



Configuring the Fabric Interconnects

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Initial System Setup

The first time that you access a fabric interconnect in a Cisco UCS domain, a setup wizard prompts you for the following information required to configure the system:

- Installation method (GUI or CLI)
- Setup mode (restore from full system backup or initial setup)
- System configuration type (standalone or cluster configuration)
- System name
- Admin password
- Management port IP address and subnet mask
- Default gateway IP address
- DNS Server IP address

- Default domain name

Setup Mode

You can choose to either restore the system configuration from an existing backup file, or manually set up the system by going through the Setup wizard. If you choose to restore the system, the backup file must be reachable from the management network.

System Configuration Type

You can configure a Cisco UCS domain to use a single fabric interconnect in a standalone configuration or to use a redundant pair of fabric interconnects in a cluster configuration.

A cluster configuration provides high availability. If one fabric interconnect becomes unavailable, the other takes over. Only one management port (Mgmt0) connection is required to support a cluster configuration; however, both Mgmt0 ports should be connected to provide link-level redundancy.

In addition, a cluster configuration actively enhances failover recovery time for redundant virtual interface (VIF) connections. When an adapter has an active VIF connection to one fabric interconnect and a standby VIF connection to the second, the learned MAC addresses of the active VIF are replicated but not installed on the second fabric interconnect. If the active VIF fails, the second fabric interconnect installs the replicated MAC addresses and broadcasts them to the network through gratuitous ARP messages, shortening the switchover time.



Note

The cluster configuration provides redundancy only for the management plane. Data redundancy is dependent on the user configuration and may require a third-party tool to support data redundancy.

To use the cluster configuration, the two fabric interconnects must be directly connected together using Ethernet cables between the L1 (L1-to-L1) and L2 (L2-to-L2) high availability ports, with no other fabric interconnects in between. This allows the two fabric interconnects to continuously monitor the status of each other and quickly know when one has failed.

Both fabric interconnects in a cluster configuration must go through the initial setup process. The first fabric interconnect to be set up must be enabled for a cluster configuration. Then, when the second fabric interconnect is set up, it detects the first fabric interconnect as a peer fabric interconnect in the cluster.

For more information, refer to the *Cisco UCS 6100 Series Fabric Interconnect Hardware Installation Guide*.

Management Port IP Address

In a standalone configuration, you must specify only one IP address and the subnet mask for the single management port on the fabric interconnect.

In a cluster configuration, you must specify the following three IP addresses in the same subnet:

- Management port IP address for fabric interconnect A
- Management port IP address for fabric interconnect B
- Cluster IP address

Performing an Initial System Setup for a Standalone Configuration

Before You Begin

- 1 Verify the following physical connections on the fabric interconnect:

- The console port is physically connected to a computer terminal or console server
- The management Ethernet port (mgmt0) is connected to an external hub, switch, or router

For more information, refer to the *Cisco UCS Hardware Installation Guide* for your fabric interconnect.

- 2 Verify that the console port parameters on the computer terminal (or console server) attached to the console port are as follows:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit

- 3 Collect the following information that you will need to supply during the initial setup:

- System name.
- Password for the admin account. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
- Management port IP address and subnet mask.
- Default gateway IP address.
- DNS server IP address (optional).
- Domain name for the system (optional).

Procedure

- Step 1** Connect to the console port.
- Step 2** Power on the fabric interconnect.
You will see the power on self-test messages as the fabric interconnect boots.
- Step 3** At the installation method prompt, enter `gui`.
- Step 4** If the system cannot access a DHCP server, you are prompted to enter the following information:
 - IP address for the management port on the fabric interconnect
 - Subnet mask for the management port on the fabric interconnect
 - IP address for the default gateway assigned to the fabric interconnect

- Step 5** Copy the web link from the prompt into a supported web browser and go to the Cisco UCS Manager GUI launch page.
- Step 6** On the Cisco UCS Manager GUI launch page, select **Express Setup**.
- Step 7** On the **Express Setup** page, select **Initial Setup** and click **Submit**.
- Step 8** In the **Cluster and Fabric Setup** Area, select the **Standalone Mode** option.
- Step 9** In the **System Setup** Area, complete the following fields:

Field	Description
System Name field	The name assigned to the Cisco UCS domain. In a standalone configuration, the system adds "-A" to the system name. In a cluster configuration, the system adds "-A" to the fabric interconnect assigned to fabric A, and "-B" to the fabric interconnect assigned to fabric B.
Admin Password field	The password used for the Admin account on the fabric interconnect. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
Confirm Admin Password field	The password used for the Admin account on the fabric interconnect.
Mgmt IP Address field	The static IP address for the management port on the fabric interconnect.
Mgmt IP Netmask field	The subnet mask for the management port on the fabric interconnect.
Default Gateway field	The IP address for the default gateway assigned to the management port on the fabric interconnect.
DNS Server IP field	The IP address for the DNS server assigned to the fabric interconnect.
Domain Name field	The name of the domain in which the fabric interconnect resides.

- Step 10** Click **Submit**.
A page displays the results of your setup operation.
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Initial System Setup for a Cluster Configuration

Performing an Initial System Setup on the First Fabric Interconnect

Before You Begin

- 1 Verify the following physical connections on the fabric interconnect:
 - A console port on the first fabric interconnect is physically connected to a computer terminal or console server
 - The management Ethernet port (mgmt0) is connected to an external hub, switch, or router
 - The L1 ports on both fabric interconnects are directly connected to each other
 - The L2 ports on both fabric interconnects are directly connected to each other

For more information, refer to the *Cisco UCS Hardware Installation Guide* for your fabric interconnect.

- 2 Verify that the console port parameters on the computer terminal (or console server) attached to the console port are as follows:
 - 9600 baud
 - 8 data bits
 - No parity
 - 1 stop bit
- 3 Collect the following information that you will need to supply during the initial setup:
 - System name.
 - Password for the admin account. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
 - Three static IP addresses: two for the management port on both fabric interconnects (one per fabric interconnect) and one for the cluster IP address used by Cisco UCS Manager.
 - Subnet mask for the three static IP addresses.
 - Default gateway IP address.
 - DNS server IP address (optional).
 - Domain name for the system (optional).

Procedure

- Step 1** Connect to the console port.
- Step 2** Power on the fabric interconnect.

You will see the power on self-test messages as the fabric interconnect boots.

Step 3 At the installation method prompt, enter `gui`.

Step 4 If the system cannot access a DHCP server, you are prompted to enter the following information:

- IP address for the management port on the fabric interconnect
- Subnet mask for the management port on the fabric interconnect
- IP address for the default gateway assigned to the fabric interconnect

Step 5 Copy the web link from the prompt into a web browser and go to the Cisco UCS Manager GUI launch page.

Step 6 On the Cisco UCS Manager GUI launch page, select **Express Setup**.

Step 7 On the **Express Setup** page, select **Initial Setup** and click **Submit**.

Step 8 In the **Cluster and Fabric Setup** Area:

- a) Click the **Enable Clustering** option.
- b) For the **Fabric Setup** option, select **Fabric A**.
- c) In the **Cluster IP Address** field, enter the IP address that Cisco UCS Manager will use.

Step 9 In the **System Setup** Area, complete the following fields:

Field	Description
System Name field	The name assigned to the Cisco UCS domain. In a standalone configuration, the system adds "-A" to the system name. In a cluster configuration, the system adds "-A" to the fabric interconnect assigned to fabric A, and "-B" to the fabric interconnect assigned to fabric B.
Admin Password field	The password used for the Admin account on the fabric interconnect. Choose a strong password that meets the guidelines for Cisco UCS Manager passwords. This password cannot be blank.
Confirm Admin Password field	The password used for the Admin account on the fabric interconnect.
Mgmt IP Address field	The static IP address for the management port on the fabric interconnect.
Mgmt IP Netmask field	The subnet mask for the management port on the fabric interconnect.
Default Gateway field	The IP address for the default gateway assigned to the management port on the fabric interconnect.
DNS Server IP field	The IP address for the DNS server assigned to the fabric interconnect.

Field	Description
Domain Name field	The name of the domain in which the fabric interconnect resides.

- Step 10** Click **Submit**.
A page displays the results of your setup operation.
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Performing an Initial System Setup on the Second Fabric Interconnect

Before You Begin

You must ensure the following:

- A console port on the second fabric interconnect is physically connected to a computer terminal or console server
- You know the password for the admin account on the first fabric interconnect that you configured.

Procedure

- Step 1** Connect to the console port.
- Step 2** Power on the fabric interconnect.
You will see the power on self-test messages as the fabric interconnect boots.
- Step 3** At the installation method prompt, enter **gui**.
- Step 4** If the system cannot access a DHCP server, you are prompted to enter the following information:
- IP address for the management port on the fabric interconnect
 - Subnet mask for the management port on the fabric interconnect
 - IP address for the default gateway assigned to the fabric interconnect
- Step 5** Copy the web link from the prompt into a web browser and go to the Cisco UCS Manager GUI launch page.
- Step 6** On the Cisco UCS Manager GUI launch page, select **Express Setup**.
- Step 7** On the **Express Setup** page, select **Initial Setup** and click **Submit**.
The fabric interconnect should detect the configuration information for the first fabric interconnect.
- Step 8** In the **Cluster and Fabric Setup** Area:
- Select the **Enable Clustering** option.
 - For the **Fabric Setup** option, make sure **Fabric B** is selected.
- Step 9** In the **System Setup** Area, enter the password for the Admin account into the **Admin Password of Master** field.
- Step 10** Click **Submit**.

A page displays the results of your setup operation.

Enabling a Standalone Fabric Interconnect for Cluster Configuration

You can add a second fabric interconnect to an existing Cisco UCS domain that uses a single standalone fabric interconnect. To do this, you must enable the standalone fabric interconnect for cluster operation by configuring it with the virtual IP address of the cluster, and then add the second fabric interconnect to the cluster.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# connect local-mgmt	Enters local management mode.
Step 2	UCS-A(local-mgmt) # enable cluster <i>virtual-ip-addr</i>	Enables cluster operation on the standalone fabric interconnect with the specified IP address. When you enter this command, you are prompted to confirm that you want to enable cluster operation. Type yes to confirm. The IP address must be the virtual IP address for the cluster configuration, not the IP address assigned to the fabric interconnect that you are adding to the cluster.

The following example enables a standalone fabric interconnect with a virtual IP address of 192.168.1.101 for cluster operation:

```
UCS-A# connect local-mgmt
UCS-A(local-mgmt)# enable cluster 192.168.1.101
This command will enable cluster mode on this setup. You cannot change it
back to stand-alone. Are you sure you want to continue? (yes/no): yes
UCS-A(local-mgmt)#
```

What to Do Next

Add the second fabric interconnect to the cluster.

Ethernet Switching Mode

The Ethernet switching mode determines how the fabric interconnect behaves as a switching device between the servers and the network. The fabric interconnect operates in either of the following Ethernet switching modes:

End-Host Mode

End-host mode allows the fabric interconnect to act as an end host to the network, representing all server (hosts) connected to it through vNICs. This is achieved by pinning (either dynamically pinned or hard pinned)

vNICs to uplink ports, which provides redundancy toward the network, and makes the uplink ports appear as server ports to the rest of the fabric. When in end-host mode, the fabric interconnect does not run the Spanning Tree Protocol (STP) and avoids loops by denying uplink ports from forwarding traffic to each other, and by denying egress server traffic on more than one uplink port at a time. End-host mode is the default Ethernet switching mode and should be used if either of the following are used upstream:

- Layer 2 switching for L2 aggregation
- Virtual Switching System (VSS) aggregation layer

**Note**

When end-host mode is enabled, if a vNIC is hard pinned to an uplink port and this uplink port goes down, the system cannot re-pin the vNIC, and the vNIC remains down.

Switch Mode

Switch mode is the traditional Ethernet switching mode. The fabric interconnect runs STP to avoid loops, and broadcast and multicast packets are handled in the traditional way. Switch mode is not the default Ethernet switching mode, and should be used only if the fabric interconnect is directly connected to a router, or if either of the following are used upstream:

- Layer 3 aggregation
- VLAN in a box

**Note**

For both Ethernet switching modes, even when vNICs are hard pinned to uplink ports, all server-to-server unicast traffic in the server array is sent only through the fabric interconnect and is never sent through uplink ports. Server-to-server multicast and broadcast traffic is sent through all uplink ports in the same VLAN.

Configuring Ethernet Switching Mode

**Important**

When you change the Ethernet switching mode, Cisco UCS Manager logs you out and restarts the fabric interconnect. For a cluster configuration, Cisco UCS Manager restarts both fabric interconnects sequentially. The second fabric interconnect can take several minutes to complete the change in Ethernet switching mode and become system ready. The configuration is retained.

Procedure

- Step 1** In the **Navigation** pane, click the **Equipment** tab.
- Step 2** On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > *Fabric_Interconnect_Name*.
- Step 3** In the **Work** pane, click the **General** tab.
- Step 4** In the **Actions** area of the **General** tab, click one of the following links:

- **Set Ethernet Switching Mode**
- **Set Ethernet End-Host Mode**

The link for the current mode is dimmed.

Step 5 In the dialog box, click **Yes**.
Cisco UCS Manager restarts the fabric interconnect, logs you out, and disconnects Cisco UCS Manager GUI.

Fibre Channel Switching Mode

The Fibre Channel switching mode determines how the fabric interconnect behaves as a switching device between the servers and storage devices. The fabric interconnect operates in either of the following Fibre Channel switching modes:

End-Host Mode

End-host mode allows the fabric interconnect to act as an end host to the connected fibre channel networks, representing all server (hosts) connected to it through vHBAs. This is achieved by pinning (either dynamically pinned or hard pinned) vHBAs to Fibre Channel uplink ports, which makes the Fibre Channel ports appear as server ports (N-ports) to the rest of the fabric. When in end-host mode, the fabric interconnect avoids loops by denying uplink ports from receiving traffic from one another.

End-host mode is synonymous with NPV mode. This is the default Fibre Channel Switching mode.



Note When end-host mode is enabled, if a vHBA is hard pinned to a uplink Fibre Channel port and this uplink port goes down, the system cannot re-pin the vHBA, and the vHBA remains down.

Switch Mode

Switch mode is the traditional Fibre Channel switching mode. Switch mode allows the fabric interconnect to connect directly to a storage device. Enabling Fibre Channel switch mode is useful in POD models where there is no SAN (for example, a single Cisco UCS system connected directly to storage), or where a SAN exists (with an upstream MDS).



Note In Fibre Channel switch mode, SAN pin groups are irrelevant. Any existing SAN pin groups will be ignored.

Switch mode is not the default Fibre Channel switching mode.

Configuring Fibre Channel Switching Mode

**Important**

When you change the Fibre Channel switching mode, Cisco UCS Manager logs you out and restarts the fabric interconnect. For a cluster configuration, Cisco UCS Manager restarts both fabric interconnects sequentially. The second fabric interconnect can take several minutes to complete the change in Fibre Channel switching mode and become system ready.

Procedure

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- Step 1** In the **Navigation** pane, click the **Equipment** tab.
- Step 2** On the **Equipment** tab, expand **Equipment** > **Fabric Interconnects** > *Fabric_Interconnect_Name*.
- Step 3** In the **Work** pane, click the **General** tab.
- Step 4** In the **Actions** area of the **General** tab, click one of the following links:
- **Set Fibre Channel Switching Mode**
 - **Set Fibre Channel End-Host Mode**
- The link for the current mode is dimmed.
- Step 5** In the dialog box, click **Yes**.
Cisco UCS Manager restarts the fabric interconnect, logs you out, and disconnects Cisco UCS Manager GUI.

Changing the Properties of the Fabric Interconnects

**Note**

To change the subnet for a Cisco UCS domain, you must simultaneously change all subnets, the virtual IP address used to access Cisco UCS Manager, and the IP addresses for all fabric interconnects.

Procedure

- Step 1** In the **Navigation** pane, click the **Admin** tab.
- Step 2** On the **Admin** tab, click **All**.
- Step 3** In the **Work** pane, click the **General** tab.
- Step 4** In the **Actions** area, click **Management Interfaces** to open the **Management Interfaces** dialog box.
- Step 5** To change only the virtual IP address that you use to access Cisco UCS Manager, enter the desired IP address in the **IP Address** field in the **Virtual IP** area.
- Step 6** To change only the name assigned to the Cisco UCS domain, enter the desired name in the **Name** field in the **Virtual IP** area.
- Step 7** To change the subnet, IP address, and default gateway assigned to the fabric interconnects, update the following fields:
- In the **Virtual IP** area, change the IP address used to access Cisco UCS Manager in the **IP Address** field.
 - In the **Fabric Interconnect** area for each fabric interconnect, update the following fields:

Name	Description
IP Address field	The IP address to use when communicating with the fabric interconnect.
Subnet Mask field	The associated subnet mask.
Default Gateway field	The associated gateway.

- Step 8** Click **OK**.
- Step 9** Log out of Cisco UCS Manager GUI and log back in again to see your changes.
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Determining the Leadership Role of a Fabric Interconnect

Procedure

- Step 1** In the **Navigation** pane, click the **Equipment** tab.
- Step 2** In the **Equipment** tab, expand **Equipment > Fabric Interconnects**.
- Step 3** Click the fabric interconnect for which you want to identify the role.
- Step 4** In the **Work** pane, click the **General** tab.
- Step 5** In the **General** tab, click the down arrows on the **High Availability Details** bar to expand that area.
- Step 6** View the **Leadership** field to determine whether the fabric interconnect is the primary or subordinate.
-