

使用DCNM构建Nexus 9000 VXLAN共享边界多站点部署

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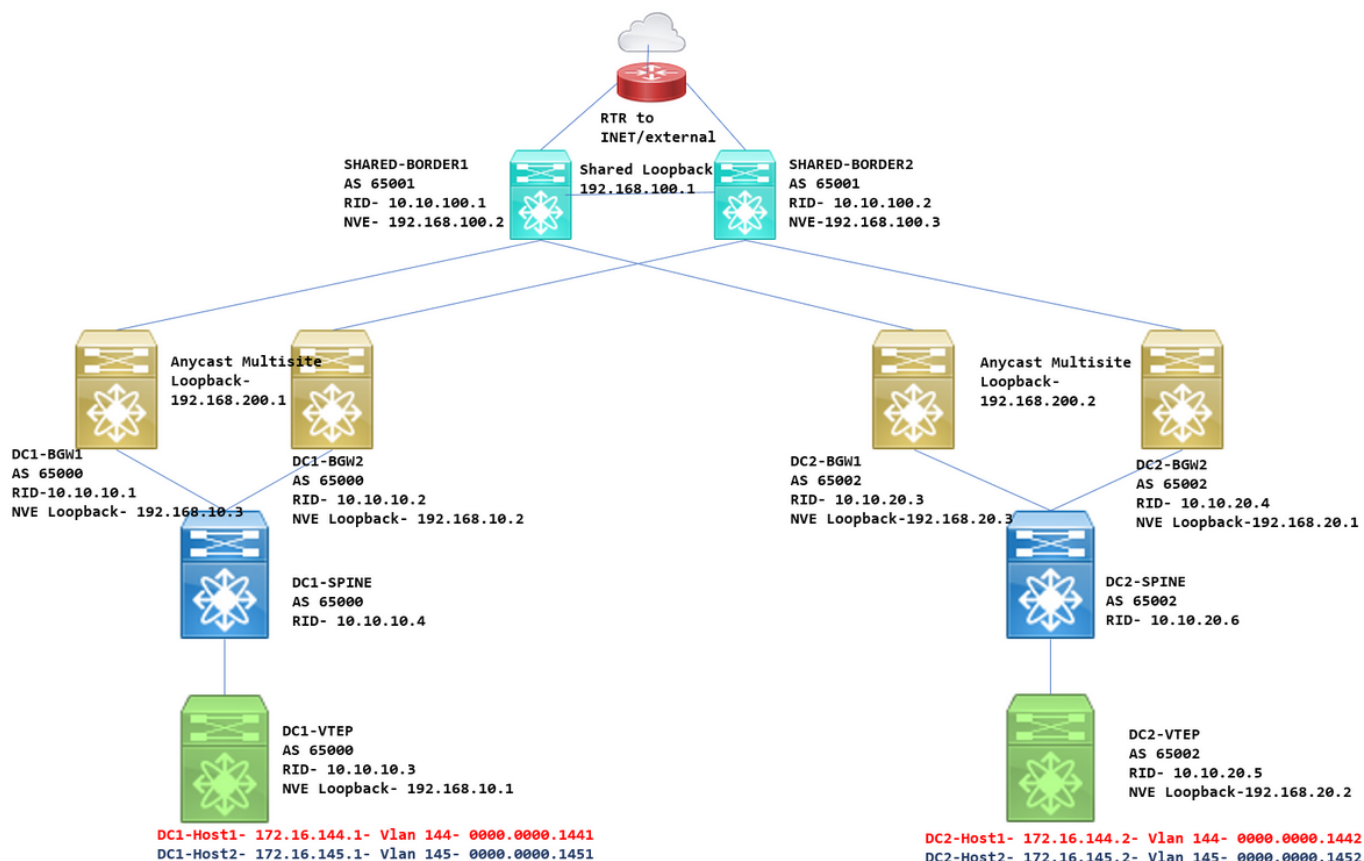
[a\)将交换矩阵间链路从共享边界添加到外部路由器](#)

[b\)添加VRF扩展](#)

简介

本文档将介绍如何使用DCNM 11.2版本使用共享边界模型部署Cisco Nexus 9000 VXLAN多站点部署。

拓扑



拓扑的详细信息

DC1和DC2是运行vxlan的两个数据中心位置；

DC1和DC2边界网关与共享边界有物理连接；

共享边界具有外部连接(例如；互联网);因此，VRF Lite连接在共享边界上终止，并且默认路由由共享边界注入到每个站点的边界网关

在vPC中配置共享边界（使用DCNM部署交换矩阵时，这是要求）

边界网关在任播模式下配置

使用的组件:

运行9.3(2)的Nexus 9k

运行11.2版本的DCNM

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

高级步骤

1)考虑到本文档基于使用vxlan多站点功能的两个数据中心，必须创建两个Easy Fabric

2)为共享边界创建另一个简单交换矩阵

3)创建MSD并移动DC1和DC2

4)创建外部交换矩阵

5)创建多站点底层和重叠 (适用于东/西)

6)在共享边界上创建VRF扩展附件

步骤 1 : 为DC1创建简易交换矩阵

- 登录DCNM , 从控制面板中选择选项 — > "Fabric Builder"



DCNM Licenses

License this copy of DCNM for each managed switch to unlock Performance Collection.



Fabric Builder

Creates a managed and controlled SDN fabric.



Networks & VRFs

Simple network overlay provisioning for N9K VXLAN EVPN Fabrics.



Documentation

Access cisco.com from documentation on configuration, maintenance and operation.

- 选择“创建交换矩阵”选项



Fabric Builder

Fabric Builder creates a managed and controlled SDN fabric. Select an existing fabric below or define a new *VXLAN* fabric, add switches using *Power On Auto Provisioning (POAP)*, set the roles of the switches and deploy settings to devices.

Create Fabric

- 接下来是提供交换矩阵名称、模板，然后打开多个选项卡，这些选项卡将需要ASN、交换矩阵接口编号、任意播放网关MAC(AGM)等详细信息

Add Fabric

* Fabric Name : DC1
* Fabric Template : Easy_Fabric_11_1

General Replication vPC Advanced Resources Manageability Bootstrap Configuration Backup

* BGP ASN 65000 ? 1-4294967295 | 1-65535[0-65535]
* Fabric Interface Numbering unnumbered ? Numbered(Point-to-Point) or Unnumbered
* Underlay Subnet IP Mask 30 ? Mask for Underlay Subnet IP Range
* Link-State Routing Protocol ospf ? Supported routing protocols (OSPF/IS-IS)
* Route-Reflectors 2 ? Number of spines acting as Route-Reflectors
* Anycast Gateway MAC 2020.2020.aaaa ? Shared MAC address for all leafs (xxxx.xxxx.xxxx)
NX-OS Software Image Version ? If Set, Image Version Check Enforced On All Switches. Images Can Be Uploaded From Control:Image Upload

#交换矩阵接口（主干/枝叶接口）可以是“未编号”或点对点接口；如果使用未编号的，则所需的IP地址更少（因为IP地址是未编号环回的IP地址）

#交换矩阵中的主机使用AGM作为默认网关MAC地址；所有作为默认网关的枝叶交换机上的情况相同

- 接下来是设置复制模式

Add Fabric

* Fabric Name :

* Fabric Template :

General | **Replication** | vPC | Advanced | Resources | Manageability | Bootstrap | Configuration Backup

* Replication Mode	Multicast	? Replication Mode for BUM Traffic
* Multicast Group Subnet	239.1.1.0/25	? Multicast address with prefix 16 to 30
Enable Tenant Routed Multicast (TRM)	<input checked="" type="checkbox"/> ? For Overlay Multicast Support In VXLAN Fabrics	
Default MDT Address for TRM VRFs	239.100.100.100	? IPv4 Multicast Address
* Rendezvous-Points	2	? Number of spines acting as Rendezvous-Point (RP)
* RP Mode	asm	? Multicast RP Mode
* Underlay RP Loopback Id	254	? 0-512
Underlay Primary RP Loopback Id		? 0-512, Primary Loopback Bidir-PIM Phantom RP
Underlay Backup RP Loopback Id		? 0-512, Fallback Loopback Bidir-PIM Phantom RP
Underlay Second Backup RP Loopback Id		? 0-512, Second Fallback Loopback Bidir-PIM Phantom RP
Underlay Third Backup RP Loopback Id		? 0-512, Third Fallback Loopback Bidir-PIM Phantom RP

#此处选择的复制模式可以是组播或IR-Ingress复制；IR将以单播方式将vxlan VLAN中的任何传入BUM流量复制到其他VTEP，也称为头端复制，而组播模式将使用为每个网络定义的组播组的外部目标IP地址将BUM流量发送到主干，主干将基于外部目标IP地址的OIL执行组播复制VTEP

#组播组子网 —>复制BUM流量（如来自主机的ARP请求）所需

#如果需要启用TRM，请选中与TRM对应的复选框，并为TRM VRF提供MDT地址。

- “vPC”的选项卡默认保留；如果备份SVI/VLAN需要任何更改，可在此处定义
- “高级”选项卡是下一部分

Add Fabric

* Fabric Name : DC1

* Fabric Template : Easy_Fabric_11_1

General	Replication	vPC	Advanced	Resources	Manageability	Bootstrap	Configuration Backup
			* VRF Template	Default_VRF_Universal	?	Default Overlay VRF Template For Leafs	
			* Network Template	Default_Network_Universal	?	Default Overlay Network Template For Leafs	
			* VRF Extension Template	Default_VRF_Extension_Universal	?	Default Overlay VRF Template For Borders	
			* Network Extension Template	Default_Network_Extension_Universa	?	Default Overlay Network Template For Borders	
			Site Id	65000	?	For EVPN Multi-Site Support (Min:1, Max: 281474976710655). Defaults to Fabric ASN	
			* Underlay Routing Loopback Id	0	?	0-512	
			* Underlay VTEP Loopback Id	1	?	0-512	
			* Link-State Routing Protocol Tag	UNDERLAY	?	Routing Process Tag (Max Size 20)	
			* OSPF Area Id	0.0.0.0	?	OSPF Area Id in IP address format	
			Enable OSPF Authentication	<input type="checkbox"/>	?		
			OSPF Authentication Key ID		?	0-255	
			OSPF Authentication Key		?	3DES Encrypted	
			Enable IS-IS Authentication	<input type="checkbox"/>	?		
			IS-IS Authentication Keychain Name		?		
			IS-IS Authentication Key ID		?	0-65535	
			IS-IS Authentication Key		?	Cisco Type 7 Encrypted	
			* Power Supply Mode	ps-redundant	?	Default Power Supply Mode For The Fabric	
			* CoPP Profile	strict	?	Fabric Wide CoPP Policy. Customized CoPP policy should be provided when 'manual' is selected	
			Enable VXLAN OAM	<input checked="" type="checkbox"/>	?	For Operations, Administration, and Management Of VXLAN Fabrics	
			Enable Tenant DHCP	<input checked="" type="checkbox"/>	?		
			Enable BFD	<input type="checkbox"/>	?		
			* Greenfield Cleanup Option	Disable	?	Switch Cleanup Without Reload When PreserveConfig=no	
			Enable BGP Authentication	<input type="checkbox"/>	?		

#此处提及的站点ID在此DCNM版本上自动填充，该版本源自“常规”选项卡下定义的ASN

#填写/修改其他相关字段

- Resources (资源) 选项卡是下一个需要环回IP编址方案的选项卡，下一个

Add Fabric

* Fabric Name : DC1

* Fabric Template : Easy_Fabric_11_1

General Replication vPC Advanced Resources Manageability Bootstrap Configuration Backup

Manual Underlay IP Address Allocation ? Checking this will disable Dynamic Underlay IP Address Allocations

* Underlay Routing Loopback IP Range	10.10.10.0/24	? Typically Loopback0 IP Address Range
* Underlay VTEP Loopback IP Range	192.168.10.0/24	? Typically Loopback1 IP Address Range
* Underlay RP Loopback IP Range	10.100.100.0/24	? Anycast or Phantom RP IP Address Range
* Underlay Subnet IP Range	10.4.10.0/24	? Address range to assign Numbered and Peer Link SVI IPs
* Layer 2 VXLAN VNI Range	100144,100145	? Overlay Network Identifier Range (Min:1, Max:16777214)
* Layer 3 VXLAN VNI Range	1001445	? Overlay VRF Identifier Range (Min:1, Max:16777214)
* Network VLAN Range	144,145	? Per Switch Overlay Network VLAN Range (Min:2, Max:3967)
* VRF VLAN Range	1445	? Per Switch Overlay VRF VLAN Range (Min:2, Max:3967)
* Subinterface Dot1q Range	2-511	? Per Border Dot1q Range For VRF Lite Connectivity (Min:2, Max:511)
* VRF Lite Deployment	Manual	? VRF Lite Inter-Fabric Connection Deployment Options
* VRF Lite Subnet IP Range	10.10.33.0/24	? Address range to assign P2P DCI Links
* VRF Lite Subnet Mask	30	? Mask for Subnet Range (Min:8, Max:31)

#第2层VXLAN VNI范围 —>这些是VNID，稍后将映射到Vlan（将进一步向下显示）

#第3层VXLAN VNI范围 —>这些是第3层VNID，稍后也会映射到第3层VNI Vlan到Vn-segment

- 此处未显示其他选项卡；如果需要，请填写其他选项卡；

Add Fabric ×

* Fabric Name : DC1

* Fabric Template : Easy_Fabric_11_1

General Replication vPC Advanced Resources Manageability Bootstrap Configuration Backup

Hourly Fabric Backup ? Backup Only when a Fabric is modified

Scheduled Fabric Backup ? Backup at Specified Scheduled Time

Scheduled Time ? Time in 24hr format. (00:00 to 23:59)

- 保存后，交换矩阵生成器页面将显示交换矩阵(从DCNM->控制 —>交换矩阵生成器

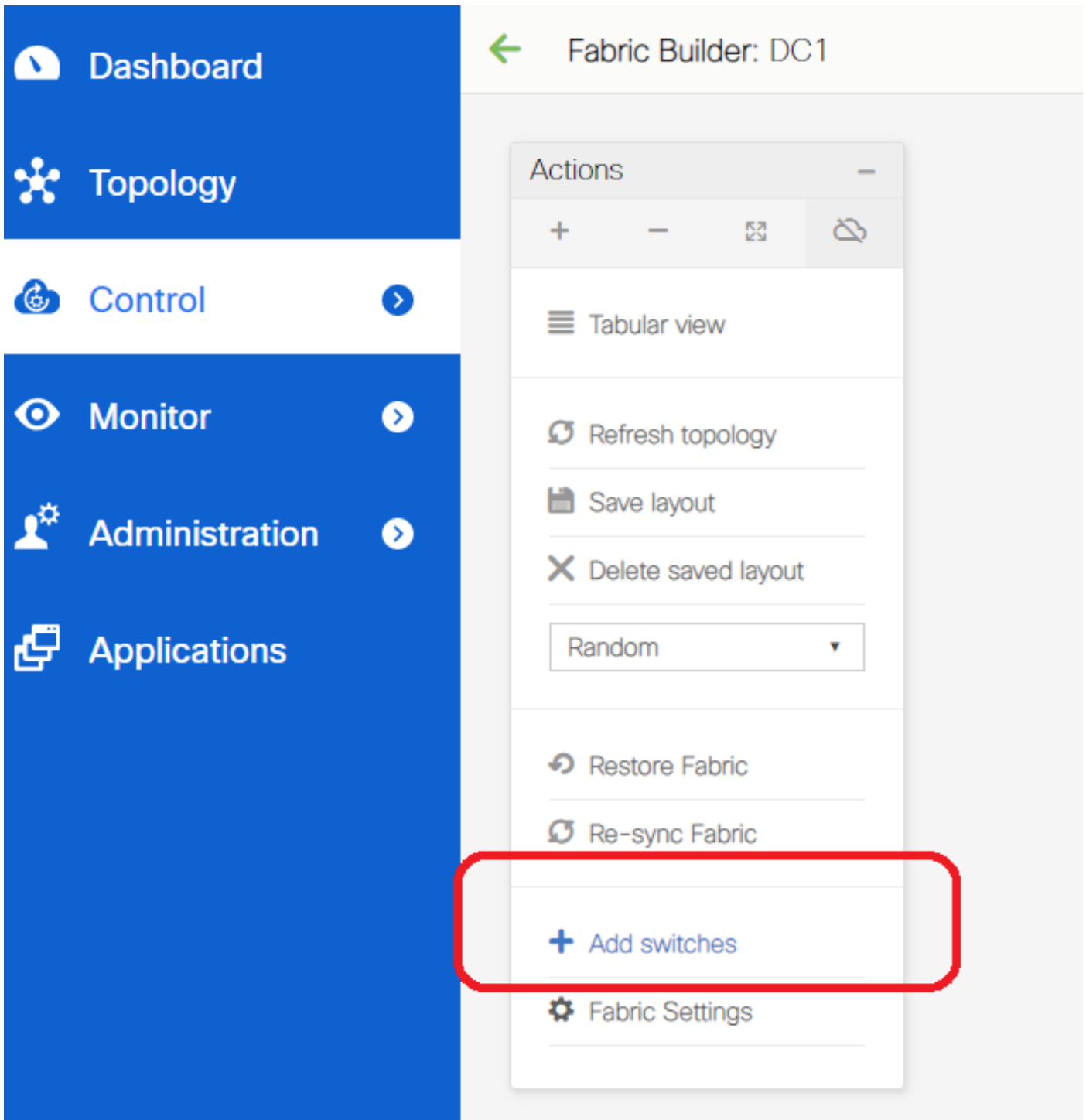
The screenshot shows the Fabric Builder interface. On the left is a blue navigation sidebar with the following menu items: Dashboard, Topology, Control, Monitor, Administration, and Applications. The main content area is titled 'Fabric Builder' and includes a sub-header: 'Fabric Builder creates a managed and controlled SDN fabric. Select an existing fabric below or def'. Below this is a 'Create Fabric' button. A red box highlights a section titled 'Fabrics (1)' which contains a single entry for 'DC1'. The entry details are: Type: Switch Fabric, ASN: 65000, Replication Mode: Multicast, and Technology: VXLAN Fabric. There are gear and close icons to the right of the entry name.

#此部分显示每个交换矩阵的交换矩阵、ASN和复制模式的完整列表

- 下一步是将交换机添加到DC1交换矩阵

步骤 2：将交换机添加到DC1交换矩阵

单击上图中的DC1，这将提供添加交换机的选项。



- 提供需要导入DC1交换矩阵的交换机的IP地址和凭证（根据本文档开头列出的拓扑，DC1-VTEP、DC1-SPINE、DC1-BGW1和DC1-BGW2是DC1的一部分）

Inventory Management

Discover Existing Switches | PowerOn Auto Provisioning (POAP)

Discovery Information > Scan Details >

Seed IP: 10.122.165.173,10.122.165.200,10
Ex: "2.2.2.20"; "10.10.10.40-60"; "2.2.2.20, 2.2.2.21"

Authentication Protocol: MD5

Username: admin

Password:

Max Hops: 10 hop(s)

Preserve Config: no yes
Selecting 'no' will clean up the configuration on switch(es)

[Start discovery](#)

#由于这是绿地部署，请注意，“preserve config”选项被选为“NO”；这将在执行导入时删除框的所有配置，并且将重新加载交换机

#选择“开始发现”，以便DCNM根据“种子IP”列中提供的IP地址开始发现交换机

- 一旦DCNM完成发现交换机，IP地址和主机名将列在资产管理中

Inventory Management

Discover Existing Switches | PowerOn Auto Provisioning (POAP)

Discovery Information > Scan Details >

Back Note: Preserve Config selection is 'no'. Switch configuration will be erased. [Import into fabric](#)

Show Quick Filter

<input type="checkbox"/>	Name	IP Address	Model	Version	Status	Progress
<input type="checkbox"/>	BB1					
<input checked="" type="checkbox"/>	DC1-SPINE	10.122.165.200	N9K-C933...	9.3(1)	manageable	
<input checked="" type="checkbox"/>	DC1-BGW1	10.122.165.187	N9K-C931...	9.3(1)	manageable	
<input checked="" type="checkbox"/>	DC1-BGW2	10.122.165.154	N9K-C931...	9.3(1)	manageable	
<input type="checkbox"/>	DC1-N3K	10.122.165.195	N3K-C317...	7.0(3)I4(6)	manageable	
<input checked="" type="checkbox"/>	DC1-VTEP	10.122.165.173	N9K-C9332C	9.3(1)	manageable	

#选择相关交换机，然后点击“导入到交换矩阵”



Warning: All switch configuration other than management, will be removed immediately after import. Do you want to proceed?

OK

Cancel

Inventory Management



Discover Existing Switches

PowerOn Auto Provisioning (POAP)

Discovery Information

Scan Details

← Back

Note: Preserve Config selection is 'no'. Switch configuration will be erased.

Import into fabric

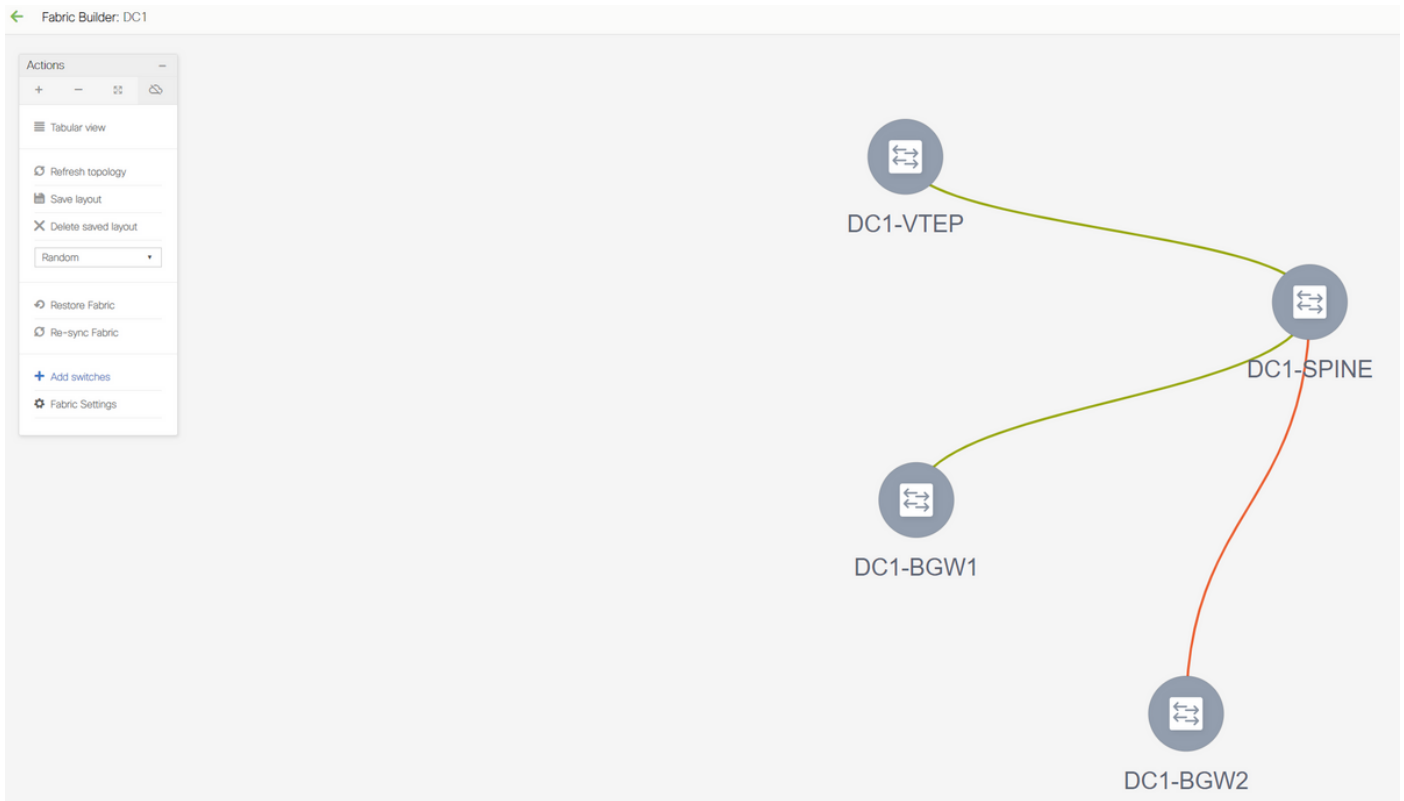
Show

Quick Filter

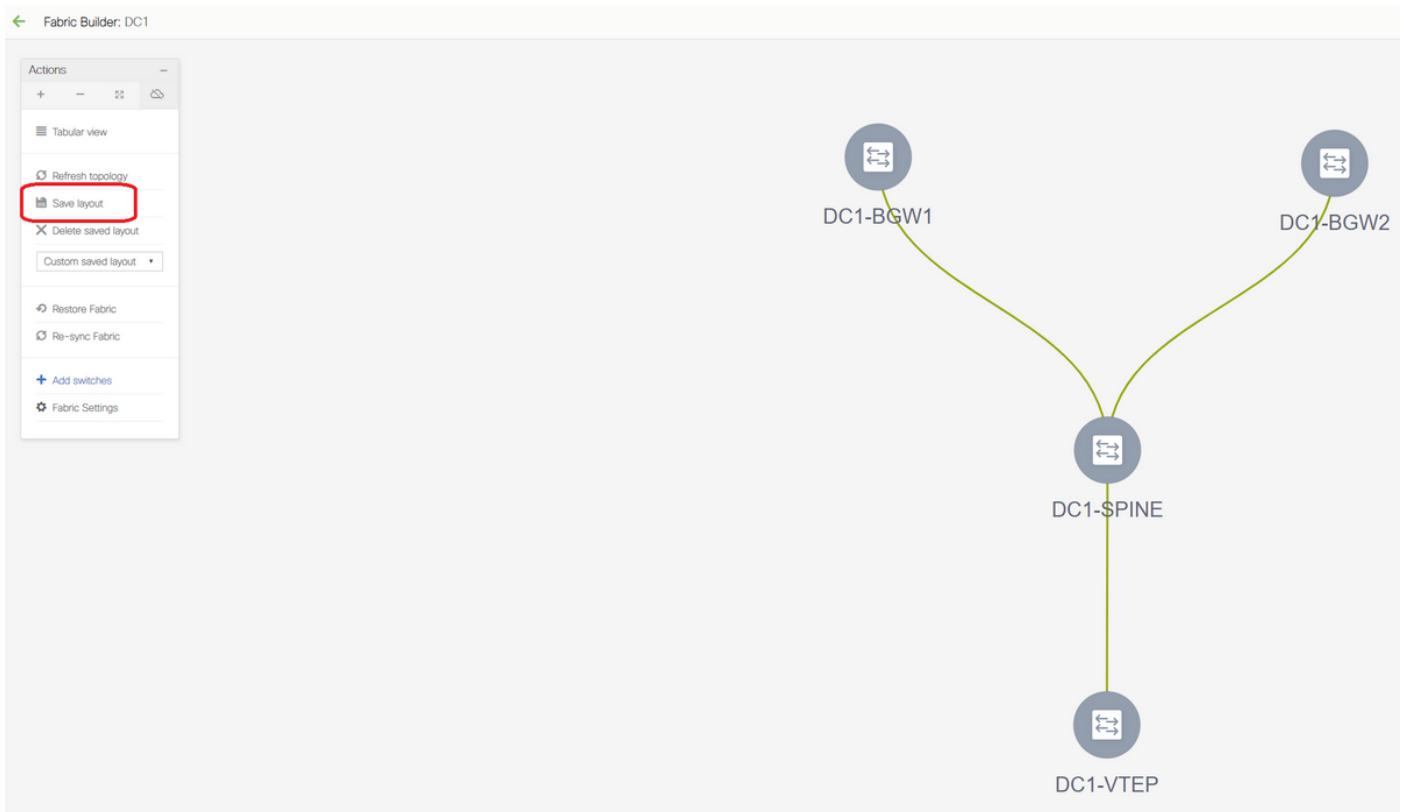


<input type="checkbox"/>	Name	IP Address	Model	Version	Status	Progress
<input type="checkbox"/>	DC1 <input type="text" value="x"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input checked="" type="checkbox"/>	DC1-SPINE	10.122.165.200	N9K-C933...	9.3(1)	manageable	<div style="width: 70%;"><div style="background-color: #76b82a; height: 10px;"></div></div> 70%
<input checked="" type="checkbox"/>	DC1-BGW1	10.122.165.187	N9K-C931...	9.3(1)	manageable	<div style="width: 70%;"><div style="background-color: #76b82a; height: 10px;"></div></div> 70%
<input checked="" type="checkbox"/>	DC1-BGW2	10.122.165.154	N9K-C931...	9.3(1)	manageable	<div style="width: 70%;"><div style="background-color: #76b82a; height: 10px;"></div></div> 70%
<input type="checkbox"/>	DC1-N3K	10.122.165.195	N3K-C317...	7.0(3)I4(6)	manageable	<div style="width: 0%;"><div style="background-color: #76b82a; height: 10px;"></div></div>
<input checked="" type="checkbox"/>	DC1-VTEP	10.122.165.173	N9K-C9332C	9.3(1)	manageable	<div style="width: 70%;"><div style="background-color: #76b82a; height: 10px;"></div></div> 70%

#导入完成后，交换矩阵构建器下的拓扑可能如下所示；

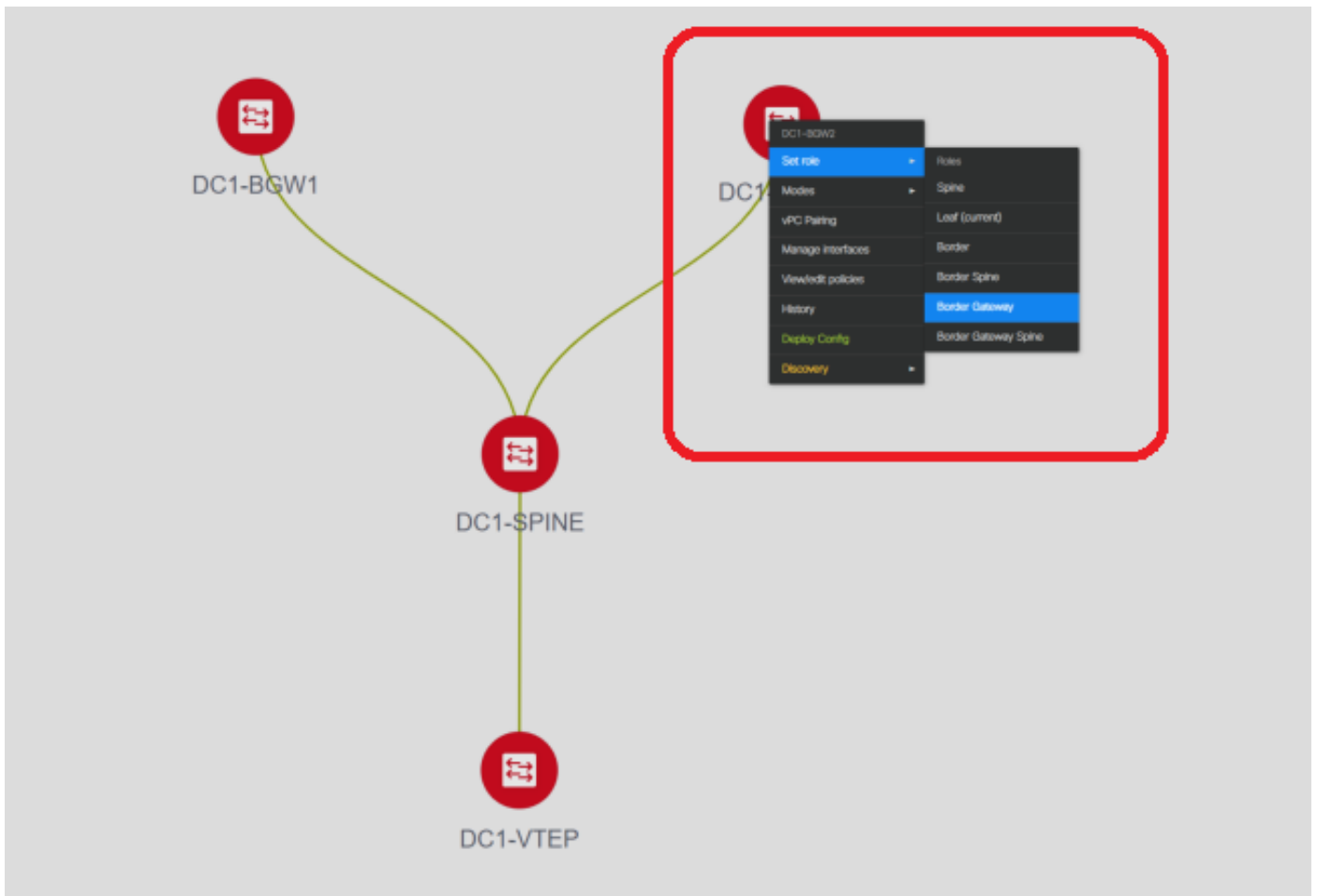


#通过单击一台交换机并将其与图中的正确位置对齐，可以移动交换机



#按需要布局的顺序重新排列交换机后，选择“保存布局”部分

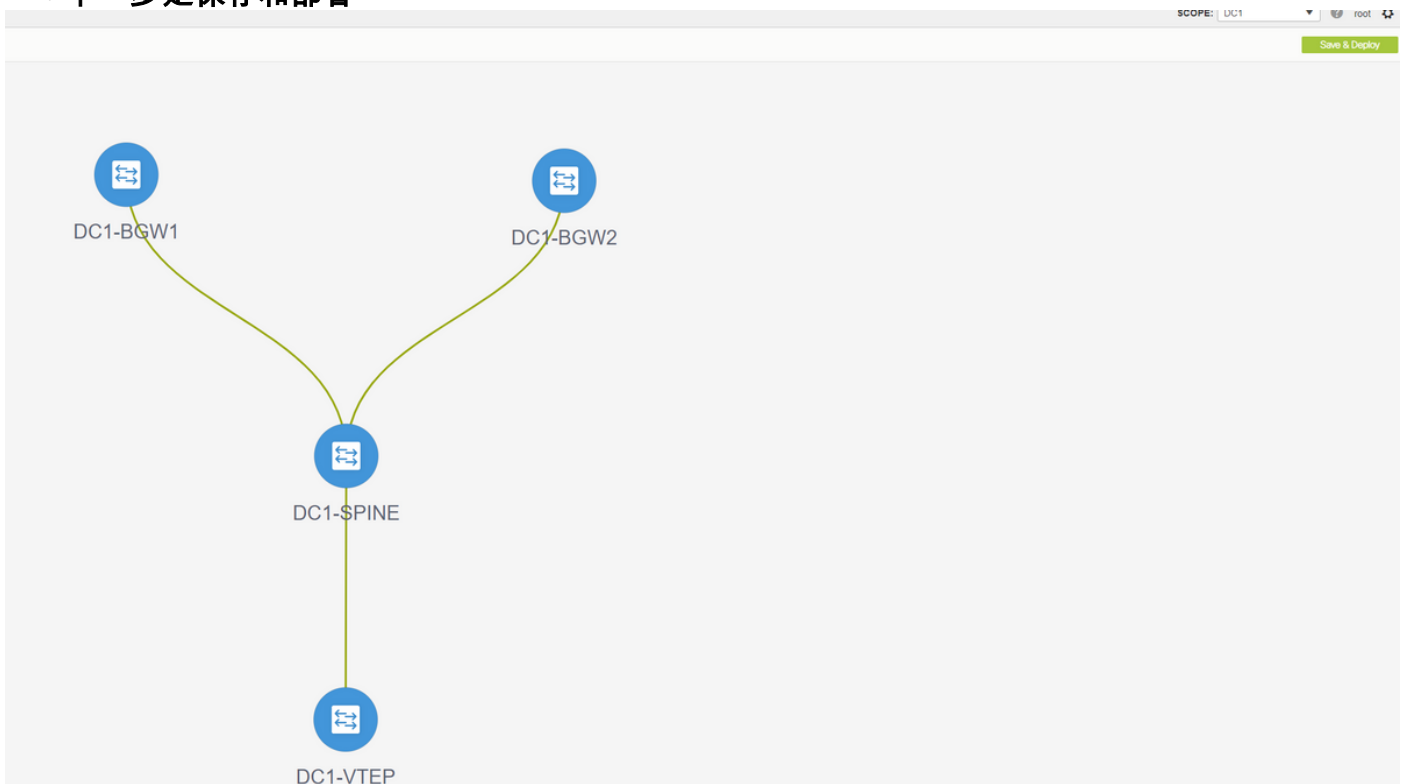
- 设置所有交换机的角色



#右键单击每台交换机并设置正确的角色；此处，DC1-BGW1和DC1-BGW2是边界网关

DC1-SPINE->将设置为role- Spine ， DC1-VTEP->将设置为role-Leaf

- 下一步是保存和部署







DCNM现在将列出交换机，并预览DCNM将推送到所有交换机的配置。

Config Deployment

Step 1. Configuration Preview

Step 2. Configuration Deployment Status

Switch Name	IP Address	Switch Serial	Preview Config	Status	Re-sync	Progress
DC1-VTEP	10.122.165.173	FDO22260MFQ	301 lines	Out-of-sync		100%
DC1-SPINE	10.122.165.200	FDO2313001T	520 lines	Out-of-sync		100%
DC1-BGW1	10.122.165.187	FDO21412035	282 lines	Out-of-sync		100%
DC1-BGW2	10.122.165.154	FDO20160TQM	282 lines	Out-of-sync		100%

Deploy Config

DC1-VTEP

Config Deployment ×

Step 1. Configuration Preview > Step 2. Configuration Deployment Status >

Switch Name	IP Address	Status	Status Description	Progress
DC1-VTEP	10.122.165.173	STARTED	Deployment in progress.	<div style="width: 30%;"><div style="background-color: #28a745; height: 10px;"></div></div> 30%
DC1-SPINE	10.122.165.200	STARTED	Deployment in progress.	<div style="width: 23%;"><div style="background-color: #28a745; height: 10px;"></div></div> 23%
DC1-BGW2	10.122.165.154	STARTED	Deployment in progress.	<div style="width: 31%;"><div style="background-color: #28a745; height: 10px;"></div></div> 31%
DC1-BGW1	10.122.165.187	STARTED	Deployment in progress.	<div style="width: 29%;"><div style="background-color: #28a745; height: 10px;"></div></div> 29%

[Close](#)

DC1-VTEP

#成功后，状态将反映，交换机将显示为绿色

Config Deployment

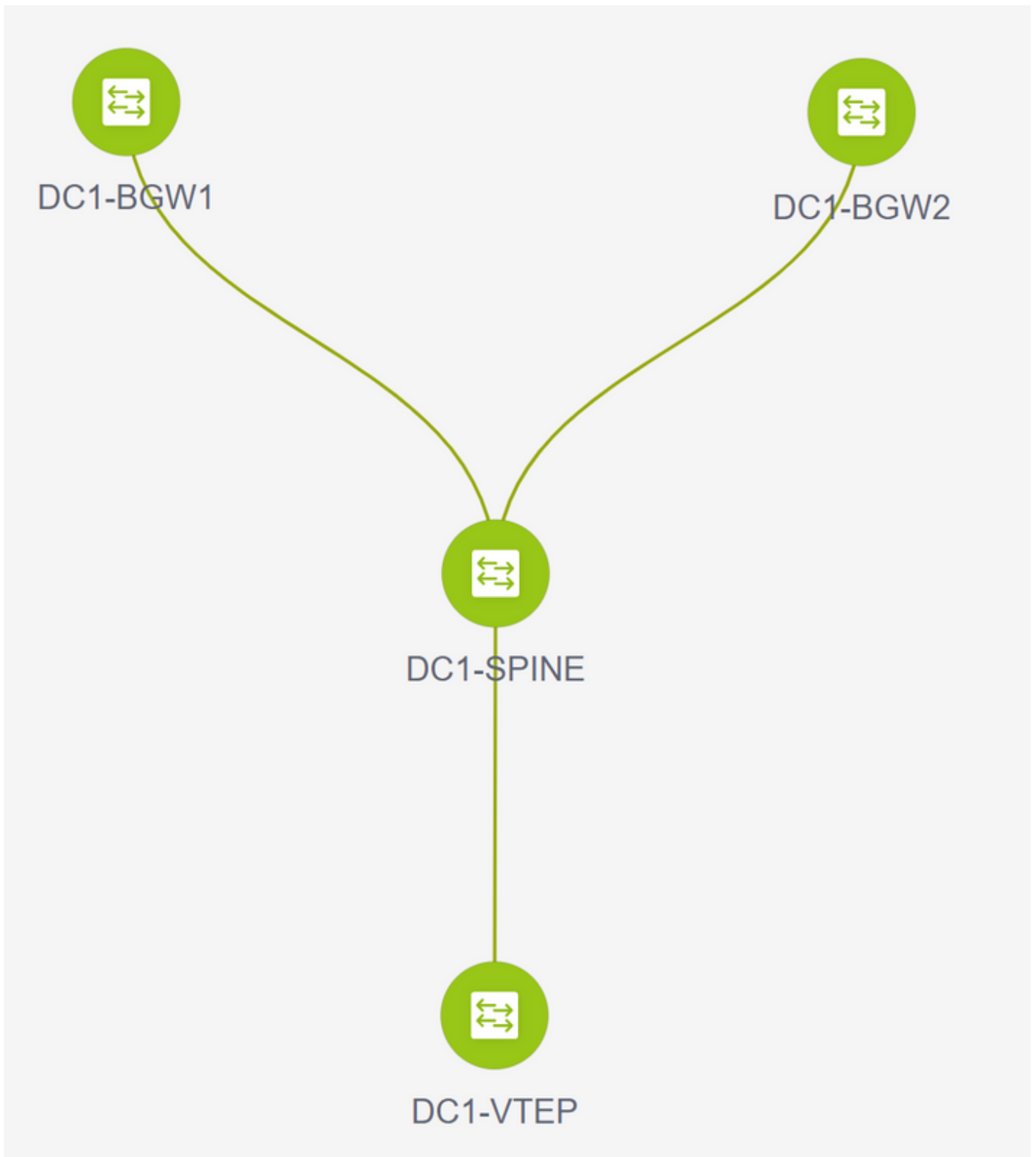


Step 1. Configuration Preview >

Step 2. Configuration Deployment Status >

Switch Name	IP Address	Status	Status Description	Progress
DC1-VTEP	10.122.165.173	COMPLETED	Deployed successfully	100%
DC1-SPINE	10.122.165.200	COMPLETED	Deployed successfully	100%
DC1-BGW2	10.122.165.154	COMPLETED	Deployed successfully	100%
DC1-BGW1	10.122.165.187	COMPLETED	Deployed successfully	100%

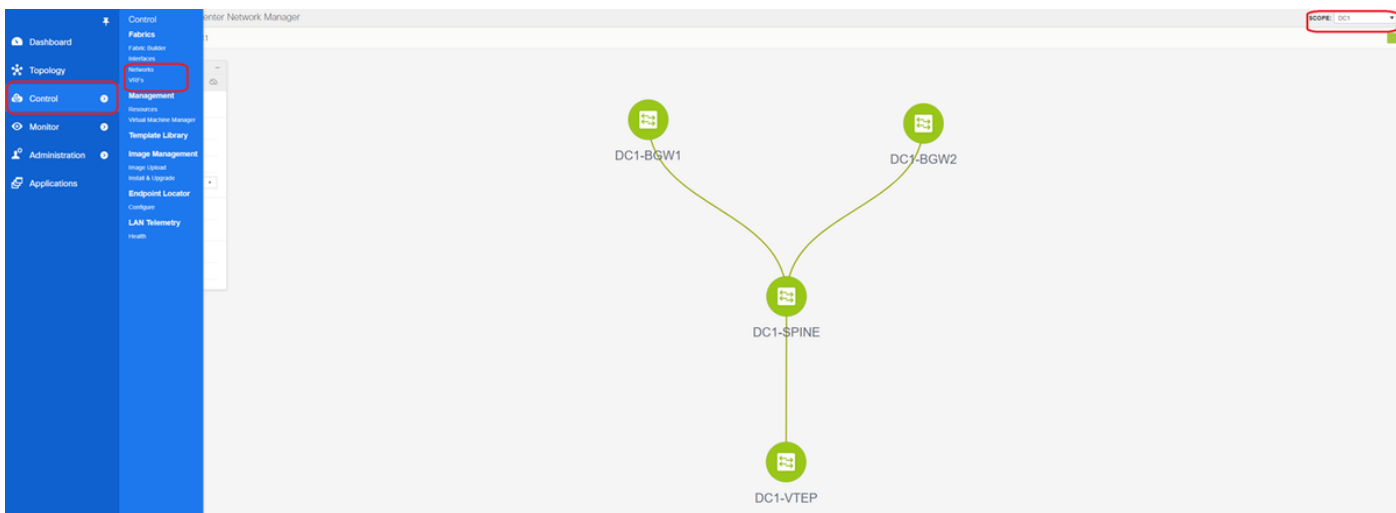
Close



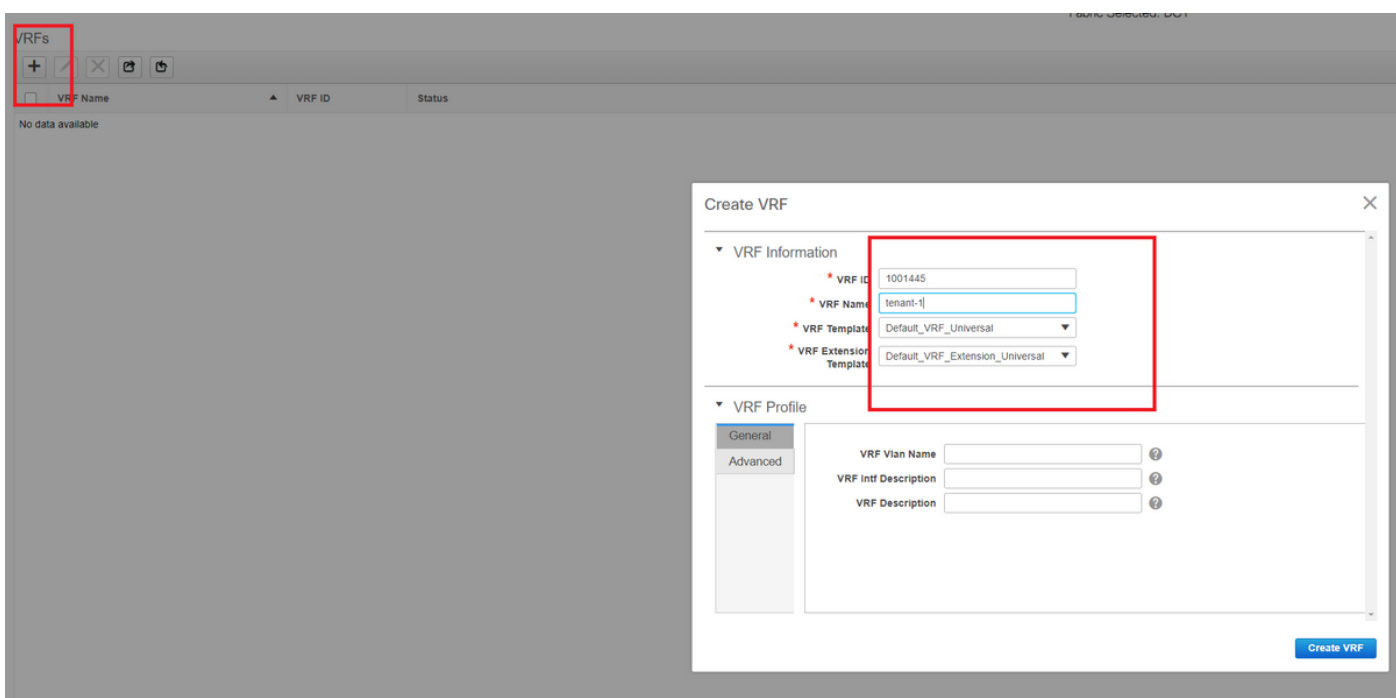
步骤 3：网络/VRF的配置

- 网络/VRF的配置

#选择DC1交换矩阵（从右上角下拉菜单），控制> VRF



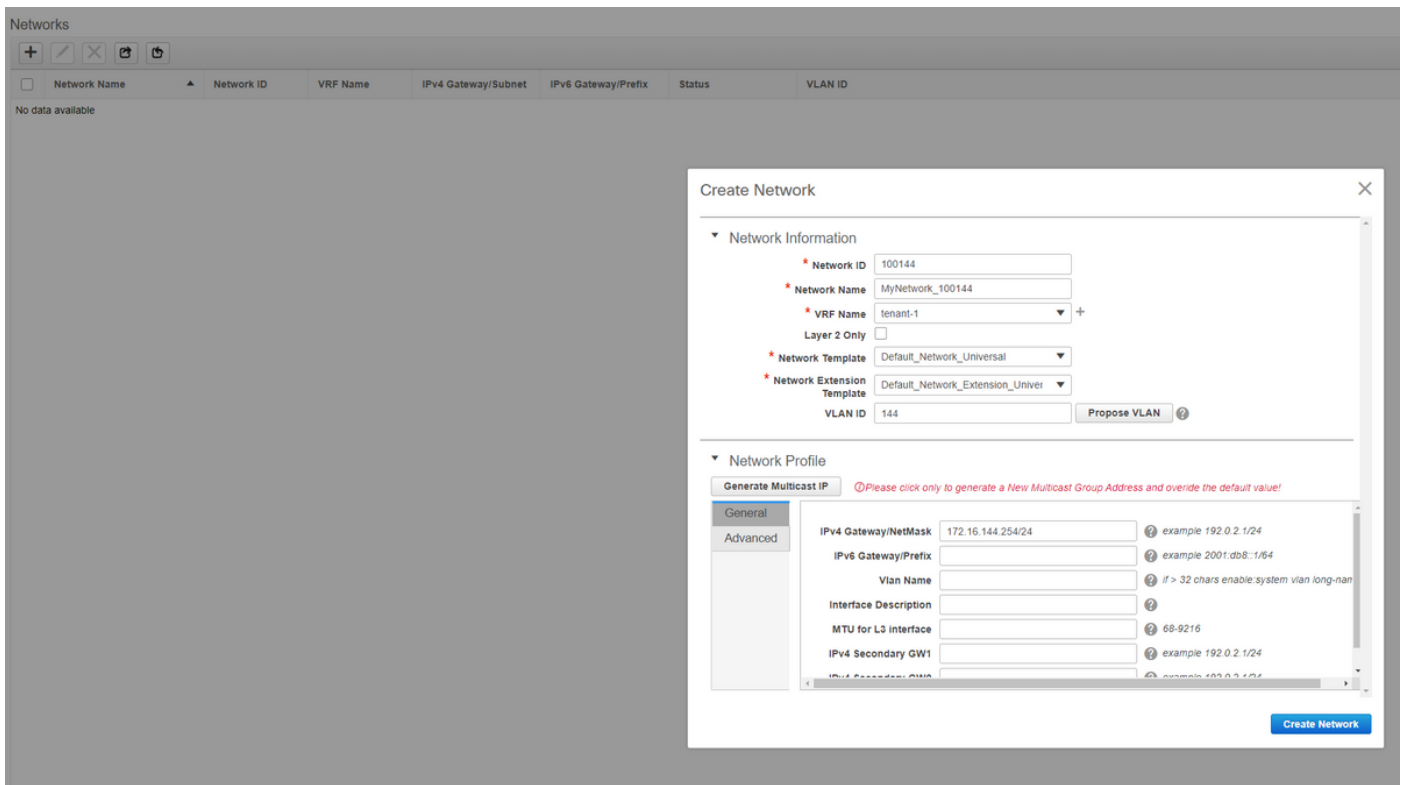
#接下来是创建VRF



11.2 DCNM版本自动填充VRF ID;如果其不同，请键入所需的VRF并选择“创建VRF”

#此处使用的第3层VNID是1001445

- 下一步是创建网络



#提供网络ID (即第2层VLAN的对应VNID)

#提供SVI应属于的VRF;默认情况下, DCNM 11.2将VRF名称填充到之前创建的名称; 根据需要更改

VLAN ID将是映射到此特定VNID的第2层Vlan

IPv4 Gateway->这是任播网关IP地址, 将在SVI上配置, 并且对于交换矩阵中的所有VTEP将相同

- “高级”(Advanced)选项卡有额外的行, 如果如此, 则需要填写; DHCP中继正在使用;

Create Network

Network Information

* Network ID: 100144

* Network Name: MyNetwork_100144

* VRF Name: tenant-1

Layer 2 Only:

* Network Template: Default_Network_Universal

* Network Extension Template: Default_Network_Extension_Univer

VLAN ID: 144 Propose VLAN ?

Network Profile

Generate Multicast IP *Please click only to generate a New Multicast Group Address and override the default value!*

General | **Advanced**

ARP Suppression ?

Ingress Replication ? *Read-only per network, Fabric-wide setting*

Multicast Group Address: 239.1.1.0 ?

DHCPv4 Server 1: ? *DHCP Relay IP*

DHCPv4 Server 2: ? *DHCP Relay IP*

DHCPv4 Server VRF: ?

Loopback ID for DHCP Relay interface (Min:0, Max:1023): ?

Create Network

#填写字段后，点击“创建网络”。

#创建需要加入此交换矩阵的任何其他网络；

- 目前，VRF和网络刚刚在DCNM中定义；但未从DCNM推送到交换矩阵中的交换机。这可通过以下方式进行验证

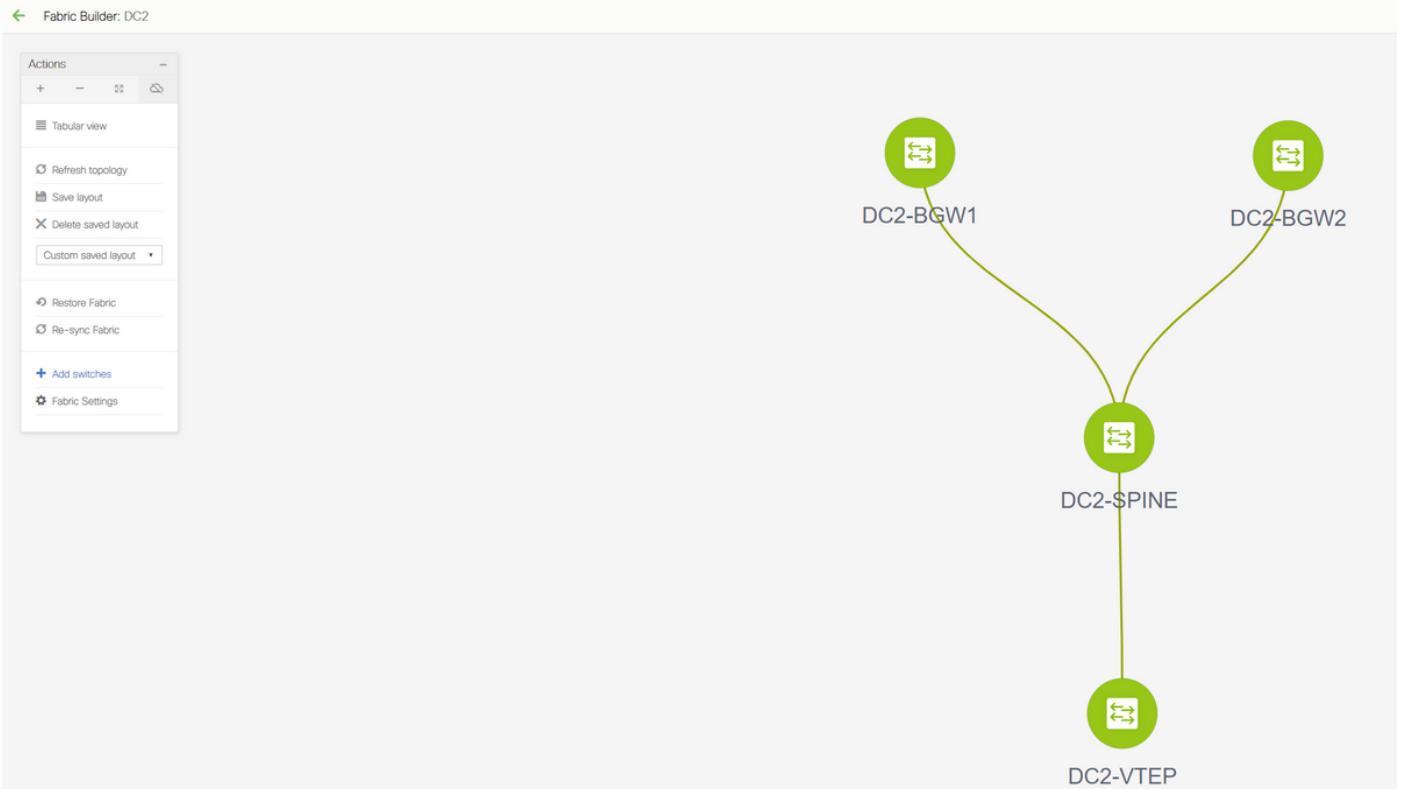
Network / VRF Selection > Network / VRF Deployment >

Networks							
	Network Name	Network ID	VRF Name	IPv4 Gateway/Subnet	IPv6 Gateway/Prefix	Status	VLAN ID
<input type="checkbox"/>	MyNetwork_100144	100144	tenant-1	172.16.144.254/24		NA	144
<input checked="" type="checkbox"/>	MyNetwork_100145	100145	tenant-1	172.16.145.254/24		NA	145

#如果未部署到交换机，则状态将处于“NA”状态。由于这是多站点且涉及边界网关，因此网络/VRF的部署将进一步深入讨论。

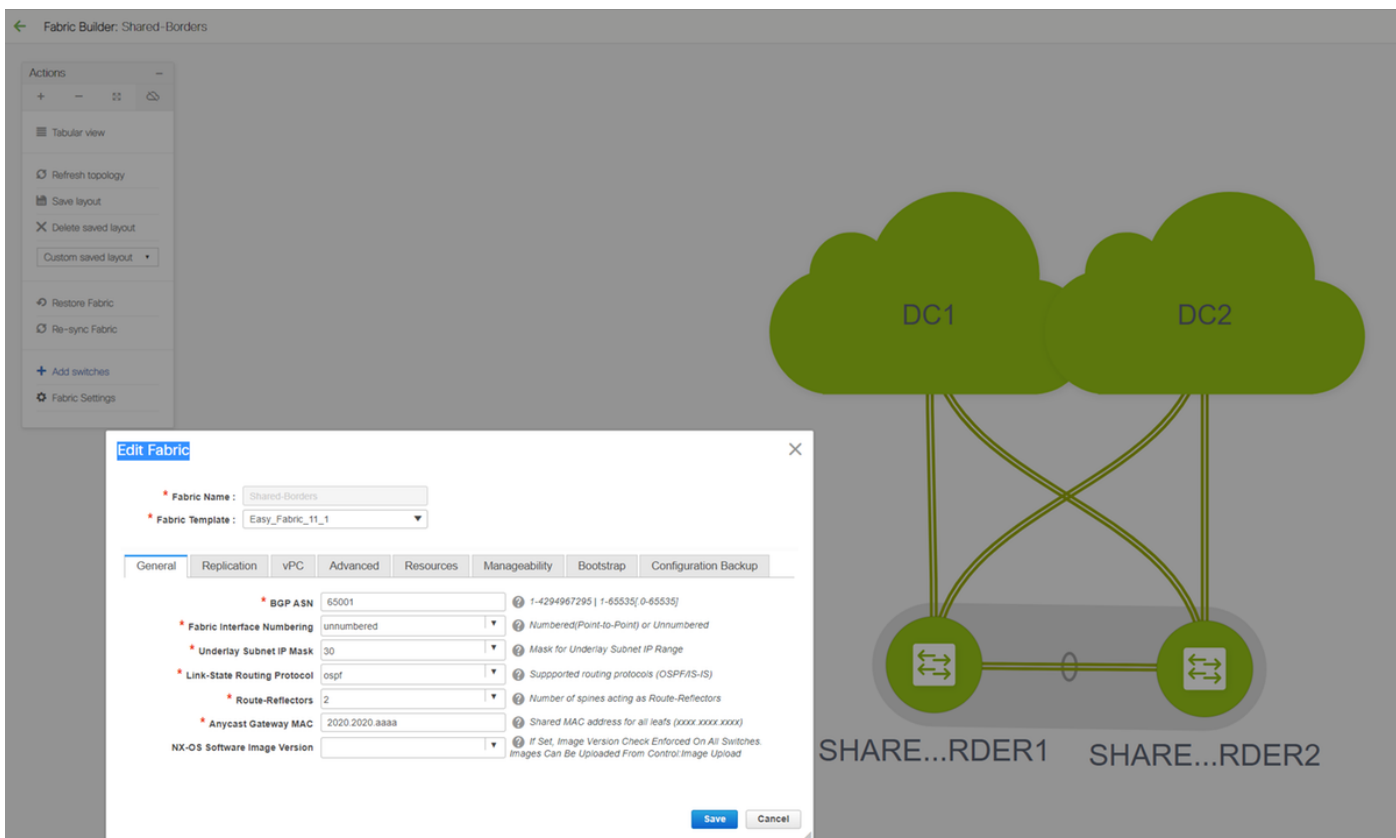
步骤 4：对DC2重复相同步骤

- 既然DC1已完全定义，DC2也将执行相同的步骤
- DC2完全定义后，如下所示



步骤 5：为共享边界创建简单交换矩阵

- 这是创建另一个简单交换矩阵的地方，该交换矩阵将包括vPC中的共享边界
- 请注意，通过DCNM部署时的共享边界应配置为vPC，否则，在DCNM上执行“重新同步”操作后，交换机间链路将关闭
- 共享边界中的交换机将设置为“边界”角色

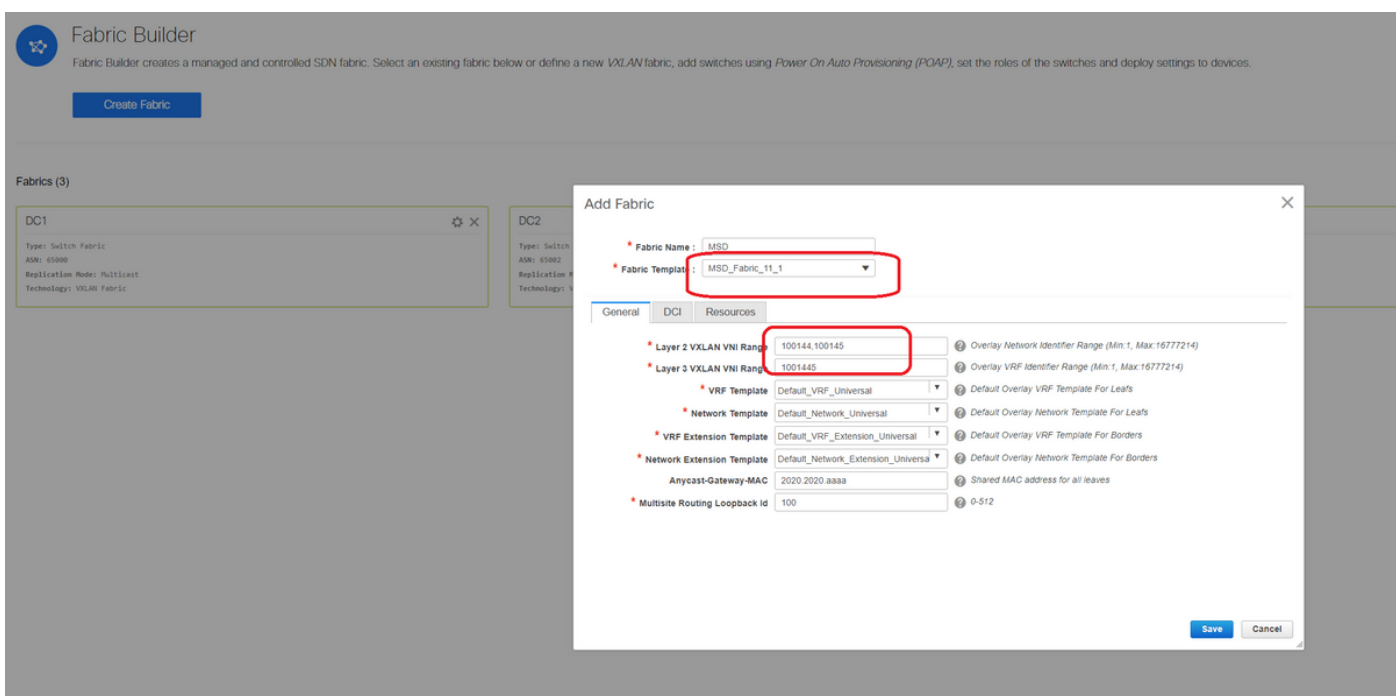


VRF的创建方式与DC1和DC2交换矩阵相同

#共享边界上不需要网络，因为共享边界上没有任何第2层VLAN/VNID;共享边界不是从DC1到DC2的任何东/西流量的隧道终端；只有边界网关在EAST/West DC1的vxlan封装/解封方面起作用 <>DC2流量

第6步 — 创建MSD并移动DC1和DC2交换矩阵

转到交换矩阵构建器并创建新交换矩阵，然后使用模板 —> MSD_Fabric_11_1



Add Fabric



* Fabric Name : MSD

* Fabric Template : MSD_Fabric_11_1

General DCI Resources

DCI Subnet IP Range ? Address range to assign P2P DCI Links

Subnet Target Mask ? Target Mask for Subnet Range (Min:8, Max:31)

* Multi-Site Overlay IFC Deployment Method ? Manual, Auto Overlay EVPN Peering to Route Servers, Auto Overlay EVPN Direct Peering to Border Gateways

* Multi-Site Route Server List ? Multi-Site Router-Server peer list, e.g. 128.89.0.1, 128.89.0.2

* Multi-Site Route Server BGP ASN List ? 1-4294967295 | 1-65535[0-65535], e.g. 65000, 65001

Multi-Site Underlay IFC Auto Deployment Flag ?

Save Cancel

#请注意，多站点重叠IFC部署方法必须为“**centralized_To_Route_Server**”；此处，共享边界被视为路由服务器，因此从下拉列表使用此选项

#在“多站点**路由服务器列表**”；在此，查找共享边界上Loopback0（即路由环回）的环回IP地址并填写

ASN 是共享边界上的ASN（有关详细信息，请参阅本文档顶部的图）；在本文档中，两个共享边界都配置在同一ASN中；相应地填写

- 下一个选项卡是提供多站点环回IP范围的位置，如下所示

Add Fabric

* Fabric Name :

* Fabric Template :

General | DCI | Resources

* Multi-Site Routing Loopback IP Range ? Typically Loopback100 IP Address Range

#填写所有字段后，点击“保存”按钮，将使用模板 —> MSD创建新交换矩阵

#接下来是将DC1和DC2交换矩阵移至此MSD

Fabric Builder: MSD

Actions

- Tabular view
- Refresh topology
- Save layout
- Delete saved layout
- Random
- Fabric Settings
- Move Fabrics**

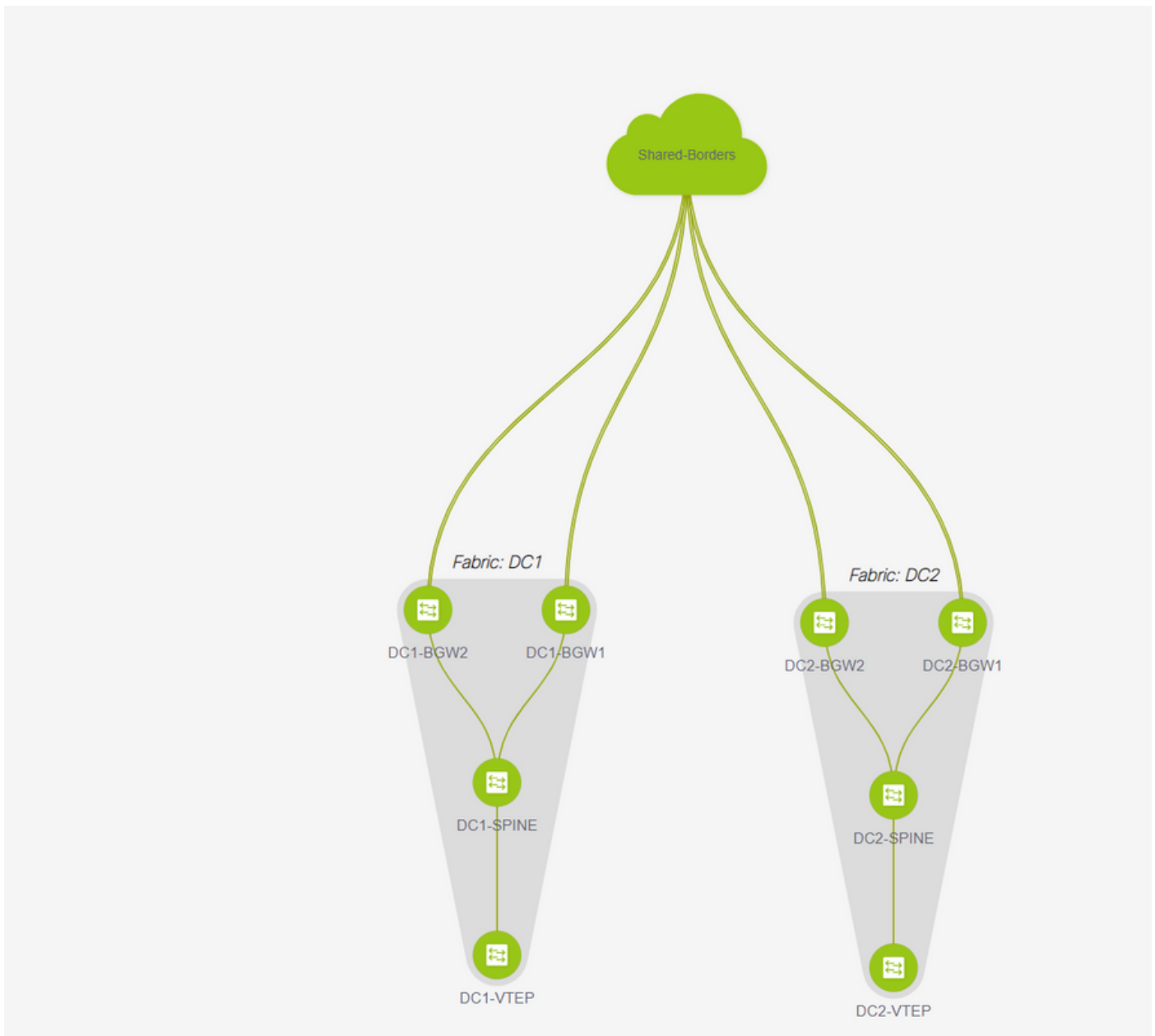
Move Fabric

Please note that it may take a few minutes if there is a large number of VRFs/NWs in the fabrics!

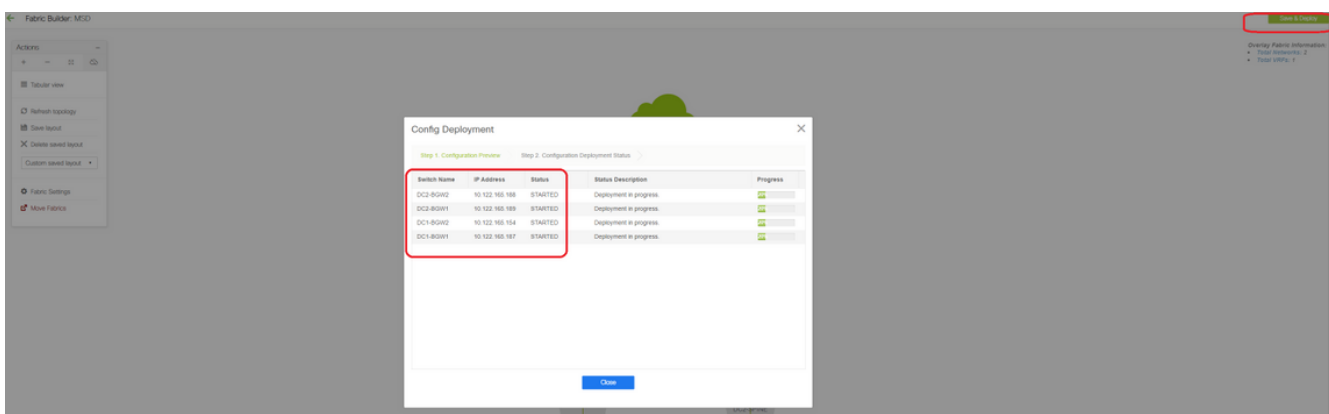
Selected 0 / Total 3

Fabric Name	Fabric State
<input type="radio"/> DC1	standalone
<input type="radio"/> DC2	standalone
<input type="radio"/> Shared-Borders	standalone

#交换矩阵移动后，如下所示



#完成后，点击“保存并部署”按钮，该按钮将按所需配置，只要涉及多站点到边界网关



步骤 7：创建外部交换矩阵

#创建外部交换矩阵并将外部路由器添加到外部交换矩阵，如下所示；

Add Fabric

* Fabric Name : External

* Fabric Template : External_Fabric_11_1

General

Advanced

Resources

DCI

Configuration Backup

Bootstrap

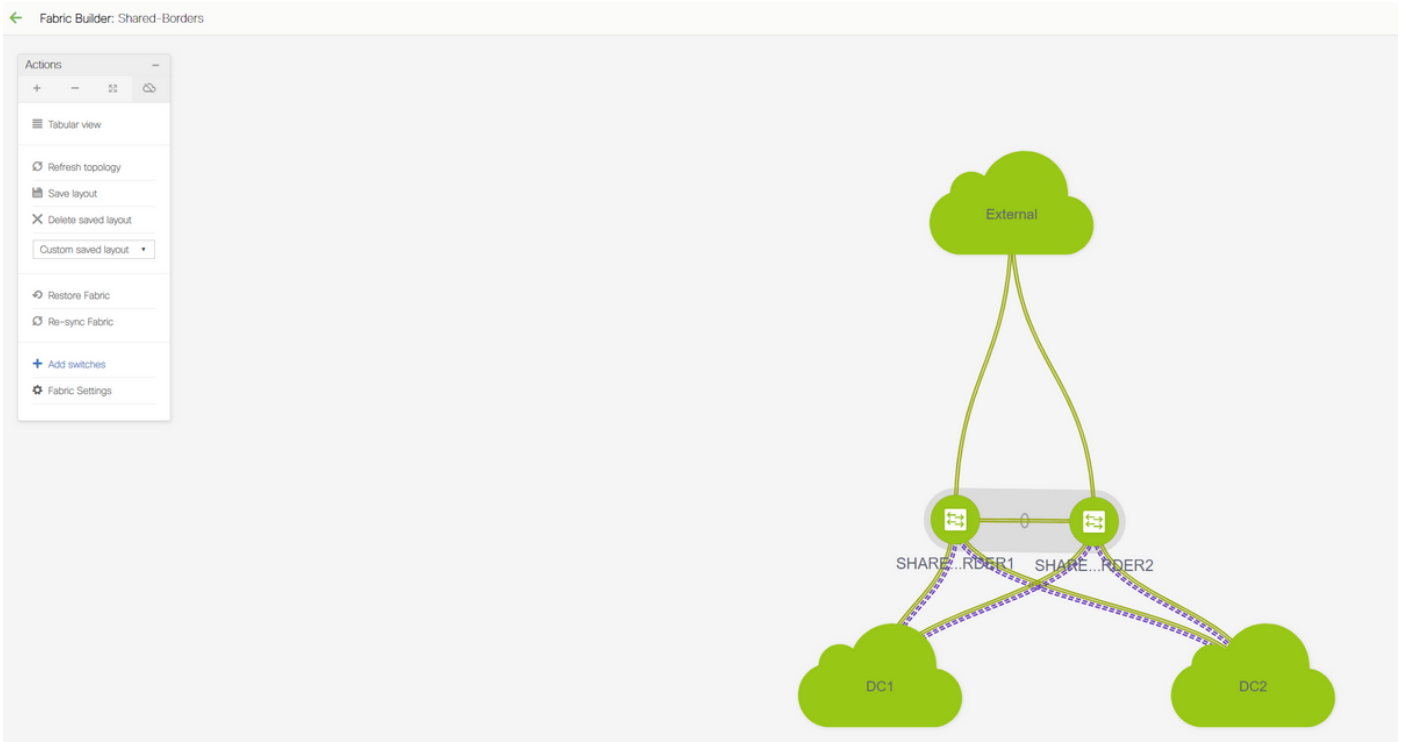
* BGP AS # 65100 ? 1-4294967295 | 1-65535[.0-65535]

Fabric Monitor Mode ? If enabled, fabric is only monitored. No configuration will be deployed

#命名交换矩阵并使用模板 —>“External_Fabric_11_1”;

#提供ASN

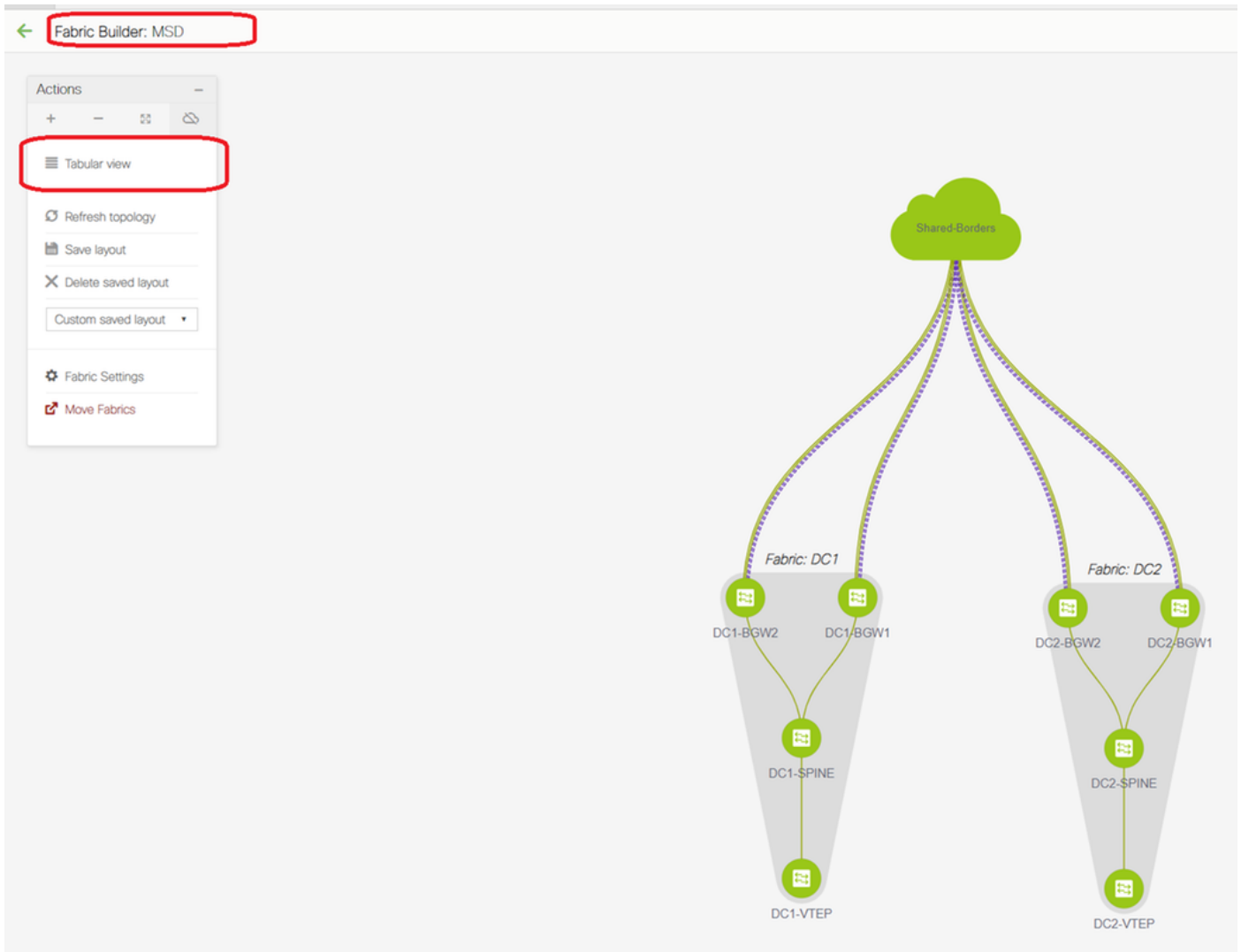
#最后，各种交换矩阵如下所示



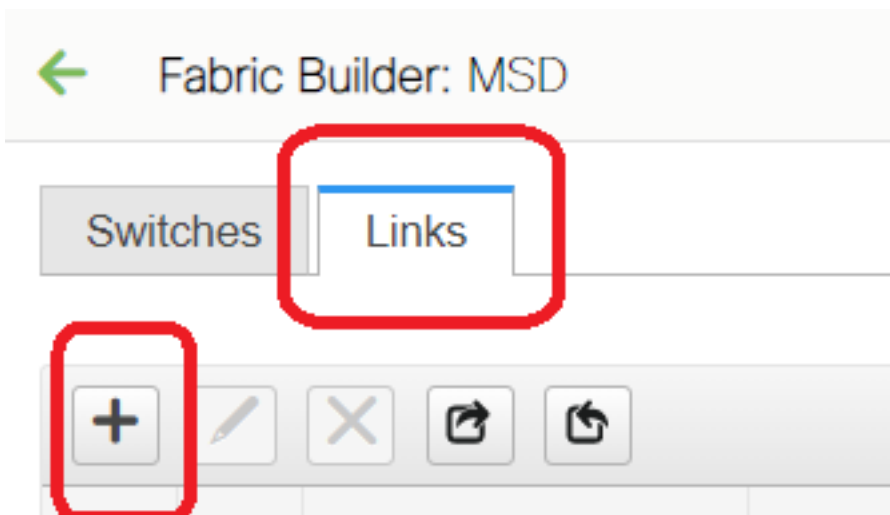
步骤 8::用于BGW (共享边界之间的iBGP) 之间环回可达性的eBGP底层

#共享边界运行eBGP I2vpn evpn，该evpn与边界网关和指向外部路由器的VRF-LITE连接

#在与环回形成eBGP I2vpn evpn之前，需要确保通过某种方法可到达环回；在本示例中，我们使用eBGP IPv4 AF从BGW到共享边界，然后通告环回以进一步形成I2vpn evpn邻居关系。



#选择MSD交换矩阵后，切换到“表格视图”



Link Management - Add Link
✕

- * Link Type
- * Link Sub-Type
- * Link Template
- * Source Fabric
- * Destination Fabric
- * Source Device
- * Source Interface
- * Destination Device
- * Destination Interface

▼ Link Profile

General

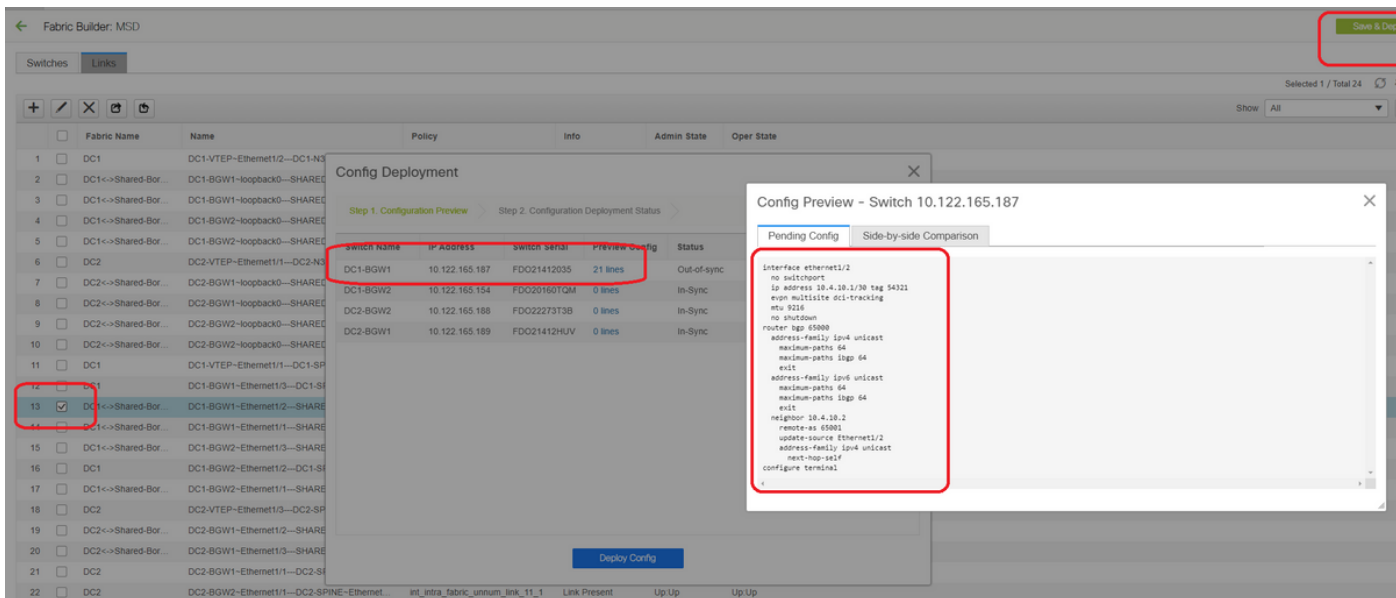
Advanced

- * BGP Local ASN Local BGP Autonomous S
- * IP Address/Mask IP address with mask (e.g.
- * BGP Neighbor IP Neighbor IP address
- * BGP Neighbor ASN Neighbor BGP Autonomou
- * BGP Maximum Paths Maximum number of IBGP,
- * Routing TAG Routing tag associated with

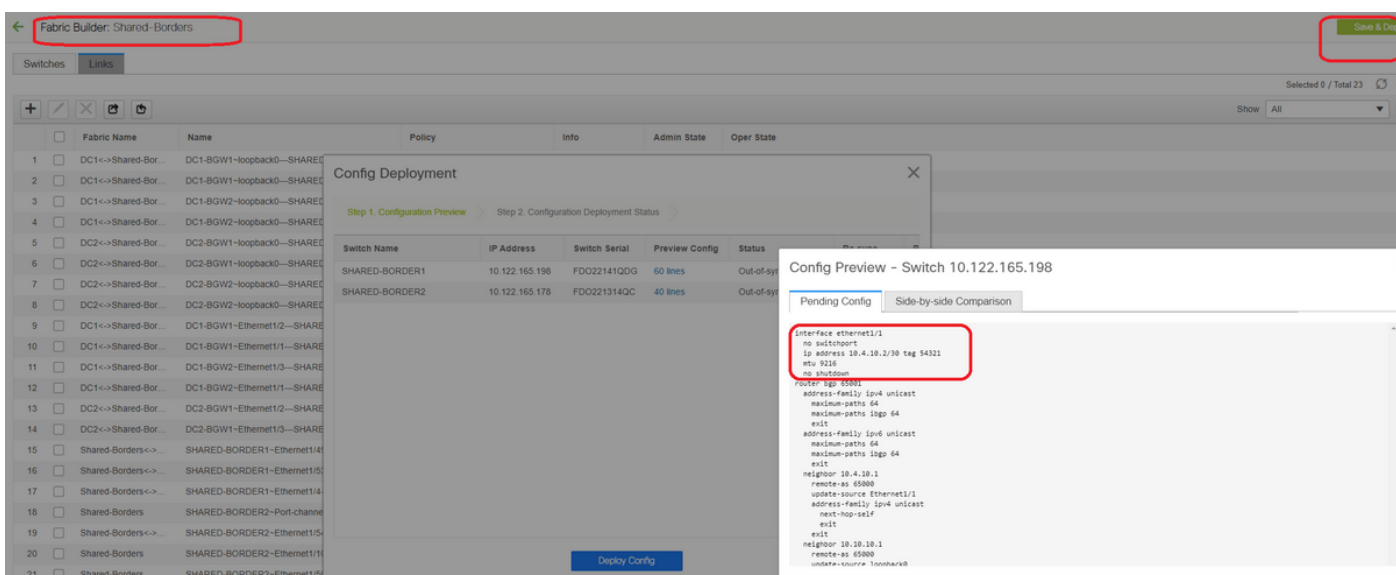
#选择“交换矩阵间”并使用“Multisite_UNDERLED”

#我们在此尝试与共享边界路由器形成IPv4 BGP邻居关系；因此，请相应地选择交换机和接口。

#请注意，如果CDP检测到从DC1-BGW1到SB1的邻居，则只需在本节中提供IP地址，并在执行“保存和部署”后在相关接口上有效配置IP地址



#选择“保存并部署”后，DC1-BGW1所需的配置行将被传播；选择“共享边界”交换矩阵后，也必须执行相同的步骤。



#在CLI中，使用以下命令可检验相同情况；

```
DC1-BGW1# show ip bgp sum
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 10.10.10.1, local AS number 65000
BGP table version is 11, IPv4 Unicast config peers 1, capable peers 1
2 network entries and 2 paths using 480 bytes of memory
BGP attribute entries [1/164], BGP AS path entries [0/0]
BGP community entries [0/0], BGP clusterlist entries [0/0]
```

```
Neighbor      V    AS MsgRcvd MsgSent  TblVer  InQ  OutQ  Up/Down  State/PfxRcd
10.4.10.2     4 65001      6      7      11    0    0 00:00:52 0
```

#请注意，“保存和部署”也必须在DC1交换矩阵上完成（选择DC1的下拉菜单，然后执行相同操作），以便相关IP编址、BGP配置传播到DC1（边界网关）中的交换机；

#此外，多站点底层必须从DC1-BGW、DC2-BGW创建到共享边界；因此，同样的步骤也必须执行。

#最后，共享边界将与DC1和DC2中的所有BGW具有eBGP IPv4 AF邻居关系，如下所示；

```

SHARED-BORDER1# sh ip bgp sum
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 10.10.100.1, local AS number 65001
BGP table version is 38, IPv4 Unicast config peers 4, capable peers 4
18 network entries and 20 paths using 4560 bytes of memory
BGP attribute entries [2/328], BGP AS path entries [2/12]
BGP community entries [0/0], BGP clusterlist entries [0/0]

```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.4.10.1	4	65000	1715	1708	38	0	0	1d03h 5	
10.4.10.6	4	65000	1461	1458	38	0	0	1d00h 5	
10.4.10.18	4	65002	1459	1457	38	0	0	1d00h 5	
10.4.10.22	4	65002	1459	1457	38	0	0	1d00h 5	

```

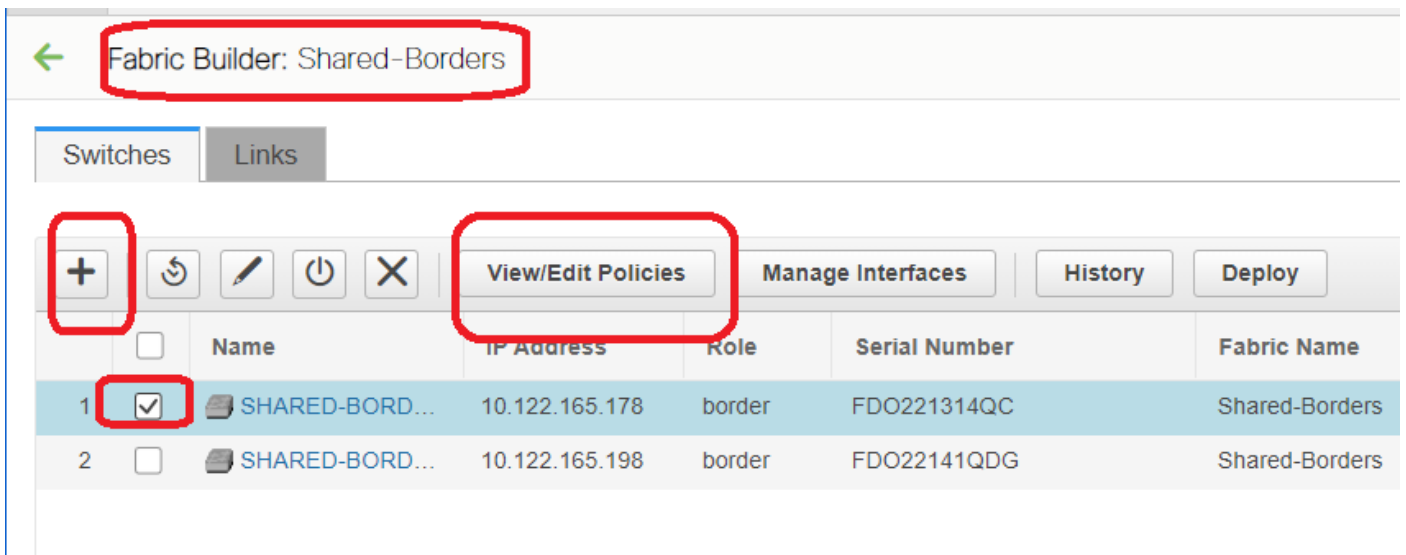
SHARED-BORDER2# sh ip bgp sum
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 10.10.100.2, local AS number 65001
BGP table version is 26, IPv4 Unicast config peers 4, capable peers 4
18 network entries and 20 paths using 4560 bytes of memory
BGP attribute entries [2/328], BGP AS path entries [2/12]
BGP community entries [0/0], BGP clusterlist entries [0/0]

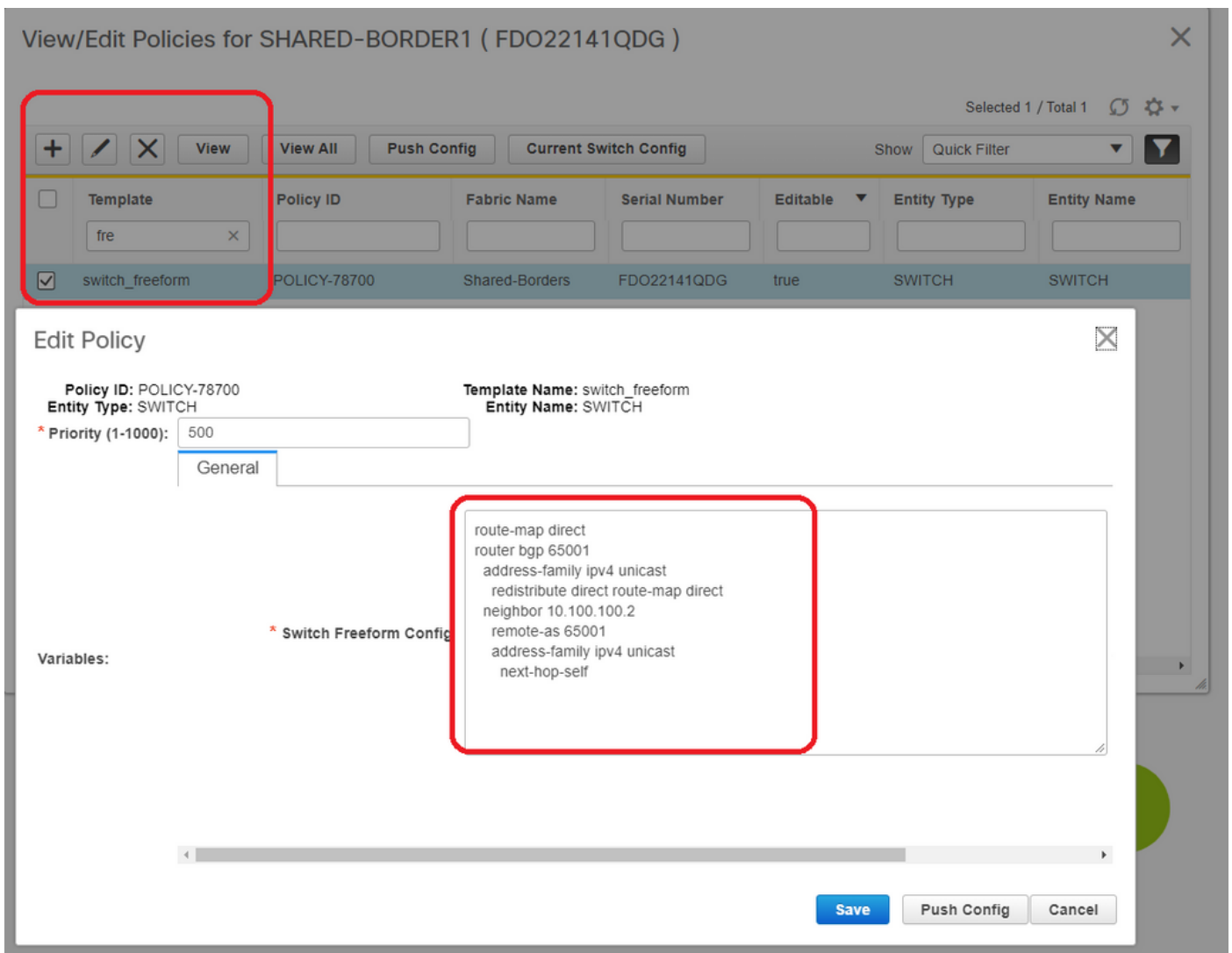
```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.4.10.10	4	65000	1459	1458	26	0	0	1d00h 5	
10.4.10.14	4	65000	1461	1458	26	0	0	1d00h 5	
10.4.10.26	4	65002	1459	1457	26	0	0	1d00h 5	
10.4.10.30	4	65002	1459	1457	26	0	0	1d00h 5	

#以上是建立从BGW到共享边界的I2vpn evpn邻居关系之前的先决条件(请注意，使用BGP并非必需条件；交换环回前缀的任何其他机制);最后，基本要求是所有环回（共享边界、BGW）应可从所有BGW访问

#另请注意，iBGP IPv4 AF邻居关系需要在共享边界之间建立；截至目前，DCNM没有在共享边界之间使用模板/下拉列表构建iBGP的选项；为此，必须执行如下所示的自由形式配置；





#查找在共享边界的备份SVI上配置的IP地址；如上所示，自由形式将添加到共享边界1交换机上，指定的iBGP邻居是共享边界2(10.100.100.2)的邻居

#请注意，在DCNM中提供自由格式中的配置时，请在每个命令后提供正确的间隔(保留偶数空格；这意味着，在路由器bgp 65001之后，提供两个空格，然后给neighbor <>命令等)

#还要确保对BGP中的直接路由（环回路由）或其他形式执行重分布直接来通告环回；在上例中，创建路由映射直接以匹配所有直接路由，然后在IPv4 AF BGP内完成重分布直接

#从DCNM“保存并部署”配置后，iBGP邻居关系形成如下所示；

```
SHARED-BORDER1# sh ip bgp sum
```

```
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 10.10.100.1, local AS number 65001
BGP table version is 57, IPv4 Unicast config peers 5, capable peers 5
18 network entries and 38 paths using 6720 bytes of memory
BGP attribute entries [4/656], BGP AS path entries [2/12]
BGP community entries [0/0], BGP clusterlist entries [0/0]
```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.4.10.1	4	65000	1745	1739	57	0	0	1d04h 5	
10.4.10.6	4	65000	1491	1489	57	0	0	1d00h 5	
10.4.10.18	4	65002	1490	1487	57	0	0	1d00h 5	
10.4.10.22	4	65002	1490	1487	57	0	0	1d00h 5	
10.100.100.2	4	65001	14	6	57	0	0	00:00:16 18	# iBGP neighborship from

shared border1 to shared border2

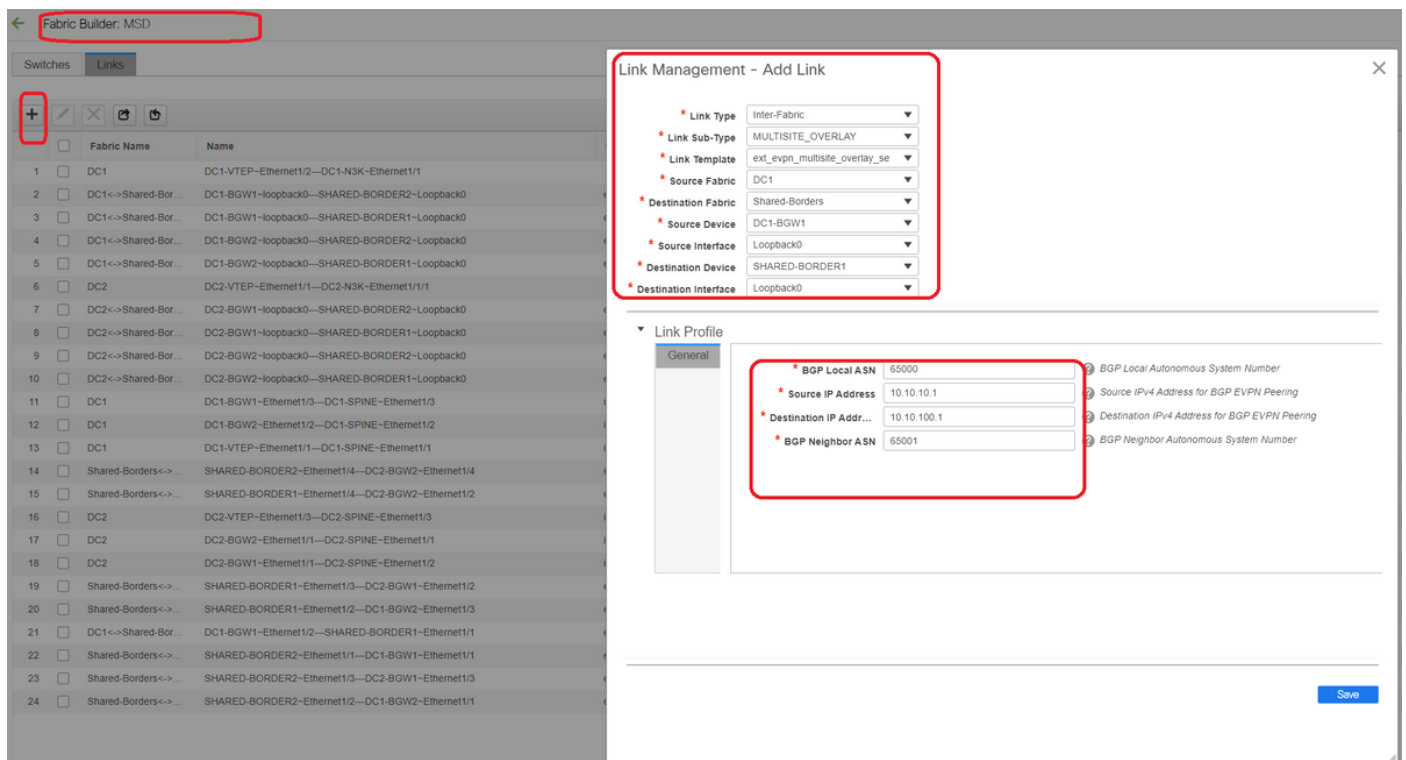
#通过上述步骤，多站点底层已完全配置。

#下一步是构建多站点重叠；

步骤 9：从BGW构建多站点重叠到共享边界

#请注意，此处共享边界也是路由服务器

#选择MSD，然后转到“表格视图”，在该视图中可以创建新链接；从那里，必须创建新的多站点重叠链路，并且相关IP地址必须提供正确的ASN，如下所示；必须对所有I2vpn evpn邻居（从每个BGW到每个共享边界）执行此步骤



#以上是一个示例；对所有其他多站点重叠链路执行相同操作，最后，CLI如下所示；

```
SHARED-BORDER1# sh bgp l2vpn evpn summary
BGP summary information for VRF default, address family L2VPN EVPN
BGP router identifier 10.10.100.1, local AS number 65001
BGP table version is 8, L2VPN EVPN config peers 4, capable peers 4
1 network entries and 1 paths using 240 bytes of memory
BGP attribute entries [1/164], BGP AS path entries [0/0]
BGP community entries [0/0], BGP clusterlist entries [0/0]
```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.10.10.1	4	65000	21	19	8	0	0	00:13:52	0
10.10.10.2	4	65000	22	20	8	0	0	00:14:14	0
10.10.20.1	4	65002	21	19	8	0	0	00:13:56	0
10.10.20.2	4	65002	21	19	8	0	0	00:13:39	0

```
SHARED-BORDER2# sh bgp l2vpn evpn summary
BGP summary information for VRF default, address family L2VPN EVPN
BGP router identifier 10.10.100.2, local AS number 65001
BGP table version is 8, L2VPN EVPN config peers 4, capable peers 4
1 network entries and 1 paths using 240 bytes of memory
```

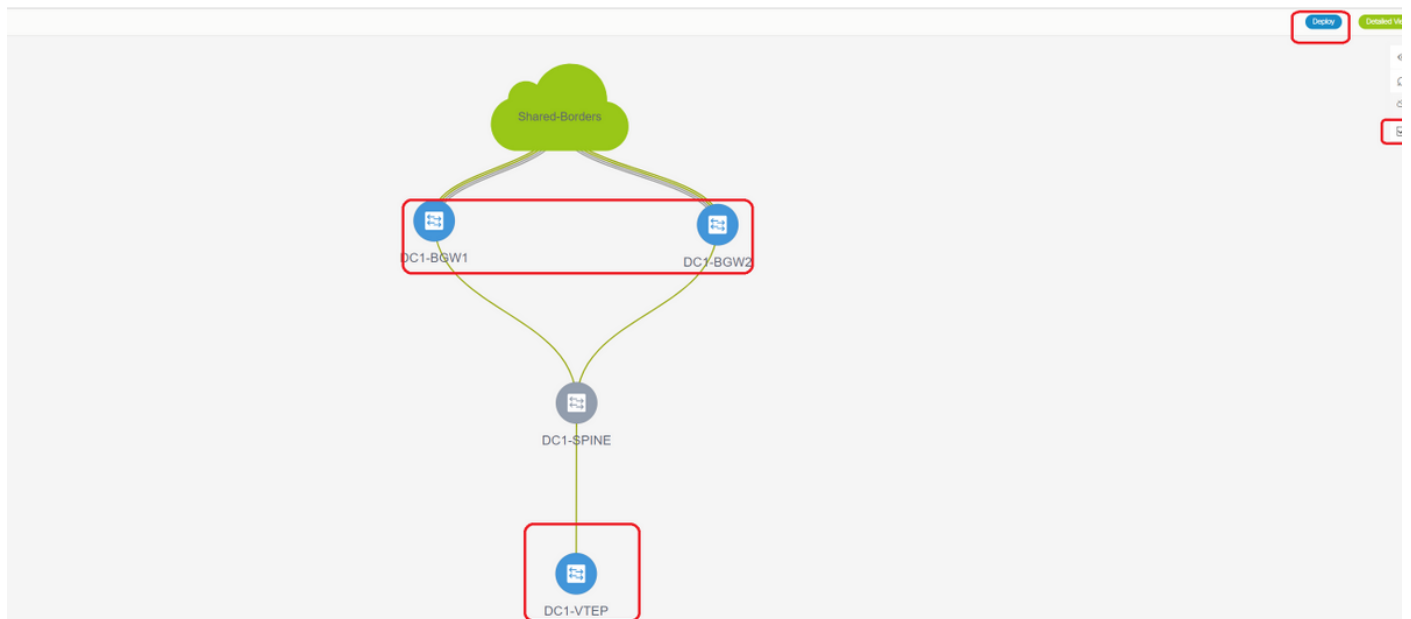
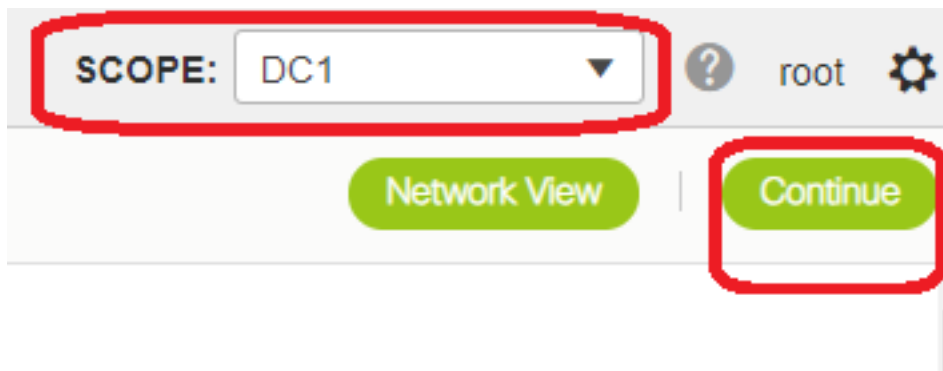

BGP attribute entries [1/164], BGP AS path entries [0/0]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.10.10.1	4	65000	22	20	8	0	0	00:14:11	0
10.10.10.2	4	65000	21	19	8	0	0	00:13:42	0
10.10.20.1	4	65002	21	19	8	0	0	00:13:45	0
10.10.20.2	4	65002	22	20	8	0	0	00:14:15	0

步骤 10：在两个站点上部署网络/VRF

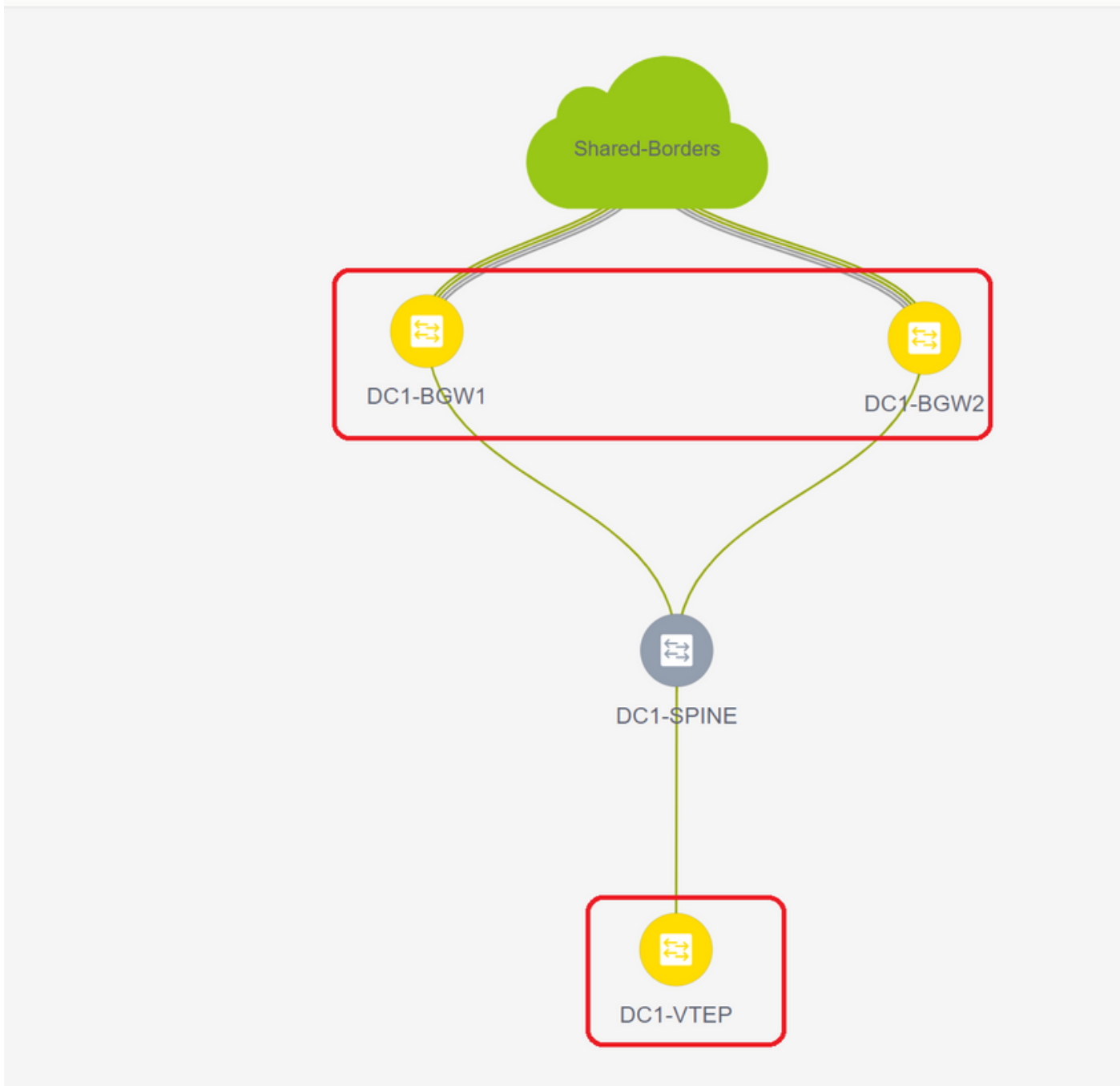
#完成多站点底层和重叠后，下一步是在所有设备上部署网络/VRF；

#从交换矩阵上的VRF开始 —> DC1、DC2和共享边界。



#选择VRF视图后，点击“继续”；这将列出拓扑中的设备

#由于VRF必须部署到多台交换机（包括边界网关和枝叶），请选中右边的复选框，然后选择同时具有相同角色的交换机；例如：DC1-BGW1和DC1-BGW2可一次选择，然后保存两台交换机；之后，选择适用的枝叶交换机（此处为DC1-VTEP）



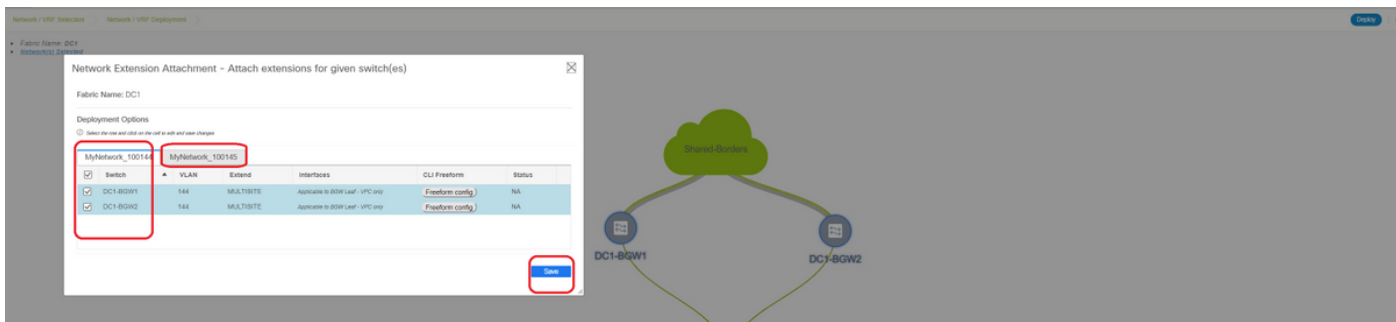
#如上所示，当选择“部署”选项时，之前选择的所有交换机将开始部署，如果部署成功，最终变为绿色。

#部署网络时必须执行相同步骤；

Network / VSP Selection Network / VSP Deployment Fabric Selected: DC1 VSP View

Network Name	Network ID	VSP Name	IPv4 Gateway/Subnet	IPv4 Gateway/Prefix	Status	VLAN ID
McNetwork_100144	100144	testnet-1	172.16.144.25/24	174	NA	144
McNetwork_100145	100145	testnet-1	172.16.140.25/24	140	NA	140

#如果创建了多个网络，请记住在部署之前导航到后续选项卡以选择网络



#现在，状态将从“NA”转为“DEPLOYED”，并可使用以下交换机的CLI来验证部署

```
DC1-VTEP# sh nve vni
Codes: CP - Control Plane          DP - Data Plane
      UC - Unconfigured            SA - Suppress ARP
      SU - Suppress Unknown Unicast
      Xconn - Crossconnect
      MS-IR - Multisite Ingress Replication
```

```
Interface VNI      Multicast-group  State Mode Type [BD/VRF]      Flags
-----
nve1      100144          239.1.1.144     Up   CP   L2 [144]           # Network1 which is VLAN
144 mapped to VNID 100144
nve1      100145          239.1.1.145     Up   CP   L2 [145]           # Network2 Which is VLAN
145 mapped to VNID 100145
nve1      1001445         239.100.100.100 Up   CP   L3 [tenant-1]     # VRF- tenant1 which is
mapped to VNID 1001445
```

```
DC1-BGW1# sh nve vni
Codes: CP - Control Plane          DP - Data Plane
      UC - Unconfigured            SA - Suppress ARP
      SU - Suppress Unknown Unicast
      Xconn - Crossconnect
      MS-IR - Multisite Ingress Replication
```

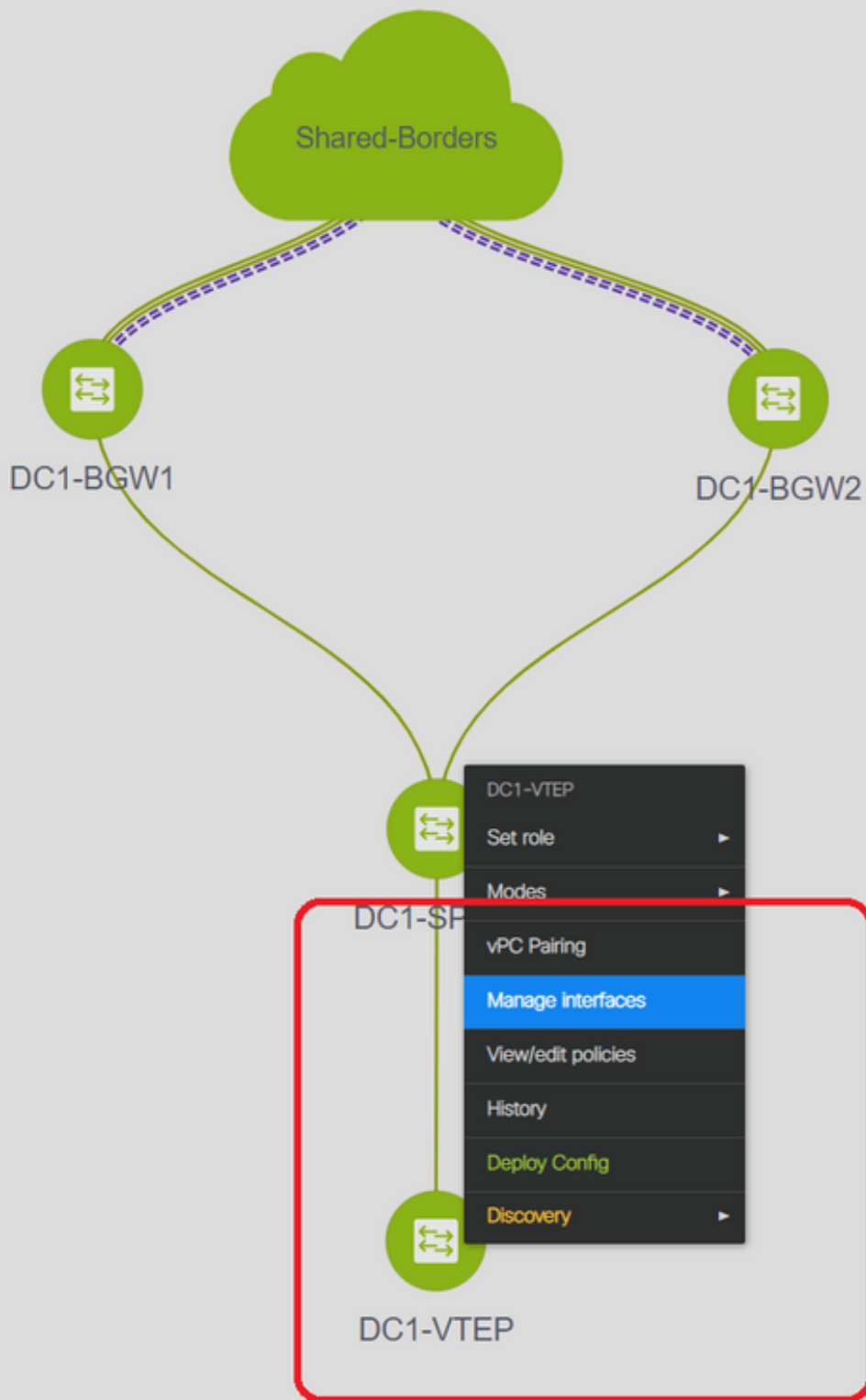
```
Interface VNI      Multicast-group  State Mode Type [BD/VRF]      Flags
-----
nve1      100144          239.1.1.144     Up   CP   L2 [144]           MS-IR
nve1      100145          239.1.1.145     Up   CP   L2 [145]           MS-IR
nve1      1001445         239.100.100.100 Up   CP   L3 [tenant-1]
```

#以上也来自BGW;简而言之，我们之前在步骤中选择的所有交换机都将与网络和VRF一起部署

#交换矩阵DC2和共享边界也必须执行相同步骤。请记住，共享边界不需要任何网络或第2层VNID;仅需要L3 VRF。

步骤 11：在枝叶交换机/VTEP上创建下游中继/接入端口

#在此拓扑中，DC1-VTEP和DC2-VTEP的端口Eth1/2和Eth1/1分别连接到主机；因此，将这些端口作为DCNM GUI中的中继端口进行移动，如下所示



Edit Configuration

Name: DC1-VTEP:Ethernet1/2

Policy: int_trunk_host_11_1

General

* Enable BPDU Guard no Enable spanning-tree bpduguard

Enable Port Type Fast Enable spanning-tree edge port behavior

* MTU jumbo MTU for the interface

* SPEED Auto Interface Speed

* Trunk Allowed Vlans all Allowed values: 'none', 'all', or vlan ranges (ex: 1-200,500-2000,3000)

Interface Description Add description to the interface (Max Size 254)

Freeform Config

Note! All configs shk strictly match 'show run' c with respect to case and Any mismatches will yield unexpected diffs during o

#选择相关接口，将“允许的vlan”从none更改为“all”（或仅允许的vlan）

步骤 12：共享边框上需要的自由

#由于共享边界交换机是路由服务器，因此需要对BGP I2vpn evpn邻居关系进行一些更改

#站点间BUM流量使用单播复制；表示在BGW到达VLAN 144（例如）中的任何BUM流量；根据哪个BGW是指定转发器(DF),DF将执行到远程站点的单播复制；此复制在BGW从远程BGW接收第3类路由后实现；在此，BGW仅与共享边界形成I2vpn对等；共享边界不应有任何第2层VNID（如果创建，将导致东/西流量黑洞）。由于第2层VNID缺失，且路由类型3由每个VNID的BGW产生，因此共享边界不会遵守从BGW传入的BGP更新；要解决此问题，请在AF I2vpn evpn下使用“retain route-target all”

#另一点是确保共享边界不更改下一跳（默认情况下，BGP更改eBGP邻居关系的下一跳）；此处，站点1到2的单播流量的站点间隧道应从BGW到BGW（从dc1到dc2，反之亦然）；为此，必须为每个I2vpn evpn邻居（从共享边界到每个BGW）创建并应用路由映射

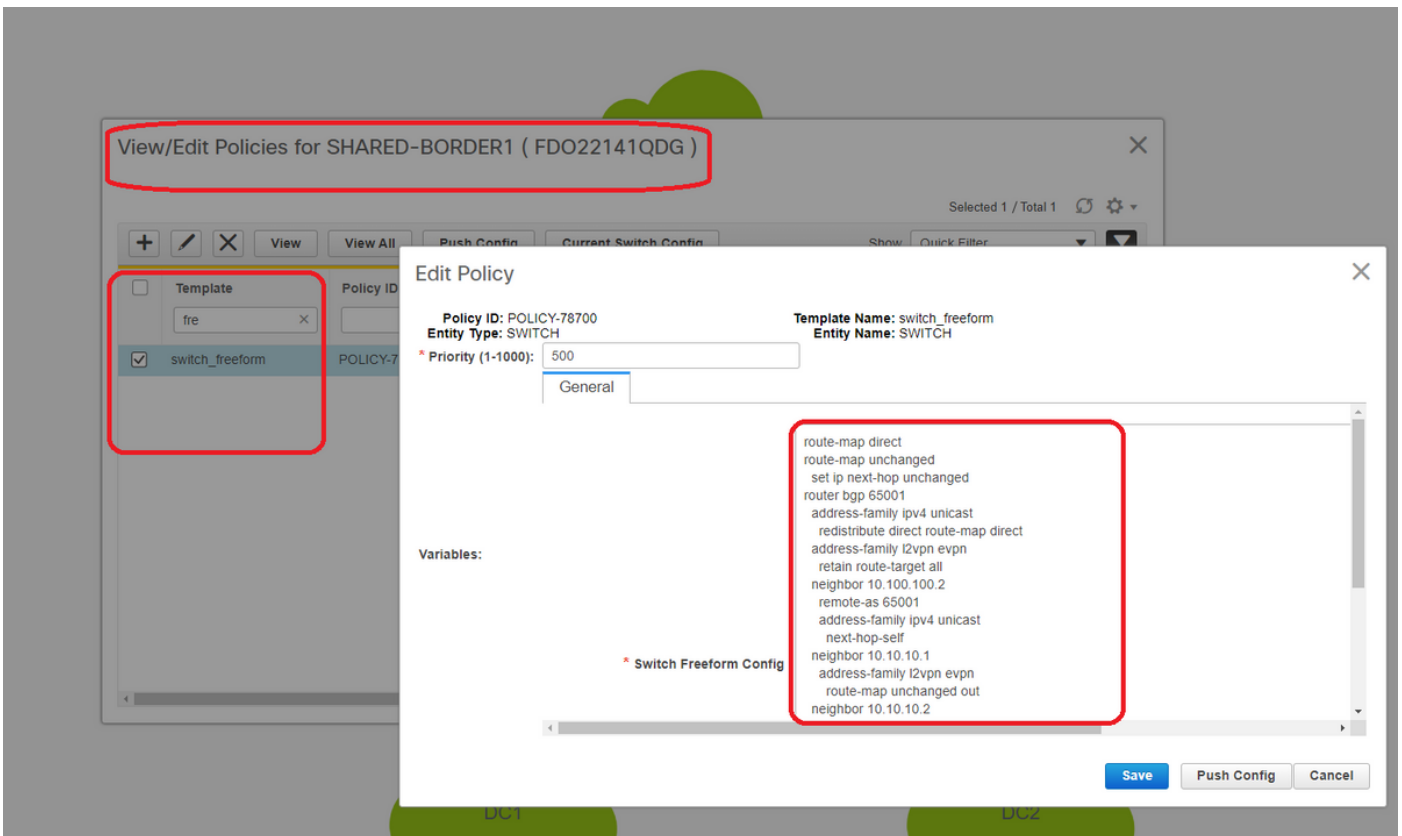
#对于上述两点，必须在共享边框上使用自由形式，如下

```
route-map direct
route-map unchanged
  set ip next-hop unchanged
router bgp 65001
  address-family ipv4 unicast
    redistribute direct route-map direct
  address-family l2vpn evpn
    retain route-target all
```

```

neighbor 10.100.100.2
  remote-as 65001
  address-family ipv4 unicast
    next-hop-self
neighbor 10.10.10.1
  address-family l2vpn evpn
    route-map unchanged out
neighbor 10.10.10.2
  address-family l2vpn evpn
    route-map unchanged out
neighbor 10.10.20.1
  address-family l2vpn evpn
    route-map unchanged out
neighbor 10.10.20.2
  address-family l2vpn evpn
    route-map unchanged out

```



步骤 13 : BGW上租户VRF内的环回

#对于来自枝叶交换机内连接的主机的北/南流量，BGW使用NVE Loopback1 IP地址的外部SRC IP;默认情况下，共享边界仅与BGW的多站点环回IP地址形成NVE对等；因此，如果vxlan数据包与BGW Loopback1的外部SRC IP地址到达共享边界，则该数据包将因SRCTEP丢失而被丢弃；为避免这种情况，必须在每台BGW交换机上创建租户VRF中的环回，然后通告给BGP，以便共享边界接收此更新，然后与BGW Loopback1 IP地址形成NVE对等；

#最初，NVE对等在共享边界上如下所示

```

SHARED-BORDER1# sh nve pee
Interface Peer-IP                               State LearnType Uptime      Router-Mac
-----
nve1      10.222.222.1                                   Up           CP           01:20:09  0200.0ade.de01  #

```

Multisite Loopback 100 IP address of DC1-BGWs

Multisite Loopback 100 IP address of DC2-BGWs

Add Interface ✕

* Type: Loopback

* Select a device: DC1-BGW2

* Loopback ID: 2

* Policy: int_loopback_11_1

General

Interface VRF: tenant-1 Interface VRF name, default VRF if not specified

* Loopback IP: 172.17.10.2 IP address of the loopback

Route-Map TAG: 12345 Route-Map tag associated with interface IP

Interface Description: Add description to the interface (Max Size 254)

Freeform Config Note: All configs should strictly match 'show run' output with respect to case and Any mismatches will yield unexpected diffs during a

Save
Preview
Deploy

#如上所示，loopback2是从DCNM创建的，并在租户1 VRF中配置，并给予标记12345，因为这是路由映射在进行通告时用于匹配环回的标记

```
DC1-BGW1# sh run vrf tenant-1
```

```
!Command: show running-config vrf tenant-1
!Running configuration last done at: Tue Dec 10 17:21:29 2019
!Time: Tue Dec 10 17:24:53 2019
```

```
version 9.3(2) Bios:version 07.66
```

```
interface Vlan1445
  vrf member tenant-1
```

```
interface loopback2
  vrf member tenant-1
vrf context tenant-1
  vni 1001445
  ip pim rp-address 10.49.3.100 group-list 224.0.0.0/4
  ip pim ssm range 232.0.0.0/8
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto mvpn
    route-target both auto evpn
  address-family ipv6 unicast
    route-target both auto
    route-target both auto evpn
router bgp 65000
  vrf tenant-1
    address-family ipv4 unicast
      advertise l2vpn evpn
  redistribute direct route-map fabric-rmap-redist-subnet
    maximum-paths ibgp 2
  address-family ipv6 unicast
    advertise l2vpn evpn
  redistribute direct route-map fabric-rmap-redist-subnet
    maximum-paths ibgp 2
```

```
DC1-BGW1# sh route-map fabric-rmap-redirect-subnet
route-map fabric-rmap-redirect-subnet, permit, sequence 10
  Match clauses:
    tag: 12345
  Set clauses:
```

#在此步骤后，NVE对等项将显示所有Loopback1 IP地址以及多站点环回IP地址。

```
SHARED-BORDER1# sh nve pee
Interface Peer-IP                               State LearnType Uptime   Router-Mac
-----
nve1      192.168.20.1                                   Up      CP        00:00:01 b08b.cfdc.2fd7
nve1      10.222.222.1                                   Up      CP        01:27:44 0200.0ade.de01
nve1      192.168.10.2                                   Up      CP        00:01:00 e00e.daa2.f7d9
nve1      10.222.222.2                                   Up      CP        01:25:19 0200.0ade.de02
nve1      192.168.10.3                                   Up      CP        00:01:43 6cb2.aeee.0187
nve1      192.168.20.3                                   Up      CP        00:00:28 005d.7307.8767
```

#在此阶段，应正确转发East/West流量

步骤 14：从共享边界到外部路由器的VRFLITE扩展

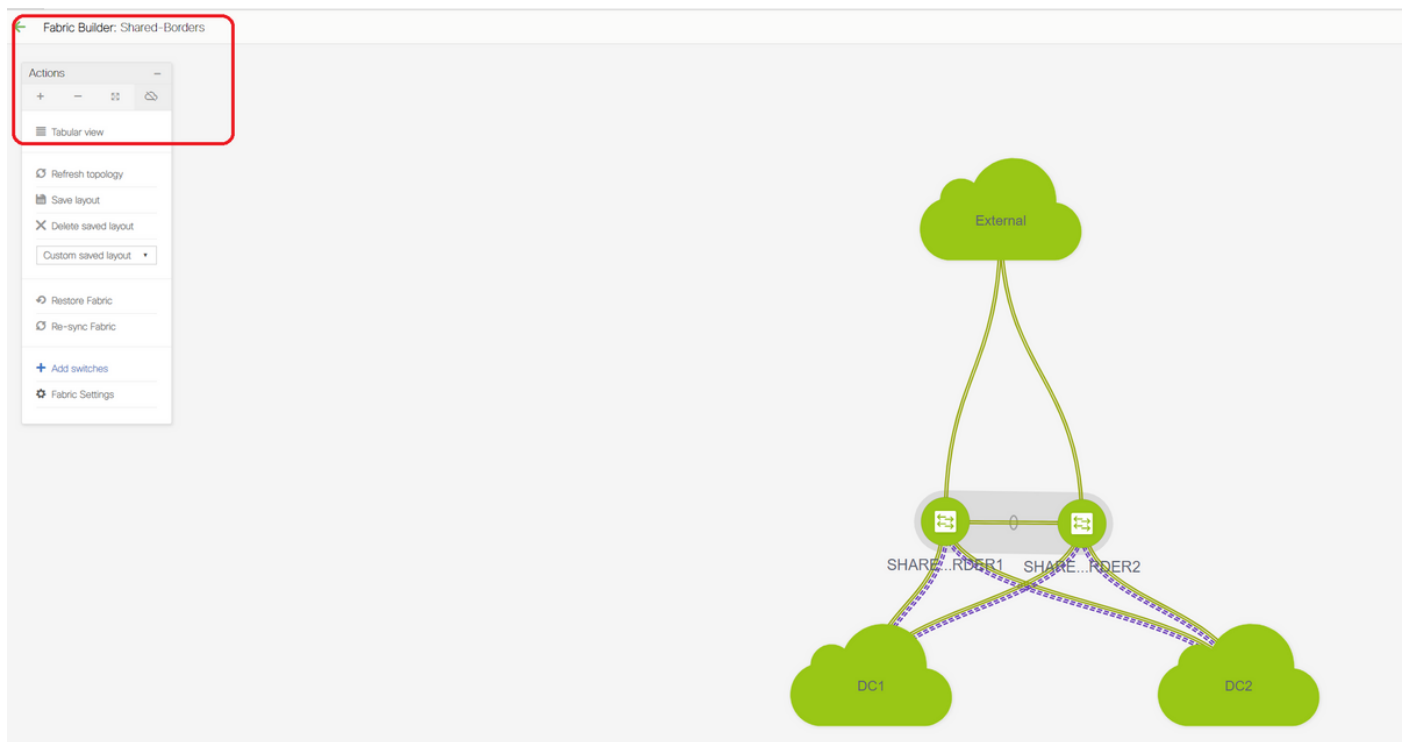
#交换矩阵外部的宿主将不得不与交换矩阵内的宿主通信。在本例中，共享边界也使这一点成为可能；

#任何位于DC1或DC2中的宿主都可以通过共享边界交换机与外部宿主通信。

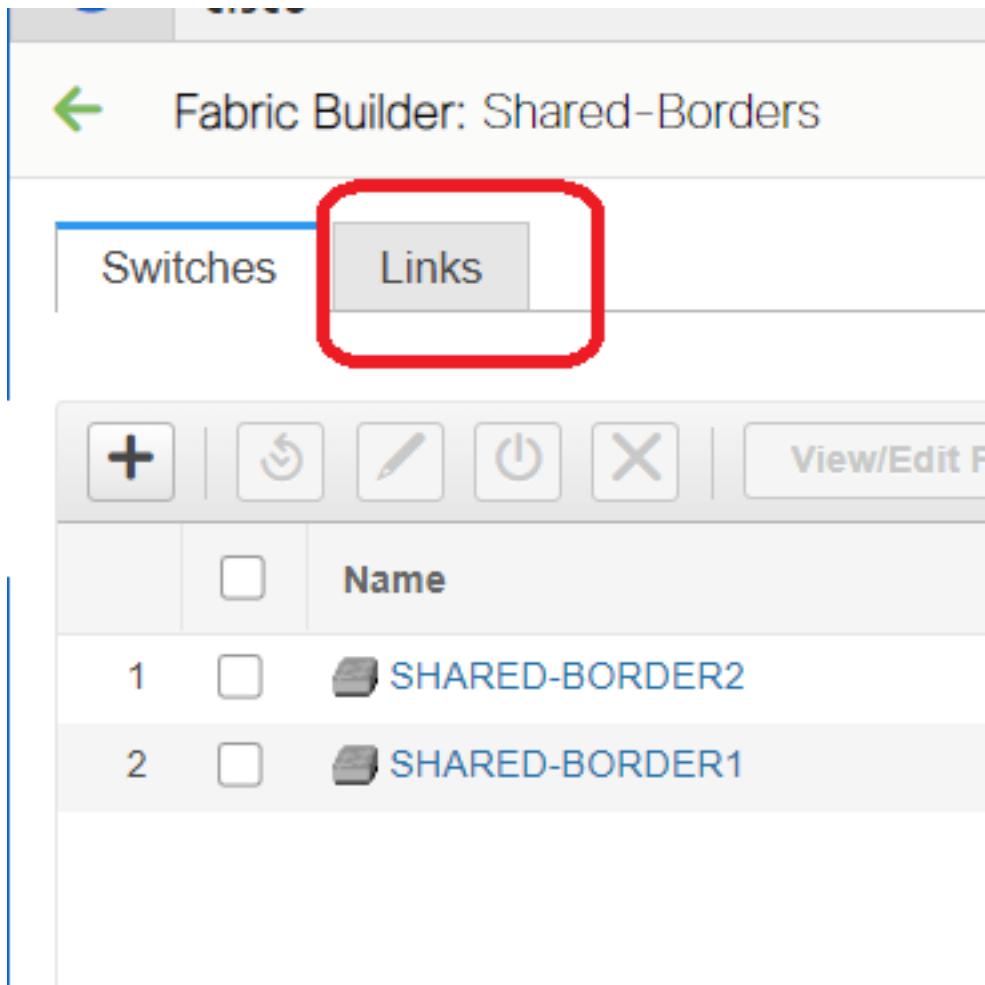
#为此，共享边界终止VRF Lite;在本示例中，eBGP从共享边界运行到外部路由器，如开头的图所示。

#要从DCNM配置此功能，需要添加vrf扩展附件。为实现这一目标，需要执行以下步骤。

a)将交换矩阵间链路从共享边界添加到外部路由器



#选择“共享边框”的交换矩阵生成器范围，并更改为表格视图



#选择链路并添加“交换矩阵间”链路，如下所示

* Link Type	Inter-Fabric
* Link Sub-Type	VRF_LITE
* Link Template	ext_fabric_setup_11_1
* Source Fabric	Shared-Borders
* Destination Fabric	External
* Source Device	SHARED-BORDER2
* Source Interface	Ethernet1/49
* Destination Device	EXT_RTR
* Destination Interface	Ethernet1/50

Link Profile

General	
Advanced	

* BGP Local ASN	65001	? Local BGP Autonomous System Number
* IP Address/Mask	172.16.222.1/24	? IP address for sub-interface in each VRF
* BGP Neighbor IP	172.16.222.2	? Neighbor IP address in each VRF
* BGP Neighbor ASN	65100	? Neighbor BGP Autonomous System Number

Save

#必须从下拉列表中选择VRF LITE子类型

#源交换矩阵是共享边界，目标交换矩阵是外部，因为这将从SB到外部的VRF LITE

#选择指向外部路由器的相关接口

#提供IP地址、掩码和邻居IP地址

ASN将自动填充。

#完成此操作后，点击Save

#对共享边界和VRFLITE中的所有外部第3层连接执行相同操作

b)添加VRF扩展

#转到共享边界VRF部分

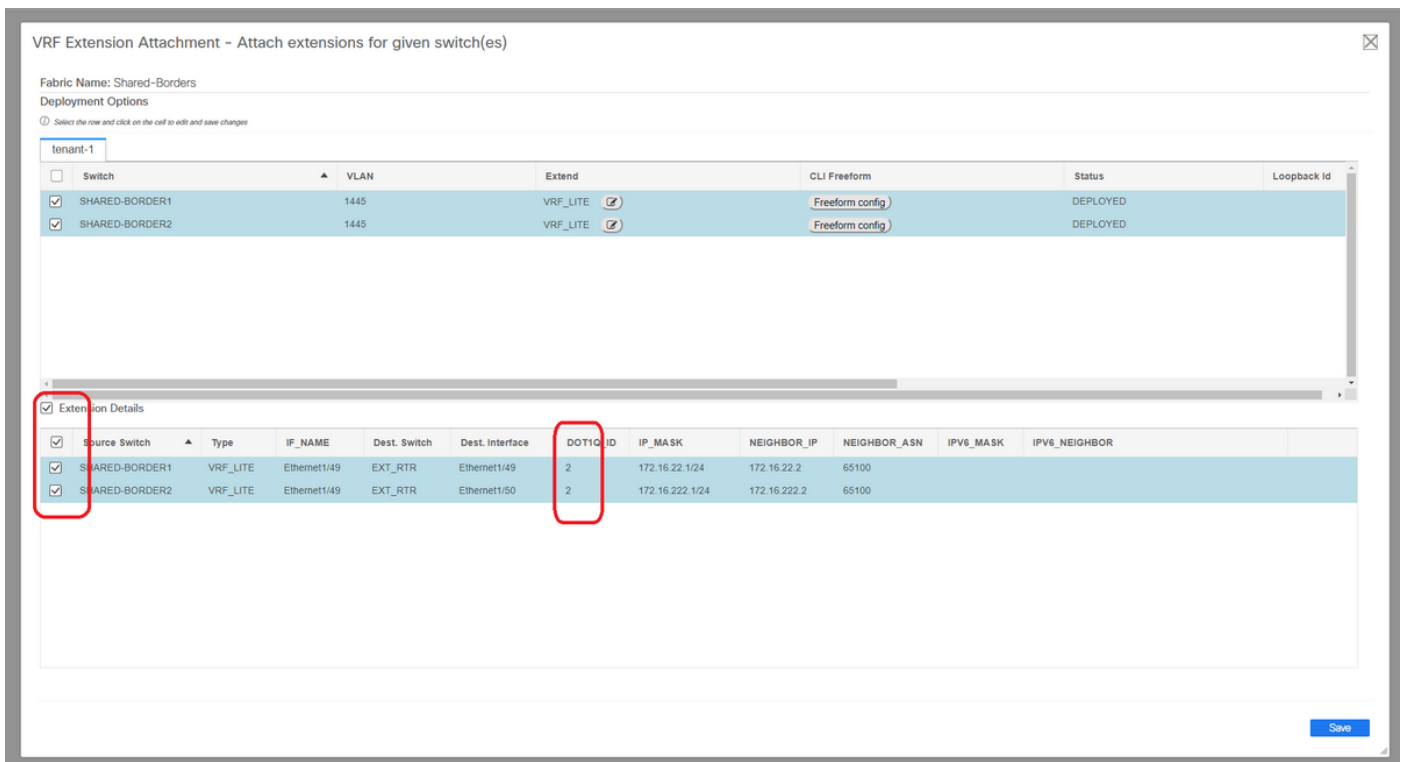
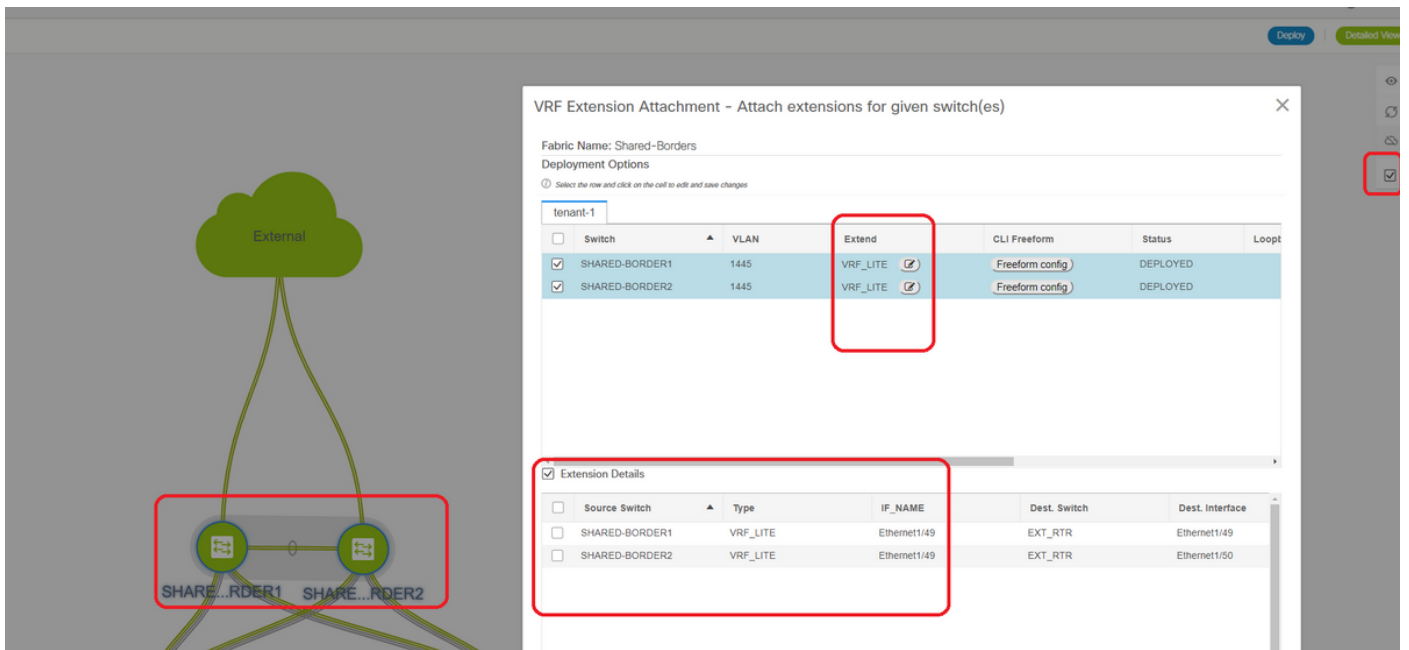
VRF将处于部署状态；选中右侧的复选框，以便可以选择多台交换机

#选择共享边框，“VRF EXTension attachment”窗口将打开

#在“extend”下，从“None”更改为“VRFLITE”

#对两个共享边界执行相同操作

#完成后，“Extension Details”（扩展详细信息）将填充上述步骤a)中之前给出的VRF LITE接口。



DOT1Q ID自动填充为2

#其他字段也自动填充

#如果IPv6邻居关系必须通过VRFLITE建立，则应对IPv6执行步骤a)

#现在点击Save

#最后，在网页右上角执行“部署”。

#成功部署将导致将配置推送到共享边界，包括在这些子接口上设置IP地址和与外部路由器建立BGP IPv4邻居关系

#请记住，在本例中，外部路由器配置（在子接口上设置IP地址和BGP邻居语句）由CLI手动完成。

CLI验证可以通过以下命令在共享边界上完成；

```
SHARED-BORDER1# sh ip bgp sum vr tenant-1
BGP summary information for VRF tenant-1, address family IPv4 Unicast
BGP router identifier 172.16.22.1, local AS number 65001
BGP table version is 18, IPv4 Unicast config peers 1, capable peers 1
9 network entries and 11 paths using 1320 bytes of memory
BGP attribute entries [9/1476], BGP AS path entries [3/18]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor          V    AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down  State/PfxRcd
172.16.22.2       4 65100     20     20     18   0   0 00:07:59 1
```

```
SHARED-BORDER2# sh ip bgp sum vr tenant-1
BGP summary information for VRF tenant-1, address family IPv4 Unicast
BGP router identifier 172.16.222.1, local AS number 65001
BGP table version is 20, IPv4 Unicast config peers 1, capable peers 1
9 network entries and 11 paths using 1320 bytes of memory
BGP attribute entries [9/1476], BGP AS path entries [3/18]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor          V    AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down  State/PfxRcd
172.16.222.2      4 65100     21     21     20   0   0 00:08:02 1
```

#在上述所有配置下，北/南连通性也将如下所示（从外部路由器对交换矩阵中的主机执行ping操作）

```
EXT_RTR# ping 172.16.144.1 # 172.16.144.1 is Host in DC1
```

Fabric

```
PING 172.16.144.1 (172.16.144.1): 56 data bytes
64 bytes from 172.16.144.1: icmp_seq=0 ttl=251 time=0.95 ms
64 bytes from 172.16.144.1: icmp_seq=1 ttl=251 time=0.605 ms
64 bytes from 172.16.144.1: icmp_seq=2 ttl=251 time=0.598 ms
64 bytes from 172.16.144.1: icmp_seq=3 ttl=251 time=0.568 ms
64 bytes from 172.16.144.1: icmp_seq=4 ttl=251 time=0.66 ms
^[A^[A
```

```
--- 172.16.144.1 ping statistics ---
```

```
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.568/0.676/0.95 ms
```

```
EXT_RTR# ping 172.16.144.2 # 172.16.144.2 is Host in DC2 Fabric
```

```
PING 172.16.144.2 (172.16.144.2): 56 data bytes
64 bytes from 172.16.144.2: icmp_seq=0 ttl=251 time=1.043 ms
64 bytes from 172.16.144.2: icmp_seq=1 ttl=251 time=6.125 ms
64 bytes from 172.16.144.2: icmp_seq=2 ttl=251 time=0.716 ms
64 bytes from 172.16.144.2: icmp_seq=3 ttl=251 time=3.45 ms
```

64 bytes from 172.16.144.2: icmp_seq=4 ttl=251 time=1.785 ms

--- 172.16.144.2 ping statistics ---

5 packets transmitted, 5 packets received, 0.00% packet loss

round-trip min/avg/max = 0.716/2.623/6.125 ms

Traceroutes还指向数据包路径中的正确设备

EXT_RTR# traceroute 172.16.144.1

traceroute to 172.16.144.1 (172.16.144.1), 30 hops max, 40 byte packets

1 SHARED-BORDER1 (172.16.22.1) 0.914 ms 0.805 ms 0.685 ms

2 DC1-BGW2 (172.17.10.2) 1.155 ms DC1-BGW1 (172.17.10.1) 1.06 ms 0.9 ms

3 ANYCAST-VLAN144-IP (172.16.144.254) (AS 65000) 0.874 ms 0.712 ms 0.776 ms

4 DC1-HOST (172.16.144.1) (AS 65000) 0.605 ms 0.578 ms 0.468 ms

EXT_RTR# traceroute 172.16.144.2 traceroute to 172.16.144.2 (172.16.144.2), 30 hops max, 40 byte

packets 1 SHARED-BORDER2 (172.16.222.1) 1.137 ms 0.68 ms 0.66 ms 2 DC2-BGW2 (172.17.20.2) 1.196

ms DC2-BGW1 (172.17.20.1) 1.193 ms 0.903 ms 3 ANYCAST-VLAN144-IP (172.16.144.254) (AS 65000)

1.186 ms 0.988 ms 0.966 ms 4 172.16.144.2 (172.16.144.2) (AS 65000) 0.774 ms 0.563 ms 0.583 ms

EXT_RTR#