Fabric Initialization and Switch Discovery

This chapter contains the following sections:

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Initializing the Fabric

About Fabric Initialization

You can build a fabric by adding switches to be managed by the APIC and then validating the steps using the GUI, the CLI, or the API.

Note

Before you can build a fabric, you must have already created an APIC cluster over the out-of-band network.

Example Topology

An example topology is as follows:

- Two spine switches (spine1, spine2)
- Two leaf switches (leaf1, leaf2)
- Three instances of APIC (apic1, apic2, apic3)
The following figure shows an example of a fabric topology.

**Figure 1: Example Fabric Topology**

![Example Fabric Topology Diagram](image)

### Example Topology Connections

An example topology with connection details is as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Connection Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>leaf1</td>
<td>eth1/1 = apic1 (eth2/1)</td>
</tr>
<tr>
<td></td>
<td>eth1/2 = apic2 (eth2/1)</td>
</tr>
<tr>
<td></td>
<td>eth1/3 = apic3 (eth2/1)</td>
</tr>
<tr>
<td></td>
<td>eth1/49 = spine1 (eth5/1)</td>
</tr>
<tr>
<td></td>
<td>eth1/50 = spine2 (eth5/2)</td>
</tr>
<tr>
<td>leaf2</td>
<td>eth1/1 = apic1 (eth2/2)</td>
</tr>
<tr>
<td></td>
<td>eth1/2 = apic2 (eth2/2)</td>
</tr>
<tr>
<td></td>
<td>eth1/3 = apic3 (eth2/2)</td>
</tr>
<tr>
<td></td>
<td>eth1/49 = spine2 (eth5/1)</td>
</tr>
<tr>
<td></td>
<td>eth1/50 = spine1 (eth5/2)</td>
</tr>
<tr>
<td>spine1</td>
<td>eth5/1 = leaf1 (eth1/49)</td>
</tr>
<tr>
<td></td>
<td>eth5/2 = leaf2 (eth1/50)</td>
</tr>
</tbody>
</table>
### Switch Discovery

#### About Switch Discovery with the APIC

The APIC is a central point of automated provisioning and management for all the switches that are part of the ACI fabric. A single data center might include multiple ACI fabrics; each data center might have its own APIC cluster and Cisco Nexus 9000 Series switches that are part of the fabric. To ensure that a switch is managed only by a single APIC cluster, each switch must be registered with that specific APIC cluster that manages the fabric.

The APIC discovers new switches that are directly connected to any switch it currently manages. Each APIC instance in the cluster first discovers only the leaf switch to which it is directly connected. After the leaf switch is registered with the APIC, the APIC discovers all spine switches that are directly connected to the leaf switch. As each spine switch is registered, that APIC discovers all the leaf switches that are connected to that spine switch. This cascaded discovery allows the APIC to discover the entire fabric topology in a few simple steps.

#### Switch Registration with the APIC Cluster

**Note**


After a switch is registered with the APIC, the switch is part of the APIC-managed fabric inventory. With the Application Centric Infrastructure fabric (ACI fabric), the APIC is the single point of provisioning, management, and monitoring for switches in the infrastructure.

**Note**

The infrastructure IP address range must not overlap with other IP addresses used in the ACI fabric for in-band and out-of-band networks.

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<table>
<thead>
<tr>
<th>Name</th>
<th>Connection Details</th>
</tr>
</thead>
</table>
| spine2| eth5/1 = leaf2 (eth1/49)  
|       | eth5/2 = leaf1 (eth1/50)  |
Registering the Unregistered Switches Using the GUI

The infrastructure IP address range must not overlap with other IP addresses used in the ACI fabric for in-band and out-of-band networks.

Before You Begin
Make sure that all switches in the fabric are physically connected and booted.

Step 1
On the menu bar, choose FABRIC > INVENTORY.

Step 2
In the Navigation pane, click Fabric Membership. In the Work pane, in the Fabric Membership table, a single leaf switch is displayed with an ID of 0. It is the leaf switch that is connected to apic1.

Step 3
Configure the ID by double-clicking the leaf switch row, and performing the following actions:

a) In the ID field, add the appropriate ID (leaf1 is ID 101, and leaf 2 is ID 102). The ID must be a number that is greater than 100 because the first 100 IDs are for APIC appliance nodes.

b) In the Switch Name field, add the name of the switch, and click Update.

Note After an ID is assigned, it cannot be updated. The switch name can be updated by double-clicking the name and updating the Switch Name field.

An IP address gets assigned to the switch, and in the Navigation pane, the switch is displayed under the pod.

Step 4
Monitor the Work pane until one or more spine switches appear.

Step 5
Configure the ID by double-clicking the spine switch row, and perform the following actions:

a) In the ID field, add the appropriate ID (spine1 is ID 203 and spine 2 is ID 204). It is recommended that leaf nodes and spine nodes be numbered differently. For example, number spines in the 200 range and number leaves in the 100 range.

b) In the Switch Name field, add the name of the switch, and click Update.

An IP address gets assigned to the switch, and in the Navigation pane, the switch is displayed under the pod. Wait until all remaining switches appear in the Node Configurations table before you go to the next step.

Step 6
For each switch listed in the Fabric Membership table, perform the following steps:

a) Double-click the switch, enter an ID and a Name, and click Update.

b) Repeat for the next switch in the list.

Switch Discovery Validation and Switch Management from the APIC

After the switches are registered with the APIC, the APIC performs fabric topology discovery automatically to gain a view of the entire network and to manage all the switches in the fabric topology.

Each switch can be configured, monitored, and upgraded from the APIC without having to access the individual switches.
Validating the Registered Switches Using the GUI

Step 1  On the menu bar, choose FABRIC > INVENTORY.
Step 2  In the Navigation pane, expand Fabric Membership.
        The switches in the fabric are displayed with their node IDs. In the Work pane, all the registered switches are displayed with the IP addresses that are assigned to them.

Validating the Fabric Topology

After all the switches are registered with the APIC cluster, the APIC automatically discovers all the links and connectivity in the fabric and discovers the entire topology as a result.

Validating the Fabric Topology Using the GUI

Step 1  On the menu bar, choose FABRIC > INVENTORY.
Step 2  In the Navigation pane, choose the pod that you want to view.
Step 3  In the Work pane, click the TOPOLOGY tab.
        The displayed diagram shows all attached switches, APIC instances, and links.
Step 4  (Optional) To view the port-level connectivity of a leaf switch or spine switch, double-click its icon in the topology diagram.
        To return to the topology diagram, in the upper left corner of the Work pane, click the Previous View icon.
Step 5  (Optional) To refresh the topology diagram, in the upper left corner of the Work pane, click the Refresh icon.

Unmanaged Switch Connectivity in VM Management

The hosts that are managed by the VM controller (for example, a vCenter), can be connected to the leaf port through a Layer 2 switch. The only prerequisite required is that the Layer 2 switch must be configured with a management address, and this management address must be advertised by Link Layer Discovery Protocol (LLDP) or Cisco Discovery Protocol (CDP) on the ports that are connected to the switches. Layer 2 switches
are automatically discovered by the APIC, and they are identified by the management address. The following figure shows the APIC GUI displaying unmanaged switches in the Fabric > Inventory view.

*Figure 2: Unmanaged Layer 2 Switches in the APIC Fabric Inventory*