



# Border Provisioning Use Case in VXLAN BGP EVPN Fabrics - Multi-Site

This section explains how to connect two Virtual eXtensible Local Area Network (VXLAN) Border Gateway Protocol (BGP) Ethernet VPN (EVPN) fabrics through DCNM using the EVPN Multi-Site feature. The EVPN Multi-Site configurations are applied on the Border Gateways (BGWs) of the two fabrics.



**Note** In Cisco® Data Center Network Manager (DCNM) 11.0(1), you can connect BGWs of two standalone fabrics or two member fabrics of an MSD.

Multi-Site Domain (MSD), introduced in DCNM 11.0(1) release, is a multifabric container that is created to manage multiple member fabrics. It is a single point of control for definition of overlay networks and VRFs that are shared across member fabrics. See *Multi-Site Domain for VXLAN BGP EVPN Fabrics* section in the *Control* chapter for more information on MSD.



**Note** For a detailed explanation on the EVPN Multi-Site feature, see the [VXLAN BGP EVPN Multi-Site Design and Deployment](#) document.

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## Prerequisites

- The EVPN Multi-Site feature requires Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(1) or later.
- Familiarity with VXLAN BGP EVPN data center fabric architecture and configuration through DCNM.
- Familiarity with MSD fabrics, if you are connecting member fabrics of an MSD.

- Fully configured VXLAN BGP EVPN fabrics that are ready to be connected using the EVPN Multi-Site feature, external fabric(s) configuration through DCNM, and relevant external fabric devices' configuration (for example, route servers).
  - VXLAN BGP EVPN fabrics (and their interconnection) can be configured manually or using DCNM. This document explains the process to connect the fabrics through DCNM. So, you should know how to configure and deploy a VXLAN BGP EVPN fabric, and how to create an external fabric through DCNM. For more details, see the *VXLAN BGP EVPN Fabrics Provisioning* section in the *Control* chapter.
- When you enable the EVPN Multi-Site feature on a BGW, ensure that there are no prior overlay deployments on it. Remove existing overlay profiles and then start provisioning Multi-Site extensions through DCNM.
- Ensure that the role of the designated BGWs is *Border Gateway*. To verify, right-click the BGW and click **Set role**. You can see that (*current*) is added to the current role of the switch.  
If the current role is not *Border Gateway*, you should remove the device from the fabric and discover it again through DCNM using the POAP bootstrap option and re-provision the configurations for the device.
- To ensure consistency across fabrics, ensure the following:




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**Note** These checks are done for member fabrics of an MSD when the fabrics are moved under the MSD fabric.

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- The underlay IP addresses across the fabrics, the loopback 0 address and the loopback 1 address subnets should be unique.
- Each fabric should have a unique site ID and BGP AS number associated and configured.
- All fabrics should have the same Anycast Gateway MAC address.
- While the MSD provisions a global range of network and VRF values, some parameters are fabric-specific and some are switch-specific. You should specify fabric instance values for each fabric (for example, *multicast group subnet address*) and switch instance values for each switch (for example, *VLAN ID*).

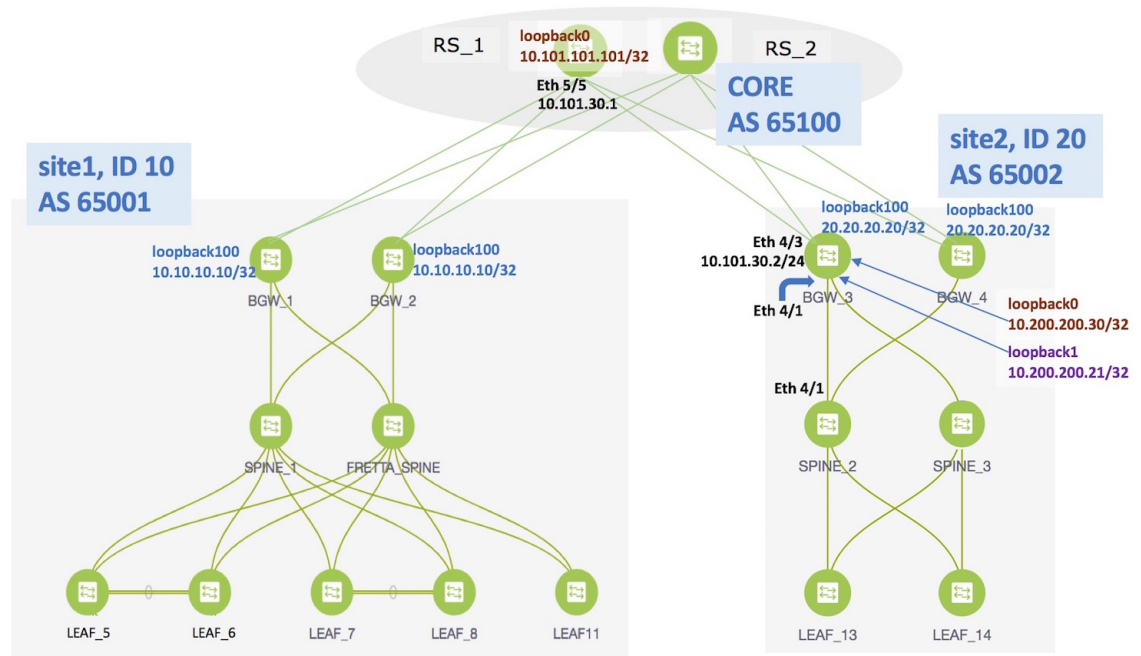
After completing the EVPN Multi-Site specific prerequisites, start EVPN Multi-Site configuration on *BGW\_3* with extensions to the route server *RS\_1*.

## Limitations

- BGWs cannot form a virtual port channel (vPC) switch pair.
- The VXLAN OAM feature in Cisco DCNM is only supported on a single fabric or site.

## Sample Scenario

The EVPN Multi-Site feature is explained through an example scenario. Consider two VXLAN BGP EVPN fabrics, *site1* and *site2* connected through devices in an external fabric, *CORE*. This document shows you how to enable end-to-end Layer 3 and Layer 2 traffic between hosts in *site1* and *site2*, through *CORE* the fabric.



Network configurations for the two VXLAN BGP EVPN fabrics are provisioned through DCNM software, 11.0(1) release. VXLAN BGP EVPN configurations are configured on the switches in the two fabrics. However, server traffic between the sites is only possible through a Data Center Interconnect (DCI) function. If a server in *site1* has to send traffic to a server in *site2* or vice versa, the DCI function (such as the Multi-Site feature, which is used for this example) should be configured on the BGWs of both the fabrics.

Route servers *RS\_1* and *RS\_2* are route servers that are directly attached to the two VXLAN BGP EVPN fabrics. From the VXLAN fabrics' point of view, the route servers belong to an external fabric, *CORE*, with a different AS number. For representation purposes, the *CORE* fabric is created as an external fabric through DCNM, and *RS\_1* and *RS\_2* are associated with it.



**Note** Though creating an external fabric is a prerequisite for this use case, steps are noted here for quick reference. To create an external fabric in DCNM, click **Control > Fabric Builder**. On the Fabric Builder page, click **Create Fabric**. On the Add Fabric page, enter the name of the fabric (*CORE*), select *External\_Fabric* as the fabric template, enter the AS Number and click **Save**.

The *CORE* fabric is created as an external fabric.

The steps that are involved to enable EVPN Multi-Site feature and traffic flow across the sites or fabrics are:

1. Top-Down deployment of the underlay for the IP core at the BGWs. This is a one-time configuration.

2. Top-Down deployment of the BGP overlay for the IP core. This is a one-time configuration for each BGW.
3. Deployment of networks and virtual routing and forwarding (VRF) instances on the leaf switches. This is a per network/VRF configuration.
4. Deployment of networks/VRFs at the BGWs. This is a per network/VRF configuration.

**EVPN Multi-Site Feature**—This requires setting up the BGW base configuration for enabling the EVPN Multi-Site feature on the BGWs and the underlay peering to the external devices. This is followed by establishing overlay peering from the BGW to appropriate external devices, either BGWs in other fabrics or route servers. Both the underlay and overlay peering are established over eBGP. While eBGP is mandatory for the overlay peering, you can use eBGP or an IGP for the underlay.




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**Note** DCNM 11.0(1) Top-Down provisioning only supports eBGP underlay.

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BGWs are special devices that allow clear control and data plane segregation from one site to another, allowing for policy enforcement points for any inter-fabric traffic. They allow the same data plane (VXLAN) and control plane (BGP EVPN) to be employed both for inter-fabric and intra-fabric traffic.

The end-to-end configurations can be split into these 2 steps:

1. **EVPN Multi-Site configurations on the BGWs (*BGW\_1*, *BGW\_2*, *BGW\_3* and *BGW\_4*).**
  1. EVPN Multi-Site feature on the BGWs on *site1*—Overlay and underlay connections between the BGWs *BGW\_1* and *BGW\_2*, and directly connected route servers *RS\_1* and *RS\_2* in the *CORE* fabric.
  2. EVPN Multi-Site feature on the BGWs on *site2*—This includes overlay and underlay connections between the BGWs *BGW\_3* and *BGW\_4*, and directly connected route servers *RS\_1* and *RS\_2* in the *CORE* fabric.
  3. Configurations on *RS\_1* and *RS\_2*—Configurations in the *CORE* fabric are not in the scope of DCNM provisioning and this document. For completeness, it is mentioned here, and sample configurations provided in the Appendix section.




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**Note** The network interconnecting the BGWs can be more complex than just 2 switches. The proper configuration (routing protocol peering, MTU settings, etc) required in that network is a one-time initial infrastructure configuration that must be performed outside of DCNM.

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For this example, *BGW\_3* EVPN Multi-Site configurations will be explained.

## 2. Deploying Networks and VRF Instances on the leaf switches and the BGWs

For this example, 2 networks are configured on the BGWs in *site2* (with the assumption that network deployment on leaf switches is already completed).

After successful deployment on both the sites, Layer 2 and Layer 3 traffic will flow between the two sites.



**Note** In the DCNM GUI, the lines connecting devices that are managed by DCNM (for example, *LEAF\_5* to *SPINE\_1* and *SPINE\_1* to *BGW\_2*) symbolize a physical cable connection, and not that the connection is functional and network traffic flows between them.

To start with, let us consider EVPN Multi-Site provisioning on *BGW\_3* through DCNM Top-Down LAN Fabric Provisioning.

## EVPN Multi-Site Configuration

### EVPN Multi-Site Extensions from *BGW\_3* to *RS\_1*

1. Choose **Control > Networks & VRFs**. The LAN Fabric Provisioning page appears.
2. Click **Continue**. The Select a Fabric page appears.
3. Select **site2** from the drop-down box since you are configuring the BGW *BGW\_3* on *site2*.
4. Click **Fabric Extension Setup** since the purpose of this task is to allow *site2* to communicate to external fabrics through *RS\_1* and *RS\_2*. The Fabric Extension screen comes up.

Fabric Extension ✕

Inter-Fabric Connections Selected 0 / Total 0 ↻

+ ✕
Show  ⌵

Type	Source Fabric	Source Device	Source Interface	Destination Fa...	Destination De...	Destination Int...	Configuration	Status

No data available

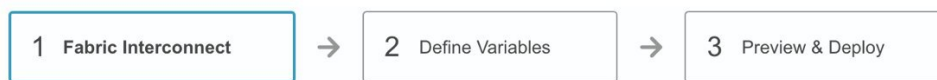
The Inter-Fabric Connections section lists previously created external connections from the BGWs on *site2*. Each line represents a physical or logical connection between a BGW in *site2* and an external device in another fabric. For each connection, the source fabric, source device, source interface, destination fabric, destination device, and destination interface are listed along with the type of external connectivity. This section is empty as this is the first time you are adding an external connection.

*To extend the fabric through EVPN Multi-Site, you should first create an underlay extension and then an overlay extension.*

### Underlay Extension from *BGW\_3* to *RS\_1*

1. Click the + icon to add a new external connection. The **Add Inter-Fabric Connection** screen appears.

## Add Inter-Fabric Connections



* Extension Type	VRF_LITE	▼
* Base Template	ext_base_setup	▼
* Extension Template	ext_fabric_setup	▼
* Source Fabric	SITE_2	
* Destination Fabric		▼
* Source Device		▼
* Source Interface		▼
* Destination Device		▼
* Destination Interface		▼

ⓘ VRF\_LITE: Set switch role - Border; MULTISITE: Set switch role - "Border Gateway"

By default, **VRF\_LITE** is populated in the **Extension Type** field. Change the selection to **MULTISITE\_UNDERLAY**.

## Add Inter-Fabric Connections

1 Fabric Interconnect → 2 Define Variables → 3 Preview & Deploy

\* Extension Type: MULTISITE\_UNDERLAY

\* Base Template: ext\_base\_setup

\* Extension Template: ext\_multisite\_underlay\_setup

\* Source Fabric: SITE\_2

\* Destination Fabric: [Dropdown]

\* Source Device: [Dropdown] ⓘ VRF\_LITE: Set switch role - Border; MULTISITE: Set switch role - "Border Gateway"

\* Source Interface: [Dropdown]

\* Destination Device: [Dropdown]

\* Destination Interface: [Dropdown]

Previous Next Save & Deploy Cancel

**Base Template**-By default, the *ext\_base\_setup* base template is populated. This template is a one-time configuration that is pushed to the BGW.

**Extension Template**-*ext\_multisite\_underlay\_setup* is a setup template that contains the configuration that is generated and pushed to the BGW to set up the corresponding interfabric connection.

These templates are autopopulated with corresponding pre-packaged default templates that are based on your selection.



**Note** You to add, edit, or delete user-defined templates. See *Template Library* section in the *Control* chapter for more details.

**Source Fabric**-This field is prepopulated with *site2* since the EVPN Multi-Site underlay connection is between *BGW\_3* in *site2* and *RS\_1* in the *CORE* fabric.

**Destination Fabric**-Choose *CORE*.

**Source Device** and **Source Interface**-Choose *BGW\_3* as the source device and an Ethernet interface that needs to be connected to *RS\_3*.

**Destination Device** and **Destination Interface**—Choose *RS\_1* as the destination device and the Ethernet interface that connects to the BGW *BGW\_3*.

Based on the selection of the source device and source interface, the destination information is autopopulated based on Cisco Discovery Protocol information, if available. There is an extra validation performed to ensure that the destination external device is indeed part of the destination fabric.

After filling up the Fabric Interconnect section, the screen looks like this:

### Add Inter-Fabric Connections

The screenshot displays the configuration interface for adding inter-fabric connections. At the top, a progress bar indicates the current step is '1 Fabric Interconnect'. Below this, the following fields are visible:

- \* Extension Type: MULTISITE\_UNDERLAY
- \* Base Template: ext\_base\_setup
- \* Extension Template: ext\_multisite\_underlay\_setup
- \* Source Fabric: SITE\_2
- \* Destination Fabric: CORE
- \* Source Device: BGW\_3
- \* Source Interface: Ethernet4/3
- \* Destination Device: RS\_1
- \* Destination Interface: Ethernet5/5

A help icon (i) is present next to the Source Device field, with the text: "VRF\_LITE: Set switch role - Border; MULTISITE: Set switch role - 'Border Gateway'". At the bottom of the form, there are four buttons: Previous, Next, Save & Deploy, and Cancel.

2. Click **Next** to go to the Define Variables section. The fields in this section are:

**IF\_NAME**—In this field, the interface name is autopopulated from the previous step.

**IP\_MASK**—Fill up this field with the IP address of the *BGW\_3* interface that connects to *RS\_1*.

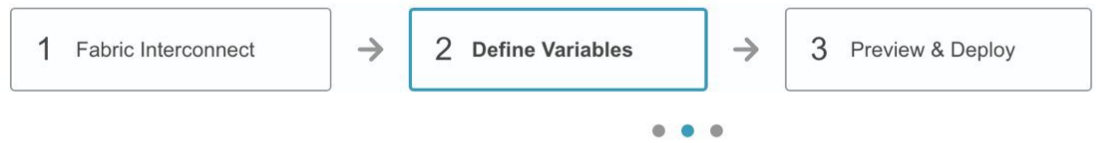
**NEIGHBOR\_IP**—Fill up this field with the IP address of the *RS\_1* interface that connects to *BGW\_3*.

**NEIGHBOR\_ASN**—In this field, the AS number of *RS\_1* will be autopopulated.

A filled up screen is displayed:



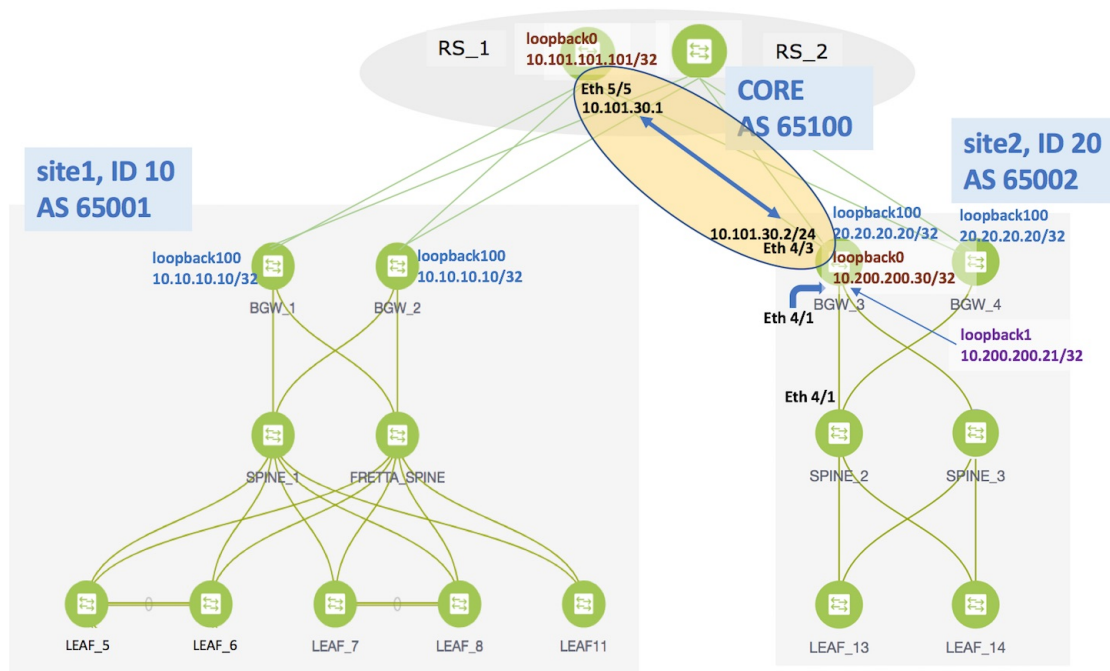
## Add Inter-Fabric Connections



## ▼ Network Profile

General	
MULTISITE	
	* IF_NAME <input type="text" value="Ethernet4/3"/> ?
	* IP_MASK <input type="text" value="10.101.30.2/24"/> ?
	* NEIGHBOR_IP <input type="text" value="10.101.30.1"/> ?
	* NEIGHBOR_ASN <input type="text" value="65100"/> ?

The corresponding connection in the topology is displayed:

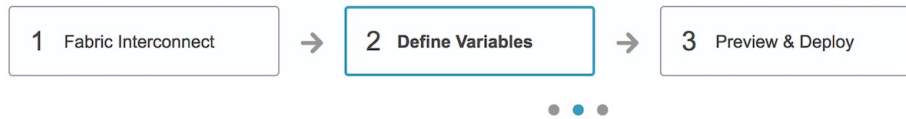


3. Click the **MULTISITE** tab.

While the **General** tab contains external connection details, this tab contains intra-fabric information such as fabric IGP, fabric facing Ethernet interface, and so on.

The **MULTISITE** tab only appears the first time that you create an EVPN Multi-Site underlay on a device, since the details remain the same for subsequent connections. The next time you create an EVPN Multi-Site underlay connection *on the same device*, only the General tab will be available.

## Add Inter-Fabric Connections



## Network Profile

General	
MULTISITE	
* Fabric Site ID	20 ?
* NVE Identifier	1 ?
* Fabric Interfaces	? E.g. e1/1-4, e2/2
* Multisite Loopback ID	100 ? [0-1023]
* MultiSite Loopback IP	? IPv4 address
* Routing Protocol	is-is ? Select IGP (ospf or is-is)
* IS-IS/OSPF Router ID	UNDERLAY ? String
* OSPF Area #	0 ? String

**Fabric Site ID**—This is the identification for the VXLAN BGP EVPN fabric *site2* to which *BGW\_3* belongs. The site ID is auto populated from the fabric settings, but it is editable. It should be same on all BGWs in one fabric and distinct from all other fabrics.

**NVE Identifier**—This is the VXLAN overlay ID.

**Fabric Interfaces**—Fill up this field with the interfaces on *BGW\_3* that connects to other intra-fabric device ports. Since Ethernet 4/1 connects to *SPINE\_2* and Ethernet 4/2 connects to *SPINE\_3* in the topology, the interfaces should be entered over here.

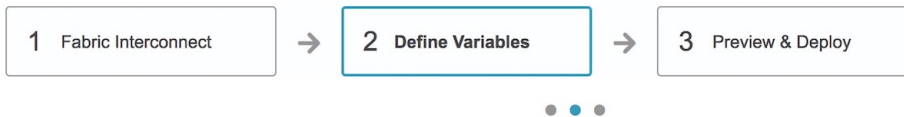
**Multisite Loopback ID** and **Multisite Loopback IP**—These are the loopback ID and IP address of this EVPN Multi-Site instance. The loopback IP address should be same for all BGWs in one fabric and distinct from all other fabrics.

**Routing Protocol** and **Router ID**—This is the IGP and the IGP instance ID within the fabric. Note that, if the IGP used in your setup is OSPF, the field has to be updated to *OSPF*.

**OSPF AREA**—OSPF area ID within the fabric.

A fully filled screen looks like this.

### Add Inter-Fabric Connections

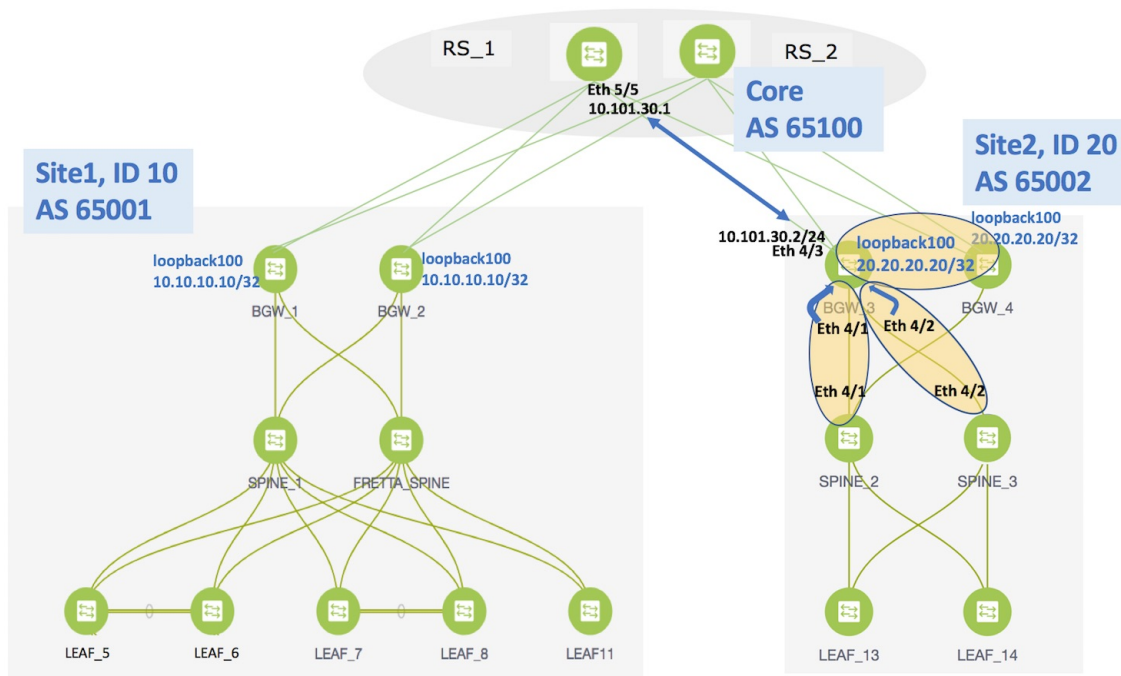


▼ Network Profile

General	
MULTISITE	
* Fabric Site ID	20
* NVE Identifier	1
* Fabric Interfaces	Eth4/1, Eth4/2
* Multisite Loopback ID	100
* MultiSite Loopback IP	20.20.20.20
* Routing Protocol	ospf
* IS-IS/OSPF Router ID	UNDERLAY
* OSPF Area #	0

Buttons: Previous, Next, Save & Deploy, Cancel

The corresponding topology depiction is given below:



4. Now that all the information is filled in, click **Next** to go to the **Preview and Deploy** section.

## Add Inter-Fabric Connections

1 Fabric Interconnect → 2 Define Variables → 3 Preview & Deploy

Switch:

Generated Configuration:

```

route-map RMAP-REDIST-DIRECT permit 10
  match tag 54321

evpn multisite border-gateway 20

interface loopback100
  description Used for EVPN Multi-Site
  ip address 20.20.20.20/32 tag 54321

  ip router ospf UNDERLAY area 0
  no shutdown

interface nve 1
  multisite border-gateway interface loopback100

interface e4/1
  evpn multisite fabric-tracking

```

Previous Next Save & Deploy Cancel

Here, you can preview the configuration that will be deployed to *BGW\_3*. Note that no configuration will be pushed to the external device itself.

5. Click **Save and Deploy** to complete the task. This results in the configuration getting pushed to *BGW\_3*. The external connection will appear in the Fabric Extension screen.

Fabric Extension

Inter-Fabric Connections Selected 0 / Total 1

Type	Source Fabric	Source Device	Source Interf...	Destination ...	Destination De...	Destination Interf...	Configuration	Status
<input type="radio"/> MULTISITE_UNDERLAY	SITE_2	BGW_3	Ethernet4/3	CORE	RS_1	Ethernet5/5	<a href="#">View Config</a>	DEPLOYED

You can check the status of the deployment (Deployment Pending, Deployed, Failed) in the **Status** column.

In case of FAILED or UNDEPLOYMENT FAILED status, use the hyperlink in the **Status** column to check the error messages for failure.

To view the configurations, click on *View Config* in the **Configuration** field.

After the underlay configuration, you need to configure the overlay configuration from *BGW\_3* to *RS\_1* (the external device connected to *BGW\_3*), as shown in the next section.

## Overlay Extension from *BGW\_3* to *RS\_1*



**Note** You can have multiple underlay connections to an external device but only one overlay connection from *BGW\_3* to each external device.

1. In the **Fabric Extension** page, click on the + icon to add an external overlay connection. The **Add Inter-Fabric Connections** screen appears.

By default, **VRF\_LITE** is populated in the **Extension Type** field. Change the selection to **MULTISITE\_OVERLAY**. The screen changes accordingly.

### Add Inter-Fabric Connections

1 Fabric Interconnect → 2 Define Variables → 3 Preview & Deploy

- \* Extension Type: MULTISITE\_OVERLAY
- \* Base Template: ext\_base\_setup
- \* Extension Template: ext\_multisite\_overlay\_setup
- \* Source Fabric: SITE\_2
- \* Destination Fabric: [Dropdown]
- \* Source Device: [Dropdown] ⓘ VRF\_LITE: Set switch role - Border; MULTISITE: Set switch role - "Border Gateway"
- \* Source Interface: [Dropdown]
- \* Destination Device: [Dropdown]
- \* Destination Interface: [Dropdown]

Previous Next Save & Deploy Cancel

**Base Template**—*ext\_base\_setup* is auto-populated in this field. The *ext\_base\_setup* base template is a one-time configuration pushed to the BGW.

**Extension Template**—*ext\_multisite\_overlay\_setup* is a setup template that contains the configuration that will be generated and pushed to the BGW to setup the corresponding inter-fabric connection. These templates are auto-populated with corresponding pre-packaged default templates based on your selection.

**Source Fabric**—This field is pre-populated with *site2* since you are deploying the configurations in *site2*.

**Destination Fabric**—For the destination fabric, select the fabric that contains *RS\_1*, *CORE*.

**Source Device**—Choose *BGW\_3* since the overlay connection is from *BGW\_3* to *RS\_1*.

**Source Interface**—Choose the source interface. Typically, a loopback interface is created for the overlay. The loopback IP address (*loopback0* in this example) is used for BGP peering with the destination interface.

**Destination Device**—Choose *RS\_1* since the overlay connection is from *BGW\_3* to *RS\_1*.

**Destination Interface**—Choose the destination interface. Choose the interface which is the BGP peer address. Note that the destination interface is not used in generating the configuration.

After filling up the Fabric Interconnect section, the screen looks like this.

### Add Inter-Fabric Connections

1 Fabric Interconnect → 2 Define Variables → 3 Preview & Deploy

\* Extension Type: MULTISITE\_OVERLAY

\* Base Template: [Empty]

\* Extension Template: ext\_multisite\_overlay\_setup

\* Source Fabric: SITE\_2

\* Destination Fabric: CORE

\* Source Device: BGW\_3 ⓘ VRF\_LITE: Set switch role - Border; MULTISITE: Set switch role - "Border Gateway"

\* Source Interface: Loopback0

\* Destination Device: RS\_1

\* Destination Interface: Loopback0

Previous Next Save & Deploy Cancel

2. Click **Next** to go to the **Define Variables** section. The fields in this screen:

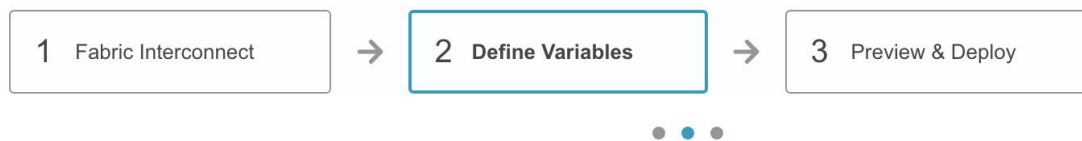
**NEIGHBOR\_ASN**—This field is populated with the *RS\_1*'s AS Number.

**Overlay Neighbor IP**—Enter the IP address on *RS\_1* that the overlay peers with. This is typically a loopback address.

**IF\_NAME**—In this field, the source interface is auto-populated from the previous step.

A fully filled screen looks like this:

## Add Inter-Fabric Connections



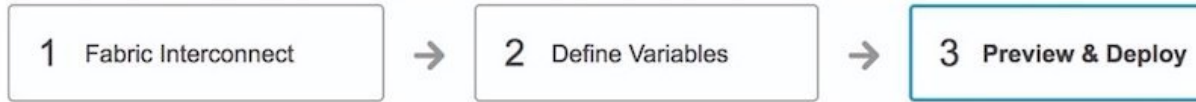
## ▼ Network Profile

General	
* NEIGHBOR_ASN	<input type="text" value="65100"/> ?
* Overlay Neighbor IP	<input type="text" value="10.101.101.101"/> ? IPv4 address
* IF_NAME	<input type="text" value="Loopback0"/> ?

3. Click **Next** to go to the **Preview and Deploy** section.



## Add Inter-Fabric Connections



Switch:

Generated Configuration:

```
router bgp 65002
  neighbor 10.101.101.101 remote-as 65100
  update-source Loopback0
  ebgp-multihop 5
  peer-type fabric-external
  address-family l2vpn evpn
  send-community
  send-community extended
  rewrite-evpn-rt-asn
```

Here, you can preview the overlay configuration that will be deployed to *BGW\_3*. In this section, you can see that an overlay connection is being established from *Loopback0* on *BGW\_3* to the neighbor with AS Number 65100.

Note that no configuration will be pushed to the external device itself.

4. Click **Save and Deploy** to complete the task. This results in the configuration getting pushed to *BGW\_3*. The external connection will appear in the Fabric Extension screen.

Fabric Extension ✕

Inter-Fabric Connections Selected 0 / Total 2

Type	Source Fa...	Source Device	Source Interface	Destination Fa...	Destination De...	Destination Int...	Configuration	Status
<input type="radio"/> MULTISITE_OVERLAY	SITE_2	BGW_3	Loopback0	CORE	RS_1	Loopback0	<a href="#">View Config</a>	DEPLOYED
<input type="radio"/> MULTISITE_UNDERLAY	SITE_2	BGW_3	Ethernet4/3	CORE	RS_1	Ethernet5/5	<a href="#">View Config</a>	DEPLOYED

You can check the status of the deployment (Pending, Deployed, Failed) in the **Status** column. In case of FAILED or UNDEPLOYMENT FAILED status, use the hyperlink in the **Status** column to check the error messages for failure.

### IFC Pointers

- Extensions will need to be deleted and then reconfigured in case of deployment failures. Currently there is no option to edit or redeploy an overlay or underlay extension.
- To see the deployment history of a functioning IFC, click the **View Config** hyperlink in the **Configuration** column (step 1 in the image). The Inter-fabric Connections Deployment History page comes up. In this page, the **Source** column refers to the specific IFC number. Click the link in the **Status** column (step 2) to view commands executed for the IFC.

The screenshot displays the 'Fabric Extension' interface. At the top, there's a table for 'Inter-Fabric Connections' with columns: Type, Source Fabric, Source Device, Source Interface, Destination Fa..., Destination De..., Destination Int..., Configuration, and Status. A yellow circle '1' highlights the 'View Config' link in the Configuration column for the first row.

Below this, a pop-up window titled 'Inter-fabric Connections Deployment History for n9k-15-bgw ( FDO20401LB4 )' is shown. It has a table with columns: Entity Name, Entity Type, Source, Status, Status Description, and Time of Completion. A red box highlights the 'Source' column containing 'IFC-4', and a yellow circle '2' highlights the 'Status' column containing 'SUCCESS'.

At the bottom right, another pop-up window titled 'Command Execution Details for n9k-15-bgw ( FDO20401LB4 )' shows a table with columns: Config, Status, and CLI Response. It lists various configuration commands and their successful execution status.

You can only see functioning IFCs in this screen. To view functioning and deleted IFCs, you should right-click the switch and click **History** (steps 1 and 2 in the image below). In the Policy Deployment screen that comes up, filter the **Source** column for the IFC (step 3 - *IFC-8*, *IFC-4*, etc) and click the link in the **Status** column (step 4, below) for detailed information.

The screenshot shows a network management interface. A dropdown menu for 'n9k-15-bgw' is open, with 'History' selected. Below it, the 'Policy Deployment History for n9k-15-bgw ( FDO20401LB4 )' is displayed. A table shows a successful deployment of an IFC. A pop-up window shows the 'Command Execution Details for n9k-15-bgw ( FDO20401LB4 )' with a list of configuration commands and their successful status.

Entity Name	Entity Type	Source	Status	Status Description	User
FDO20401LB4	SWITCH	IFC-8	SUCCESS	Successfully deployed	admin

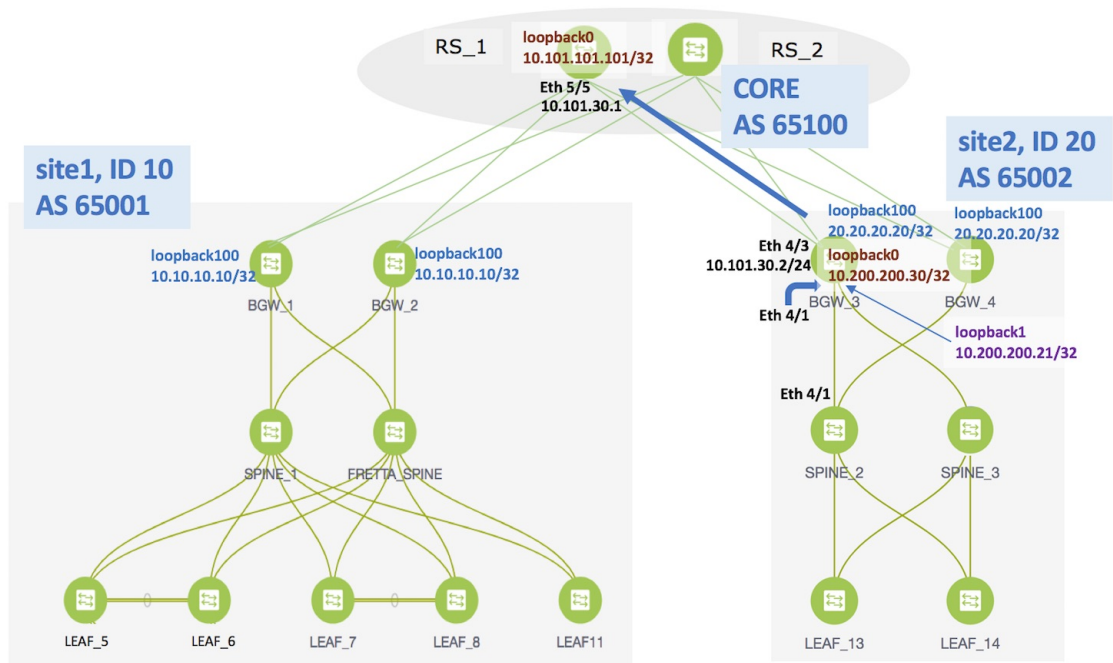
  

Config	Status	CLI Response
no route-map extcon-rmap-filter deny...	SUCCESS	
router bgp 60000	SUCCESS	
address-family ipv4 unicast	SUCCESS	
redistribute direct route-map rmap-re...	SUCCESS	

- When a destination switch in an IFC is removed, and not available, in DCNM, you will still be able to delete a deployed IFC.

## Other EVPN Multi-Site Configurations

At this stage, overlay and underlay EVPN Multi-Site configurations are provisioned on *BGW\_3* toward *RS\_1* (as shown by the arrow in the figure).



To complete EVPN Multi-Site configurations between *site1* and *site2* using DCNM, you should also configure as follows:

- **On *site2***

- EVPN Multi-Site configurations from *BGW\_3* to *RS\_2*.
- EVPN Multi-Site configurations from *BGW\_4* to *RS\_1* and *RS\_2*.

- **On *site1***

- EVPN Multi-Site configurations from *BGW\_1* to *RS\_1* and *RS\_2*.
- EVPN Multi-Site configurations from *BGW\_2* to *RS\_1* and *RS\_2*.

- **On the route servers**

- Apart from the DCNM provisioning on the BGWs of *site1* and *site2*, you should enable appropriate configurations on *RS\_1* and *RS\_2* for connectivity between the route servers and the BGWs.

Sample *RS\_1* configurations are provided in the *Appendix* section for your reference.

As noted earlier, the end-to-end Multi-Site configurations through DCNM Top-Down provisioning include these two steps:

(1) Multi-Site configurations on the BGWs (*BGW\_1*, *BGW\_2*, *BGW\_3* and *BGW\_4*).

(2) Deploying Networks and VRF Instances on the leaf switches and the BGWs.

At this stage, the first step explanation is complete. In the next part of the document, the networks' configuration (second step), is explained. After appropriate network configurations on the leaf switches and BGWs, server traffic will flow across the two sites for the deployed and extended networks and VRFs.

## Deploying Networks and VRF Instances

Typically, you create a fabric in DCNM, then create and deploy networks and VRFs on devices within the fabric on leaf switches, and then configure the BGWs for external connectivity. Though the focus of the document is external connectivity with EVPN Multi-Site configurations on BGWs using DCNM, for completeness and right context, network deployment on the BGWs is explained in this section. When EVPN Multi-Site deployment is completed, server traffic from these networks and VRFs on *site2* will pass through a BGW (*BGW\_3* or *BGW\_4*) towards *site1*.



**Note** For VRF deployment, refer the *Deploying VRF Instances on Border Leafs* section in the chapter *Border Provisioning Use Case in VXLAN BGP EVPN Fabrics - VRF Lite*.

## Deploying Networks on the BGWs

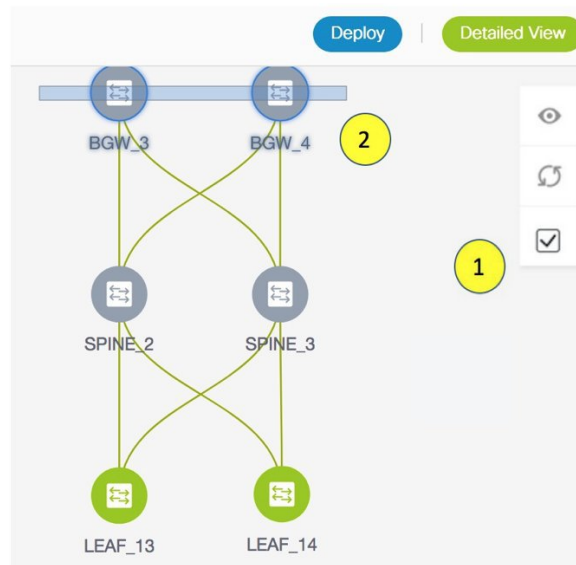
*Before you begin* - In this scenario, we will deploy two networks in *site2*, *MyNetwork\_10000* and *MyNetwork\_10001*, on the BGWs *BGW\_3* and *BGW\_4*. You should ensure that you have already deployed the networks that you want to extend to *site1* on the leaf switches (*LEAF\_13* and *LEAF\_14* in this case).

After deploying the 2 networks on the leaf switches and the BGWs, the networks will be extended to *site1*. To know how to create a new fabric, network, and VRF, see the *Fabrics* section in the *Control* chapter in the *Cisco DCNM LAN Fabric User Guide, Release 11.0(1)*. The procedure:

1. In the Select a Fabric page, click the **Continue** button at the top right part of the screen. The **Networks** page comes up.  
(To access the Select a Fabric page, click **Control > Networks & VRFs**. The LAN Fabric Provisioning page comes up. Click **Continue**. The Select a Fabric page comes up.)
2. We will deploy two new networks *MyNetwork\_10000* and *MyNetwork\_10001* on the BGWs. To do that, select the checkboxes (in the extreme left column).

Network Name	Network ID	VRF Name	IPv4 Gateway/Subnet	IPv6 Gateway/Prefix	Status	VLAN ID
<input checked="" type="checkbox"/> MyNetwork_10000	10000	MyVRF_200000	10.1.10.1/24	10:1:A::1/48	UNDEPLOYED	
<input checked="" type="checkbox"/> MyNetwork_10001	10001	MyVRF_200000	10.1.11.1/24		UNDEPLOYED	11
<input type="checkbox"/> MyNetwork_10002	10002	MyVRF_200002	10.1.12.1/24	10:1:C::1/48	UNDEPLOYED	
<input type="checkbox"/> MyNetwork_10003	10003	NA	10.1.13.1/24		UNDEPLOYED	

3. Click the **Continue** button at the top right part of the screen. The Network Deployment page (Topology View) comes up. You can deploy networks simultaneously on multiple switches. The selected devices should have the same role (*Leaf*, *Border Gateway*, etc). So, deploy the selected networks on the BGWs.
4. Select the multi-select check box available at the right part of the page. (displayed as step 1 in the image). Then, click your mouse (or track pad) and drag the cursor across *BGW\_3* and *BGW\_4*. (step 2).



**Note** In the image, you can see that the networks are deployed on the leaf switches (green color indicates *deployed* status). Note that the color code (and hence the deployment state) on switches is contextual and specific to the selection. In this scenario, the deployed state only depicts that networks *MYNetwork10000* and *MYNetwork10001* are deployed on leaf switches *LEAF\_13* and *LEAF\_14*. It does not display information about other (networks and VRFs) deployment instances, if any.

Immediately, the **Switches Deploy** screen (for networks) appears.

## Switches Deploy

*Fabric Name: SITE\_2*

MyNetwork\_10000

MyNetwork\_10001

*Deploy Options:* *Select the row and click on the cell to edit and save changes*

<input type="checkbox"/>	Switch	▲	VLAN	Extend	Status
<input type="checkbox"/>	BGW_3		10	MULTISITE	NA
<input type="checkbox"/>	BGW_4		10	MULTISITE	NA

Save

A tab is displayed for each network. Click the checkbox next to the **Switch** column. Both the BGW check boxes will be selected automatically and the **Extension Details** section will appear at the bottom part of the screen.

In the **Extension Details** section, select the **Switch** checkbox (or ensure that you select the check box in each row) and click **Save** (bottom right part of your screen).


## Switches Deploy

Fabric Name: *SITE\_2*

MyNetwork\_10000

MyNetwork\_10001

## Deploy Options:

 Select the row and click on the cell to edit and save changes

<input checked="" type="checkbox"/>	Switch	▲	VLAN	Extend	Status
<input checked="" type="checkbox"/>	BGW_3		10	MULTISITE	NA
<input checked="" type="checkbox"/>	BGW_4		10	MULTISITE	NA

Extension Details

<input checked="" type="checkbox"/>	Switch	▲	Type	IF_NAME
<input checked="" type="checkbox"/>	BGW_3		MULTISITE	Loopback0
<input checked="" type="checkbox"/>	BGW_3		MULTISITE	Loopback0
<input checked="" type="checkbox"/>	BGW_4		MULTISITE	Loopback0
<input checked="" type="checkbox"/>	BGW_4		MULTISITE	Loopback0

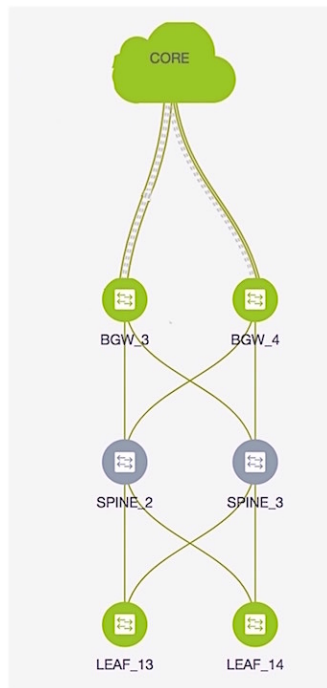
After saving the details in this screen, the Network Deployment screen (Topology view) appears.

*BGW\_3* and *BGW\_4* will be displayed in blue color, indicating pending deployment. If you want to check your configurations again, click on the Preview (eye) icon.

- After you verify that the configurations that are generated from the profiles are correct for the selected switches, click the **Deploy** button (on the top right part of the screen) to deploy the *MYNetwork10000* and *MYNetwork10001* network configurations on *BGW\_3* and *BGW\_4*.

DCNM shows the deployment status in the topology by highlighting the switch icons with different colors, yellow for *In Progress* and green for *Deployed*.



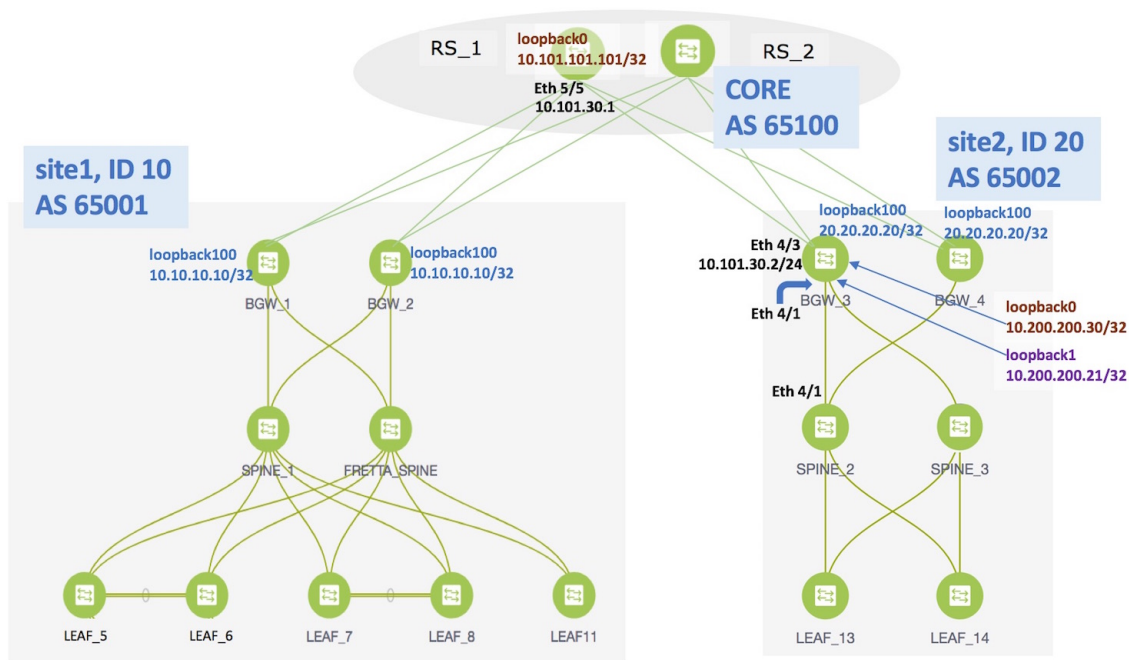


From the snapshot, you can see that the 2 networks *MYNetwork10000* and *MYNetwork10001* have been deployed on the leaf switches and BGWs.

6. After configurations in *site2* are complete, configure the following in *site1* too.

## Configurations in *site1*

Provision the networks *MYNetwork10000* and *MYNetwork10001* on the leaf switches (*LEAF\_5*, *LEAF\_6*, *LEAF\_7*, *LEAF\_8*, *LEAF\_11*) and the BGWs (*BGW\_1* and *BGW\_2*).



As noted in the *EVPN Multi-Site Configuration* section, enable the following for end-to-end configuration:

- Since DCNM does not provision configurations for *RS\_1* and *RS\_2* (devices directly connected to the BGWs), enable appropriate configurations on these devices.
- Configure the EVPN Multi-Site feature on the *site1* BGWs (as explained in this document) so that server traffic from the 2 networks can flow to *site2* and back.

## Additional References

Document Title and Link	Document Description
<a href="#">VXLAN EVPN Multi-Site Design and Deployment White Paper</a>	This document explains Multi-Site design and deployment in detail.
<a href="#">Configuring VXLAN EVPN Multi-Site</a>	This document explains manual configurations for the Multi-Site solution.

## Appendix

### Route Server Configurations

*RS\_1* configuration example for the overlay—The following configurations are enabled on *RS\_1*, and reproduced here for reference.



**Note** *switch(config)#* refers to the global configuration mode. To access this mode, type the following on your switch: *switch# configure terminal*.

```

switch(config)#

route-map ALL-PATHS permit 100
  set path-selection all advertise
route-map RMAP-REDIST-DIRECT permit 10
  match tag 12345
route-map UNCHANGED permit 10
  set ip next-hop unchanged

switch(config)#

interface loopback0
  ip address 10.101.101.101/32 tag 12345
line vty
router bgp 65100
  router-id 10.101.101.101
  address-family ipv4 unicast
    redistribute direct route-map RMAP-REDIST-DIRECT
    maximum-paths 4
    additional-paths send
    additional-paths receive
    additional-paths selection route-map ALL-PATHS
  address-family l2vpn evpn
    retain route-target all
  template peer OVERLAY-PEERING
    update-source loopback0
    ebgp-multihop 5
  address-family l2vpn evpn
    send-community both
    route-map UNCHANGED out
  neighbor 10.100.100.10
    inherit peer OVERLAY-PEERING
    remote-as 65001
    address-family l2vpn evpn
      rewrite-evpn-rt-asn
      route-map UNCHANGED out
  neighbor 10.100.100.20
    inherit peer OVERLAY-PEERING
    remote-as 65001
    address-family l2vpn evpn
      rewrite-evpn-rt-asn
      route-map UNCHANGED out
  neighbor 10.101.11.2
    remote-as 65101
    update-source Ethernet5/1
    address-family ipv4 unicast
      next-hop-self
  neighbor 10.101.12.2
    remote-as 65101
    update-source Ethernet5/2
    address-family ipv4 unicast
      next-hop-self
  neighbor 10.101.13.2
    remote-as 65102
    update-source Ethernet5/3
    address-family ipv4 unicast
      next-hop-self

```

```
neighbor 10.101.14.2
  remote-as 65102
  update-source Ethernet5/4
  address-family ipv4 unicast
  next-hop-self
neighbor 10.101.30.2
  remote-as 65002
  update-source Ethernet5/5
  address-family ipv4 unicast
  next-hop-self
neighbor 10.101.40.2
  remote-as 65002
  update-source Ethernet5/6
  address-family ipv4 unicast
  next-hop-self
neighbor 10.200.200.30
  remote-as 65002
  update-source loopback0
  ebgp-multihop 5
  address-family l2vpn evpn
  rewrite-evpn-rt-asn
  send-community both
  route-map UNCHANGED out
neighbor 10.200.200.40
  remote-as 65002
  update-source loopback0
  ebgp-multihop 5
  address-family l2vpn evpn
  rewrite-evpn-rt-asn
  send-community both
  route-map UNCHANGED out
```