

Layer 4-Layer 7 Service

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Cisco DCNM Release 11.3(1) introduces the ability to insert Layer 4-Layer 7 (L4-L7) service devices in a data center fabric, and also enables selectively redirecting traffic to these service devices. You can add a service node, create route peering between the service node and the service leaf switch, and then selectively redirect traffic to these service nodes.

Service Node

You have to create an external fabric and specify that a service node resides in that external fabric during service node creation. DCNM does not auto-detect or discover any service node. You also have to specify the service node name, type, and form factor. The name of the service node has to be unique within a fabric. The service node is attached to a leaf, border leaf, border spine, or a border super spine switch. DCNM does not define a new switch role for a service leaf.

DCNM manages the switches that are attached to a service node. DCNM also manages the interfaces of these attached switches. Ensure that the interfaces to which the service node is attached to are in trunk mode. The L4-L7 service will not change its mode. In case the attached switches are forming a vPC pair, the name of the attached switch is a combination of both switches.

Route Peering

Route peering creates service networks. DCNM supports both static route and eBGP-based dynamic route peering options. After you specify the service network and select the peering policy for the tenant, DCNM automatically creates the service network under the specified tenant. Note that the terms, tenant and VRF, will be used interchangeably in this guide. If you select a route peering and click **Deploy** in the **Service Nodes** window, the L4-L7 service deploys the corresponding service network and VRF configuration to the leaf that is attached to the service node. Click **Preview** to review both the peering and service network configuration.

The automatically created service network will also be listed on the **Control > Fabrics > Networks** window. You can view and edit the corresponding config parameters in the **Networks** window. However, you cannot delete the service network. Deletion of service networks is handled automatically during the service route peering deletion process. There can be multiple route peerings defined per tenant/VRF.

Service Policy

You can only define the service policy between the created networks. The L4-L7 service does not create any VRF or network other than the service networks that are defined during route peering. The source and destination network can be a subnet, an individual IP address or the networks that are defined in the **Control** > **Fabrics** > **Networks** window. Note that the source or destination network can also be defined by using the **any** CLI keyword. This means that any IP address traffic is supported. For intra-tenant firewall, one-arm and two-arm load balancer, the L4-L7 service in DCNM uses Policy-Based Routing (PBR) for service insertion. The inter-tenant firewall does not have a service policy. You only need to create a service node and route peering for inter-tenant firewall.

As the source and destination network can be attached or deployed independent of service policy deployment, the tenant/ VRF-related service policy configuration is only attached or pushed to the switch that is attached to the service node, and the source and destination network is updated with the service policy-related configuration. You can preview and confirm the generated configuration. By default, the service policy is defined but is not enabled or attached. You have to enable or attach the service policy to activate it.

The service configuration that is related to the source and destination network will be auto-processed when the source and destination networks are to be attached, or auto-updated in case the networks are already attached or deployed. By default, DCNM will collect statistics every 5 minutes and store it in ElasticSearch for aggregation and analysis. Click the graph line under **Stats** in the **Service Policy** tab of the **Service Nodes** window to view the historical time-based statistics. By default, the statistics are stored for a maximum of 7 days.

The service insertion is effective only on the flows to be created. There is no impact on any existing flows. Deletion of a network is not allowed in case an enabled service policy is associated with that network.

The L4-L7 service integration is built on top of the easy fabric policy enforcement. Use the fabric builder to create a VXLAN EVPN fabric and then import Cisco Nexus 9000 Series switches into the fabric with pre-defined fabric policies.

Guidelines and Limitations for Layer 4-Layer 7 Service

- L4-L7 service in DCNM does not manage or provision service nodes, such as firewall and load balancer.
- This feature is supported only on VXLAN BGP EVPN fabrics.
- The service policies defined in this feature leverage Policy-Based Routing (PBR). Refer Nexus 9000 Series NX-OS Unicast Routing Configuration Guide for PBR related configuration, constraints, and so on.
- This feature supports Cisco Nexus 9300-EX and 9300-FX platform switches as leaf, border leaf, border spine, or border super spine switches.
- Configurations involving intra-tenant and inter-tenant firewall for L3 networks, and one-arm and two-arm deployed load balancers, are supported.
- The existing DCNM topology view is also leveraged to display redirected flows associated with the switches that the service node is attached to, and to locate specific redirected flows.
- Load sharing is not supported.
- This feature does not support Multi-Site Domains (MSD).
- This feature creates, updates, and deletes the service network, as required. Service networks cannot be created or deleted from the Control > Fabrics > Networks window.

Configuring Fabric Settings for Layer 4-Layer 7 Service

Certain fabric settings have to be configured to enable L4-L7 service functionality. To configure these settings, click **Fabric Settings** under **Actions** in the **Fabric Builder** window.

Initia Data Center Network Manager
Fabric Builder: Acorn
Actions
Actions –
T Ka Con
Tabular view
Ø Refresh topology
Save layout
X Delete saved layout
Hierarchical
 Restore Fabric
S Backup Now
Ø Re-sync Fabric
+ Add switches
A Fabric Settings
←→
es-leaf1
00 10011

The Edit Fabric window is displayed. Click Advanced. Select the Enable Policy-Based Routing (PBR) checkbox to enable routing of packets based on the specified policy.

* Fab	ric Name :	Acom							
* Fabric	Template :	Easy_Fabric_11	_1	▼					
ieneral	Replicat	ion vPC	Protocols	Advanced	Reso	urces	Manageability	Bootstrap	Configuration Backup
	* Pow	er Supply Mode	ps-redundant			🕜 De	fault Power Supply Mo	ode For The Fabric	
		* CoPP Profile	strict		•	Provided	oric Wide CoPP Policy d when 'manual' is sel	. Customized CoPF ected	policy should be
Brown	ield Overlay	Network Name Format	Auto_Net_VN	II\$\$VNI\$\$_VLAN	\$\$VLAN_	Ge Ge	nerated network name	e should be < 64 ch	aracters
	Enab	e VXLAN OAM							
	Enab	le Tenant DHCP							
		Enable NX-API							
Enchie	Enable N	IX-API on HTTP							
Enab	le Strict Con	fig Compliance							
*	Greenfield	Cleanup Ontion	Disable		•	🕜 Sw	itch Cleanup Without	Reload	
						When P	reserveConfig=no		
Enable Pre	ecision Time	Protocol (PTP)				0.00			
	PTP Sou	Irce Loopback Id				(Mi	n:0, Max:1023)		
		PTP Domain Id				on a Sir	ltiple Independent PTI ale Network (Min:0. N	P Clocking Subdom (ax:127)	ains
	Enable	MPLS Handoff	0				5	,	
	Underlay MF	PLS Loopback Id				(Min:0,	ed for VXLAN to MPLS Max:1023)	S SR/LDP Handoff	
Enab	le Default Q	ueuing Policies							
		d Casla Diatform			1	A Ou	euina Policy for all 92	xy -FX -FX -FX?	

Now, click **Resources**. Specify a VLAN range in the **Service Network VLAN Range** field. This is a per switch overlay service network VLAN range. The minimum allowed value is 2 and the maximum allowed value is 3967. Also, specify a value for the **Route Map Sequence Number Range** field. The minimum allowed value is 1 and the maximum allowed value is 65534. Click **Save and Deploy** to deploy the updated configuration.

* F	abric Name :	Acom							
* Fabri	ic Template :	Easy_Fabric_11	_1	•					
Seneral	Replicatio	on vPC	Protocols	Advanced	Resou	rces	Manageability	Bootstrap	Configuration Backup
		Range				•	· Jhionil Tookaania		
	Underlay VTE	P Loopback IPv6 Range				0	Typically Loopback1 IPv	6 Address Range	1
U	nderlay Anycas	t Loopback IPv6 Range				?	Anycast Loopback IPv6	Address Range	
	Underlay Sul	bnet IPv6 Range				3	IPv6 Address range to a	ssign Numbered	and Peer Link SVI IPs
	BGP Router II	D Range for IPv6 Underlay				8			
	* Layer 2 VX	LAN VNI Range	30000-49000	Ì		0	Overlay Network Identifie	er Range (Min:1,	Max:16777214)
	* Layer 3 VX	LAN VNI Range	50000-59000	1		0	Overlay VRF Identifier R	ange (Min:1, Ma:	x:16777214)
	* Netwo	rk VLAN Range	2300-2999			3	Per Switch Overlay Netw	ork VLAN Range	e (Min:2, Max:3967)
	* VF	RF VLAN Range	2000-2299			0	Per Switch Overlay VRF	VLAN Range (M	lin:2, Max:3967)
	* Subinterfac	ce Dot1q Range	2-511			?	Per Border Dot1q Range	For VRF Lite Co	onnectivity (Min:2, Max:511)
	* VRF L	ite Deployment.	Manual		•	0	VRF Lite Inter-Fabric Co	nnection Deployr	ment Options
	* VRF Lite S	ubnet IP Range	10.33.0.0/16			?	Address range to assign	P2P Interfabric (Connections
	* VRF Li	te Subnet Mask	30			0	(Min:8, Max:31)		
*	Service Netwo	ork VLAN Range	3000-3199			0	Per Switch Overlay Serv	ice Network VLA	N Range (Min:2, Max:3967)
* Route M	ap Sequence	Number Range	1-65535			2	(Min:1. Max:65535)		

Configuring Layer 4-Layer 7 Service

To launch the L4-L7 Service, or the Elastic Service, on the Cisco DCNM Web UI, choose **Control>Fabrics>Services**.

The **Service Nodes** window is displayed. Select a valid switch fabric to display or define the service nodes, route peerings, and service policies, in that fabric.

X diality Data Center Network Manager	SCOPE: Everest	•	♠ @	admir	¢
Service Nodes					
Service nodes cannot be defined for selected fabric scope. Select a valid fabric scope. In a valid fabric scope, you can define Service Node Onboard a service device such as a <i>firewall</i> or <i>load balancer</i> . Specify service node name, type, and interface attachment details					
Route Peering Specify deployment type, network parameters, peering protocol, and service IP					
Service Policy Specify traffic redirection rules to/from the service node	3				

The L4-L7 service configuration procedure consists of the following steps:

Create Service Node

To create a service node, click the + icon at the top right of the **Service Nodes** window to display the **New Service Nodes** window.

Save Cancel

× dude Data Center Net	twork Manager			SCOPE: Everest 🔻 🌲 🚳 admin 🛟
Service Nodes				Ŏ +
ASA1	PHYSICAL	ī /	1 + Route Peering	2 + Senice Policy
LB1	PHYSICAL	ì /	1 + Route Peering	2 + Service Policy

The New Service Nodes window has three steps, Create Service Node, Create Route Peering and Create Service Policy.

The **Create Service Node** window has two sections - Create Service Node and Switch Attachment, followed by a **Link Template** drop-down list. You can select service_link_trunk, service_link_port_channel_trunk and service_link_vpc from this drop-down list.

Figure 1: Example: Link Template - service_link_trunk

× dude Data Center Network Manager			SCOPE: Everest 🔹 🐥 🔞 admin 🌣
New Service Nodes			×
Create Service Node	Create Service Node • Service Node Name © test	* Type Firewall	
2 Create Route Peering	Form Factor Physical V		
3 Create Policy	Switch Attachment Ext	* Service Node Interface © 1/10 * Attached Switch Interface ©	
	General Parameters Advanced vru O	SPEED © Auto v Enable BPOLi Guard © NO v	
	Clinon vor i Vitersen Co	Next	

× dudu Data Center Network Manager			SCOPE: Everest 💌 🐥 🚳 admin 🌣
New Service Nodes			×
Create Service Node	Create Service Node * service Node Name © test	* Type Frewall	
2 Create Route Peering 3 Create Policy	• Form Factor Physical Switch Attachment		
	Ebermal Faire Ext Ext Acadeed Switch. (0) es-lead 3 Like Template service_link_trunk V	* Service Node Interface (0) 1/10 * Assched Switch Interface (0)	
	General Parameters Advanced Source Interface Description 0 Source Interface Freetorm Config 0	Destination Interface Description ()	
		Next	

Figure 2: Example: Link Template - service_link_port_channel_trunk

Service Nodes				
Create Service Node	Create Service Node * Service Node Name @	* Type		
	LB1	Load Balancer	~	
2) Create Route Peering	* Form Factor			
	Physical	V		
3) Create Policy	Switch Attachment			
	* External Fabric	* Service Node Interface ①		
	Ext	∨ 1/5		
	* Attached Switch ③	* Attached Switch Interface 🕤		
	es-leaf1	V Port-channel501	~	
	Link Template			
	service_link_port_channel_trunk	~		
	Port Channel Mode 🕢	Enable BPDU Guard ()		
	active	✓ true	\times	
	MTU @	Trunk Allowed Vians 🛈		
	jumbo	✓ none		
	Port Channel Description ()	Freeform Config 🧿		
	Enable Port Type Fast 🕥	Enable Port Channel 🕥	li.	

Figure 3: Example: Link Template - service_link_vpc

X dude Data Center Network Manager			SCOPE: Everest 💌 🐥 🞯 admin 🌣
New Service Nodes			×
Create Service Node	Create Service Node	* Type	
	test	Firewall V	
2 Create Route Peering	* Form Factor		
	Physical		
3 Create Policy	Switch Attachment * External Fabric	* Service Node Interface Q	
	Ext	1/10	
	* Attached Switch ()	* Attached Switch Interface ()	
	es-leaf1 ~ es-leaf2 V	VPC1 V	
	Link Template		
	service_link_vpc \lor		
		Next	

The fields in the **Create Service Node** window are as given below. It is mandatory to fill the fields marked with an asterisk. For more information on the fields in this window, hover over the **i** icon.

Create Service Node

Service Node Name - Enter a name for the service node. The name can have alphanumeric, underscore, or dash characters.

Type - Select Firewall or Load Balancer.

Form Factor - Select Physical or Virtual.

Switch Attachment

External Fabric - Specify the external fabric.

Service Node Interface - Specify the service node interface.

Attached Switch- Select a switch from the drop-down list.

Attached Switch Interface - Select the interface from the drop-down list. In case the vPC pair is selected from the Attached Leaf Switch drop-down list, the vPC channel will be shown in the Attached Leaf Switch Interface drop-down list. Otherwise, the port-channel and interfaces with trunk mode are shown in the Attached Leaf Switch Interface drop-down list.

Link Template - Select the service_link_trunk, service_link_port_channel_trunk, or the service_link_vpc template. For more information on template fields, refer Templates.

Now, click **Next**. A pop-up window is displayed stating that a new service node has been created successfully and the **Create Route Peering** window is displayed.

Create Route Peering

The fields that appear in the **Create Route Peering** window depend on the type of deployment chosen in the **Create Service Node** window. Depending on the type chosen (Firewall or Load Balancer), the types of deployments are Intra-Tenant Firewall, Inter-Tenant Firewall, One-Arm load balancer and Two-Arm load balancer.

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Note

Deletion of service network is not supported in Top-down provisioning.

Example: Intra-Tenant Firewall Deployment X disco Data Center Network Manager -New Service Nodes Create Service Node * Peering N test Intra-Tenant Firewal Inside Network Create Route Peering 2 MyVRF_50000 Inside Netw * Service Network Vian ID 3 Create Policy * Sendon National Tomolati Service_Network_Universa General Parameters Advanced * IPv4 G VetMask () Vian Name () Outside Network * Network Ty MyVRF 50000 Outside Network * Service Network Vian ID Service Network Template Service_Network_Univ eral Parameters Advanced sk 🛈 Vian Name 🛈 Next Hop Section Next Hop IP Address ① Next Hop IP Addr

The fields in the **Create Route Peering** window for an Intra-Tenant Firewall deployment are as given below. It is mandatory to fill the fields marked with an asterisk. For more information on the fields in this window, hover over the **i** icon.

Peering Name - Specify a name for the peering. The name can have alphanumeric, underscore, or dash characters.

Back

Deployment - Select Intra-Tenant Firewall.

Inside Network

VRF - Specify the VRF.

Network Type - Select Inside Network.

Service Network - Specify the name of the service network.

Vlan ID - Specify the VLAN ID. Valid IDs range from 2 to 3967. Click Propose to retrieve a value from the pre-defined service network VLAN range pool.

Service Network Template - Select the Service_Network_Universal template from the drop-down list. For more information on the template fields, refer Templates.

Outside Network

VRF - Specify the VRF.

Network Type - Select Outside Network.

Service Network - Specify the name of the service network.

Vlan ID - Specify the VLAN ID. Valid IDs range from 2 to 3967. Click Propose to retrieve a value from the pre-defined service network VLAN range pool.

Service Network Template - Select the Service_Network_Universal template from the drop-down list. For more information on the template fields, refer Templates.

Next Hop Section

Next Hop IP Address - Specify the next-hop IP address. This is the IP/VIP of the service node used for traffic redirection.

Next Hop IP Address for Reverse Traffic - Specify the next-hop IP address for reverse traffic. This is the IP/VIP of the service node used for traffic redirection.

Example: Inter-Tenant Firewall Deployment

Peering Option - Static Peering, Inside Network Peering Template - service_static_route, Outside Network Peering Template - service_static_route

× Unite Data Center Network Manager					SCOPE: Everest	• + 0	admin 🏠
New Service Nodes							×
\sim							
Create Service Node	tost		Inter-Toppet Firewall				
	test		Intel - renanc Pirewait	×			
	* Peering Option ①						
Create Route Peering	Static Peering						
	Inside Network						
3 Create Policy	* VRF		* Network Type				
	Sales		Inside Network	~			
	* Service Network		* Vian ID				
	Network Name		Vlan ID	Propose			
	* Service Network Template						
	Service Network Universal						
	General Parameters Advanced						
	* IPv4 Gateway/NetMask ①		IPv6 Gateway/Prefix ①				
	Van Name ()		Interface Description				
	Peering Template						
	service_static_route						
	Static Routes ①						
		1.					
	Outside Network						
	Sales		Outside Network				
	Service Network Network Neme		Vian ID	Propose			
	Service Network Templete Service Network Universal						
	Conneral Decompeters						
	General Parameters Advanced						
	 IPv4 Gateway/NetMask ① 		IPv6 Gateway/Prefix ③				
	Vian Name 🛇		Interface Description				
	Design Template						
	service_static_route						
	Static Routes O						
		Bac	k Next				

The fields in the **Create Route Peering** window for an Inter-Tenant Firewall deployment are as given below. It is mandatory to fill the fields marked with an asterisk.

Peering Name - Specify a name for the peering. The name can have alphanumeric, underscore, or dash characters.

Deployment - Select Inter-Tenant Firewall.

Peering Option - Select Static Peering or eBGP Dynamic Peering.

Inside Network

VRF - Select a VRF from the drop-down list..

Network Type - Select Inside Network.

Service Network - Select a service network name from the drop-down list.

Vlan ID - Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined service network VLAN range pool.

Service Network Template - Select the Service_Network_Universal template from the drop-down list. For more information on the template fields, refer Templates.

Peering Template - Select service_static_route or service_ebgp_route from the drop-down list. For more information on the template fields, refer Templates.

Outside Network

VRF - Select a VRF from the drop-down list..

Network Type - Select Outside Network.

Service Network - Select a service network name from the drop-down list.

Vlan ID - Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined service network VLAN range pool.

Service Network Template - Select the Service_Network_Universal template from the drop-down list. For more information on the template fields, refer Templates.

Peering Template - Select service_static_route or service_ebgp_route from the drop-down list. For more information on the template fields, refer Templates.



Note Inter-tenant firewall deployment with eBGP dynamic peering option is not supported.

X diale Data C	Center Network Manager					SCOPE:	Everest	•	+	0	admin 🗘
New Servic	e Nodes										\times
Create	Service Node	* Peering Name ①		* Deployment							
		Peering Name		One-Arm Mode	\sim						
		* Pearing Option ()									
2 Create	Route Peering	Static Peering V									
		First Arm									
(3) Create	Policy	* VRF	1	* Network Type							
				First Arm							
		* Service Network	1	Vlan ID							
		Network Name		Vlan ID	Propose						
		* Service Network Template									
		Service_Network_Universal									
		General Parameters Advanced] [Pul Gaternay/Prefix Q							
		Vian Name (0		Interface Description							
		Peering Template									
		service_static_route v									
		Static Routes ©	á								
		Next Hop Section									
		Next Hop IP Address for Reverse Traffic									
			Back	Next							

Example: One-Arm Mode Load Balancer

The fields in the **Create Route Peering** window for a One-Arm Mode load balancer deployment are as given below. It is mandatory to fill the fields marked with an asterisk.

Peering Name - Specify a name for the peering. The name can have alphanumeric, underscore, or dash characters.

Deployment - Select One-Arm Mode.

Peering Option - Select Static Peering or eBGP Dynamic Peering.

First Arm

VRF - Select a VRF from the drop-down list..

Network Type - Select First Arm.

Service Network - Select a service network name from the drop-down list.

Vlan ID - Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined service network VLAN range pool.

Service Network Template - Select the Service_Network_Universal template from the drop-down list. For more information on the template fields, refer Templates.

Peering Template - Select service_static_route or service_ebgp_route from the drop-down list. For more information on the template fields, refer Templates.

Next Hop IP Address for Reverse Traffic - Specify the next-hop IP address for reverse traffic.

Conter Network Man	ager			SCOPE: Everest 💌 🐥 🔞
lew Service Nodes				
~				
Create Service Node	* Peering Name	* Deployment		
	Peening wante	Two-Ann wode		
	* Peering Option O			
Create Route Peering	Static Peering V			
	First Arm			
3 Create Policy	* VRF	* Network Type		
O	v	First Arm	~	
	Service Network	* Vian ID		
	Network Name	Vian ID	Propose	
	Service Network Template			
	Service_Network_Universal V			
	General Parameters Advanced			
	* IPv4 Gateway/NetMask ()	IPv6 Gateway/Prehx ()		
	Vian Name ①	Interface Description		
	Peering Template			
	service_static_route V			
	Second Arm	* Matural View		
	× vier	Second Arm		
	* Service Network	* Vian ID	2	
	Network Name	Vian ID	Propose	
	* Service Network Template			
	Service_Network_Universal V			
	General Parameters Advanced			
	* IPv4 Gateway/NetMask ①	IPv6 Gateway/Prefix ()		
	Vian Name O	Interface Description		
	Next Hop Section			
	* Next Hop IP Address for Reverse Traffic			
	Next Hop IP Address for Reverse Traffic			
	E	Jack Next		

Example: Two-Arm Mode Load Balancer

The fields in the Create Route Peering window for a Two-Arm Mode load balancer deployment are as given below. It is mandatory to fill the fields marked with an asterisk.

Peering Name - Specify a name for the peering. The name can have alphanumeric, underscore, or dash characters.

Deployment - Select Two-Arm Mode.

Peering Option - Select Static Peering or eBGP Dynamic Peering.

First Arm

VRF - Select a VRF from the drop-down list..

Network Type - Select First Arm.

Service Network - Select a service network name from the drop-down list.

Vlan ID - Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined service network VLAN range pool.

Service Network Template - Select the Service_Network_Universal template from the drop-down list. For more information on the template fields, refer Templates.

Peering Template - Select service_static_route or service_ebgp_route from the drop-down list. For more information on the template fields, refer Templates.

Second Arm

VRF - Select a VRF from the drop-down list ...

Network Type - Select Second Arm.

Service Network - Specify the name of the service network.

Vlan ID - Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined service network VLAN range pool.

Service Network Template - Select the Service_Network_Universal template from the drop-down list. For more information on the template fields, refer Templates.

Next Hop Section

Next Hop IP Address for Reverse Traffic - Specify the next-hop IP address for reverse traffic.

Now, click Next. The Create Policy window is displayed.

Create Service Policy

The Create Policy window is displayed as given below.

X •:India Center Network Manager			
New Service Nodes			
Create Service Node	* Policy Name ①	Peering Name	
	policy1	peering1 ~	
	* Source VRF Name	* Destination VRF Name	
Create Route Peering	Sales V	Sales V	
	* Source Network ()	* Destination Network ④	
	Net1: 1.2.3.1/24	Net2: 2.3.4.1/24	
3 Create Policy	Reverse Next Hop IP Address		
	Policy Template Name		
	service_pbr ~		
	Protocol 🕥	* Source Port ()	
	ip v	0	
	* Destination Port ④		
	0		
	Back	Create	

The fields in the **Create Policy** window are as given below. It is mandatory to fill the fields marked with an asterisk.

Policy Name - Specify a name for the policy.

Peering Name - Select a peering option from the drop-down list.

Source VRF Name - Select a source VRF from the drop-down list.

Destination VRF Name - Select a destination VRF from the drop-down list.

Source Network - Select an IP address from the drop-down list.

Destination Network - Select an IP address from the drop-down list.

Reverse Next Hop IP Address - The reverse next-hop IP address is displayed.

Policy Template Name - Select a template from the drop-down list. For more information on the template fields, refer Templates.

Protocol - Select a protocol from the drop-down list. The options are icmp, ip, tcp, and udp.

Source Port - Specify a source port number. In case the ip protocol is selected, this value is ignored.

Destination Port - Specify a destination port number. In case the ip protocol is selected, this value is ignored.

Click Create. The service policy is created.



Note

Deletion of any service network in Top-Down provisioning that is used by Services is not allowed. Deletion of any regular network that is used in a service policy is also not allowed.

Templates

Service Node Link Templates

service_link_trunk

General Parameters tab

MTU - Specifies the MTU for the interface. By default, this is set to jumbo.

SPEED - Specifies the speed of the interface. By default, this is set to Auto. You can change it to 100Mb, 1Gb, 10GB, 25Gb, 40Gb, or 100Gb, as required.

Trunk Allowed Vlans - Specify 'none',' all' or VLAN ranges. By default, none is specified.

Enable BPDU Guard - Specify an option from the drop-down list. The available options are true, false or no.

Enable Port Type Fast - Select the checkbox to enable spanning tree edge port behavior. By default, this is enabled.

Enable Interface - Uncheck the checkbox to disable the interface. By default, the interface is enabled.

Advanced tab

Source Interface Description - Enter a description for the source interface.

Destination Interface Description - Enter a description for the destination interface.

Source Interface Freeform Config - Enter any addition CLI for the source interface.

Destination Interface Freeform Config - Enter any addition CLI for the destination interface.

service_link_port_channel_trunk

Port Channel Mode - Select a port channel mode from the drop-down list. By default, active is specified.

Enable BPDU Guard - Specify an option from the drop-down list. The available options are true, false or no.

MTU - Specifies the MTU for the interface. By default, this is set to jumbo.

Trunk Allowed Vlans - Specify 'none',' all' or VLAN ranges. By default, none is specified.

Port Channel Description - Enter a description for the port channel.

Freeform Config - Specify the required freeform configuration CLIs.

Enable Port Type Fast - Select the checkbox to enable spanning tree edge port behavior. By default, this is enabled.

Enable Port Channel - Select the checkbox to enable the port channel. By default, this is enabled.

service_link_vpc

This template has no specifiable parameters.

Route Peering Service Network Template

Service_Network_Universal

General Parameters tab

IPv4 Gateway/Netmask - Specify the gateway IP address and mask of the service network.

IPv6 Gateway/Prefix - Specify the gateway IPv6 address and prefix of the service network.

Vlan Name - Specify a name for the VLAN.

Interface Description - Enter a description for the interface

Advanced tab

Routing Tag - Specify a routing tag. Valid values range from 0 to 4294967295.

Route Peering Templates

service_static_route

Enter the static routes in the **Static Routes** field. You can enter one static route per line.

service_ebgp_route

General Parameters tab

Neighbor IPv4 - Specify the IPv4 address of the neighbor.

Loopback IP - Specify the IP address of the loopback.

Advanced tab

Neighbor IPv6 - Specify the IPv6 address of the neighbor.

Loopback IPv6 - Specify the IPv6 address of the loopback.

Route-Map TAG - Specify route-map tag that is associated with the interface ID.

Interface Description - Enter a description for the interface.

Enable Interface - Uncheck the checkbox to disable the interface. By default, the interface is enabled.

Service Policy Template

service_pbr

Protocol - Select a protocol from the drop-down list. The options are icmp, ip, tcp, and udp.

Source port - Specify a source port number. In case the ip protocol is selected, this value is ignored.

Destination port - Specify a destination port number. In case the ip protocol is selected, this value is ignored.

You can also customize the templates based on specific requirements. For more information on templates, refer *Template Library section in Cisco LAN Fabric Configuration Guide*.

Adding a Route Peering

To add a route peering from the Cisco DCNM Web UI, perform the following steps:

Procedure

Step 1 Click the Add Route Peering icon on the Service Nodes window.

X divide Data Center Ne	etwork Manager			SCOPE: Everest 💌 🐥 🔞 admin 🏠
Service Nodes				0 +
LB1 > LOAD BALANCER	VIRTUAL	Ť /	Add Roure Peering 1 + Route Peering	1 + Service Policy

Step 2 The **Add Route Peering** window is displayed.

X dindi: Data Center Network Manager		SCOPE: Everest 🔻 🐥 admin
Service Nodes	Add Route Peering	>
FW1 PHYSICAL	Service Node service Node Name Type FW1 Firewall Form Factor I Physical I	Switch Attachment Exernal Fainc Service Node Interface Ext IGigs1/2 Assolved Switch Attached Switch Interface IS31807c-688 IPArt-channelS01
LOAD BALANCER Service Policy Route Peering	t rijaivas	Lak Complete I service_link_port_ch annel_trunk
Policy Name Route Peering Status Surce Source Network Destination	* Peering Name ①	* Deployment
policy1 peering1 None Sales Net1 Sales	Peering Name	Intra-Tenant Firewall \lor
	Inside Network	Nanox Type Inside Network Van D Propose Put Gateway/metre O Interface Description
	Outside Network	* Network Type
	V	Outside Network
	* Service Network	* Vian ID
	Network Name	Vian ID Propose
	Service Network Template Service_Network_Universal	
	General Parameters Advanced # IPv4 Gatewey/NetMask O	Pv6 Gateway/Prets ()
	Van Name ()	Interface Description
	Next Hop Section * Next Hop IP Address	Next Hop IP Address for Reverse Traffic
	Next Hop IP Address	Next Hop IP Address for Reverse Traffic
		Add

Specify the required parameters and click Add. For more information on specific fields, hover over the i icon.

Adding a Service Policy

To add a service policy from the Cisco DCNM Web UI, perform the following steps:

Pro	ced	ure
-----	-----	-----

Step 1 Click the Add Service Policy icon on the Service Nodes window.

X disco Data Center N	letwork Manager			SCOPE: Everest 🔻 🐥 🔞 admin 🌣
Service Nodes				O +
LB1	VIRTUAL	ĩ /	1 + Route Peering	Add Service Policy 1 + Service Policy

Step 2 The **Add Service Policy** window is displayed.

X dude Data Center Network Manager		SCOPE: Everest 💌 🌲 admin 4
Service Nodes	Add Service Policy	>
FW1 PHYSICAL The FIREWALL	Service Node service Node Name Type [FW1 Firewall	Switch Attachment
LB1 PHYSICAL The Address of Addre	Form Factor Physical	Assolved Swith Adapted Swith I warfied [93180/C-68 Port-channel501 Link Yampiane I service_link_port_ch annel_trunk
Policy Name : Route Peering : Status : Source Very : Destination policy1 peering1 None Sales Net1 Sales	Route Peering Peering tame I peering I I peering I I peering I I Intra-Ten VV I I Sales I Sale	ant Firewall Service_Network_Universal Service_Network_Universal Hot Hop Proces 22.1.1.22
	* Policy Name O Policy Name	Peering Name peering 1 V
	Sales	Cestination VRF Name Sales V
	* Source Network (0	* Destination Network ()
	Net1: 1.2.3.1/24	Net1: 1.2.3.1/24
	Next Hop IP Address	Reverse Next Hop IP Address 21.1.1.21
	ZZ.1.1.ZZ V	
	Policy Template Name	
	service_pbr V	
	Protocol ()	* Source Pert ()
	ip	0
	* Destination Port ()	
	0	
		Add

Specify the required parameters and click Add. For more information on specific fields, hover over the i icon.

Deleting a Service Node

To delete a service node from the Cisco DCNM Web UI, perform the following steps:

Procedu	re
---------	----

Step 1 Click the Delete Service Node icon on the Service Nodes window.

X dhalle Data Center N	etwork Manager			SCOPE: Everest 💌 🐥 🔞 admin 🗘
Service Nodes				0 +
LB1	VIRTUAL	Delete Service Node	1 + Route Peering	1 + Service Policy

Step 2 A pop-up window comes up to confirm if the node has to be deleted. Click Delete.

Note Ensure that the service node that has to be deleted has no pairings or policies associated with it. In case there are pairings or policies associated with the service node, the deletion is blocked with a warning indicating that any pairings or policies associated with the service node have to be removed before deleting the service node.

Editing a Service Node

To edit a service node from the Cisco DCNM Web UI, perform the following steps:

Procedure				
Click the E	dit Service Node is	con on the Service N	l odes window.	
× diuli Data Ce	enter Network Manager			SCOPE: Everest 💌 🐥 🚱 admin 🕻
Service Nod	es			Ŏ +
LB1	VIRTUAL	Edit Service Node	1 +	1 +

Step 2 The Edit Service Node window is displayed.

K disco Data Center Ne	twork Manager				SCOPE: Everest	•	admin
Service Nodes				Edit Service Node			
FW1	PHYSICAL	¥ /		Service Node Name FW1 Form Factor Physical	Service Node Type		
LB1 LOAD BALANCER Service Policy Route Peering	PHYSICAL	ì /		Switch Attachment Exernal Fabric Ext Amoched Switch	Service Node Interface Giga 1/2 Attached Switch Interface		
Policy Name ©	Route Peering	Source Source Network Sales Net1	Destinatic	93180YC-68 Link Template service_llink_port_channel_trunk	Port-channel501		
				Port Channel Mode 🕥	Enable BPDU Guard 🔘		
				active	Trunk Allowed Vians ()		
				jumbo Port Channel Description	Freeform Config (0)		
				Enable Port Type Fast O	Enable Port Channel 💿	h.	
					Save		

Make the required changes and click Save.

Preview a Service Policy or a Route Peering

To display the preview of a service policy or a route peering from the Cisco DCNM Web UI, perform the following steps:

Procedure

Step 1 Select a service policy or route peering checkbox and click **Preview** on the **Service Nodes** window.

X dist. Data Center Network Manager			SCOPE: Acom 💌 🌲 admin
Service Nodes			O +
FW1 PHYSICAL FIREWALL Service Policy Route Peering	¥ /	1 + Route Peering	1 + Service Policy ⊘ Preview Deploy ± 7 च
✓ Policy Name	Source VRF	Destination VRF	xt Hop IP $\ \ \Rightarrow$ Reverse Next Hop IP $\ \ \Rightarrow$ Reverse I Action $\ \ \Rightarrow$
✓ fw_policy1 fw_peering1 None	Sales Net1	Sales Net2 22.	1.1.22 21.1.1.21 Yes 🔶 🖊

A Preview Service Policy or a Preview Route Peering window is displayed.

Switch	Network	
es-leaf1 V	sales_service_net_inside \lor	
route-map fabric-rmap-redist-static	permit 10	- 1
configure profile Sales		
vlan 2000		- 1
vn-segment 50000		- 1
Interface Vian2000		
vrr member sales		
ip forward		
Ipv6 address use-IInk-Iocal-Only		
no ip redirects		
mtu 9216		
no shutdown		
vrf context sales		
vni 50000		
rd auto		
address-family ipv4 unicast		
route-target both auto		
route-target both auto evpn		
address-family ipv6 unicast		
route-target both auto		
		11.

Step 2 Select a specific switch or network from the respective drop-down lists to display the service policies or route peerings for specific switches and networks. Click **Close** to close the window.

Deploying a Service Policy or a Route Peering

To deploy a service policy or a route peering from the Cisco DCNM Web UI, perform the following steps:

```
Procedure
```

Step 1

Select a service policy or route peering checkbox and click **Deploy** on the **Service Nodes** window.

cisco Data Center Network Man	ager				SCOPE: Everest	•	🕜 ar
rvice Nodes							
LB1 VI COAD BALANCER Service Policy Route Peering	RTUAL	¥ /	1 Route P	+ cering	1 + Service Policy Preview	Deploy _	. .
Policy Name 💠 Route Peeri	ng 💠 Status 💠	Source VRF \$ Source Network \$	Destination VRF 👙	Destination Network	Reverse Next Hop IP 🖕	Reverse I Ac	tion 🔅

A pop-up window is displayed asking for confirmation to deploy.

ervic	e Nodes											Ċ
FW1 PHYSICAL			Deploy Service Policy		Х		2 +					
	Policy Poute Peori				Deploying for policy,				Service Policy	Donlow	+ -	
Service	Folicy Route Feelin	ng			policyz				OPPEVIEW	Deploy		
Service	Policy Name ‡	Route Peering ¢	Status ¢	Source VRF	Proceed by clicking Deploy			\$ Next Hop IP \$	Reverse Next Hop IP 👙	Reve	Action	
I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Policy Name policy1	Route Peering ¢	Status ¢	Source VRF Dev	Proceed by clicking Deploy	Cancel	Deploy	Next Hop IP 22.1.1.22	Reverse Next Hop IP ‡	Reve	Action	/



Exporting a Service Policy or a Route Peering Table

To export the service policy or route peering information as an Excel file, click the **Export** icon on the **Service Nodes** window. Click the **Export** icon on the **Service Policy** tab to export information about the service policies. Click the **Export** icon on the **Route Peering** tab to export information about the route peerings.

×	cisco	Data Center Ne	twork Manager							SCOPE: Everest	¥	÷ 0	admin 🎝
Se	rvice	e Nodes										Ċ	> +
	LB1 LOAD	BALANCER	VIRTUAL		ï	ì /	1 Route Pe	+ ering		1 H Service Policy Preview	Deploy	Export	Ĩ
		Policy Name 👙	Route Peering \Rightarrow	Status 👙	Source VRF ‡	Source Network $\ \ \updownarrow$	Destination VRF $\ otherapy$	Destination Network	Next Hop IP 👙	Reverse Next Hop IP 👙	Reverse	I Action	\$
		policy1	peering1	None	Dev	Net1	Dev	Net2		33.1.1.33	Yes	•	/

Importing a Service Policy or a Route Peering Table

To import service policy or route peering information as an Excel file, click the **Import** icon on the **Service Nodes** window. Click the **Import** icon on the **Service Policy** tab to export information about the service policies. Click the **Import** icon on the **Route Peering** tab to export information about the route peerings.

× diale Data Center Network M	Nanager			SCOPE	Everest 💌	🜲 🕜 admin -
Service Nodes						Ċ +
LB1 V LOAD BALANCER Service Policy Route Peering	VIRTUAL	¥ /	1 + Route Peering	1 Service F		Import
Policy Name 👙 Route P	leering	ce ≑ Source Network ≑	Destination VRF	Next Hop IP Reverse Next	t Hop IP	E Action 😄
policy1 peering1	None Dev	Net1 (Dev Net2	33.1.1.33	Yes	•- /

Deleting a Service Policy

To delete a service policy from the Cisco DCNM Web UI, perform the following steps:

L

Procedure

Step 1 Select the service policy that has to be deleted by clicking the checkbox that is next to the name of the policy, and then click the **Delete** icon on the **Service Nodes** window.

×	cisco	Data Center Net	work Manager							SCOPE: Everest	•	0	admin 🕻
Se	ervice	e Nodes										(- Č
	ASA FIREW	VALL Route Peering	PHYSICAL		i	i /	1 Route Pe	+ Hering		2 + Service Policy	Deploy	<u>+</u> +	Delete
		Policy Name 👙	Route Peering $\ \ \updownarrow$	Status 👙	Source VRF	Source Network \Leftrightarrow	Destination VRF $\ \ \updownarrow$	Destination Network	Next Hop IP $\ \ \updownarrow$	Reverse Next Hop IP $\ \ \updownarrow$	Reverse I	Action	¢
		fw_policy1	fw_peering1	Out-of-Sync	@Sales	Net1	Sales	Net2	22.1.1.22	21.1.1.21	Yes	-0	/
		fw_policy2	fw_peering1	Out-of-Sync	Gales	Net3	Sales	Net4	22.1.1.22	21.1.1.21	No	-0	/

Step 2 A pop-up window is displayed asking for confirmation to delete. Click **Delete**. In case the service policy that has to be deleted is attached, the pop-up window indicates that the service policy has to be detached by using the toggle in the **Action** column, and deploying the changes (removing the policy) before it can be deleted.



Deleting a Route Peering

To delete a route peering from the Cisco DCNM Web UI, perform the following steps:

Procedure

Step 1 Select the route peering that has to be deleted by clicking the checkbox that is next to the name of the route peering, and then click the **Delete** icon on the **Service Nodes** window.

×	cisco	Data Center Ne	twork Manager									SCOPE:	Everest 💌	+ 0	admin 🕇
Se	ervice	e Nodes													O +
	ASA FIREV Service P	VALL olicy Route Peerin	PHYSICAL		ì /			1 Route Peering	3	+		2 Service Policy	+ Preview Deploy	<u>+</u> +	Delete
		Peering Name 👙	Deployment 👙	Peering Option 💠	Status 💠	VRF	Service Network O Network Name	ne 👙 Gateway IP	VRF	Service Network Tw Network Name	ro 👙 Gateway IP	Next Hop IP 👙	Reverse Next	Action	4
		fw_peering1	IntraTenantFW	None	Out-of-Sync ()	Sales	service_net_inside	21.1.1/24	Sales	service_net_outside	22.1.1.1/24	22.1.1.22	21.1.1.21	-0	/

Step 2 A pop-up window is displayed asking for confirmation to delete. Click **Delete**. In case the route peering that has to be deleted is attached or if the service policy associated with the route peering is active, the pop-up window indicates that the peering has to be detached by using the toggle in the **Action** column, deploy the changes (remove the policy), and delete the service policy associated with the route peering before the route peering can be deleted.

X dude Data Center Network Manager		SCOPE: Acom 💌 🐥 admin 🛱
Service Nodes		Q +
ASA1 PHYSICAL	Route Peering Delete X	2 +
Service Policy Route Peering	Selected route peering are either attached or mapped to service policy. To delete, • Detach the peering from actions column	Service Policy
Peering Name (c) Deployment (c) Peering Option (c)	Delete service policy before deleting route peering	Network Two \oplus Next Hop IP \oplus Reverse Next Action \oplus Name Gateway IP
v_fw_peering1 intraTenantFW None	Ou Cancel Delete	et_outside 22.1.1.1/24 22.1.1.22 21.1.1.21

Viewing Service Policy Information

In the **Service Nodes** window, the **Service Policy** tab displays information about the configured service policies.

Conter Network Manager					SCOPE: Acom	v .	admi
Service Nodes							Q
ASA1 PHYSICAL FIREWALL Service Policy Route Peering	ì /	Route F	+		2 - Service Policy	Deploy 📥 🕇	Ŧ
Policy Name	Status	Destination VRF \$	Destination Network	Next Hop IP 💲	Reverse Next Hop IP 👙	Reverse E Action	¢
fw_policy1 fw_peering1 (Jut-of-Sync @sales Net1	Sales	Net2	22.1.1.22	21.1.1.21	Yes 🔍	/

Table 1: Service Policy Table Field and Description

Field	Description
Policy Name	Displays the name of the policy.

Field	Description
Route Peering	Displays the route peering name given for the peering configuration. Click the specified peering name to display route peering information.
Status	Displays the status of the service policy.
Source VRF	Displays the Virtual Routing and Forwarding (VRF) source.
Source Network	Displays the source network.
Destination VRF	Displays the destination VRF.
Destination Network	Displays the destination network.
Next Hop IP	Displays the next-hop IP address.
Reverse Next Hop IP	Displays the reverse next-hop IP address.
Reverse Enabled	Displays if reverse next-hop is enabled or not.
Last Updated	Displays the time at which the service policy was last updated.
Stats	Click the graph line to display cumulative statistics for a policy in a specified time range. For more information, refer Stats.
Action	Use the toggle to enable/attach or disable/detach the service policy. When the service policy is attached or enabled, the corresponding policies are applied to the VRF (tenant), source, and destination networks.
	Action \Rightarrow Click to enable
	The toggle turns blue in color when the service policy is attached or enabled.
	Action 💠
	-0 /
	Click the Edit icon to edit the service policy.
	Edit Service Policy

Stats

In the **Service Nodes** window, the **Service Policy** tab displays statistical information about the configured service policies. Select a time range for which the statistics should be displayed from the **Time Range** drop-down box. You can select the date from the calendar displayed on the window and the time by clicking **select time** at the bottom right corner of the window. You can also display statistics from the last 15 minutes, 1 hour, 6 hours, 1 day, 1 week, and 1 month. Select the required time range and click **Apply**. Select a switch for which the statistics should be displayed from the **Switch** drop-down list. The statistics are then displayed for the selected switch in the specified time range.



Viewing Route Peering Information

In the Service Nodes window, click Route Peering. The Route Peering tab displays route peering information.

×	cisco Dat	a Center Net	work Manager									SCOPE	Acom 🔻		admin
Se	ervice N	lodes													Ċ +
	Service Policy	Route Peering	PHYSICAL		¥ /			1 Route Peering	3	+		2 Service Policy	+ Preview Deploy	<u>+</u> +	Ĩ
	Peer	ring Name 👙	Deployment 👙	Peering Option 👙	Status 👙	VRF	Service Network O Network Name	ne ÷ Gateway IP	VRF	Service Network Tw Network Name	vo ¢ Gateway IP	Next Hop IP 👙	Reverse Next	I Action	¢
	fw_p	peering1	IntraTenantFW	None	Out-of-Sync 🛈	Sales	service_net_inside	21.1.1.1/24	Sales	service_net_outside	22.1.1.1/24	22.1.1.22	21.1.1.21	-0	/

Table 2: Route Peering Table Field and Description

Field	Description
Peering Name	Displays the defined peering name.
Deployment	Displays the deployment - One-Arm mode or Two-Arm mode.
Peering Option	Displays the peering option - Static or eBGP Dynamic peering.
Status	Displays the status of the route peering.
Service Network VRF	Displays the service network VRF.
Service Network Name	Displays the name of the service network.
Service Network Gateway IP	Displays the gateway IP of the service network VRF.
Next Hop IP	Displays the next-hop IP address.
Reverse Next Hop IP	Displays the reverse next-hop IP address.
Last Updated	Displays the time at which the route peering was last updated.

Field	Description
Action	Use the toggle to enable/attach or disable/detach the route peering. When the route peering is enabled, the service networks defined in that route peering will be attached to the service leaf.
	Action 💠
	Click to enable
	The toggle turns blue in color when the route peering is attached or enabled.
	Action 🚖
	-0 /
	Click the Edit icon to edit the route peering.
	Action Carling