# Cisco UCS Director Multi-Node Installation and Configuration Guide, Release 6.7

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# CONTENTS

# Preface



## Audience

This guide is intended primarily for data center administrators who use Cisco UCS Director and who have responsibilities and expertise in one or more of the following:

- Server administration
- Storage administration
- Network administration
- Network security
- Virtualization and virtual machines

## Conventions

| Text Type | Indication |
|---|---|
| GUI elements | GUI elements such as tab titles, area names, and field labels appear in **this font**.<br>Main titles such as window, dialog box, and wizard titles appear in **this font**. |
| Document titles | Document titles appear in *this font*. |
| TUI elements | In a Text-based User Interface, text the system displays appears in `this font`. |
| System output | Terminal sessions and information that the system displays appear in `this font`. |

| Text Type | Indication |
|---|---|
| CLI commands | CLI command keywords appear in **this font**.<br>Variables in a CLI command appear in *this font*. |
| [ ] | Elements in square brackets are optional. |
| {x \| y \| z} | Required alternative keywords are grouped in braces and separated by vertical bars. |
| [x \| y \| z] | Optional alternative keywords are grouped in brackets and separated by vertical bars. |
| string | A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks. |
| < > | Nonprinting characters such as passwords are in angle brackets. |
| [ ] | Default responses to system prompts are in square brackets. |
| !, # | An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line. |

**Note** Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

**Caution** Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

**Tip** Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

**Timesaver** Means *the described action saves time*. You can save time by performing the action described in the paragraph.

**Warning** IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

# Related Documentation

### Cisco UCS Director Documentation Roadmap

For a complete list of Cisco UCS Director documentation, see the *Cisco UCS Director Documentation Roadmap* available at the following URL: http://www.cisco.com/en/US/docs/unified_computing/ucs/ucs-director/doc-roadmap/b_UCSDirectorDocRoadmap.html.

### Cisco UCS Documentation Roadmaps

For a complete list of all B-Series documentation, see the *Cisco UCS B-Series Servers Documentation Roadmap* available at the following URL: http://www.cisco.com/go/unifiedcomputing/b-series-doc.

For a complete list of all C-Series documentation, see the *Cisco UCS C-Series Servers Documentation Roadmap* available at the following URL: http://www.cisco.com/go/unifiedcomputing/c-series-doc.

**Note** The *Cisco UCS B-Series Servers Documentation Roadmap* includes links to documentation for Cisco UCS Manager and Cisco UCS Central. The *Cisco UCS C-Series Servers Documentation Roadmap* includes links to documentation for Cisco Integrated Management Controller.

# Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to ucs-director-docfeedback@cisco.com. We appreciate your feedback.

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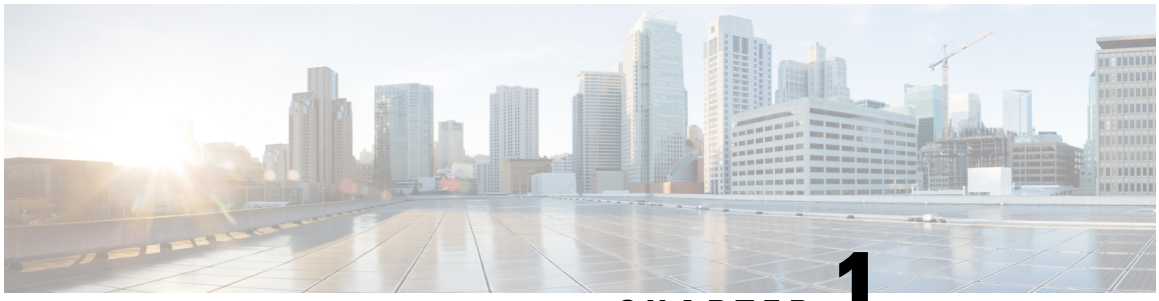
- To obtain general networking, training, and certification titles, visit Cisco Press.
- To find warranty information for a specific product or product family, access Cisco Warranty Finder.

### Cisco Bug Search Tool

Cisco Bug Search Tool (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.



CHAPTER 1

# Overview

This chapter contains the following sections:



## About the Optimized Multi-Node Setup

In Cisco UCS Director versions prior to Release 6.7, the multi-node setup included the following nodes:

- One primary node
- One or more service nodes
- One monitoring database
- One inventory database

Starting with Release 6.7, the multi-node configuration support has been re-designed and optimized to support the same capabilities and scale with only the following nodes:

- One database node
- One primary node

If you are upgrading the Cisco UCS Director version to release 6.7, the upgrade process will make the following changes in your environment:

- Migrates existing data from the inventory database node to the monitoring database node, and converts the monitoring database node to the database node.
- Upgrades the primary node to the current release.

**Note** After upgrading to release 6.7, since the multi-node configuration requires only 2 VMs, you can claim the freed up VMs.

For more information on how to upgrade your current multi-node setup, see Upgrading Your Multi-Node Setup, on page 13.

# Minimum System Requirements for Optimized Multi-Node Setup

## System Requirements for the Primary Node

| Number of VMs | vCPU Allocation | Memory Allocation (GB) | Memory Reservation (GB) | Disk Size (GB) | Inframgr Memory Allocation (GB) |
|---|---|---|---|---|---|
| 1 - 5000 | 4 | 16 | 16 | 100 | 8 |
| 5001 - 10000 | 4 | 22 | 22 | 100 | 12 |
| 10001 - 15000 | 4 | 28 | 28 | 100 | 12 |
| 15001 - 20000 | 4 | 34 | 34 | 100 | 16 |
| 20001 - 25000 | 8 | 40 | 40 | 100 | 16 |
| 25001 - 30000 | 8 | 46 | 46 | 100 | 24 |
| 30001 - 35000 | 8 | 52 | 52 | 100 | 24 |
| 35001 - 40000 | 8 | 58 | 58 | 100 | 28 |
| 40001 - 45000 | 8 | 64 | 64 | 100 | 28 |
| 45001 - 50000 | 8 | 64 | 64 | 100 | 32 |

You can configure the Inframgr memory allocation in the `/opt/infra/bin/inframgr.env` file.

## System Requirements for the Database Node

| Number of VMs | vCPU Allocation | Memory Allocation (GB) | Memory Reservation (GB) | Disk Read I/O Bandwidth (MBps) | Disk Write I/O Bandwidth (MBps) | Disk Size (GB) | MySQL InnoDB Buffer Pool (GB) |
|---|---|---|---|---|---|---|---|
| 1 - 5000 | 4 | 12 | 12 | 4 | 4 | 100 | 8 |
| 5001 - 10000 | 4 | 16 | 16 | 6 | 6 | 100 | 12 |
| 10001 - 15000 | 4 | 28 | 28 | 8 | 8 | 100 | 24 |
| 15001 - 20000 | 4 | 40 | 40 | 10 | 10 | 200 | 36 |

| Number of VMs | vCPU Allocation | Memory Allocation (GB) | Memory Reservation (GB) | Disk Read I/O Bandwidth (MBps) | Disk Write I/O Bandwidth (MBps) | Disk Size (GB) | MySQL InnoDB Buffer Pool (GB) |
|---|---|---|---|---|---|---|---|
| 20001 - 25000 | 8 | 52 | 52 | 12 | 12 | 200 | 48 |
| 25001 - 30000 | 8 | 64 | 64 | 14 | 14 | 200 | 60 |
| 30001 - 35000 | 8 | 76 | 76 | 16 | 16 | 300 | 72 |
| 35001 - 40000 | 16 | 90 | 90 | 18 | 18 | 600 | 84 |
| 40001 - 45000 | 16 | 90 | 90 | 20 | 20 | 600 | 84 |
| 45001 - 50000 | 16 | 90 | 90 | 22 | 22 | 600 | 84 |

You can configure the MySQL InnoDB Buffer Pool parameter in the `/etc/my.cnf` file.

**Note** To determine the currently configured disk read I/O bandwidth and disk write I/O bandwidth, use the **Collect Diagnostics** option from the Cisco UCS Director Shell Admin menu.

# MySQL Parameters

| VMs | Thread Cache Size | Maximum Connections | innodb lock wait timeout | Query Cache Size (MB) | Maximum Connection Errors | Connection Timeout | innodb read I/O Threads | innodb write I/O Threads |
|---|---|---|---|---|---|---|---|---|
| 1 - 5000 | 1000 | 1000 | 100 | 128 | 10000 | 20 | 64 | 64 |
| 5001 - 10000 | 1000 | 1000 | 100 | 128 | 10000 | 20 | 64 | 64 |
| 10001 - 15000 | 1000 | 1000 | 100 | 128 | 10000 | 20 | 64 | 64 |
| 15001 - 20000 | 1000 | 1000 | 100 | 128 | 10000 | 20 | 64 | 64 |
| 20001 - 25000 | 2000 | 2000 | 100 | 128 | 10000 | 20 | 64 | 64 |
| 25001 - 30000 | 2000 | 2000 | 100 | 128 | 10000 | 20 | 64 | 64 |

| VMs | Thread Cache Size | Maximum Connections | innodb lock wait timeout | Query Cache Size (MB) | Maximum Connection Errors | Connection Timeout | innodb read I/O Threads | innodb write I/O Threads |
|---|---|---|---|---|---|---|---|---|
| 30001 - 35000 | 4000 | 2000 | 100 | 128 | 10000 | 20 | 64 | 64 |
| 35001 - 40000 | 4000 | 4000 | 100 | 128 | 10000 | 20 | 64 | 64 |
| 40001 - 45000 | 4000 | 4000 | 100 | 128 | 10000 | 20 | 64 | 64 |
| 45001 - 50000 | 4000 | 4000 | 100 | 128 | 10000 | 20 | 64 | 64 |

Configure these parameters in the `/etc/my.cnf` file.

# Guidelines and Limitations for Optimized Multi-Node Setup

Before you configure an optimized multi-node setup, review the following guidelines:

- Plan the locations and IP addresses of your nodes carefully. You cannot change the types of any nodes. For example, you cannot reconfigure a database node as a primary node or a primary node as a database node.
- Install licenses only on the primary node.
- After you configure the nodes, the list of operations available in the shelladmin changes for the database node and the primary node.
- If you modify your standalone configuration to a multi-node setup, you cannot revert to the standalone configuration unless you took a snapshot of the standalone configuration.
- Connector packs are installed only on the primary node, while Cisco UCS Director patch releases are installed on the database node. As a result, you may notice a discrepancy of software versions between the primary node and the database node.

# Best Practices for an Optimized Multi-Node Setup

Before you configure a multi-node setup for Cisco UCS Director, consider the following best practices:

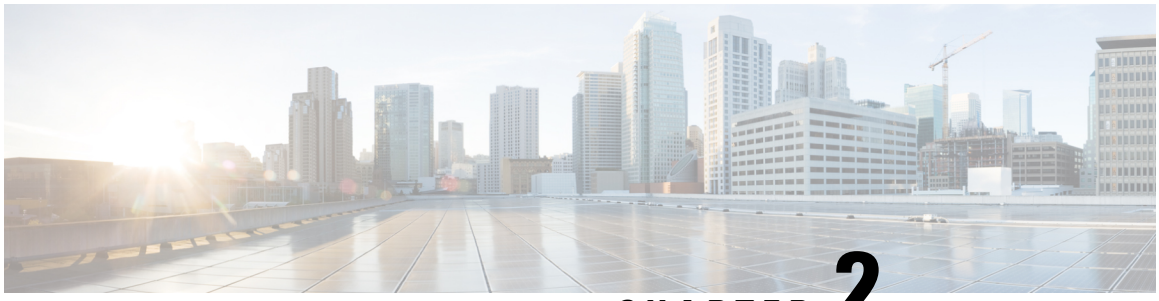
- To maximize output and minimize network latency, we recommend that the primary node and the database node reside on the same host.
- Network latency (average RTT) between the primary or service node and the physical, virtual compute, storage, and network infrastructures should be minimized. A lower average RTT results in increased overall performance.
- You can reserve more CPU cycles (MHz) and memory than recommended for better performance at system load.

See System Requirements for the Primary Node, on page 2 and System Requirements for the Database Node, on page 2.

- You must configure passwordless authentication between the application node and the database node to:
  - Use the backup and restore feature available in Cisco Intersight on claimed UCS Director instances.
  - Enforce default password reset capability for SSH root and shelladmin users.

    You are prompted to reset the default SSH root user and shelladmin user passwords before logging into the Cisco UCS Director administrator interface. You will be prompted to reset these passwords only if you have not reset the passwords prior to upgrading to release 6.7(4.0). In an optimized multi-node environment, you must reset the password for these user accounts on the application node and the database node.

See Setting Up Passwordless Authentication, on page 10.



CHAPTER 2

# Configuring Optimized Multi-Node Setup



## Database Node

The database node hosts the database service in a multi-node setup. While configuring a multi-node setup for the first time with Release 6.7, you must always first configure the database node.

If you are upgrading your multi-node setup from a prior version to Cisco UCS Director release 6.7, data from the inventory database node is migrated to the monitoring database node and the monitoring database node is converted to the database node.

## Primary Node

The primary node in the optimized multi-node setup runs the Cisco UCS Director software services, and also acts as the front-end user interface node. While configuring the optimized multi-node setup with release 6.7, you must first configure the database node, and then configure the primary node.

If you are upgrading your multi-node setup from a prior version to release 6.7, you will first have to upgrade the monitoring database node, and then upgrade the primary node.

## Configuring a Database Node

### Before you begin

If the node you are configuring as a database node is currently configured as a node in a stand-alone configuration, existing data in the database is erased when you configure the node as the database node. If

the data currently stored in the database is relevant and critical to your environment, take a backup of the database.

### Procedure

**Step 1** Login to the Cisco UCS Director Shell Admin Console on the node that you want to configure as the database node.

**Step 2** From the menu, choose `Configure Multi-Node` and press **Enter**.

**Step 3** When prompted, enter **y** to configure the multi- node setup.

**Step 4** When prompted, enter **b** to configure the node as the database node.

**Step 5** When prompted, enter **y** to confirm configuring the current node as the database node.

**Step 6** When prompted, enter and confirm a new root password for the MySQL database.

**Step 7** When prompted, enter and confirm the admin password for the MySQL database.

**Step 8** When prompted, enter **y** to log out so that the changes can take effect.

**Step 9** After you are logged out, log back on to the Cisco UCS Director shelladmin on the database node.

After you return to the Shell Admin, the menu options change to those available for a database node.

### What to do next

Configure the primary node.

# Configuring the Primary Node

### Before you begin

You should have configured the database node. See Configuring a Database Node, on page 7.

### Procedure

**Step 1** Login to the Cisco UCS Director Shell Admin Console on the node that you want to configure as the primary node.

**Step 2** From the menu, choose `Configure Multi-Node` and press **Enter**.

**Step 3** When prompted, enter **y** to configure the multi-node setup.

**Step 4** When prompted, enter **a** to configure the node as the primary node.

**Step 5** When prompted, enter y to confirm configuring the current node as the primary node.

**Step 6** When prompted, enter the database node IP address.

**Note** Do not configure multiple primary nodes with the same database node IP address. This will lead to data corruption. If the database node IP address of one multi-node configuration has to be configured for a primary node in a different multi-node configuration, then you must first stop the services running on the primary node.

**Step 7** When prompted, enter the password for the mySQL root user and admin user for the database node.

**Step 8** When prompted, enter **y** to log out so that the changes can take effect.

**Step 9** After you are logged out, log back on to the Cisco UCS Director shelladmin on the primary node.

After you return to the Shell Admin, the menu options change to those available for a primary node.

# Converting a Standalone Configuration to a Multi-Node Configuration

Complete the following procedure to convert your release 6.7 standalone configuration to a multi-node configuration.

### Procedure

**Step 1** Take a snapshot of the existing standalone VM.

**Step 2** Deploy a new Cisco UCS Director VM, and configure it as the database node.

For more information, see Configuring a Database Node, on page 7.

**Step 3** Take the backup of the database of the existing standalone VM.

**Step 4** Configure the existing standalone VM as the primary node.

As part of this configuration, you will need to provide the IP address of the database node. For more information, see Configuring the Primary Node, on page 8.

**Step 5** Restore the data from the database backup.

**Step 6** If you have configured Bare Metal Agent accounts, run the following script in the primary node to re-configure the database IP configured in the BMA.

```
/opt/scalability/migration/updateDatabaseIPForBMAAccounts.sh
```

**Step 7** Start the Cisco UCS Director services in the primary node.

# Upgrading Optimized Multi-Node Setup to Release 6.7(3.0) or Later Versions

### Before you begin

Login to the primary node and from the Shell Admin console, choose **Stop Services** to halt all services running on the primary node.

### Procedure

**Step 1** Login to the database node.

**Step 2** From the Shell Admin console, choose **Apply Signed Patch** to upgrade the node to Release 6.7(3.0) or the later version.

**Step 3** Login to the primary node, and from the Shell Admin console, choose **Apply Signed Patch** to upgrade the node to Release 6.7(3.0) or the later version.

**Step 4** Choose **Start Services** to start all the services on the primary node.

# Setting Up Passwordless Authentication

In an optimized multi-node setup, prior to installing or upgrading the base platform pack to version 6.7.3.1 or to Cisco UCS Director 6.7(4.0), you must first configure passwordless authentication between the primary node and the database node. You need to configure this form of authentication only once and need not repeat it before upgrading to later versions.

### Procedure

**Step 1** Login to the primary node.

**Step 2** Run the following command on the primary node: **cd /opt/scalability**.

**Step 3** Run the **./multiNodeConfig.sh script** command to start the passwordless authentication setup.

**Step 4** When prompted, enter **`2`** to access the database node.

**Step 5** When prompted, enter the database node IP address.

**Step 6** When prompted, enter **`root`** as the username for the database node.

**Step 7** When prompted, enter **`y`** to generate the key.

**Step 8** At the confirmation prompt, enter **`yes`**.

**Step 9** If you are installing a new version of Cisco UCS Director using the OVA, and if the default **`root`** user password of the database node is not reset already, you are prompted to change the password.

**Step 10** When prompted, enter the password for the **`root`** user of the database node.

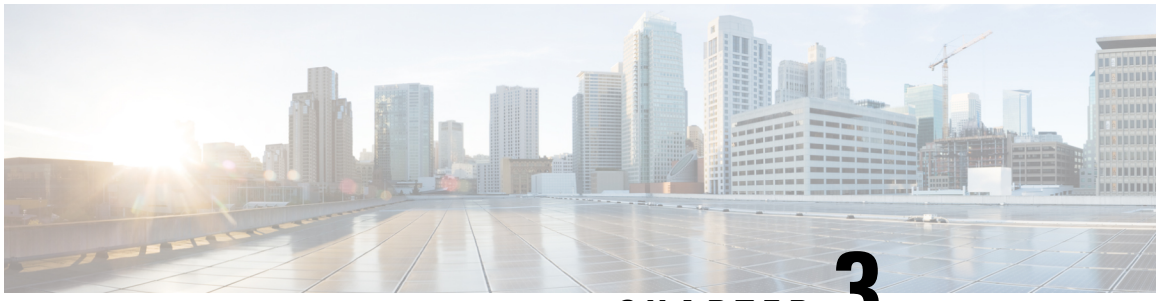
A confirmation message stating that passwordless authentication for the **`root`** user on the database node is displayed.

**Step 11** Run the **chmod 600 ~/.ssh/id_rsa** command.
This completes the passwordless authentication setup.

**Step 12** (Optional) Run the **sudo ssh <<username>>@<<db nodeIp>>** command to verify the completion of the setup.

If you are logged in to the database node after running this command, then passwordless authentication is successfully configured.

**Step 13** (Optional) If you cannot login to the database node without a password, login to the primary node and delete the entry of the database node from the `~/.ssh/id_rsa/known_hosts` file and repeat this procedure.



CHAPTER 3

# Upgrading Multi-Node Setup to Release 6.7



## Upgrading Your Multi-Node Setup

Following is a summary of the process that you must follow to upgrade your current multi-node setup to the optimized multi-node setup introduced in Release 6.7:

1. We recommend that you take snapshots of the VMs in the primary node, the inventory database node and monitoring database node.
2. Stop all services on the primary and service nodes.
3. Ensure that disk-1 has sufficient space in both database nodes for migrating data from the inventory database node. If there is not enough disk space, use the `Clean-up patch files` option in the Shell Admin console to create disk space in disk-1.
4. Upgrade the monitoring database node to the current version of Cisco UCS Director and run the database migration script.

   For more information, see Upgrading the Monitoring Node to Release 6.7 , on page 14
5. Upgrade the primary node to the Cisco UCS Director release 6.7.

   For more information, see Upgrading the Primary Node, on page 15
6. Power off the inventory database node and the service nodes.

**Note** The time taken to upgrade your current multi-node configuration to the optimized multi-node configuration depends on the database size.

# Upgrading the Monitoring Node to Release 6.7

When you upgrade the current monitoring node to release 6.7, the inventory and monitoring databases are merged, and the monitoring database node is converted to the new database node.

### Before you begin

1. We recommend that you take snapshots of the VMs in the primary node, the inventory database node and monitoring database node.
2. Enable root access on the monitoring database node and the inventory database node.
3. Ensure that the available disk size on the monitoring database node is equal to or more than the combined disk size of the inventory database node and monitoring database node.

### Procedure

**Step 1** Login to the monitoring database node.

**Step 2** From the Shell Admin console, choose `Apply Signed Patch` to upgrade the node to Release 6.7.

**Step 3** At the `Do you want to take database backup before applying patch [y/n]?` prompt, enter one of the following:

- **`y`** to back up the Cisco UCS Director database.
- **`n`** if you took a snapshot of the VM before you started.

**Step 4** At the `Specify the Transfer mode` prompt, enter one of the following:

- HTTP—Enter the URL for the location where you stored the upgrade file.
- SFTP—Enter the SFTP server IP address, server login name and password, and the path to the location where you have stored the upgrade file.
- SCP—Enter the SCP server IP address, server login name and password, and the path to the location where you have stored the upgrade file.
- FILE—Enter the path to the local directory where you have stored the upgrade file.
- FTP—Enter the FTP server IP address, server login name and password, and the path to the location where you have stored the upgrade file. For example, if you stored the patch file on an FTP server, enter **ftp://***username*:*password*@*hostname*|*IP_address*/*software_location_and_name*

**Step 5** When prompted for the `Patch URL`, type the location of the Release 6.7 patch and press **`Enter`**

For example, if you stored the software patch on an FTP server, enter **ftp://***username*:*password*@*hostname*|*IP_address*/*software_location_and_name*

**Step 6** Wait for the patch to download to the Cisco UCS Director VM.

**Step 7** Wait for the patch upgrade to complete.

The upgrade process performs many steps including the following:

- Unpacks the patch file.
- Installs the Release 6.7 files

- Initializes the database schema.
- Reboots the Cisco UCS Director appliance. The Cisco UCS Director services start automatically.

Depending upon the size of the database, the upgrade process can take several minutes to complete.

**Step 8** Log in as root.

**Step 9** Navigate to the migration folder with the following command:

```
cd /opt/scalability/migration
```

**Step 10** Run the `upgradeMultiNodeDB.sh` script.

**Step 11** When prompted, enter **y** to confirm that you have taken a snapshot of the existing multi-node setup

**Step 12** When prompted, enter **y** to confirm converting the monitoring database node to the database node.

**Step 13** When prompted, enter the IP address of the inventory database node.

**Step 14** When prompted, enter the root password for the inventory database node.

At this point, the process to migrate data from the inventory database node to the monitoring database node and to convert the monitoring database node into the database node is initiated.

**Step 15** Wait for the `upgradeMultiNodeDB.sh` script to execute completely.

After the script executes completely, do not power off the inventory database node. This node must be powered on and running to upgrade the primary node successfully.

### What to do next

Upgrade the primary node.

# Upgrading the Primary Node

### Before you begin

- Take a snapshot of the VM in the primary node.
- Upgrade the monitoring database node. See Upgrading the Monitoring Node to Release 6.7 , on page 14.
- Ensure that the monitoring database node and the inventory database node is powered on.

### Procedure

**Step 1** Login to the primary node.

**Step 2** From the Shell Admin console, choose `Apply Signed Patch` to upgrade the node to Release 6.7.

**Step 3** When prompted, enter y to stop the services on the primary node.

**Step 4** At the `Do you want to take database backup before applying patch [y/n]?` prompt, enter one of the following:

- **y** to back up the Cisco UCS Director database.
- **n** if you took a snapshot of the VM before you started.

**Step 5** At the `Specify the Transfer mode` prompt, enter one of the following:

- HTTP—Enter the URL for the location where you stored the upgrade file.
- SFTP—Enter the SFTP server IP address, server login name and password, and the path to the location where you have stored the upgrade file.
- SCP—Enter the SCP server IP address, server login name and password, and the path to the location where you have stored the upgrade file.
- FILE—Enter the path to the local directory where you have stored the upgrade file.
- FTP—Enter the FTP server IP address, server login name and password, and the path to the location where you have stored the upgrade file. For example, if you stored the patch file on an FTP server, enter **ftp://***username*:*password@hostname*|*IP_address*/*software_location_and_name*

**Step 6** When prompted for the `Patch URL`, type the location of the Release 6.7 patch and press **Enter**

For example, if you stored the software patch on an FTP server, enter **ftp://***username*:*password@hostname*|*IP_address*/*software_location_and_name*

**Step 7** Wait for the patch to download to the Cisco UCS Director VM.

**Step 8** Wait for the patch upgrade to complete.

The upgrade process includes the following steps:

- Unpacks the patch file.
- Verifies that the database node upgrade is complete. If the database node upgrade is incomplete, the upgrade process is cancelled.
- Installs the Release 6.7 files
- Upgrades the primary node.
- Initializes the database schema.
- Reboots the Cisco UCS Director appliance. The Cisco UCS Director services start automatically.