Deploying a services appliance node

StorageGRID

NetApp
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Deploying a services appliance node

You can deploy a services appliance as a primary Admin Node, a non-primary Admin Node, or a Gateway Node. Both the SG100 and the SG1000 appliances can operate as Gateway Nodes and Admin Nodes (primary or non-primary) at the same time.

Deploying a services appliance as a primary Admin Node

When you deploy a services appliance as a primary Admin Node, you use the StorageGRID Appliance Installer included on the appliance to install the StorageGRID software, or you upload the software version you want to install. You must install and configure the primary Admin Node before you install any other appliance node types. A primary Admin Node can connect to the Grid Network, and to the optional Admin Network and Client Network, if one or both are configured.

What you'll need

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

  If you have remapped any ports, you cannot use the same ports to configure load balancer endpoints. You can create endpoints using remapped ports, but those endpoints will be remapped to the original CLB ports and service, not the Load Balancer service. Follow the steps in the recovery and maintenance instructions for removing port remaps.

  The CLB service is deprecated.

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

About this task

To install StorageGRID on an appliance primary Admin Node:

- You use the StorageGRID Appliance Installer to install the StorageGRID software. If you want to install a different version of the software, you first upload it using the StorageGRID Appliance Installer.
- You wait as the software is installed.
- When the software has been installed, the appliance is rebooted automatically.

Steps

1. Open a browser, and enter the IP address for the appliance.
   `https://services_appliance_IP:8443`

   The StorageGRID Appliance Installer Home page appears.

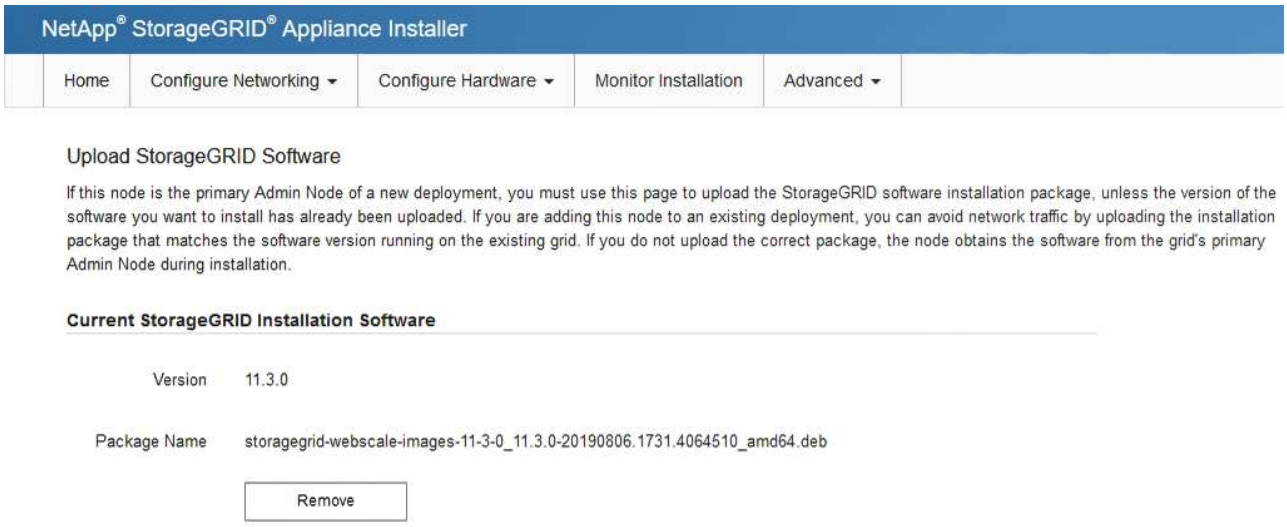
2. In the **This Node** section, select **Primary Admin**.
3. In the **Node name** field, enter the name you want to use for this appliance node, and click **Save**.

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

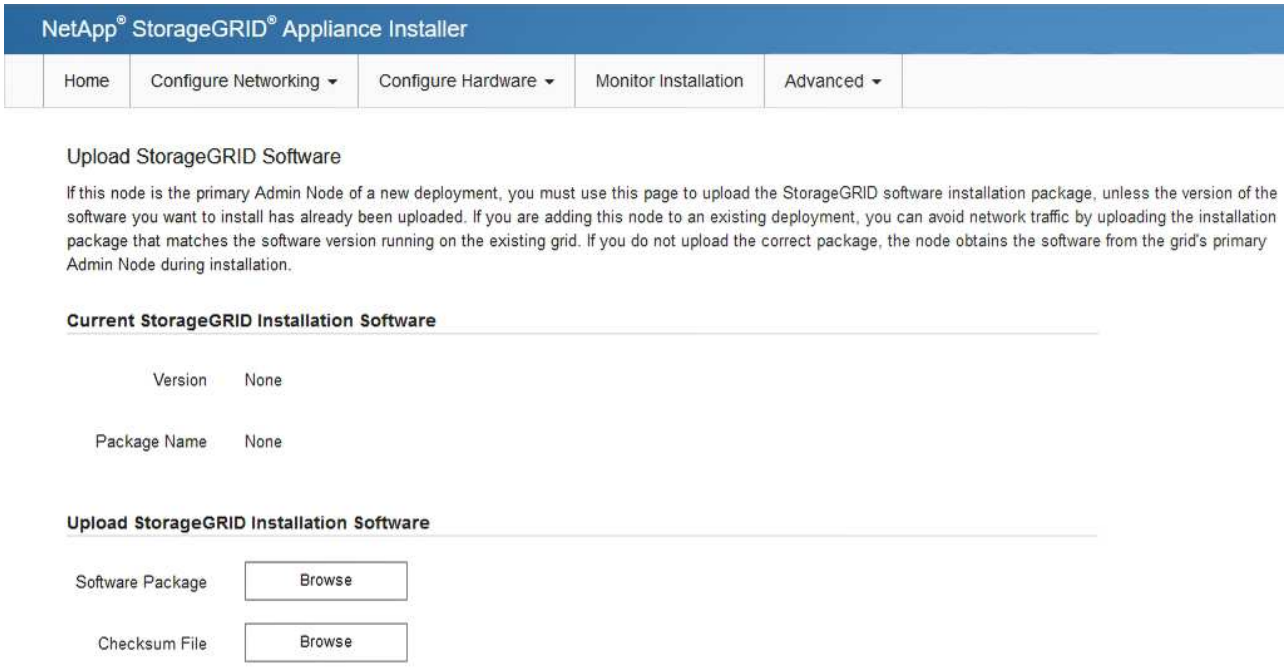
4. Optionally, to install a different version of the StorageGRID software, follow these steps:
   a. Download the installation archive from the NetApp Downloads page for StorageGRID.

      NetApp Downloads: StorageGRID

   b. Extract the archive.
   c. From the StorageGRID Appliance Installer, select **Advanced** > **Upload StorageGRID Software**.
   d. Click **Remove** to remove the current software package.



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



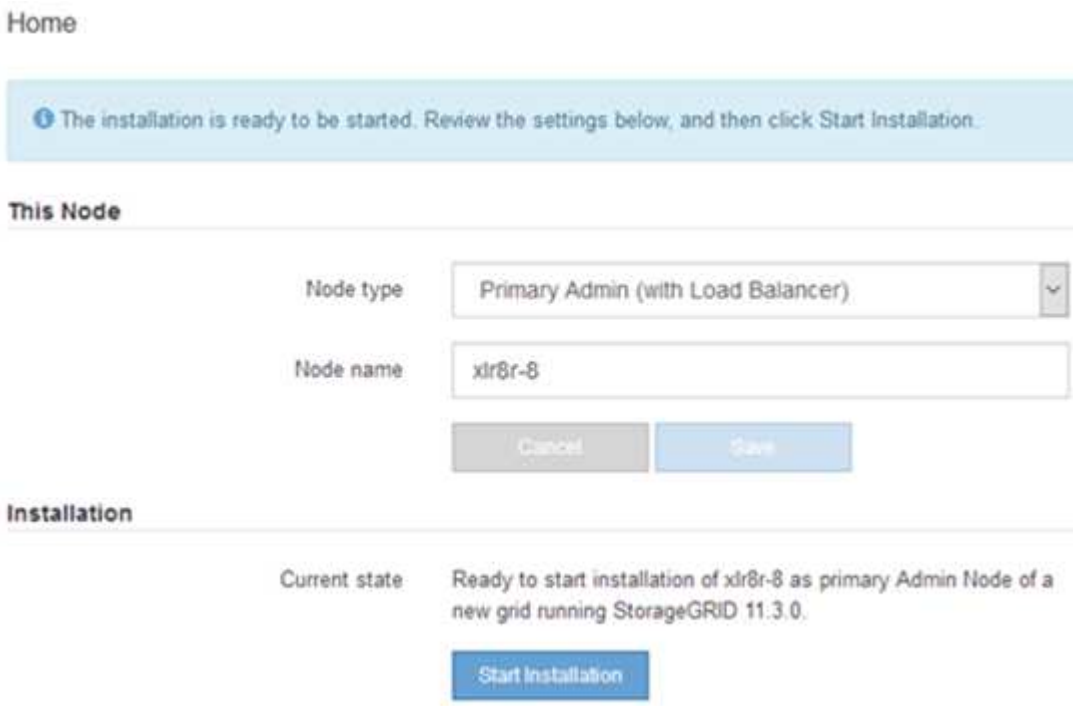
   f. Select **Home** to return to the Home page.

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

   If you are deploying the Admin Node appliance as a node cloning target, stop the deployment process here and continue the node cloning procedure in recovery and maintenance.

   Maintain & recover

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



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

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

Related information

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

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

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

What you’ll need

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

using the StorageGRID Appliance Installer.

> If you have remapped any ports, you cannot use the same ports to configure load balancer endpoints. You can create endpoints using remapped ports, but those endpoints will be remapped to the original CLB ports and service, not the Load Balancer service. Follow the steps in the recovery and maintenance instructions for removing port remaps.

> The CLB service is deprecated.

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

About this task

To install StorageGRID on a services appliance node:

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

  Partway through the appliance Gateway Node 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. The installation of a non-primary Admin Node does not require your approval.

> Do not deploy the SG100 and SG1000 service appliances in the same site. Unpredictable performance might result.

> 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. You can also use the Appliance Installer to upload a JSON file that contains configuration information. See Automating appliance installation and configuration.

Steps

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

   `https://Controller_IP:8443`

   The StorageGRID Appliance Installer Home page appears.

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

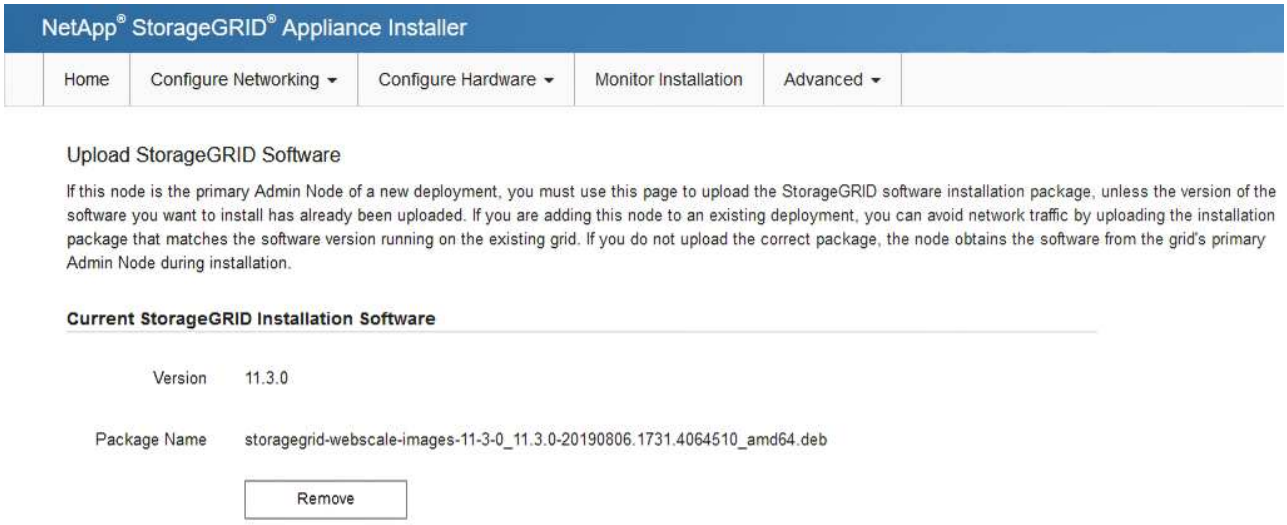
4. In the **Node name** field, enter the name you want to use for this appliance node, and click **Save**.

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

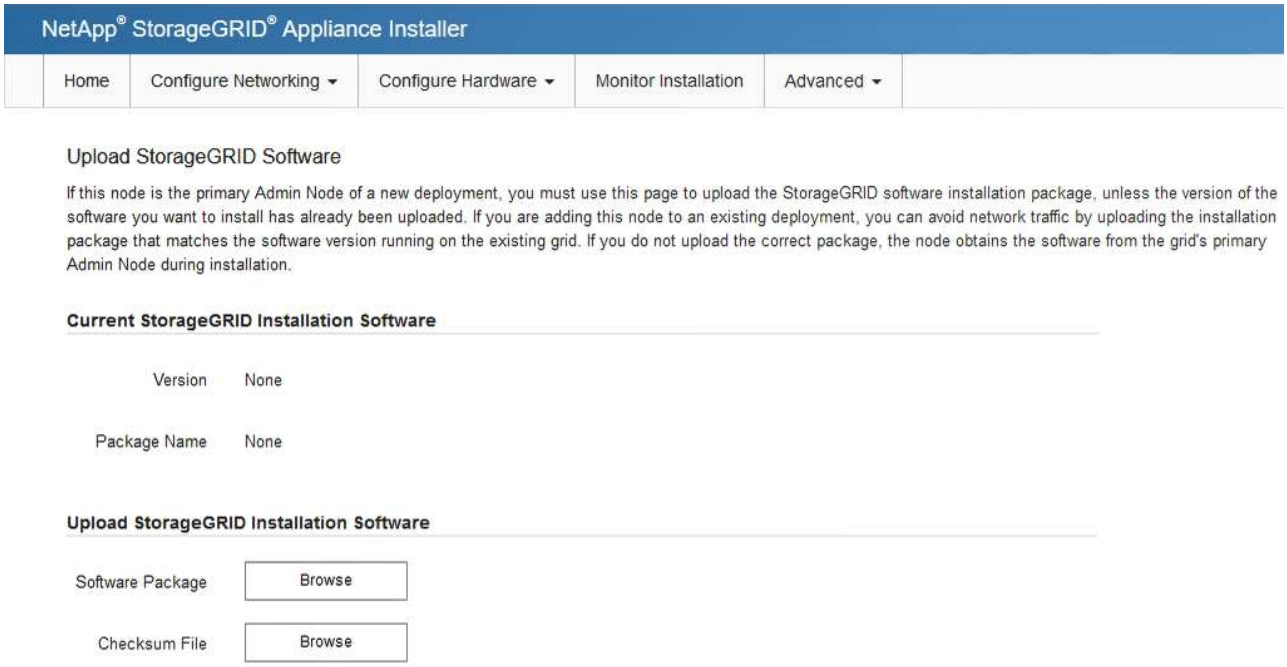
5. Optionally, to install a different version of the StorageGRID software, follow these steps:
   a. Download the installation archive from the NetApp Downloads page for StorageGRID.

      NetApp Downloads: StorageGRID

   b. Extract the archive.
   c. From the StorageGRID Appliance Installer, select **Advanced** > **Upload StorageGRID Software**.
   d. Click **Remove** to remove the current software package.



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

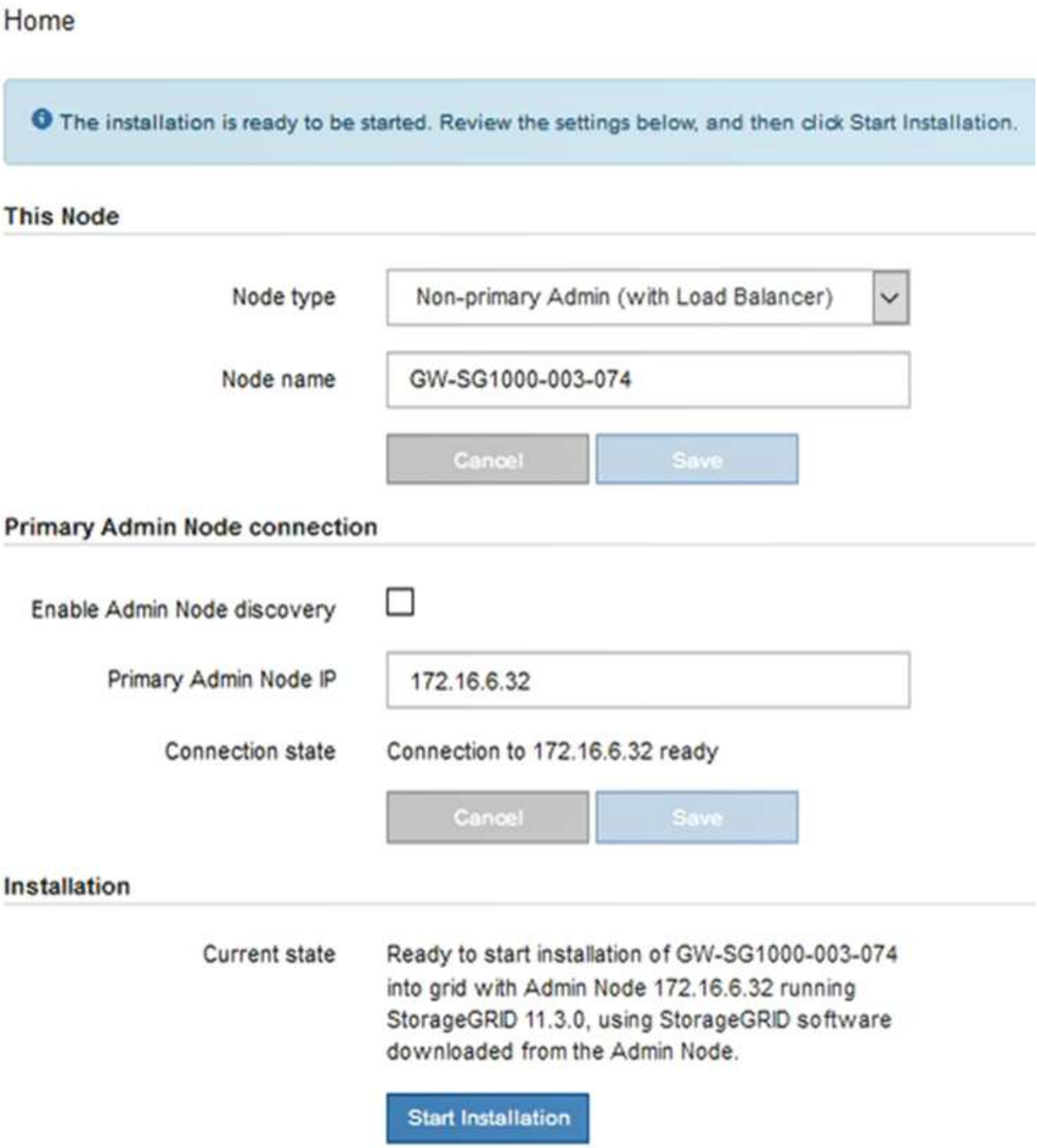


f. Select **Home** to return to the Home page.

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

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

7. From the StorageGRID Appliance Installer home page, click **Start Installation**.



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

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

8. If your grid includes multiple appliance nodes, repeat the previous steps for each appliance.

Related information

Deploying a services appliance as a primary Admin Node

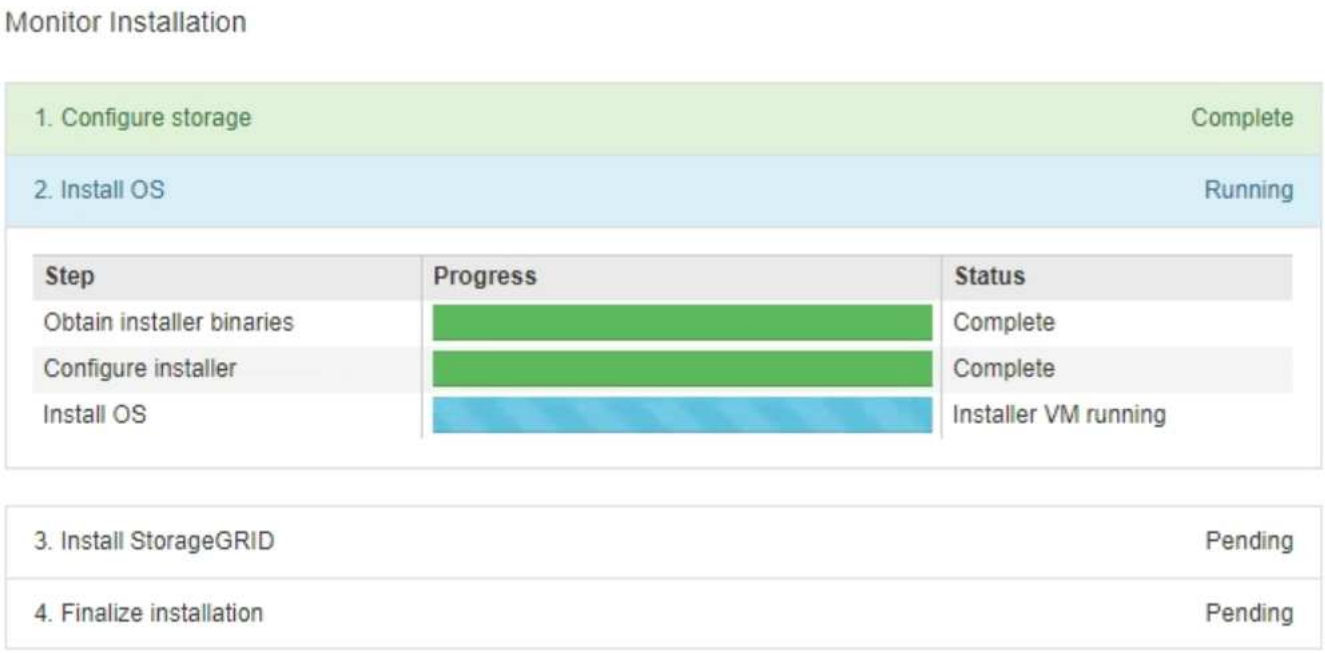
Monitoring the services appliance installation

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

Steps

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

   The Monitor Installation page shows the installation progress.



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

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

2. Review the progress of first two installation stages.
   - **1. Configure storage**

     During this stage, the installer clears any existing configuration from the drives in the appliance, and configures host settings.

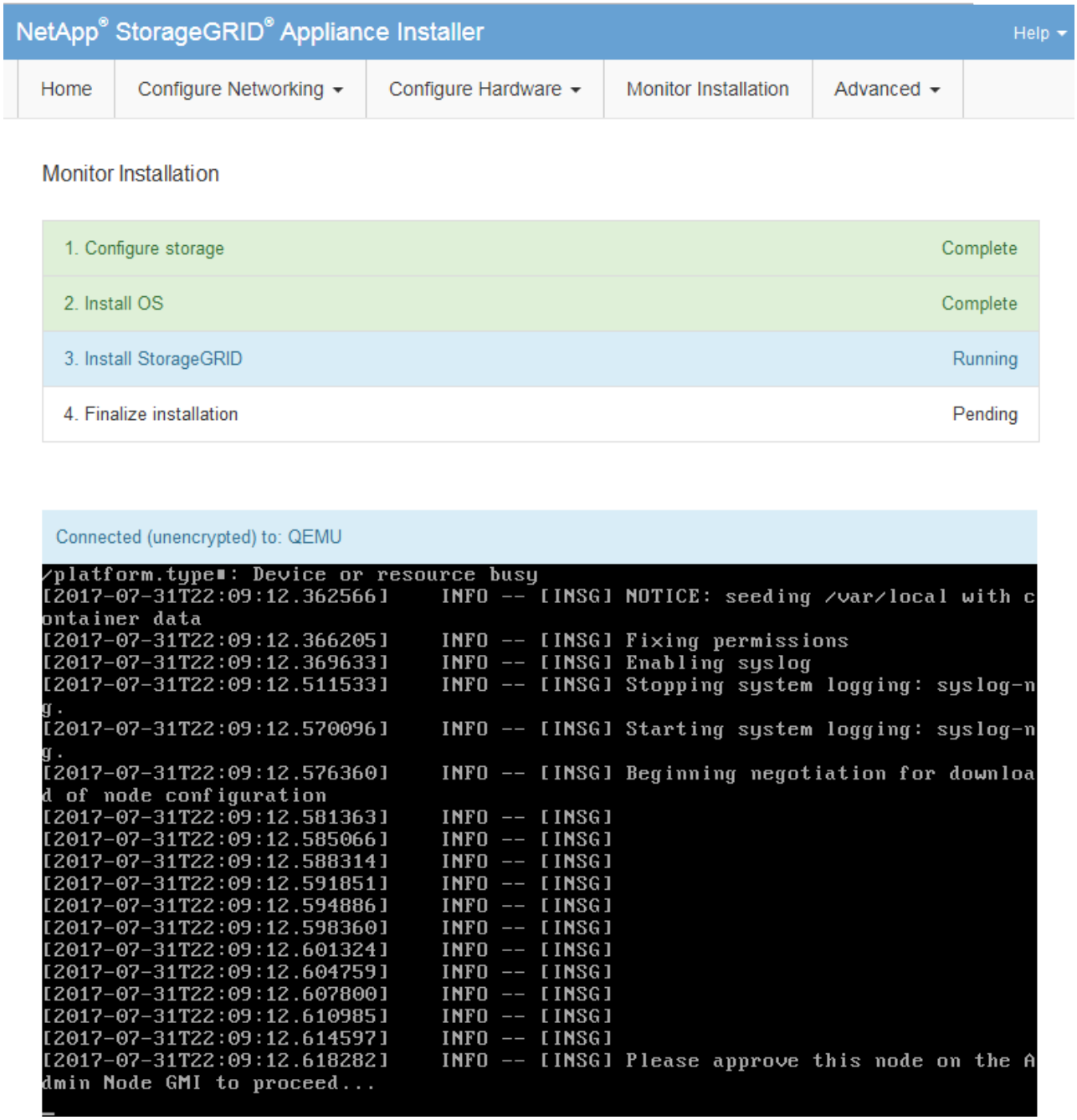
   - **2. Install OS**

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

3. Continue monitoring the installation progress until one of the following processes occurs:
   - For all appliance nodes except the primary Admin Node, the Install StorageGRID stage pauses and a message appears on the embedded console, prompting you to approve this node on the Admin Node using the Grid Manager. Go to the next step.

- For appliance primary Admin Node installation, you do not need to approve the node. The appliance is rebooted. You can skip the next step.

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



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

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

Automating appliance installation and configuration

You can automate the installation and configuration of your appliances and configuration of the whole StorageGRID system.

About this task

Automating installation and configuration can be useful for deploying multiple StorageGRID instances or one large, complex StorageGRID instance.

To automate installation and configuration, use one or more of the following options:

- Create a JSON file that specifies the configuration settings for your appliances. Upload the JSON file using the StorageGRID Appliance Installer.

  You can use the same file to configure more than one appliance.

- Use the StorageGRID `configure-sga.py` Python script to automate the configuration of your appliances.
- Use additional Python scripts to configure other components of the whole StorageGRID system (the "grid").

You can use StorageGRID automation Python scripts directly, or you can use them as examples of how to use the StorageGRID Installation REST API in grid deployment and configuration tools you develop yourself. See the information about downloading and extracting the StorageGRID installation files in the Recovery and Maintenance instructions.

Related information

Maintain & recover

Automating appliance configuration using the StorageGRID Appliance Installer

You can automate the configuration of an appliance by using a JSON file that contains the configuration information. You upload the file using the StorageGRID Appliance Installer.

What you'll need

- Your appliance must be on the latest firmware compatible with StorageGRID 11.5 or higher.
- You must be connected to the StorageGRID Appliance Installer on the appliance you are configuring using a supported browser.

About this task

You can automate appliance configuration tasks such as configuring the following:

- Grid Network, Admin Network, and Client Network IP addresses
- BMC interface
- Network links
  - Port bond mode
  - Network bond mode
  - Link speed

Configuring your appliance using an uploaded JSON file is often more efficient than performing the configuration manually using multiple pages in the StorageGRID Appliance Installer, especially if you have to configure many nodes. You must apply the configuration file for each node one at a time.

Experienced users who want to automate both the installation and configuration of their appliances can use the `configure-sga.py` script.
Automating installation and configuration of appliance nodes using the configure-sga.py script

Steps

1. Generate the JSON file using one of the following methods:
   - The ConfigBuilder application

     ConfigBuilder.netapp.com

   - The `configure-sga.py` appliance configuration script. You can download the script from StorageGRID Appliance Installer (**Help** > **Appliance Configuration Script**). See the instructions on automating the configuration using the configure-sga.py script.

     Automating installation and configuration of appliance nodes using the configure-sga.py script

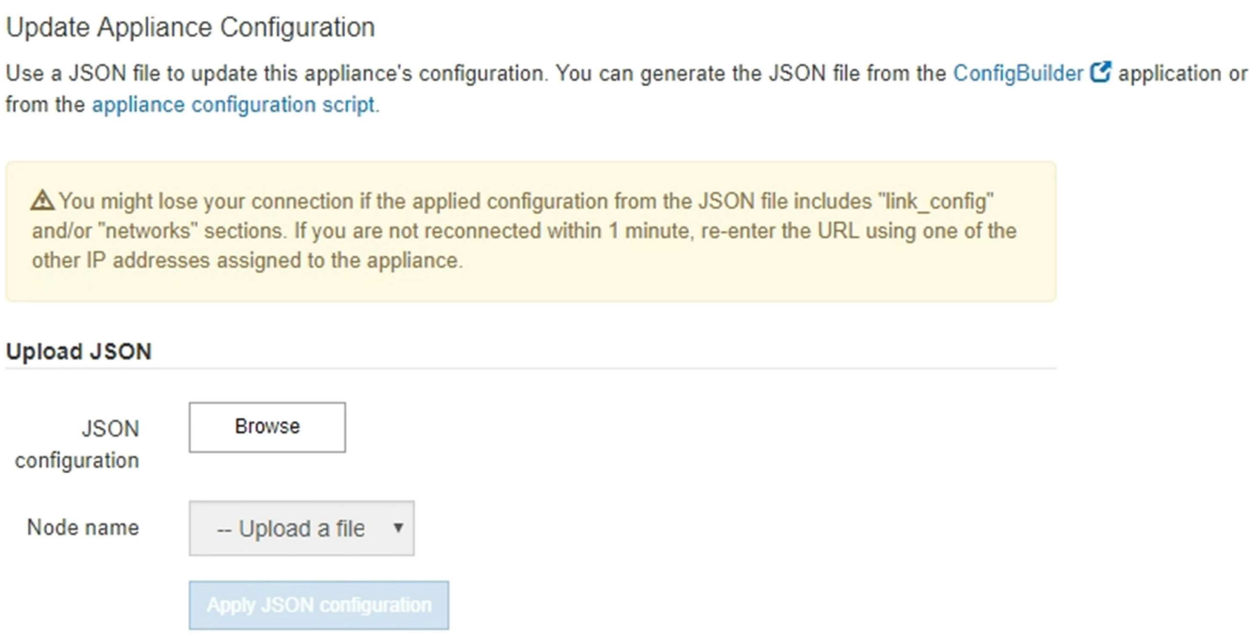
     The node names in the JSON file must follow these requirements:

     - Must be a valid hostname containing at least 1 and no more than 32 characters
     - Can use letters, numbers, and hyphens are allowed
     - Cannot start or end with a hyphen or contain only numbers

     Ensure that the node names (the top-level names) in the JSON file are unique, or you will not be able to configure more than one node using the JSON file.

2. Select **Advanced** > **Update Appliance Configuration**.

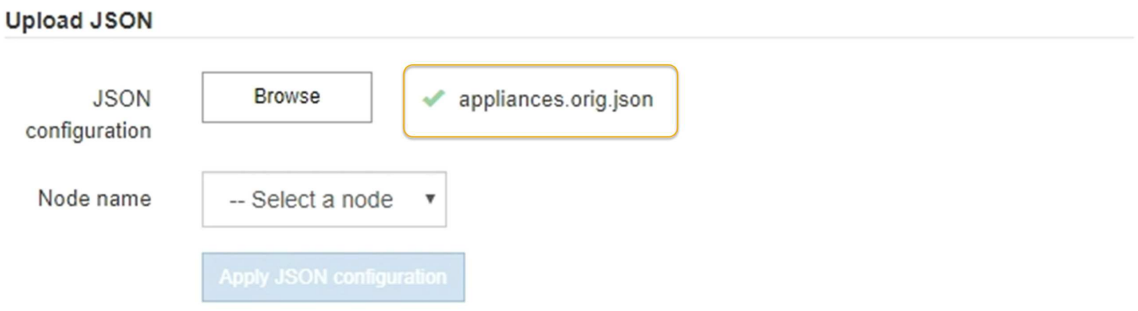
   The Update Appliance Configuration page appears.



3. Select the JSON file with the configuration you want to upload.
   a. Select **Browse**.
   b. Locate and select the file.
   c. Select **Open**.

   The file is uploaded and validated. When the validation process is complete, the file name is shown next to a green check mark.

   You might lose connection to the appliance if the configuration from the JSON file includes sections for "link_config", "networks", or both. If you are not reconnected within 1 minute, re-enter the appliance URL using one of the other IP addresses assigned to the appliance.

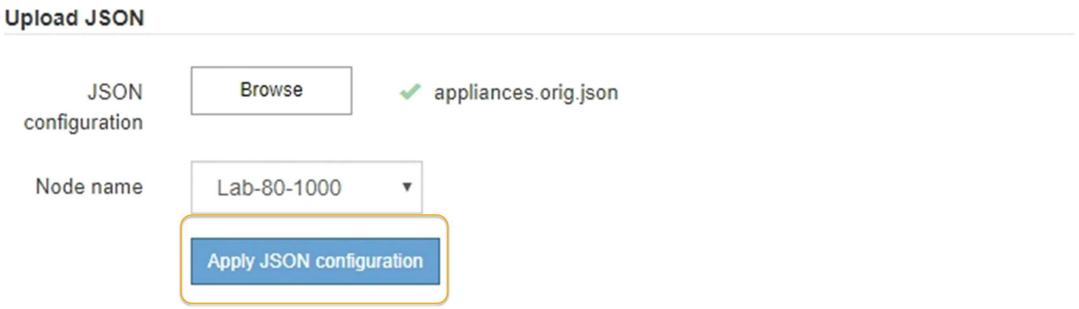


   The **Node name** drop down is populated with the top-level node names defined in the JSON file.

   If the file is not valid, the file name is shown in red and an error message is displayed in a yellow banner. The invalid file is not applied to the appliance. You can use ConfigBuilder to ensure you have a valid JSON file.

4. Select a node from the list in the **Node name** drop down.

   The **Apply JSON configuration** button is enabled.



5. Select **Apply JSON configuration**.

   The configuration is applied to the selected node.

Automating installation and configuration of appliance nodes using the configure-sga.py script

You can use the `configure-sga.py` script to automate many of the installation and configuration tasks for StorageGRID appliance nodes, including installing and configuring a primary Admin Node. This script can be useful if you have a large number of appliances to configure. You can also use the script to generate a JSON file that contains appliance configuration information.

What you'll need

- The appliance has been installed in a rack, connected to your networks, and powered on.
- Network links and IP addresses have been configured for the primary Admin Node using the StorageGRID Appliance Installer.
- If you are installing the primary Admin Node, you know its IP address.
- If you are installing and configuring other nodes, the primary Admin Node has been deployed, and you know its IP address.
- For all nodes other than the primary Admin Node, all Grid Network subnets listed on the IP Configuration page of the StorageGRID Appliance Installer have been defined in the Grid Network Subnet List on the primary Admin Node.
- You have downloaded the `configure-sga.py` file. The file is included in the installation archive, or you can access it by clicking **Help** > **Appliance Installation Script** in the StorageGRID Appliance Installer.

> This procedure is for advanced users with some experience using command-line interfaces. Alternatively, you can also use the StorageGRID Appliance Installer to automate the configuration.
> Automating appliance configuration using the StorageGRID Appliance Installer

Steps

1. Log in to the Linux machine you are using to run the Python script.

2. For general help with the script syntax and to see a list of the available parameters, enter the following:

```
configure-sga.py --help
```

   The `configure-sga.py` script uses five subcommands:

   - `advanced` for advanced StorageGRID appliance interactions, including BMC configuration and creating a JSON file containing the current configuration of the appliance
   - `configure` for configuring the RAID mode, node name, and networking parameters
   - `install` for starting a StorageGRID installation
   - `monitor` for monitoring a StorageGRID installation
   - `reboot` for rebooting the appliance

     If you enter a subcommand (advanced, configure, install, monitor, or reboot) argument followed by the `--help` option you will get a different help text providing more detail on the options available within that subcommand:
     `configure-sga.py` *`subcommand`* `--help`

3. To confirm the current configuration of the appliance node, enter the following where *`SGA-install-ip`* is any one of the IP addresses for the appliance node:
   `configure-sga.py configure` *`SGA-INSTALL-IP`*

   The results show current IP information for the appliance, including the IP address of the primary Admin Node and information about the Admin, Grid, and Client Networks.

```
Connecting to +https://10.224.2.30:8443+ (Checking version and
connectivity.)
2021/02/25 16:25:11: Performing GET on /api/versions... Received 200
2021/02/25 16:25:11: Performing GET on /api/v2/system-info... Received
200
2021/02/25 16:25:11: Performing GET on /api/v2/admin-connection...
Received 200
2021/02/25 16:25:11: Performing GET on /api/v2/link-config... Received
200
2021/02/25 16:25:11: Performing GET on /api/v2/networks... Received 200
2021/02/25 16:25:11: Performing GET on /api/v2/system-config... Received
200

  StorageGRID Appliance
    Name:         LAB-SGA-2-30
    Node type:    storage

  StorageGRID primary Admin Node
    IP:         172.16.1.170
    State:      unknown
```

```
  Message:   Initializing...
  Version:   Unknown

Network Link Configuration
  Link Status
        Link      State      Speed (Gbps)
        ----      -----      -----
        1         Up         10
        2         Up         10
        3         Up         10
        4         Up         10
        5         Up         1
        6         Down       N/A

  Link Settings
      Port bond mode:      FIXED
      Link speed:          10GBE

      Grid Network:        ENABLED
          Bonding mode:    active-backup
          VLAN:            novlan
          MAC Addresses:   00:a0:98:59:8e:8a  00:a0:98:59:8e:82

      Admin Network:       ENABLED
          Bonding mode:    no-bond
          MAC Addresses:   00:80:e5:29:70:f4

      Client Network:      ENABLED
          Bonding mode:    active-backup
          VLAN:            novlan
          MAC Addresses:   00:a0:98:59:8e:89  00:a0:98:59:8e:81

Grid Network
  CIDR:      172.16.2.30/21 (Static)
  MAC:       00:A0:98:59:8E:8A
  Gateway:   172.16.0.1
  Subnets:   172.17.0.0/21
             172.18.0.0/21
             192.168.0.0/21
  MTU:       1500

Admin Network
  CIDR:      10.224.2.30/21 (Static)
  MAC:       00:80:E5:29:70:F4
  Gateway:   10.224.0.1
  Subnets:   10.0.0.0/8
```

```
                172.19.0.0/16
                172.21.0.0/16
    MTU:        1500

  Client Network
    CIDR:       47.47.2.30/21 (Static)
    MAC:        00:A0:98:59:8E:89
    Gateway:    47.47.0.1
    MTU:        2000

#################################################################
#####   If you are satisfied with this configuration,    #####
##### execute the script with the "install" sub-command. #####
#################################################################
```

4. If you need to change any of the values in the current configuration, use the `configure` subcommand to update them. For example, if you want to change the IP address that the appliance uses for connection to the primary Admin Node to `172.16.2.99`, enter the following:
`configure-sga.py configure --admin-ip 172.16.2.99 SGA-INSTALL-IP`
5. If you want to back up the appliance configuration to a JSON file, use the advanced and `backup-file` subcommands. For example, if you want to back up the configuration of an appliance with IP address *SGA-INSTALL-IP* to a file named `appliance-SG1000.json`, enter the following:
`configure-sga.py advanced --backup-file appliance-SG1000.json SGA-INSTALL-IP`

   The JSON file containing the configuration information is written to the same directory you executed the script from.

   > Check that the top-level node name in the generated JSON file matches the appliance name. Do not make any changes to this file unless you are an experienced user and have a thorough understanding of StorageGRID APIs.

6. When you are satisfied with the appliance configuration, use the `install` and `monitor` subcommands to install the appliance:
`configure-sga.py install --monitor SGA-INSTALL-IP`
7. If you want to reboot the appliance, enter the following:
`configure-sga.py reboot SGA-INSTALL-IP`

Automating the configuration of StorageGRID

After deploying the grid nodes, you can automate the configuration of the StorageGRID system.

What you'll need

- You know the location of the following files from the installation archive.

Filename	Description
`configure-storagegrid.py`	Python script used to automate the configuration
`configure-storagegrid.sample.json`	Sample configuration file for use with the script
`configure-storagegrid.blank.json`	Blank configuration file for use with the script

- You have created a `configure-storagegrid.json` configuration file. To create this file, you can modify the sample configuration file (`configure-storagegrid.sample.json`) or the blank configuration file (`configure-storagegrid.blank.json`).

About this task

You can use the `configure-storagegrid.py` Python script and the `configure-storagegrid.json` configuration file to automate the configuration of your StorageGRID system.

> You can also configure the system using the Grid Manager or the Installation API.

Steps

1. Log in to the Linux machine you are using to run the Python script.
2. Change to the directory where you extracted the installation archive.

   For example:
   `cd StorageGRID-Webscale-`*`version/platform`*

   where *`platform`* is `debs`, `rpms`, or `vsphere`.

3. Run the Python script and use the configuration file you created.

   For example:

```
./configure-storagegrid.py ./configure-storagegrid.json --start-install
```

After you finish

A Recovery Package `.zip` file is generated during the configuration process, and it is downloaded to the directory where you are running the installation and configuration process. You must back up the Recovery Package file so that you can recover the StorageGRID system if one or more grid nodes fails. For example, copy it to a secure, backed up network location and to a secure cloud storage location.

> 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.

If you specified that random passwords should be generated, you need to extract the `Passwords.txt` file and look for the passwords required to access your StorageGRID system.

```
######################################################################
##### The StorageGRID "recovery package" has been downloaded as: #####
#####           ./sgws-recovery-package-994078-rev1.zip          #####
#####   Safeguard this file as it will be needed in case of a    #####
#####                 StorageGRID node recovery.                 #####
######################################################################
```

Your StorageGRID system is installed and configured when a confirmation message is displayed.

```
StorageGRID has been configured and installed.
```

Overview of installation REST APIs

StorageGRID provides two REST APIs for performing installation tasks: the StorageGRID Installation API and the StorageGRID Appliance Installer API.

Both APIs use the Swagger open source API platform to provide the API documentation. Swagger allows both developers and non-developers to interact with the API in a user interface that illustrates how the API responds to parameters and options. This documentation assumes that you are familiar with standard web technologies and the JSON (JavaScript Object Notation) data format.

> Any API operations you perform using the API Docs webpage are live operations. Be careful not to create, update, or delete configuration data or other data by mistake.

Each REST API command includes the API's URL, an HTTP action, any required or optional URL parameters, and an expected API response.

StorageGRID Installation API

The StorageGRID Installation API is only available when you are initially configuring your StorageGRID system, and in the event that you need to perform a primary Admin Node recovery. The Installation API can be accessed over HTTPS from the Grid Manager.

To access the API documentation, go to the installation web page on the primary Admin Node and select **Help** > **API Documentation** from the menu bar.

The StorageGRID Installation API includes the following sections:

- **config** — Operations related to the product release and versions of the API. You can list the product release version and the major versions of the API supported by that release.
- **grid** — Grid-level configuration operations. You can get and update grid settings, including grid details, Grid Network subnets, grid passwords, and NTP and DNS server IP addresses.
- **nodes** — Node-level configuration operations. You can retrieve a list of grid nodes, delete a grid node, configure a grid node, view a grid node, and reset a grid node's configuration.
- **provision** — Provisioning operations. You can start the provisioning operation and view the status of the provisioning operation.

- **recovery** — Primary Admin Node recovery operations. You can reset information, upload the Recover Package, start the recovery, and view the status of the recovery operation.
- **recovery-package** — Operations to download the Recovery Package.
- **sites** — Site-level configuration operations. You can create, view, delete, and modify a site.

StorageGRID Appliance Installer API

The StorageGRID Appliance Installer API can be accessed over HTTPS from `Controller_IP:8443`.

To access the API documentation, go to the StorageGRID Appliance Installer on the appliance and select **Help** > **API Docs** from the menu bar.

The StorageGRID Appliance Installer API includes the following sections:

- **clone** — Operations to configure and control node cloning.
- **encryption** — Operations to manage encryption and view encryption status.
- **hardware configuration** — Operations to configure system settings on attached hardware.
- **installation** — Operations for starting the appliance installation and for monitoring installation status.
- **networking** — Operations related to the Grid, Admin, and Client Network configuration for a StorageGRID appliance and appliance port settings.
- **setup** — Operations to help with initial appliance installation setup including requests to get information about the system and update the primary Admin Node IP.
- **support** — Operations for rebooting the controller and getting logs.
- **upgrade** — Operations related to upgrading appliance firmware.
- **uploadsg** — Operations for uploading StorageGRID installation files.

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