



# **Configure the grid and complete installation (VMware)**

## **StorageGRID**

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# Table of Contents

- Configure the grid and complete installation (VMware) . . . . . 1
  - Navigate to the Grid Manager . . . . . 1
  - Specify the StorageGRID license information . . . . . 1
  - Add sites . . . . . 2
  - Specify Grid Network subnets . . . . . 3
  - Approve pending grid nodes . . . . . 4
  - Specify Network Time Protocol server information . . . . . 9
  - Specify Domain Name System server information . . . . . 10
  - Specify the StorageGRID system passwords . . . . . 11
  - Review your configuration and complete installation . . . . . 13
  - Post-installation guidelines . . . . . 15

# 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.

### What you'll need

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
```

```
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.

2. Click **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 **Grid Name**.

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

2. Click **Browse**, locate the NetApp License File (NLUnique\_id.txt) and click **Open**.

The license file is validated, and the serial number and licensed storage capacity are 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.

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

New License File

License Serial Number

Storage Capacity (TB)

3. Click **Next**.

## Add sites

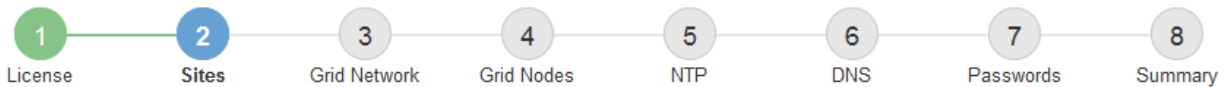
You must create at least one site when you are installing StorageGRID. You can create additional sites to increase the reliability and storage capacity of your StorageGRID system.

### 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 via the Grid Network.

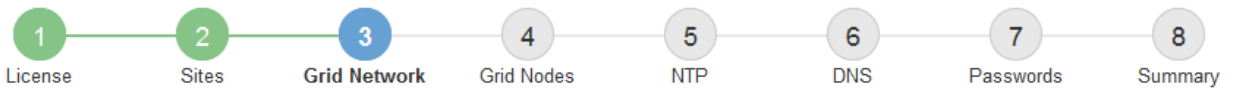
If you have multiple grid subnets, the Grid Network gateway is required. All grid subnets specified must be reachable through this gateway.

### 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.

### What you'll need

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:

## Storage Node Configuration

### General Settings

Site	<input type="text" value="Raleigh"/>
Name	<input type="text" value="NetApp-SGA"/>
NTP Role	<input type="text" value="Automatic"/>
ADC Service	<input type="text" value="Automatic"/>

### Grid Network

Configuration	STATIC
IPv4 Address (CIDR)	<input type="text" value="172.16.5.20/21"/>
Gateway	<input type="text" value="172.16.5.20"/>

### Admin Network

Configuration	STATIC
IPv4 Address (CIDR)	<input type="text" value="10.224.5.20/21"/>
Gateway	<input type="text" value="10.224.0.1"/>
Subnets (CIDR)	<input type="text" value="10.0.0.0/8"/> <b>x</b>
	<input type="text" value="172.19.0.0/16"/> <b>x</b>
	<input type="text" value="172.21.0.0/16"/> <b>+ x</b>

### Client Network

Configuration	STATIC
IPv4 Address (CIDR)	<input type="text" value="47.47.5.20/21"/>
Gateway	<input type="text" value="47.47.0.1"/>

- **Site:** The name of the site with which this grid node will be associated.
- **Name:** The name that will be assigned to the node, and the name that will be displayed in the Grid Manager. The name defaults to the name you specified when you configured the node. During this step of the installation process, you can change the name as required.



After you complete the installation, you cannot change the name of the node.



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.

- **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 cannot 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 cannot 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, reset 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.

For additional information, see the installation and maintenance instructions for your appliance model.

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 cannot 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, reset 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.

For additional information, see the installation and maintenance 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, do not 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 progress bar with eight 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 bar, 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 Domain Name System server information

You must specify Domain Name System (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. Specifying at least two DNS servers is recommended.



Provide two to six IPv4 addresses for DNS servers. You should select DNS servers that each site can access locally in the event of network islanding. This is to ensure an islanded site continues to have access to the DNS service. After configuring the grid-wide DNS server list, you can further customize the DNS server list for each node. For details, see the information about modifying the DNS configuration in the recovery and maintenance instructions.

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 progress bar with 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 visible. 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." Below this text are two input fields. The first field is labeled "Server 1" and contains the IP address "10.224.223.130". To its right is a red "X" icon. The second field is labeled "Server 2" and contains the IP address "10.224.223.136". To its right are a red "+" icon and a red "X" icon.

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

3. Select **Next**.

### Related information

[Recover and maintain](#)

## 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 may 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.



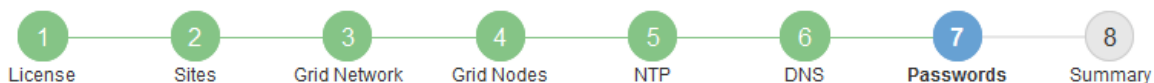
If after the installation completes and you want to change the provisioning passphrase later, you can use the Grid Manager. Select **CONFIGURATION > Access control > Grid passwords**.

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.

Install



### Passwords

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.

Provisioning Passphrase	<input type="password"/>
Confirm Provisioning Passphrase	<input type="password"/>
Grid Management Root User Password	<input type="password"/>
Confirm Root User Password	<input type="password"/>

Create random command line passwords.

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

For production deployments, random passwords should always be used for security reasons. Deselect **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**.

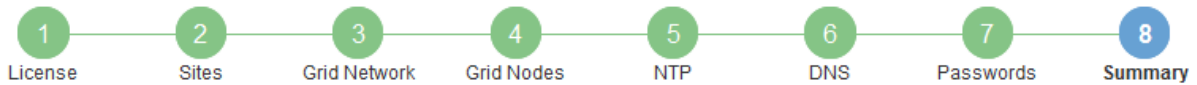
## Review your configuration and complete installation

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

### Steps

1. View the **Summary** page.

Install



### 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

<b>Grid Name</b>	Grid1	<a href="#">Modify License</a>
<b>Passwords</b>	Auto-generated random command line passwords	<a href="#">Modify Passwords</a>

### Networking

<b>NTP</b>	10.60.248.183 10.227.204.142 10.235.48.111	<a href="#">Modify NTP</a>
<b>DNS</b>	10.224.223.130 10.224.223.136	<a href="#">Modify DNS</a>
<b>Grid Network</b>	172.16.0.0/21	<a href="#">Modify Grid Network</a>

### Topology

<b>Topology</b>	Atlanta	<a href="#">Modify Sites</a>	<a href="#">Modify Grid Nodes</a>
	Raleigh		
	<a href="#">dc1-adm1</a> <a href="#">dc1-g1</a> <a href="#">dc1-s1</a> <a href="#">dc1-s2</a> <a href="#">dc1-s3</a> <a href="#">NetApp-SGA</a>		

- 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.
- 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.

- 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 cannot complete the installation and access the StorageGRID system until you download and verify this file.

- 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.

- Select the **I have successfully downloaded and verified the Recovery Package file** check box, and click **Next**.




## Download Recovery Package

Before proceeding, you must download the Recovery Package file. This file is necessary to recover the StorageGRID system if a failure occurs.

When the download completes, open the .zip file and confirm it includes a "gpt-backup" directory and a second .zip file. Then, extract this inner .zip file and confirm you can open the passwords.txt file.

After you have verified the contents, copy the Recovery Package file 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.

 The Recovery Package is required for recovery procedures and must be stored in a secure location.

[Download Recovery Package](#)

I have successfully downloaded and verified the Recovery Package file.

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%;"><div style="width: 100%;"></div></div>	Starting services
dc1-g1	Site1	172.16.4.216/21	<div style="width: 100%;"><div style="width: 100%;"></div></div>	Complete
dc1-s1	Site1	172.16.4.217/21	<div style="width: 100%;"><div style="width: 50%;"></div></div>	Waiting for Dynamic IP Service peers
dc1-s2	Site1	172.16.4.218/21	<div style="width: 100%;"><div style="width: 20%;"></div></div>	Downloading hotfix from primary Admin if needed
dc1-s3	Site1	172.16.4.219/21	<div style="width: 100%;"><div style="width: 20%;"></div></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 cannot 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 re-establish these connections.

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