



Deploying Cisco Programmable Fabric

- [Deploying Cisco Programmable Fabric, on page 1](#)

Deploying Cisco Programmable Fabric

This chapter briefly describes about the Cisco Programmable Fabric deployment and its requirements.

Platform Requirements

Cisco Programmable Fabric supports an IP fabric with VXLAN being employed as a network overlay and MP-BGP based EVPN address family being used for distribution of host information. MP-BGP-based EVPN address family distributes end host and external network reachability information in the fabric.

Following table shows the minimum hardware and software support required to deploy Cisco Programmable Fabric.

Table 1: Hardware and Software Support for Cisco Programmable Fabric with VXLAN BGP EVPN

Function	Platform	I/O Module	Minimum Software Release
Fabric Management ¹	Cisco DCNM	-	Cisco NX-OS 7.2(3)
Cisco Programmable Fabric Spine	Cisco Nexus 5600	-	Cisco NX-OS 7.3(0)N1(1)
	Cisco Nexus 7000/7700	F3 card	Cisco NX-OS 7.3(0)D1(1)
	Cisco Nexus 9200	-	Cisco NX-OS 7.0(3)I4(1)
	Cisco Nexus 9300	-	Cisco NX-OS 7.0(3)I1(3)
	Cisco Nexus 9500	-	Cisco NX-OS 7.0(3)I1(3)

Function	Platform	I/O Module	Minimum Software Release
Cisco Programmable Fabric Leaf	Cisco Nexus 5600	-	Cisco NX-OS 7.3(0)N1(1)
	Cisco Nexus 7000/7700	F3 card	Cisco NX-OS 7.3(0)D1(1)
	Cisco Nexus 9200	-	Cisco NX-OS 7.0(3)I4(1)
	Cisco Nexus 9300	-	Cisco NX-OS 7.0(3)I1(3)
	Cisco Nexus 9500	-	Cisco NX-OS 7.0(3)I1(3)
Cisco Programmable Fabric Border Leaf/Border Spine	Cisco Nexus 5600	-	Cisco NX-OS 7.3(0)N1(1)
	Cisco Nexus 7000/7700	F3 card ²	Cisco NX-OS 7.3(0)D1(1)
	Cisco Nexus 9200	-	Cisco NX-OS 7.0(3)I4(1)
	Cisco Nexus 9300	-	Cisco NX-OS 7.0(3)I1(3)
	Cisco Nexus 9500	-	Cisco NX-OS 7.0(3)I1(3)

¹ We recommend you to carefully read the 'New and Changed Features' section on the Release Notes for additional information.

² Border PE is supported on Cisco Nexus 7000 Series Switches and Cisco Nexus 7700 Switches on (F3 line card) as a single box solution that does VXLAN decapsulation and MPLS encapsulation on the same box/VDC.



Note

1. Only Cisco Nexus 5600 Switches are supported for VXLAN. Cisco Nexus 5500 Switches and Cisco Nexus 6000 Series Switches are not supported.
2. For Cisco Programmable Fabric, we recommend at least one multiprotocol BGP route-reflector (RR). As an integrated function of Cisco Programmable Fabric, the following platforms can support this function:
 - Cisco Nexus 5600 Switches with Cisco NX-OS 7.3(0)N1(1) and later releases.
 -

Guidelines and Limitations for Cisco Programmable Fabric

Cisco Programmable Fabric has the following guidelines and limitations:

Guidelines

- To ensure that the day-zero POAP device provisioning does not interfere with other DHCP servers on your network, we recommend that you use a dedicated VLAN and subnet for the fabric management network. Cisco DCNM and the Ethernet out-of-band/inband ports of the Cisco Programmable Fabric switches (mgmt0 or Ethernet front panel ports) reside in the fabric management network. You have the option to interconnect the fabric management network with your existing out-of-band management network.

- Beginning with Cisco NX-OS Release 7.0(3)I5(2), inband POAP and management are available for Cisco Nexus 9000 Series switches and Cisco NX-OS 7.1(2) on Cisco DCNM with 10.1(2)ST(1) Cisco DCNM templates.
- Cisco Programmable Fabric supports POAP via the out-of-band and inband network, which means POAP via the management interface (mgmt0) and front panel Ethernet ports.
- For Cisco Programmable Fabric, auto-configuration feature is the reachability to the LDAP/network database through inband and as well through out-of-band support.
- Every Cisco Programmable Fabric switch that is managed by Cisco DCNM via out-of-band or inband network must be connected to the fabric management network through the Ethernet out-of-band or inband network.
- A console connection for fabric management is recommended but not required for Cisco Programmable Fabric.
- If Cisco DCNM is your repository server for POAP, you must upload the Cisco NX-OS kick start and system images to Cisco DCNM using the Secure Copy Protocol (SCP) or Secure File Transfer Protocol (SFTP).

Limitations

- The fabric management network can support only one Dynamic Host Configuration Protocol (DHCP) server. You can either use the DHCP server in Cisco DCNM or a designated DHCP server, but not both.
- You can create a VRF instance using a controller (Cisco APIC or Cisco DCNM) or using the CLI. If you want to delete a VRF instance that was created using a controller, you have to use the controller for deletion too, and not the CLI. However, for a controller created VRF instance, you can add VRF attributes such as route-map, etc, through the CLI.

How to Cable the Network Fabric and Servers for Cisco Programmable Fabric

Fabric Management Network and Console

We recommend that every Cisco Programmable Fabric switch that is to be managed by Cisco Programmable Fabric is directly connected (Layer-2) to the fabric management network through the Ethernet out-of-band port (mgmt0). Else you need to add specific configuration on the router (helper-address) and add a static route on the Cisco DCNM to reach the out-of-band network.

The Cisco DCNM is the central point of management for Cisco Programmable Fabric. For more information on Cisco DCNM installation, see [Cisco DCNM Installation Guide](#).

Figure 1: Cabling the Fabric Management Out-of-band Network

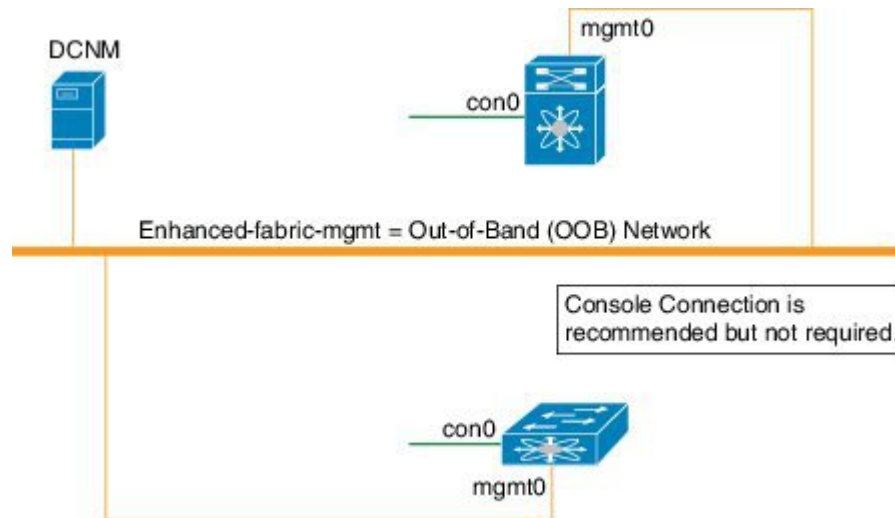
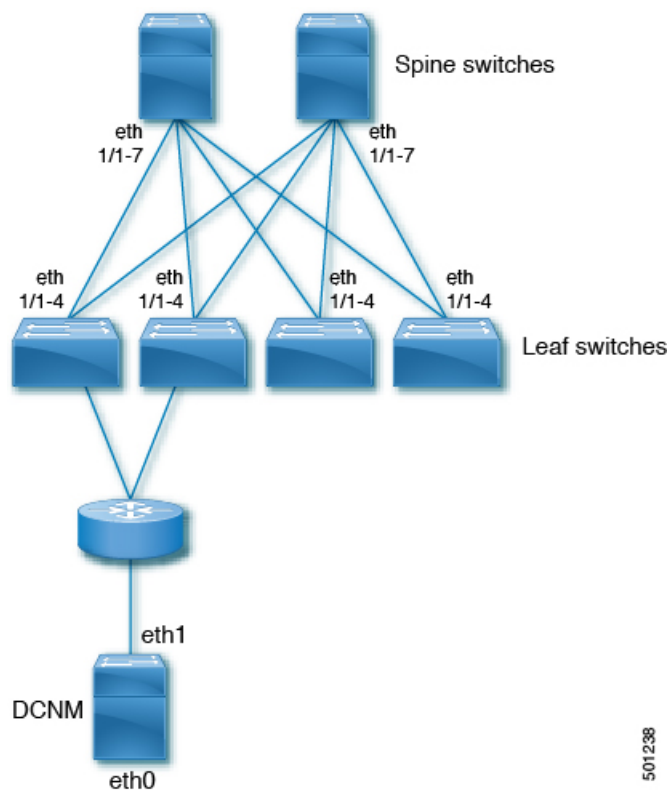


Figure 2: Cabling the Fabric Management Inband Network

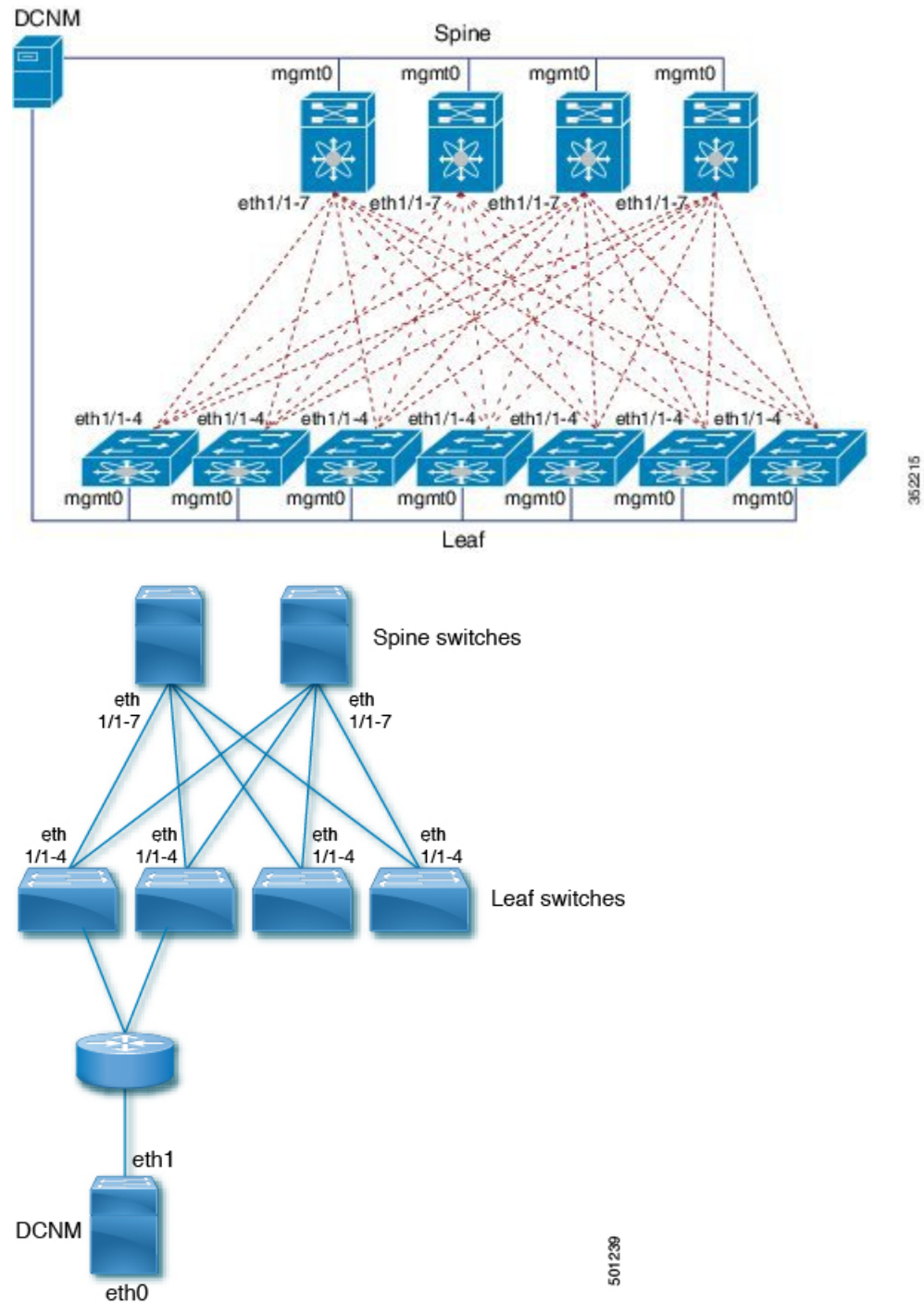


Fabric Connectivity

The fabric interfaces of the Cisco Programmable Fabric switches connect to one another. Fabric interfaces are configured as regular Layer-3 routed ports for efficient forwarding of traffic on the IP underlay. Choice

of routing protocols includes Layer-3 IS-IS and Open Shortest Path First (OSPF). Both IP numbered and IP unnumbered options are supported.

Figure 3: Cabling the Cisco Programmable Fabric Networks and Servers



Server Connectivity

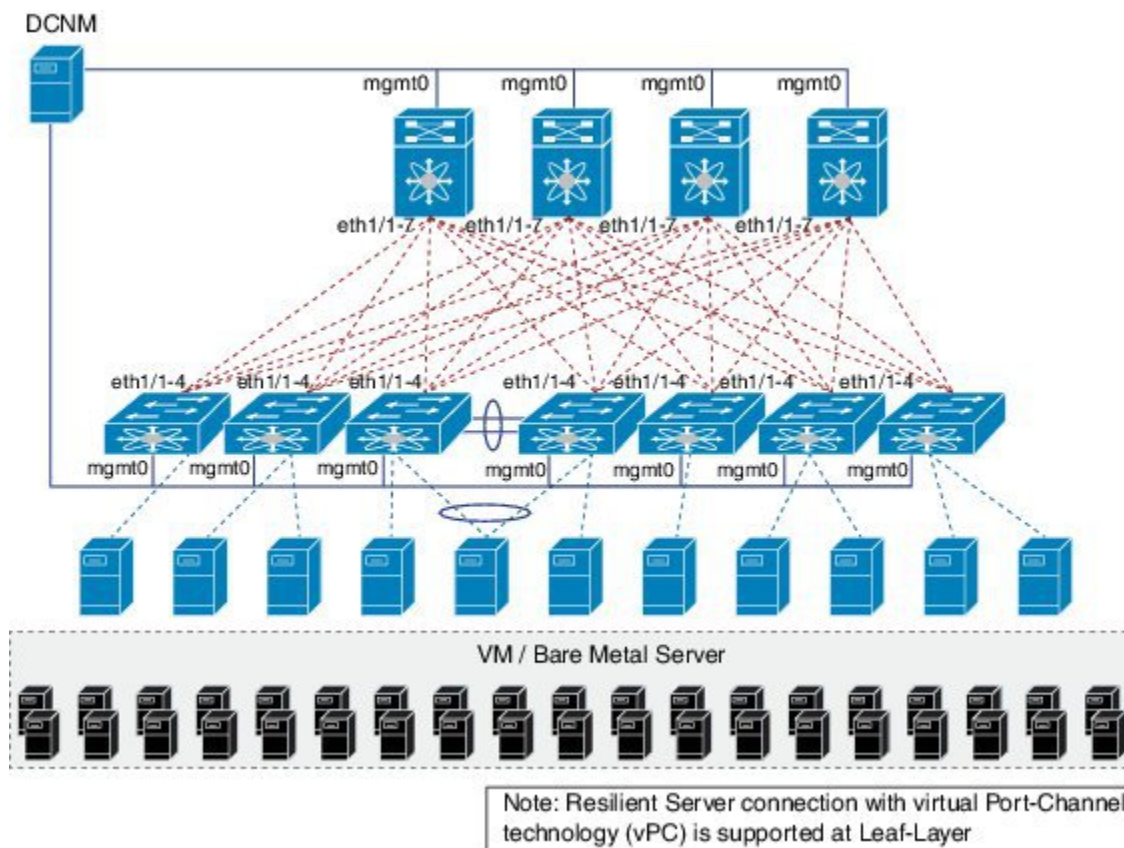
To transport data traffic across the Cisco Programmable Fabric, the leaf switch must receive the traffic for connected VLANs that are to be extended across the fabric. The leaf-to-server interfaces are called host interfaces.



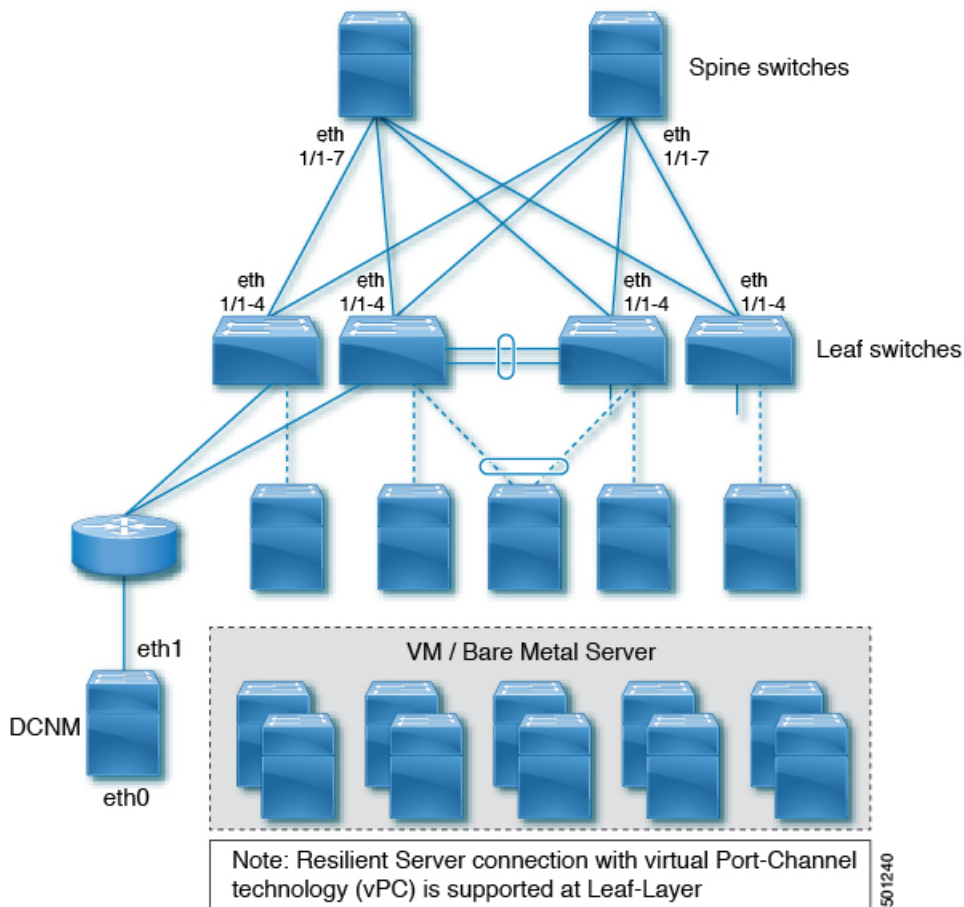
Note

Always connect servers to Cisco Programmable Fabric leaf switches. You must not connect servers to Cisco Programmable Fabric border leaf switches (since host-based auto-configuration is not supported) and spine switches.

Figure 4: How to Cable Server Connectivity



352216



Deploying Cisco Programmable Fabric

1. Ensure that you have the appropriate Cisco Nexus devices with the minimum required Cisco NX-OS software releases to support Cisco Programmable Fabric. For more information on hardware and software support, see [Platform Requirements](#).
2. Install the Data Center Nexus devices. For more information on installation and upgrade, see the following appropriate guides for your Cisco Programmable Fabric switches.
 - [Cisco Nexus 9000 Series Switches](#)
 - [Cisco Nexus 7000 Series Switches and Cisco Nexus 7700 Switches](#)
 - [Cisco Nexus 5600 Series Switches](#)
3. (Optional) Cisco Nexus 1000V is necessary, only if your requirement is to support VDP based auto-configuration. Install and configure the Cisco Nexus 1000V switch for VMware vSphere for Cisco Programmable Fabric. For more information on Cisco Nexus installation, see the [Cisco Nexus 1000V Installation and Upgrade Guide](#).

**Note**

To deploy Cisco DCNM, two port groups or port profiles are required on the virtual switch.

4. Install either Cisco DCNM Open Virtual Appliance (OVA) or Cisco DCNM Virtual Appliance (ISO). For more information on Cisco DCNM installation, see the [Cisco DCNM Installation Guide](#).
 - a. Install Cisco DCNM OVA to manage all the applications for the central point of management or
 - b. Install Cisco DCNM ISO to deploy on ESXi and KVM Hypervisors
5. (Optional) Use the following option to install OpenStack for Cisco Programmable Fabric:
 - Install the Cisco OpenStack Installer to install the OpenStack for Cisco Programmable Fabric orchestrator.

**Note**

- Before installing the Cisco OpenStack installer, ensure to install Cisco Programmable Fabric, switches, Cisco DCNM OVA or Cisco DCNM ISO must be already installed.
- To support OpenStack for Cisco Programmable Fabric, Cisco DCNM must be accessible via the OpenStack controller and Cisco Programmable Fabric.