



Configure the grid and complete installation (VMware)

StorageGRID 11.8

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Configure the grid and complete installation (VMware)

Navigate to the Grid Manager

You use the Grid Manager to define all of the information required to configure your StorageGRID system.

Before you begin

The primary Admin Node must be deployed and have completed the initial startup sequence.

Steps

1. Open your web browser and navigate to one of the following addresses:

```
https://primary_admin_node_ip
```

```
https://client_network_ip
```

Alternatively, you can access the Grid Manager on port 8443:

```
https://primary_admin_node_ip:8443
```



You can use the IP address for the primary Admin Node IP on the Grid Network or on the Admin Network, as appropriate for your network configuration. You might need to use the security/advanced option in your browser to navigate to an untrusted certificate.

2. Select **Install a StorageGRID system**.

The page used to configure a StorageGRID grid appears.

NetApp® StorageGRID® Help ▾

Install

1 License 2 Sites 3 Grid Network 4 Grid Nodes 5 NTP 6 DNS 7 Passwords 8 Summary

License

Enter a grid name and upload the license file provided by NetApp for your StorageGRID system.

Grid Name

License File

Specify the StorageGRID license information

You must specify the name for your StorageGRID system and upload the license file provided by NetApp.

Steps

1. On the License page, enter a meaningful name for your StorageGRID system in the **Grid Name** field.

After installation, the name is displayed at the top of the Nodes menu.

2. Select **Browse**, locate the NetApp license file (*NLF-unique-id.txt*), and select **Open**.

The license file is validated, and the serial number is displayed.



The StorageGRID installation archive includes a free license that does not provide any support entitlement for the product. You can update to a license that offers support after installation.

A screenshot of the StorageGRID installation wizard's 'License' page. At the top, there is a progress bar with eight steps: 1. License (highlighted in blue), 2. Sites, 3. Grid Network, 4. Grid Nodes, 5. NTP, 6. DNS, 7. Passwords, and 8. Summary. Below the progress bar, the page title is 'License'. The instructions read: 'Enter a grid name and upload the license file provided by NetApp for your StorageGRID system.' There are three input fields: 'Grid Name' with the value 'StorageGRID', 'License File' with a 'Browse' button and the filename 'NLF-959007-Internal.txt', and 'License Serial Number' with the value '959007'.

3. Select **Next**.

Add sites

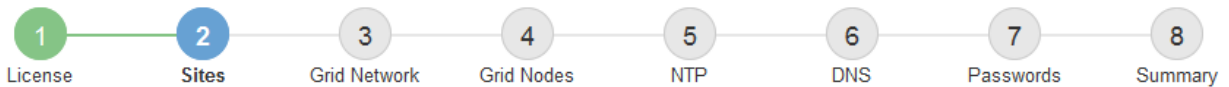
You must create at least one site when you are installing StorageGRID. You can create additional sites to increase the reliability and storage capacity of your StorageGRID system.

Steps

1. On the Sites page, enter the **Site Name**.
2. To add additional sites, click the plus sign next to the last site entry and enter the name in the new **Site Name** text box.

Add as many additional sites as required for your grid topology. You can add up to 16 sites.

Install



Sites

In a single-site deployment, infrastructure and operations are centralized in one site.

In a multi-site deployment, infrastructure can be distributed asymmetrically across sites, and proportional to the needs of each site. Typically, sites are located in geographically different locations. Having multiple sites also allows the use of distributed replication and erasure coding for increased availability and resiliency.

Site Name 1	<input type="text" value="Raleigh"/>	✕
Site Name 2	<input type="text" value="Atlanta"/>	+ ✕

3. Click **Next**.

Specify Grid Network subnets

You must specify the subnets that are used on the Grid Network.

About this task

The subnet entries include the subnets for the Grid Network for each site in your StorageGRID system, along with any subnets that need to be reachable through the Grid Network.

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

Steps

1. Specify the CIDR network address for at least one Grid Network in the **Subnet 1** text box.
2. Click the plus sign next to the last entry to add an additional network entry.

If you have already deployed at least one node, click **Discover Grid Networks Subnets** to automatically populate the Grid Network Subnet List with the subnets reported by grid nodes that have registered with the Grid Manager.

Install



Grid Network

You must specify the subnets that are used on the Grid Network. These entries typically include the subnets for the Grid Network for each site in your StorageGRID system. Select Discover Grid Networks to automatically add subnets based on the network configuration of all registered nodes.

Note: You must manually add any subnets for NTP, DNS, LDAP, or other external servers accessed through the Grid Network gateway.

Subnet 1



3. Click **Next**.

Approve pending grid nodes

You must approve each grid node before it can join the StorageGRID system.

Before you begin

You have deployed all virtual and StorageGRID appliance grid nodes.



It is more efficient to perform one single installation of all the nodes, rather than installing some nodes now and some nodes later.

Steps

1. Review the Pending Nodes list, and confirm that it shows all of the grid nodes you deployed.



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

2. Select the radio button next to a pending node you want to approve.



Grid Nodes

Approve and configure grid nodes, so that they are added correctly to your StorageGRID system.

Pending Nodes

Grid nodes are listed as pending until they are assigned to a site, configured, and approved.

+ Approve		✘ Remove		Search <input type="text"/>			
	Grid Network MAC Address	Name	Type	Platform	Grid Network IPv4 Address		
<input checked="" type="radio"/>	50:6b:4b:42:d7:00	NetApp-SGA	Storage Node	StorageGRID Appliance	172.16.5.20/21		

Approved Nodes

Grid nodes that have been approved and have been configured for installation. An approved grid node's configuration can be edited if errors are identified.

✎ Edit		🔄 Reset		✘ Remove		Search <input type="text"/>			
	Grid Network MAC Address	Name	Site	Type	Platform	Grid Network IPv4 Address			
<input type="radio"/>	00:50:56:87:42:ff	dc1-adm1	Raleigh	Admin Node	VMware VM	172.16.4.210/21			
<input type="radio"/>	00:50:56:87:c0:16	dc1-s1	Raleigh	Storage Node	VMware VM	172.16.4.211/21			
<input type="radio"/>	00:50:56:87:79:ee	dc1-s2	Raleigh	Storage Node	VMware VM	172.16.4.212/21			
<input type="radio"/>	00:50:56:87:db:9c	dc1-s3	Raleigh	Storage Node	VMware VM	172.16.4.213/21			
<input type="radio"/>	00:50:56:87:62:38	dc1-g1	Raleigh	API Gateway Node	VMware VM	172.16.4.214/21			

3. Click **Approve**.

4. In General Settings, modify settings for the following properties, as necessary:

- **Site:** The system name of the site for this grid node.
- **Name:** The system name for the node. The name defaults to the name you specified when you configured the node.

System names are required for internal StorageGRID operations and can't be changed after you complete the installation. However, during this step of the installation process, you can change system names as required.



For a VMware node, you can change the name here, but this action will not change the name of the virtual machine in vSphere.

- **NTP Role:** The Network Time Protocol (NTP) role of the grid node. The options are **Automatic**, **Primary**, and **Client**. Selecting **Automatic** assigns the Primary role to Admin Nodes, Storage Nodes with ADC services, Gateway Nodes, and any grid nodes that have non-static IP addresses. All other grid nodes are assigned the Client role.



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

- **Storage Type** (Storage Nodes only): Specify that a new Storage Node be used exclusively for metadata. The options are **Objects and metadata** and **Metadata only**. See [Types of Storage Nodes](#) for more information about metadata-only Storage Nodes.



When installing a grid with metadata-only nodes, the grid must also contain a minimum number of nodes for object storage. For a single-site grid, at least two Storage Nodes are configured for objects and metadata. For a multi-site grid, at least one Storage Node per site are configured for objects and metadata.

- **ADC service** (Storage Nodes only): Select **Automatic** to let the system determine whether the node requires 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.

5. In Grid Network, modify settings for the following properties as necessary:

- **IPv4 Address (CIDR)**: The CIDR network address for the Grid Network interface (eth0 inside the container). For example: 192.168.1.234/21
- **Gateway**: The Grid Network gateway. For example: 192.168.0.1



The gateway is required if there are multiple grid subnets.



If you selected DHCP for the Grid Network configuration and you change the value here, the new value will be configured as a static address on the node. You must make sure the resulting IP address is not within a DHCP address pool.

6. If you want to configure the Admin Network for the grid node, add or update the settings in the Admin Network section as necessary.

Enter the destination subnets of the routes out of this interface in the **Subnets (CIDR)** text box. If there are multiple Admin subnets, the Admin gateway is required.



If you selected DHCP for the Admin Network configuration and you change the value here, the new value will be configured as a static address on the node. You must make sure the resulting IP address is not within a DHCP address pool.

Appliances: For a StorageGRID appliance, if the Admin Network was not configured during the initial installation using the StorageGRID Appliance Installer, it can't be configured in this Grid Manager dialog box. Instead, you must follow these steps:

- Reboot the appliance: In the Appliance Installer, select **Advanced** > **Reboot**.

Rebooting can take several minutes.

- Select **Configure Networking** > **Link Configuration** and enable the appropriate networks.
- Select **Configure Networking** > **IP Configuration** and configure the enabled networks.
- Return to the Home page and click **Start Installation**.

- e. In the Grid Manager: If the node is listed in the Approved Nodes table, remove the node.
- f. Remove the node from the Pending Nodes table.
- g. Wait for the node to reappear in the Pending Nodes list.
- h. Confirm that you can configure the appropriate networks. They should already be populated with the information you provided on the IP Configuration page of the Appliance Installer.

For additional information, see the [Quick start for hardware installation](#) to locate instructions for your appliance.

7. If you want to configure the Client Network for the grid node, add or update the settings in the Client Network section as necessary. If the Client Network is configured, the gateway is required, and it becomes the default gateway for the node after installation.



If you selected DHCP for the Client Network configuration and you change the value here, the new value will be configured as a static address on the node. You must make sure the resulting IP address is not within a DHCP address pool.

Appliances: For a StorageGRID appliance, if the Client Network was not configured during the initial installation using the StorageGRID Appliance Installer, it can't be configured in this Grid Manager dialog box. Instead, you must follow these steps:

- a. Reboot the appliance: In the Appliance Installer, select **Advanced** > **Reboot**.

Rebooting can take several minutes.

- b. Select **Configure Networking** > **Link Configuration** and enable the appropriate networks.
- c. Select **Configure Networking** > **IP Configuration** and configure the enabled networks.
- d. Return to the Home page and click **Start Installation**.
- e. In the Grid Manager: If the node is listed in the Approved Nodes table, remove the node.
- f. Remove the node from the Pending Nodes table.
- g. Wait for the node to reappear in the Pending Nodes list.
- h. Confirm that you can configure the appropriate networks. They should already be populated with the information you provided on the IP Configuration page of the Appliance Installer.

For additional information, see the [Quick start for hardware installation](#) to locate instructions for your appliance.

8. Click **Save**.

The grid node entry moves to the Approved Nodes list.



Grid Nodes

Approve and configure grid nodes, so that they are added correctly to your StorageGRID system.

Pending Nodes

Grid nodes are listed as pending until they are assigned to a site, configured, and approved.

+ Approve
✕ Remove

Search Q

Grid Network MAC Address	Name	Type	Platform	Grid Network IPv4 Address
<i>No results found.</i>				

◀
▶

Approved Nodes

Grid nodes that have been approved and have been configured for installation. An approved grid node's configuration can be edited if errors are identified.

✎ Edit
🔄 Reset
✕ Remove

Search Q

	Grid Network MAC Address	Name	Site	Type	Platform	Grid Network IPv4 Address
<input type="radio"/>	00:50:56:87:42:ff	dc1-adm1	Raleigh	Admin Node	VMware VM	172.16.4.210/21
<input type="radio"/>	00:50:56:87:c0:16	dc1-s1	Raleigh	Storage Node	VMware VM	172.16.4.211/21
<input type="radio"/>	00:50:56:87:79:ee	dc1-s2	Raleigh	Storage Node	VMware VM	172.16.4.212/21
<input type="radio"/>	00:50:56:87:db:9c	dc1-s3	Raleigh	Storage Node	VMware VM	172.16.4.213/21
<input type="radio"/>	00:50:56:87:62:38	dc1-g1	Raleigh	API Gateway Node	VMware VM	172.16.4.214/21
<input type="radio"/>	50:6b:4b:42:d7:00	NetApp-SGA	Raleigh	Storage Node	StorageGRID Appliance	172.16.5.20/21

◀
▶

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

You must approve all nodes that you want in the grid. However, you can return to this page at any time before you click **Install** on the Summary page. You can modify the properties of an approved grid node by selecting its radio button and clicking **Edit**.

10. When you are done approving grid nodes, click **Next**.

Specify Network Time Protocol server information

You must specify the Network Time Protocol (NTP) configuration information for the StorageGRID system, so that operations performed on separate servers can be kept synchronized.

About this task

You must specify IPv4 addresses for the NTP servers.

You must specify external NTP servers. The specified NTP servers must use the NTP protocol.

You must specify four NTP server references of Stratum 3 or better to prevent issues with time drift.



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

[Support boundary to configure the Windows Time service for high-accuracy environments](#)

The external NTP servers are used by the nodes to which you previously assigned Primary NTP roles.



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

Perform additional checks for VMware, such as ensuring that the hypervisor uses the same NTP source as the virtual machine, and using VMTools to disable the time sync between the hypervisor and StorageGRID virtual machines.

Steps

1. Specify the IPv4 addresses for at least four NTP servers in the **Server 1** to **Server 4** text boxes.
2. If necessary, select the plus sign next to the last entry to add additional server entries.

The screenshot shows the NetApp StorageGRID installation wizard interface. At the top, there is a blue header with "NetApp® StorageGRID®" and a "Help" dropdown. Below the header is a navigation bar with "Install" and a progress indicator. The progress indicator consists of eight numbered steps: 1. License, 2. Sites, 3. Grid Network, 4. Grid Nodes, 5. NTP (highlighted in blue), 6. DNS, 7. Passwords, and 8. Summary. Below the progress indicator, the "Network Time Protocol" section is visible. It contains the instruction: "Enter the IP addresses for at least four Network Time Protocol (NTP) servers, so that operations performed on separate servers are kept in sync." There are four input fields labeled "Server 1" through "Server 4". The values entered are: Server 1: 10.60.248.183, Server 2: 10.227.204.142, Server 3: 10.235.48.111, and Server 4: 0.0.0.0. A plus sign (+) is located to the right of the Server 4 input field.

3. Select **Next**.

Specify DNS server information

You must specify DNS information for your StorageGRID system, so that you can access external servers using hostnames instead of IP addresses.

About this task

Specifying [DNS server information](#) allows you to use Fully Qualified Domain Name (FQDN) hostnames rather than IP addresses for email notifications and AutoSupport.

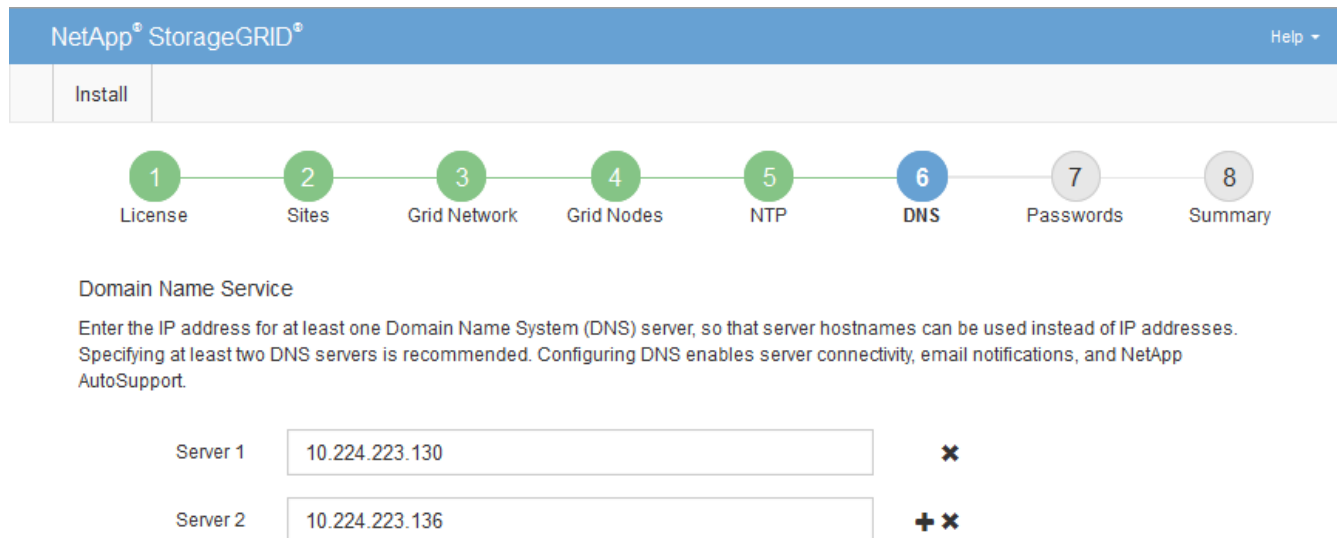
To ensure proper operation, specify two or three DNS servers. If you specify more than three, it is possible that only three will be used because of known OS limitations on some platforms. If you have routing restrictions in your environment, you can [customize the DNS server list](#) for individual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

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

If the DNS server information is omitted or incorrectly configured, a DNST alarm is triggered on each grid node's SSM service. The alarm clears when DNS is configured correctly and the new server information has reached all grid nodes.

Steps

1. Specify the IPv4 address for at least one DNS server in the **Server 1** text box.
2. If necessary, select the plus sign next to the last entry to add additional server entries.



The screenshot shows the NetApp StorageGRID installation wizard. At the top, there is a blue header with "NetApp® StorageGRID®" and a "Help" dropdown. Below the header is a "Install" button. A progress bar shows eight steps: 1. License, 2. Sites, 3. Grid Network, 4. Grid Nodes, 5. NTP, 6. DNS (highlighted in blue), 7. Passwords, and 8. Summary. Below the progress bar, the "Domain Name Service" section is active. It contains the following text: "Enter the IP address for at least one Domain Name System (DNS) server, so that server hostnames can be used instead of IP addresses. Specifying at least two DNS servers is recommended. Configuring DNS enables server connectivity, email notifications, and NetApp AutoSupport." There are two input fields: "Server 1" with the value "10.224.223.130" and a red "x" icon to its right, and "Server 2" with the value "10.224.223.136" and a red "+ x" icon to its right.

The best practice is to specify at least two DNS servers. You can specify up to six DNS servers.

3. Select **Next**.

Specify the StorageGRID system passwords

As part of installing your StorageGRID system, you need to enter the passwords to use to secure your system and perform maintenance tasks.

About this task

Use the Install passwords page to specify the provisioning passphrase and the grid management root user password.

- The provisioning passphrase is used as an encryption key and is not stored by the StorageGRID system.
- You must have the provisioning passphrase for installation, expansion, and maintenance procedures,

including downloading the Recovery Package. Therefore, it is important that you store the provisioning passphrase in a secure location.

- You can change the provisioning passphrase from the Grid Manager if you have the current one.
- The grid management root user password can be changed using the Grid Manager.
- Randomly generated command line console and SSH passwords are stored in the `Passwords.txt` file in the Recovery Package.

Steps

1. In **Provisioning Passphrase**, enter the provisioning passphrase that will be required to make changes to the grid topology of your StorageGRID system.

Store the provisioning passphrase in a secure place.



If after the installation completes and you want to change the provisioning passphrase later, you can use the Grid Manager. Select **CONFIGURATION > Access control > Grid passwords**.

2. In **Confirm Provisioning Passphrase**, reenter the provisioning passphrase to confirm it.
3. In **Grid Management Root User Password**, enter the password to use to access the Grid Manager as the "root" user.

Store the password in a secure place.

4. In **Confirm Root User Password**, reenter the Grid Manager password to confirm it.

The screenshot shows the NetApp StorageGRID installation wizard interface. At the top, there is a blue header with "NetApp® StorageGRID®" and a "Help" link. Below the header is a navigation bar with "Install" and a progress indicator. The progress indicator consists of eight numbered steps: 1. License, 2. Sites, 3. Grid Network, 4. Grid Nodes, 5. NTP, 6. DNS, 7. Passwords (highlighted in blue), and 8. Summary. Below the progress indicator, the "Passwords" step is expanded. The "Passwords" section contains the following text: "Enter secure passwords that meet your organization's security policies. A text file containing the command line passwords must be downloaded during the final installation step." Below this text are four password input fields, each with a label and a masked password field (represented by dots): "Provisioning Passphrase", "Confirm Provisioning Passphrase", "Grid Management Root User Password", and "Confirm Root User Password". At the bottom of the "Passwords" section, there is a checkbox labeled "Create random command line passwords." which is checked.

5. If you are installing a grid for proof of concept or demo purposes, optionally clear the **Create random command line passwords** checkbox.

For production deployments, random passwords should always be used for security reasons. Clear **Create random command line passwords** only for demo grids if you want to use default passwords to access grid nodes from the command line using the "root" or "admin" account.



You are prompted to download the Recovery Package file (`sgws-recovery-package-id-revision.zip`) after you click **Install** on the Summary page. You must [download this file](#) to complete the installation. The passwords required to access the system are stored in the `Passwords.txt` file, contained in the Recovery Package file.

6. Click **Next**.

Review your configuration and complete installation

You must carefully review the configuration information you have entered to ensure that the installation completes successfully.

Steps

1. View the **Summary** page.

NetApp® StorageGRID® Help ▾

Install

1 License 2 Sites 3 Grid Network 4 Grid Nodes 5 NTP 6 DNS 7 Passwords 8 **Summary**

Summary

Verify that all of the grid configuration information is correct, and then click Install. You can view the status of each grid node as it installs. Click the Modify links to go back and change the associated information.

General Settings

Grid Name	Grid1	Modify License
Passwords	Auto-generated random command line passwords	Modify Passwords

Networking

NTP	10.60.248.183 10.227.204.142 10.235.48.111	Modify NTP
DNS	10.224.223.130 10.224.223.136	Modify DNS
Grid Network	172.16.0.0/21	Modify Grid Network

Topology

Topology	Atlanta	Modify Sites	Modify Grid Nodes
	Raleigh		
	dc1-adm1	dc1-g1	dc1-s1
	dc1-s2	dc1-s3	NetApp-SGA

2. Verify that all of the grid configuration information is correct. Use the Modify links on the Summary page to go back and correct any errors.

3. Click **Install**.



If a node is configured to use the Client Network, the default gateway for that node switches from the Grid Network to the Client Network when you click **Install**. If you lose connectivity, you must ensure that you are accessing the primary Admin Node through an accessible subnet. See [Networking guidelines](#) for details.

4. Click **Download Recovery Package**.

When the installation progresses to the point where the grid topology is defined, you are prompted to download the Recovery Package file (.zip), and confirm that you can successfully access the contents of this file. You must download the Recovery Package file so that you can recover the StorageGRID system if one or more grid nodes fail. The installation continues in the background, but you can't complete the installation and access the StorageGRID system until you download and verify this file.

5. Verify that you can extract the contents of the .zip file, and then save it in 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.

6. Select the **I have successfully downloaded and verified the Recovery Package file** checkbox, and click **Next**.

If the installation is still in progress, the status page appears. This page indicates the progress of the installation for each grid node.

Installation Status

If necessary, you may [Download the Recovery Package file](#) again.

Name	Site	Grid Network IPv4 Address	Progress	Stage
dc1-adm1	Site1	172.16.4.215/21	<div style="width: 100%; height: 10px; background-color: #0070C0;"></div>	Starting services
dc1-g1	Site1	172.16.4.216/21	<div style="width: 100%; height: 10px; background-color: #0070C0;"></div>	Complete
dc1-s1	Site1	172.16.4.217/21	<div style="width: 75%; height: 10px; background-color: #0070C0;"></div>	Waiting for Dynamic IP Service peers
dc1-s2	Site1	172.16.4.218/21	<div style="width: 25%; height: 10px; background-color: #0070C0;"></div>	Downloading hotfix from primary Admin if needed
dc1-s3	Site1	172.16.4.219/21	<div style="width: 25%; height: 10px; background-color: #0070C0;"></div>	Downloading hotfix from primary Admin if needed

When the Complete stage is reached for all grid nodes, the sign-in page for the Grid Manager appears.

7. Sign in to the Grid Manager using the "root" user and the password you specified during the installation.

Post-installation guidelines

After completing grid node deployment and configuration, follow these guidelines for DHCP addressing and network configuration changes.

- If DHCP was used to assign IP addresses, configure a DHCP reservation for each IP address on the networks being used.

You can only set up DHCP during the deployment phase. You can't set up DHCP during configuration.



Nodes reboot when their IP addresses change, which can cause outages if a DHCP address change affects multiple nodes at the same time.

- You must use the Change IP procedures if you want to change IP addresses, subnet masks, and default gateways for a grid node. See [Configure IP addresses](#).
- If you make networking configuration changes, including routing and gateway changes, client connectivity to the primary Admin Node and other grid nodes might be lost. Depending on the networking changes applied, you might need to reestablish these connections.

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