need to deploy multiple appliance nodes at one time, you can automate the installation process by using the `configure-sga.py` Appliance Installation Script.

Steps

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

   `https://Controller_IP:8443`

   The StorageGRID Appliance Installer Home page appears.

2. In the **Primary Admin Node** connection section, determine whether you need to specify the IP address for the primary Admin Node.

   If you have previously installed other nodes in this data center, the StorageGRID Appliance Installer can discover this IP address automatically, assuming the primary Admin Node, or at least one other grid node with ADMIN_IP configured, is present on the same subnet.

3. If this IP address is not shown or you need to change it, specify the address:

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

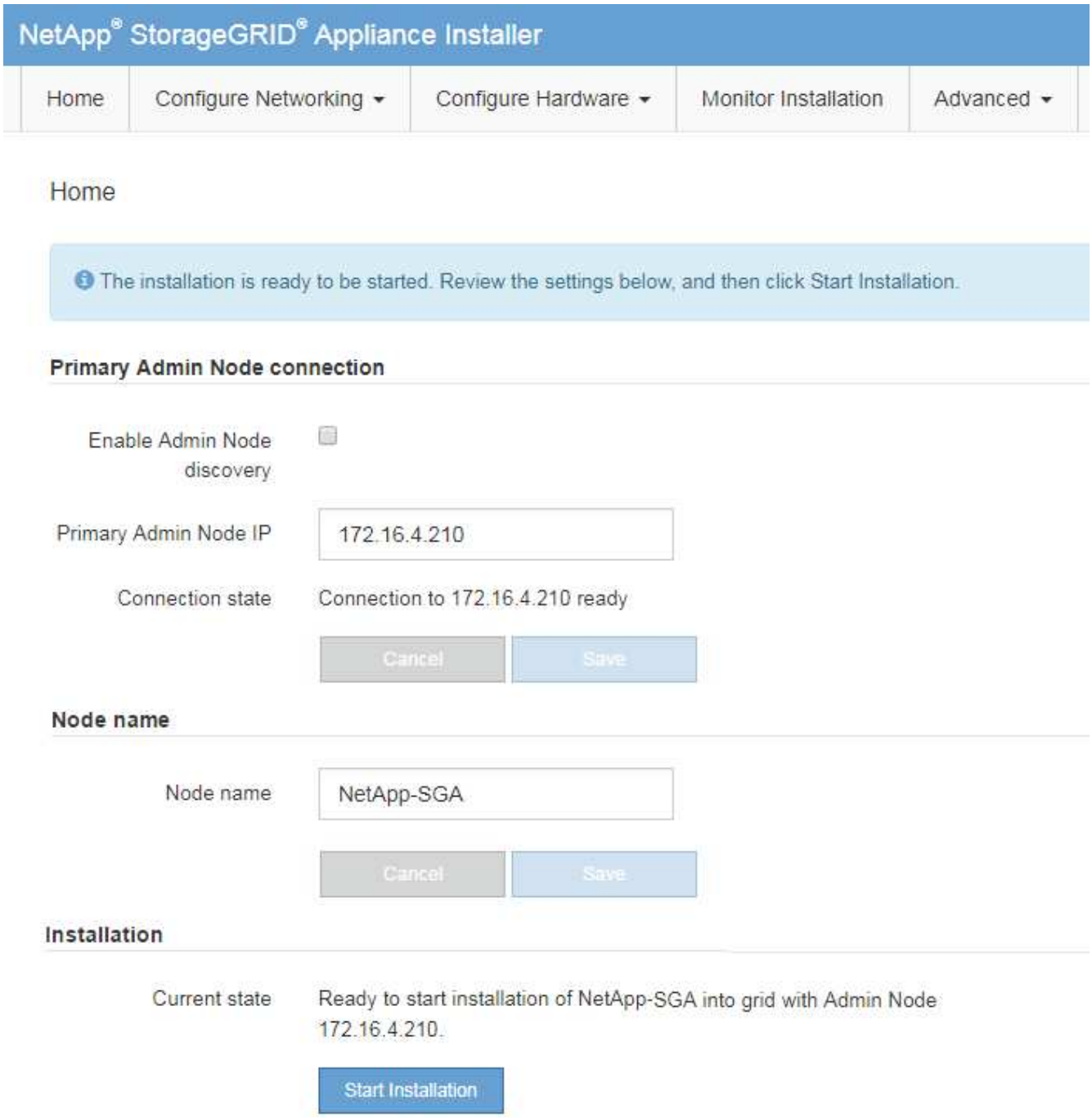
4. In the **Node name** field, enter the name you want to use for this appliance node, and select **Save**.

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

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

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

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



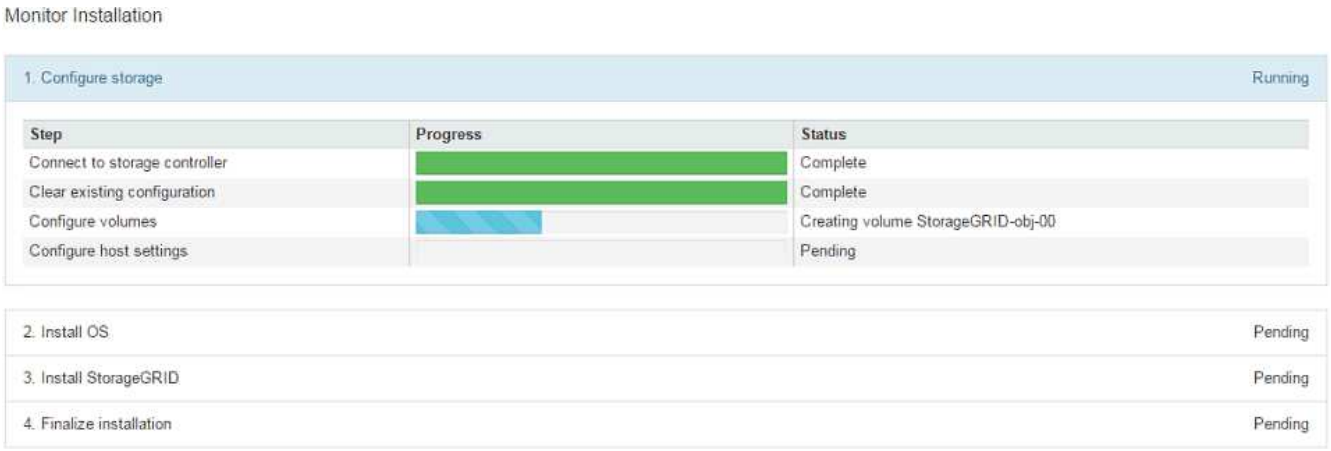
The Current state changes to "Installation is in progress," and the Monitor Installation page is displayed.

7. If your expansion includes multiple appliance nodes, repeat the previous steps for each appliance.

> If you need to deploy multiple appliance Storage Nodes at one time, you can automate the installation process by using the configure-sga.py appliance installation script.

8. If you need to manually access the Monitor Installation page, select **Monitor Installation** from the menu bar.

   The Monitor Installation page shows the installation progress.



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

> The installer ensures that tasks completed in a previous install aren't re-run. If you are re-running an installation, any tasks that don't need to be re-run are shown with a green status bar and a status of "Skipped."

9. Review the progress of first two installation stages.

   1. Configure appliance

   During this stage, one of the following processes occurs:

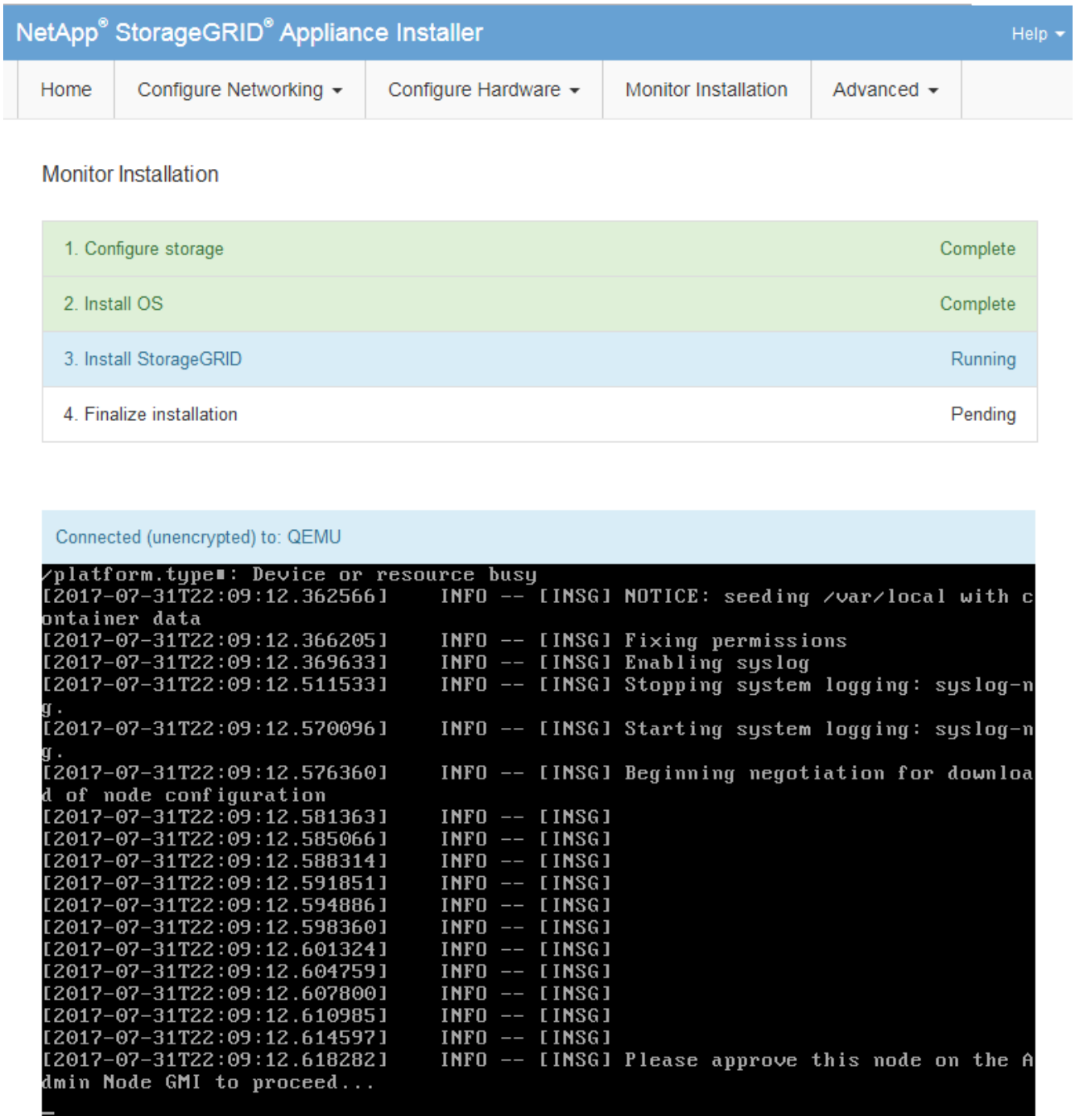
   - For a storage appliance, the installer connects to the storage controller, clears any existing configuration, communicates with SANtricity OS to configure volumes, and configures host settings.
   - For a services appliance, the installer clears any existing configuration from the drives in the compute controller, and configures host settings.

   2. Install OS

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

10. Continue monitoring the installation progress until a message appears in the console window, prompting you to use the Grid Manager to approve the node.

> Wait until all nodes you added in this expansion are ready for approval before going to the Grid Manager to approve the nodes.



Perform expansion

When you perform the expansion, the new grid nodes are added to your existing StorageGRID deployment.

Before you begin

- You are signed in to the Grid Manager using a supported web browser.
- You have the provisioning passphrase.
- You have deployed all of the grid nodes that are being added in this expansion.
- You have the Maintenance or Root access permission.

- If you are adding Storage Nodes, you have confirmed that all data-repair operations performed as part of a recovery are complete. See Check data repair jobs.
- If you are adding Storage Nodes and you want to assign a custom storage grade to those nodes, you have already created the custom storage grade. You also have either the Root access permission or both the Maintenance and ILM permissions.
- If you are adding a new site, you have reviewed and updated ILM rules. You must ensure that object copies aren't stored to the new site until after the expansion is complete. For example, if a rule uses the default storage pool (**All Storage Nodes**), you must create a new storage pool that contains only the existing Storage Nodes and update ILM rules and the ILM policy to use that new storage pool. Otherwise, objects will be copied to the new site as soon as the first node at that site becomes active.

About this task

Performing the expansion includes these main user tasks:

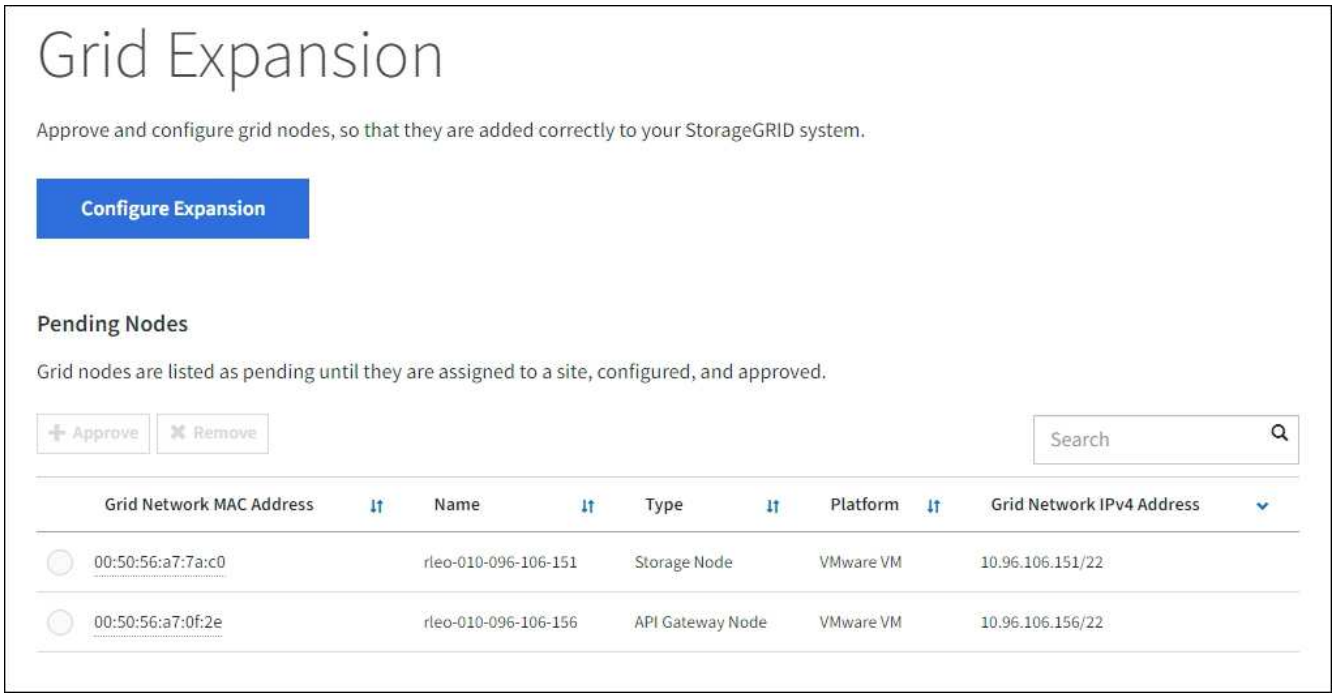
1. Configure the expansion.
2. Start the expansion.
3. Download a new Recovery Package file.
4. Monitor the expansion steps and stages until all new nodes are installed and configured and all services have started.

> Some expansion steps and stages might take a significant amount of time to run on a large grid. For example, streaming Cassandra to a new Storage Node might take only a few minutes if the Cassandra database is empty. However, if the Cassandra database includes a large amount of object metadata, this stage might take several hours or longer. Don't reboot any Storage Nodes during the either the "Expanding the Cassandra cluster" or "Starting Cassandra and streaming data" stages.

Steps

1. Select **MAINTENANCE** > **Tasks** > **Expansion**.

   The Grid Expansion page appears. The Pending Nodes section lists the nodes that are ready to be added.

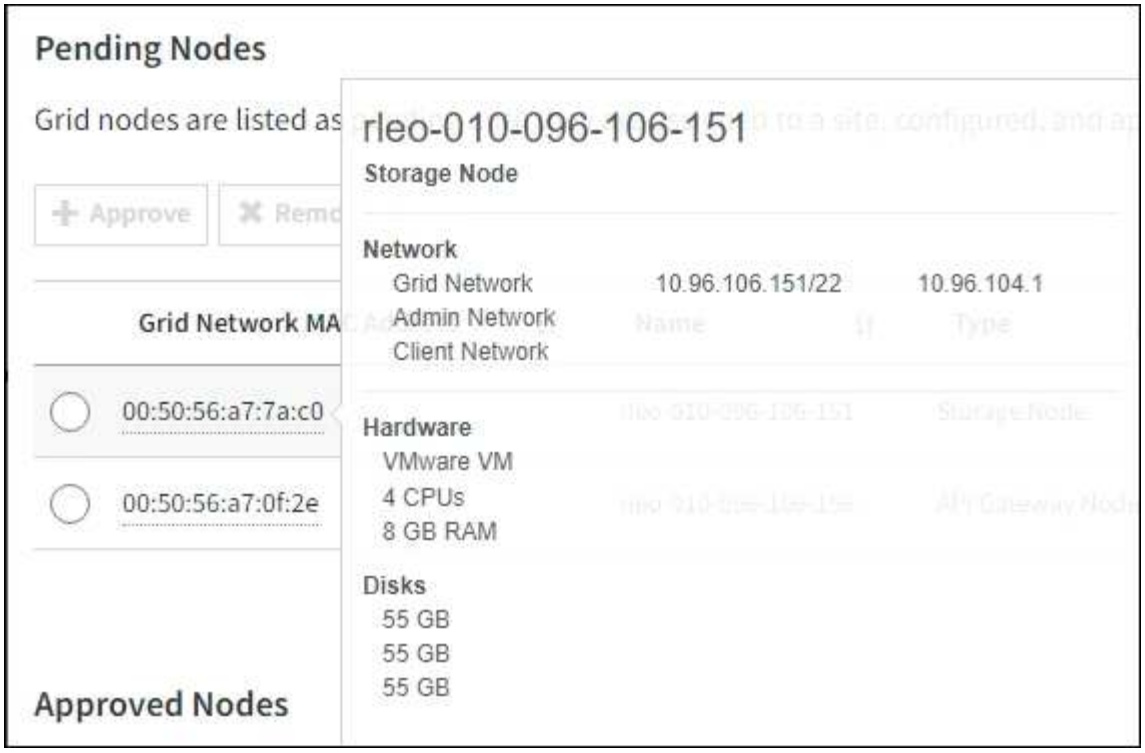


2. Select **Configure Expansion**.

   The Site Selection dialog box appears.

3. Select the type of expansion you are starting:
   - If you are adding a new site, select **New**, and enter the name of the new site.
   - If you are adding one or more nodes to an existing site, select **Existing**.
4. Select **Save**.
5. Review the **Pending Nodes** list, and confirm that it shows all of the grid nodes you deployed.

   As required, you can position your cursor over a node's **Grid Network MAC Address** to see details about that node.



If a node is missing, confirm that it was deployed successfully.

6. From the list of pending nodes, approve the nodes you want to add in this expansion.
   a. Select the radio button next to the first pending grid node you want to approve.
   b. Select **Approve**.

      The grid node configuration form appears.

   c. As required, modify the general settings:

Field	Description
Site	The name of the site the grid node will be associated with. If you are adding multiple nodes, be sure to select the correct site for each node. If you are adding a new site, all nodes are added to the new site.
Name	The system name for the node. System names are required for internal StorageGRID operations and can’t be changed.

Field	Description
NTP Role	The Network Time Protocol (NTP) role of the grid node: • Select **Automatic** (default) to automatically assign the NTP role to the node. The Primary role will be assigned to Admin Nodes, Storage Nodes with ADC services, Gateway Nodes, and any grid nodes that have non-static IP addresses. The Client role will be assigned to all other grid nodes. • Select **Primary** to manually assign the Primary NTP role to the node. At least two nodes at each site should have the Primary role to provide redundant system access to external timing sources. • Select **Client** to manually assign the Client NTP role to the node.
ADC Service (Storage Nodes only)	Whether this Storage Node will run the Administrative Domain Controller (ADC) service. The ADC service keeps track of the location and availability of grid services. At least three Storage Nodes at each site must include the ADC service. You can't add the ADC service to a node after it is deployed. • Select **Yes** if the Storage Node you are replacing includes the ADC service. Because you can't decommission a Storage Node if too few ADC services would remain, this ensures that a new ADC service is available before the old service is removed. • Select **Automatic** to let the system determine whether this node requires the ADC service. Learn about the ADC quorum.
Storage Grade (Storage Nodes only)	Use the **Default** storage grade, or select the custom storage grade you want to assign to this new node. Storage grades are used by ILM storage pools, so your selection can affect which objects will be placed on the Storage Node.

d. As required, modify the settings for the Grid Network, Admin Network, and Client Network.

- **IPv4 Address (CIDR)**: The CIDR network address for the network interface. For example: 172.16.10.100/24

> If you discover that nodes have duplicate IP addresses on the Grid Network while you are approving nodes, you must cancel the expansion, redeploy the virtual machines or appliances with a non-duplicate IP, and restart the expansion.

- **Gateway**: The default gateway of the grid node. For example: 172.16.10.1
- **Subnets (CIDR)**: One or more subnetworks for the Admin Network.

e. Select **Save**.

The approved grid node moves to the Approved Nodes list.

- To modify the properties of an approved grid node, select its radio button, and select **Edit**.
- To move an approved grid node back to the Pending Nodes list, select its radio button, and select **Reset**.
- To permanently remove an approved grid node, power the node off. Then, select its radio button, and select **Remove**.

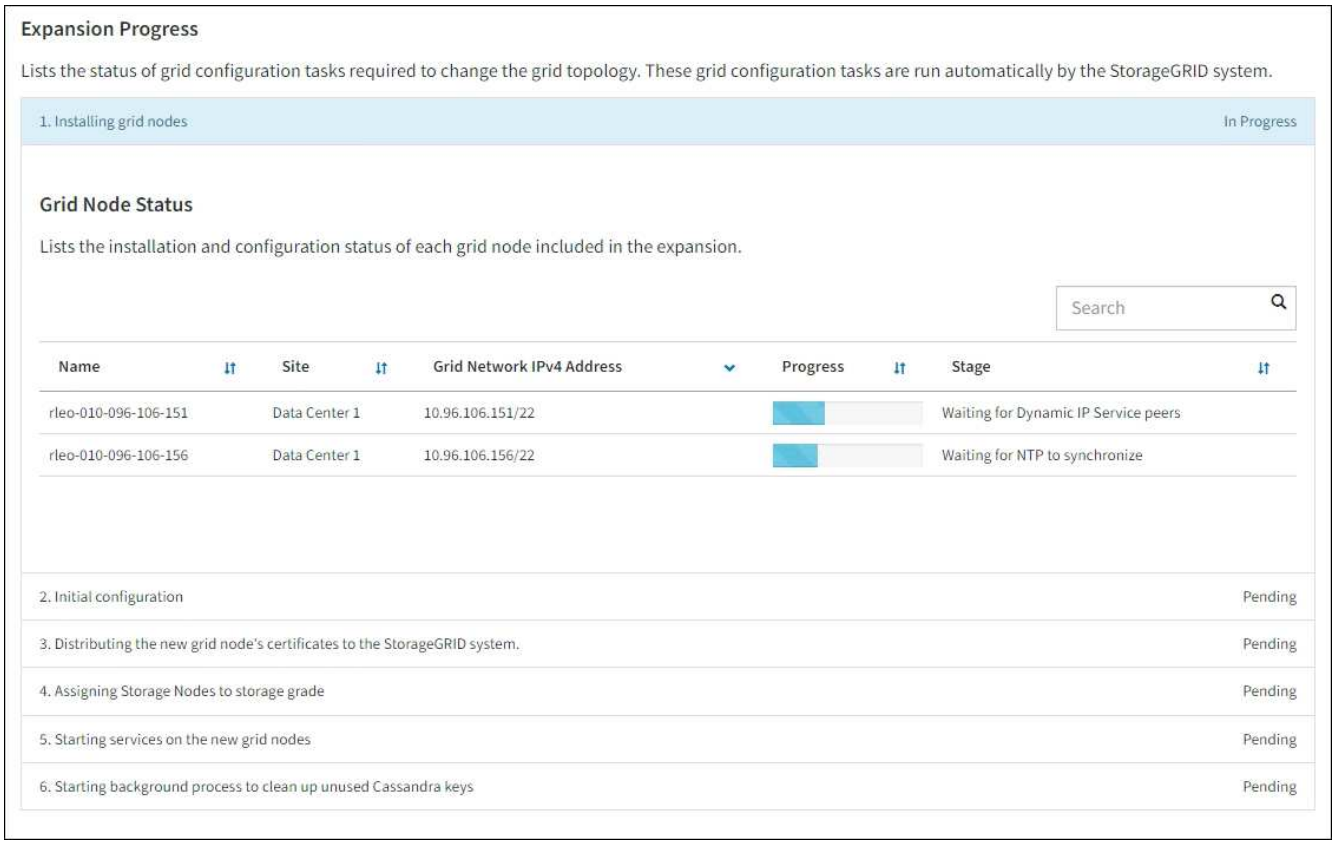
f. Repeat these steps for each pending grid node you want to approve.

> If possible, you should approve all pending grid notes and perform a single expansion. More time will be required if you perform multiple small expansions.

7. When you have approved all grid nodes, enter the **Provisioning Passphrase**, and select **Expand**.

After a few minutes, this page updates to display the status of the expansion procedure. When tasks that affect individual grid nodes are in progress, the Grid Node Status section lists the current status for each grid node.

> During the "Installing grid nodes" step for a new appliance, the StorageGRID Appliance Installer shows installation moving from Stage 3 to Stage 4, Finalize Installation. When Stage 4 completes, the controller is rebooted.



> A site expansion includes an additional task to configure Cassandra for the new site.

8. As soon as the **Download Recovery Package** link appears, download the Recovery Package file.

You must download an updated copy of the Recovery Package file as soon as possible after making grid

topology changes to the StorageGRID system. The Recovery Package file allows you to restore the system if a failure occurs.

a. Select the download link.

b. Enter the provisioning passphrase, and select **Start Download**.

c. When the download completes, open the `.zip` file and confirm that you can access the contents, including the `Passwords.txt` file.

d. Copy the downloaded Recovery Package file (`.zip`) to two safe, secure, and separate locations.

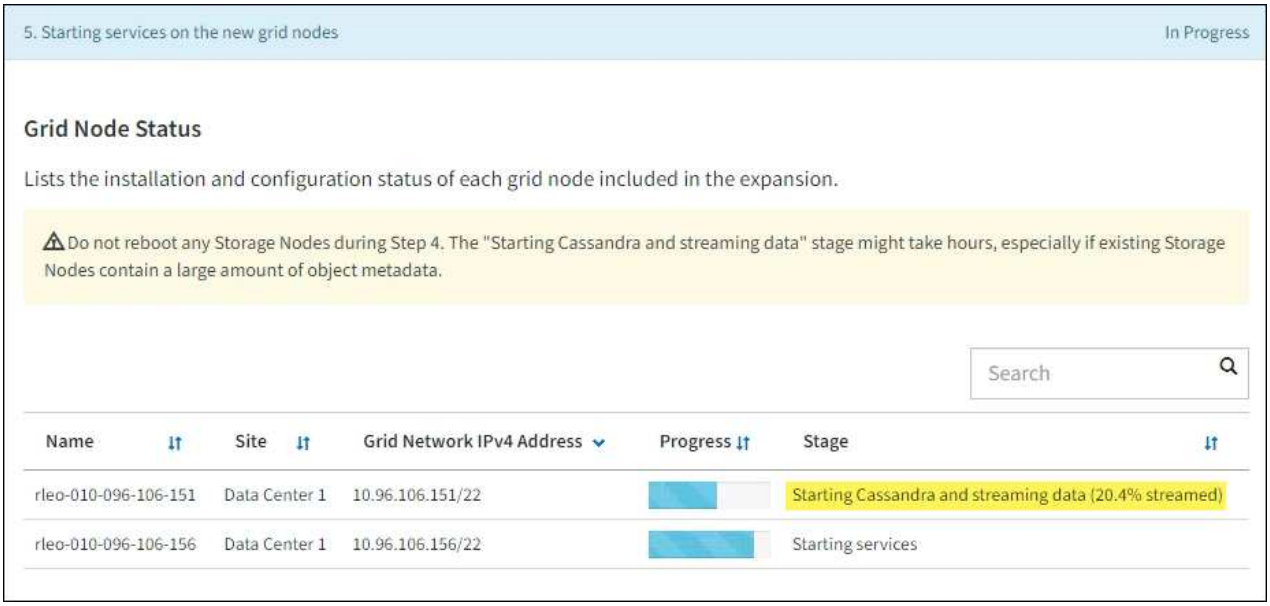
> The Recovery Package file must be secured because it contains encryption keys and passwords that can be used to obtain data from the StorageGRID system.

9. If you are adding Storage Nodes to an existing site or adding a site, monitor the Cassandra stages, which occur when services are started on the new grid nodes.

> Don’t reboot any Storage Nodes during either the "Expanding the Cassandra cluster" or "Starting Cassandra and streaming data" stages. These stages might take many hours to complete for each new Storage Node, especially if existing Storage Nodes contain a large amount of object metadata.

Adding Storage Nodes

If you are adding Storage Nodes to an existing site, review the percentage shown in the "Starting Cassandra and streaming data" status message.



This percentage estimates how complete the Cassandra streaming operation is, based on the total amount of Cassandra data available and the amount that has already been written to the new node.

Adding site

If you are adding a new site, use `nodetool status` to monitor the progress of Cassandra streaming and to see how much metadata has been copied to the new site during the "Expanding the Cassandra cluster" stage. The total Data Load on the new site should be within about 20% of the total of a current site.

10. Continue monitoring the expansion until all tasks are complete and the **Configure Expansion** button reappears.

After you finish

Depending on which types of grid nodes you added, perform additional integration and configuration steps. See Configuration steps after expansion.

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