

L4-L7 Services Configuration

Cisco Nexus Dashboard Fabric Controller 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 L4-L7 service devices. You can add a L4-L7 service node, create route peering between the L4-L7 service node and the L4-L7 service leaf switch, and then selectively redirect traffic to these L4-L7 service nodes.

Note This is a preview feature in Nexus Dashboard Fabric Controller, Release 12.0.1a. We recommend that you use this feature marked as BETA in your lab setup only. Do not use these features in your production deployment.

From NDFC Release 12.0.2a, you can use this feature in your production environment.

• L4-L7 Services, on page 1

L4-L7 Services

UI Path: **LAN** > **Services**

Alternatively, you can navigate from **LAN** > **Fabrics** > **Fabric Overview** > **Services**

Cisco provides ability to insert 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 switch, and then selectively redirect traffic to these service nodes.

You can also watch a video Service Redirection that demonstrates how to orchestrate a L4-L7 service appliance with a VXLAN Fabric in a data center managed by Cisco Nexus Dashboard Fabric Controller. This demo covers provisioning, defining of service policies, and monitoring of redirected flows.

Service Nodes

You have to create an External Connectivity Network and specify that a service node resides in that External Connectivity Network during service node creation. Nexus Dashboard Fabric Controller 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, border super spine, or a border gateway. Nexus Dashboard Fabric Controller does not define a new switch role for a service switch.

Remove the fabric from fabric Monitor Mode to display the icon to delete the service node. This delete icon will be shown only to users with admin role access.

Nexus Dashboard Fabric Controller manages the switches that are attached to a service node. Nexus Dashboard Fabric Controller also manages the interfaces of these attached switches. Ensure that the interfaces to which the service node is attached to are in trunk mode and do not belong to any interface group. 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.

Double-click on required service name to view the below tabs of the service node details window:

- Overview, on page 4
- Route Peering, on page 16
- Service Policy, on page 19

VXLAN EVPN Multi-Site Support

This feature supports VXLAN EVPN Multi-Site. You can choose the VXLAN EVPN Multi-Site member fabric as attached fabric during service node creation, create a service node (for example, firewall, or load balancer), attach the service node to the switch in the selected VXLAN EVPN Multi-Site member fabric, define the route peering and service policies, and deploy relevant configurations on the selected VXLAN EVPN Multi-Site member fabric. For more information on the procedure to configure service, refer Configuring L4-L7 Services, on page 5.

RBAC Support

The L4-L7 service supports Role-Based Access Control (RBAC) along with fabric access mode.

The admin, stager, and operator, are pre-defined roles in Nexus Dashboard Fabric Controller. The table given below lists the various operations that each role can perform.

Service Operation	Service Node	Route Peering	Service Policy
Create/Update/Delete/Import	admin	admin, stager	admin, stager
List/Export	admin, stager, operator	admin, stager, operator	admin, stager, operator
Attach/Detach	NA	admin, stager	admin, stager
Deploy	NA	admin (blocked if fabric is in fabric monitor or read-only mode)	admin (blocked if fabric is in fabric monitor or read-only mode)
Preview/Deployment History	NA	admin, stager, operator	admin, stager, operator

PBR Support on WAN Interfaces of Border Switches

You can specify an arbitrary network, that has not been defined in the top-down configuration, as a source or destination network in the service policy. This helps in streamlining policy enforcement for north-south traffic. The Nexus Dashboard Fabric Controller UI lists out routed Layer-3 interfaces of all border switches, standalone or vPC, that have a VRF association. You can then choose the required interface that has to be associated with the defined policy. The border switches include border leaf, border spine, border super spine and border

gateway. There can be multiple interface associations. For example, multiple L3 interfaces, subinterfaces, and port-channels, can be selected for one border switch. You can also select multiple border switches for interface association. For information, see NX-OS Unicast Routing Configuration Guide.

Depending on the policy direction, the border switch and interface association for ‘any’ or arbitrary network may not be needed. For example, for a forwarding policy, the border switch and interface input or route-map association is not needed for ‘any’ or arbitrary destination network. For a reversed policy, the border switch and interface or route-map association is not needed for ‘any’ or arbitrary source network.

When the policy with ‘any’ or arbitrary network is attached, the policy related CLIs are generated and associated with the selected L3 routed interfaces of the border switches. The deployment of that policy pushes the CLIs to the selected border switches. The deployment history will include the corresponding entries and can be quickly accessed using VRF filtering. The service policy stats diagram includes the PBR stats of route maps that are associated with the selected L3 routed interfaces of the border switches.

Static Route

The L4-L7 service pushes static routes on all VTEPs, including service leaf switches, where the VRF being referenced in the static route is attached. This expedites service node failover with static routes.

Guidelines and Limitations for L4-L7 Services

- L4-L7 Service in Nexus Dashboard Fabric Controller does not manage or provision service nodes, such as firewall, load balancer, and Virtual Network Function.
- The L4-L7 Service feature is supported only on the VXLAN BGP EVPN fabrics with the **Data Center VXLAN EVPN** template.
- 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, border super spine, and border gateway switches.
- Configurations involving intra-tenant and inter-tenant firewall for L3 networks, and one-arm Virtual Network Function and one-arm and two-arm deployed load balancer are supported.
- The existing Nexus Dashboard Fabric Controller 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.
- L4-L7 Service REST APIs are accessible via Nexus Dashboard Fabric Controller packaged REST API documentation. For more information, refer Cisco Nexus Dashboard Fabric Controller REST API Reference Guide.
- L4-L7 Services generate Kafka notifications for real-time interaction.
- Load sharing is not supported.
- This feature creates, updates, and deletes the service network, as required. Service Networks cannot be created or deleted from the **LAN > Fabrics > Networks** window.

Types of Service Devices

The L4-L7 Service in Cisco Nexus Dashboard Fabric Controller supports any vendors service node attachments. Typical service node types that are deployed in a data center are Firewalls, Load Balancers, and other Layer-4 to Layer-7 products.

Examples of supported Firewall vendors are Cisco Systems, Palo Alto Networks, Fortinet, Check Point Software Technologies, and others.

Examples of supported Load Balancer vendors are F5 Networks, Citrix Systems, A10 Networks, and others.

Note that these example lists are meant to serve as examples and not intended to be **exhaustive** lists. The L4-L7 service attachment is generic and applies to any vendors service node.

Overview

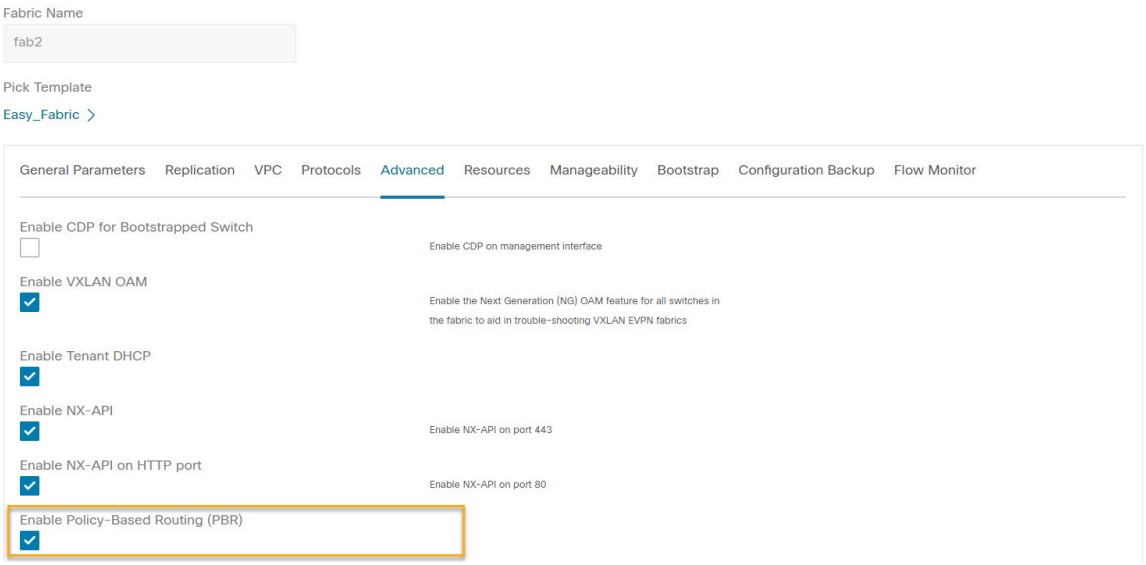
On **Overview** tab you can view **Summary**, **Route Peering**, **Service Policy** topology of selected service node.

Click **Refresh** icon to view the latest details.

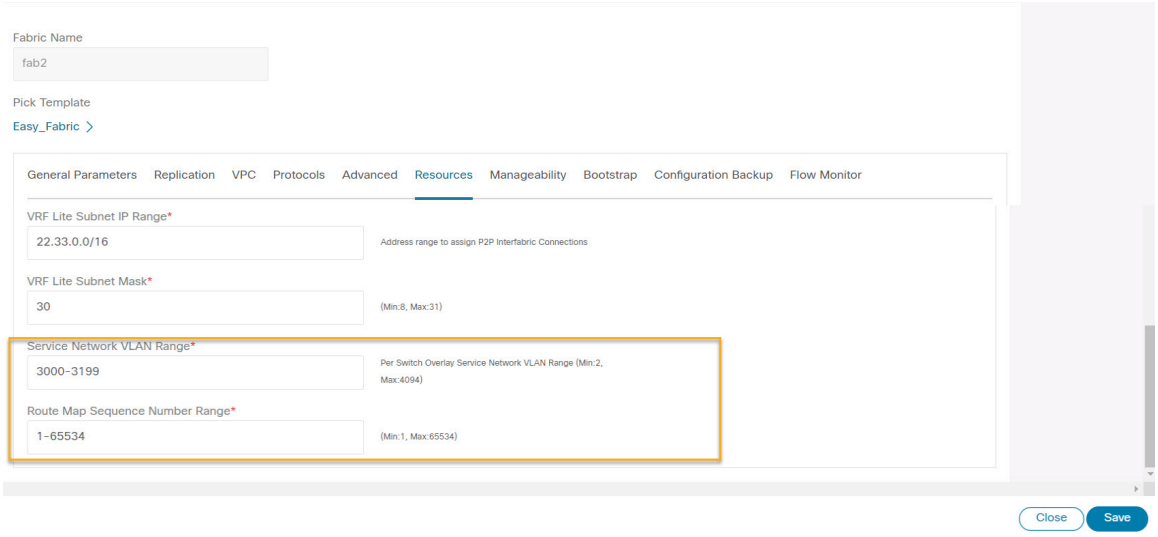
Configuring Fabric Settings for L4-L7 Service

Certain fabric settings have to be configured to enable L4-L7 Service functionality. To configure these settings, choose **LAN > Fabrics** and then click **Actions > Create Fabric**.

The **Create Fabric** window is displayed. Provide a Fabric Name and Pick a Template. Click **Advanced**. Select the **Enable Policy-Based Routing (PBR)** checkbox to enable routing of packets based on the specified policy.



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 4094. 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** to save the updated configuration.



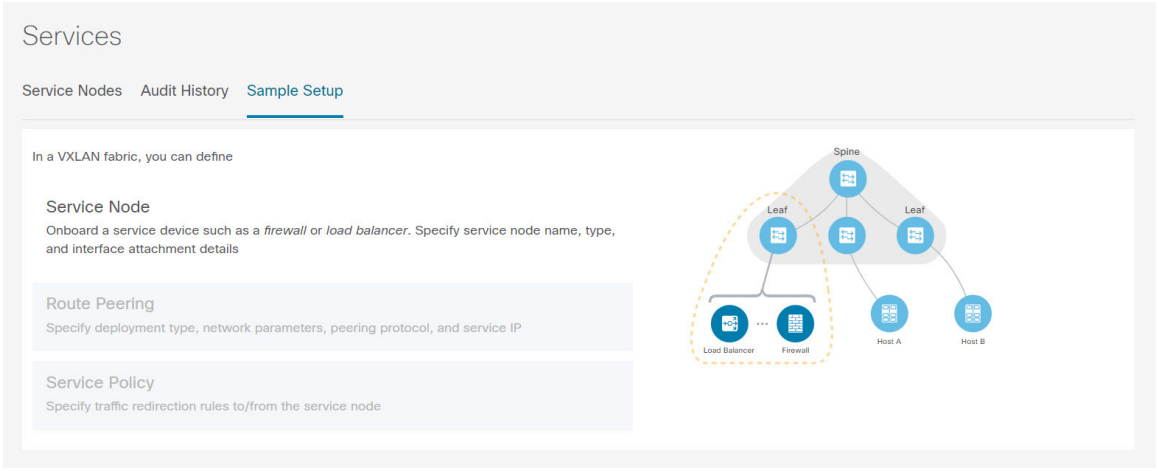
Configuring L4-L7 Services

To launch the L4-L7 Services, or the Elastic Service, on the Cisco Nexus Dashboard Fabric Controller Web UI, choose **LAN > Services**.

You can also navigate to **Services** tab by one of the following below mentioned paths:

LAN > **Fabrics** > **Fabric Overview** > **Services**

LAN > **Switches** > **Switches Overview** > **Services**

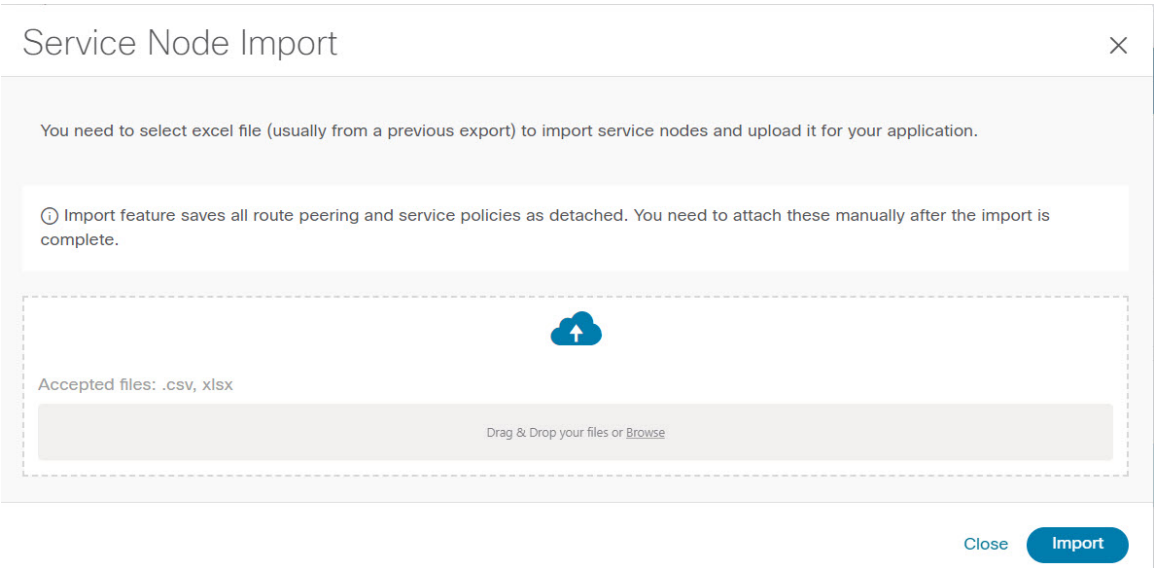


The services configuration procedure consists of the following steps:

Adding Service Node

You can navigate to **Service Node** tab by one of the following below mentioned paths:

LAN > **Services**



To create service node, click **Actions** > **Add** > **Service Nodes**. The **Create New Service Node** window is displayed.

The **Create New Service Node** window has three guided steps: **Create New Service Node**, **Create Route Peering**, and **Create Service Policy**.

The **Create New 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 based on the specified attached switch interface type.

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

Create New Service Node

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

Service Node Type: Select Firewall, Load Balancer, or Virtual Networking Function.

Form Factor: Select Physical or Virtual.

External Fabric: Specify the external fabric.

Service Node Interface: Specify the service node interface.

Attached Fabric: Select a fabric from the list.

Attached Switch: Select a switch or a switch pair from the list.

Attached Switch Interface: Select the interface from the list. In case the vPC pair is selected from the **Attached Leaf Switch** list, the vPC channel will be shown in the **Attached Switch Interface** list. Otherwise, the port-channel and interfaces with trunk mode are shown in the **Attached Leaf Switch Interface** 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, on page 13.

A form is displayed depending on the template used. Update all the required fields in the form and click **Save**.

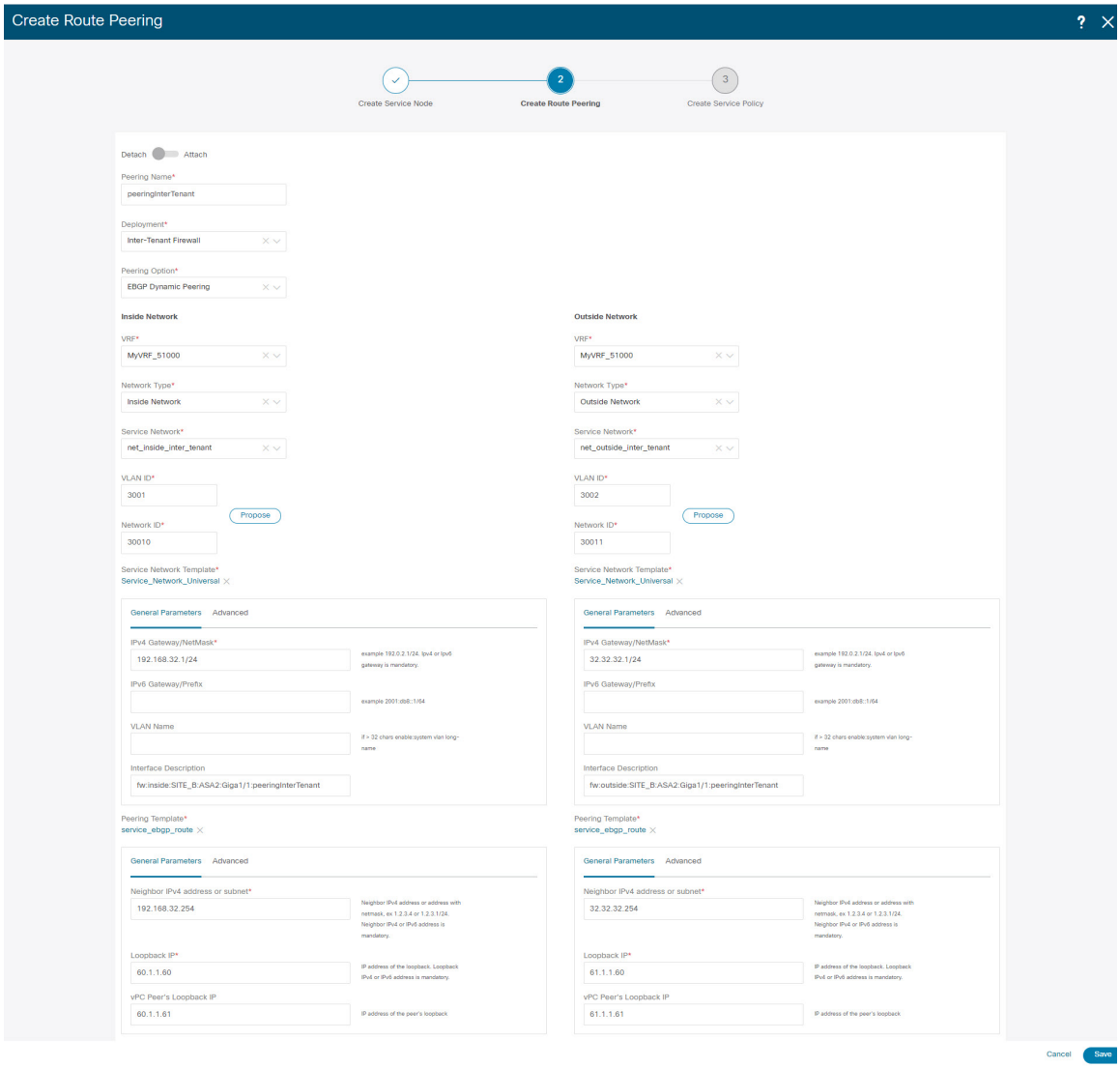
Creating Route Peering

You can navigate to **Route Peering** tab by one of the following below mentioned paths:

LAN > **Services**

The fields that appear in the **Create Route Peering** window depend on the type of L4-L7 service node chosen in the **Create New Service Node** window. Depending on the type chosen (Firewall or Load Balancer or VNF), the types of deployments are Intra-Tenant Firewall, Inter-Tenant Firewall, One-Arm load balancer and Two-Arm load balancer, and One-Arm VNF.

Note Deletion of service network is not allowed on the **Networks** tab of detail screen from path **LAN** > **Fabrics**, click **Launch** icon **Network** window.



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 L4-L7 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, on page 13.

Outside Network

VRF: Specify the VRF.

Network Type: Select Outside Network.

Service Network: Specify the name of the L4-L7 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 L4-L7 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, on page 13.

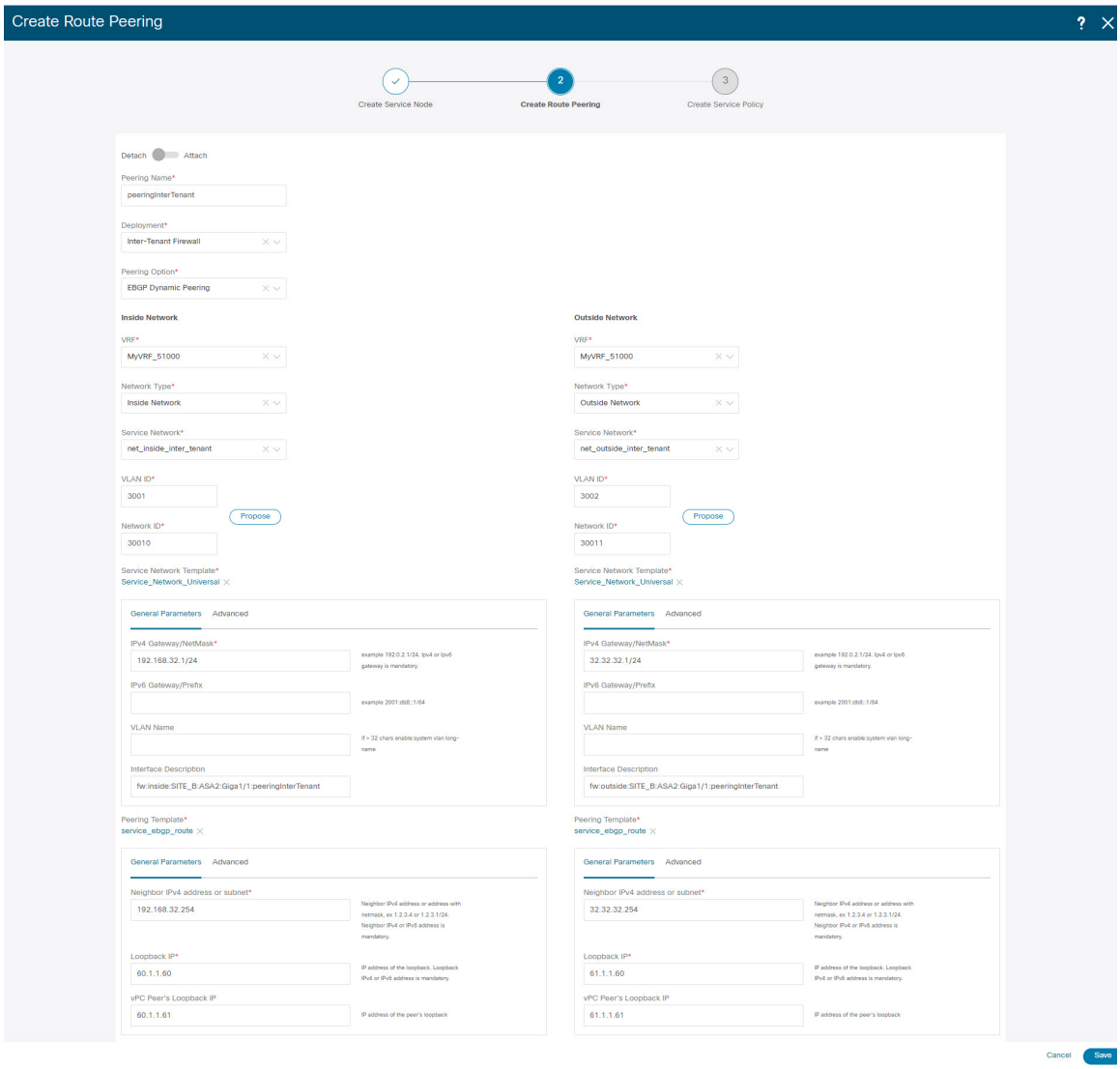
Next Hop Section

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



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: Provide a L4-L7 service network name.

VLAN ID: Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined L4-L7 service network VLAN range pool.

Network ID: Specify the Network ID. Valid IDs range from to .

Service Network Template: Select the Service_Network_Universal template from the drop-down list. For more information on the template fields, refer Templates, on page 13.

Peering Template - Select service_static_route or service_ebgp_route from the drop-down list. For more information on the template fields, refer Templates, on page 13.

Outside Network

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

Network Type: Select Outside Network.

Service Network: Provide a L4-L7 service network name.

VLAN ID: Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the predefined L4-L7 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, on page 13.

Peering Template: Select service_static_route or service_ebgp_route from the drop-down list. For more information on the template fields, refer Templates, on page 13.

Example: One-Arm Mode Load Balancer

The fields in the **Create Route Peering** window for a One-Arm 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 One-Arm F.

Peering Option: Select Static Peering or eBGP Dynamic Peering.

Inside Network

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

Network Type: Select First Mode.

Service Network: Provide a L4-L7 service network name.

VLAN ID: Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined L4-L7 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, on page 13.

Peering Template: Select service_static_route or service_ebgp_route from the drop-down list. For more information on the template fields, refer Templates, on page 13.

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

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: Provide a L4-L7 service network name.

VLAN ID: Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined L4-L7 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, on page 13.

Peering Template: Select service_static_route or service_ebgp_route from the drop-down list. For more information on the template fields, refer Templates, on page 13.

Second Arm

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

Network Type: Select Second Arm.

Service Network: Provide a L4-L7 service network name.

VLAN ID: Specify the VLAN ID. Valid IDs range from 2 to 3967. Click **Propose** to retrieve a value from the pre-defined L4-L7 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, on page 13.

Next Hop Section

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

Now, click **Save**. The **Create Policy** window is displayed.

Example: One-Arm Virtual Network Function

The fields in the Create Route Peering window for a One-Arm Mode Virtual Network Function 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.

One Arm

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

Network Type: Select One Arm.

Service Network: Provide a L4-L7 service network name.

VLAN ID: Specify the VLAN ID. Valid IDs range from 2 to 3967. Click Propose to retrieve a value from the predefined L4-L7 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.

IPv4 Gateway/Netmask: Specify the IPv4 gateway and netmask.

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.

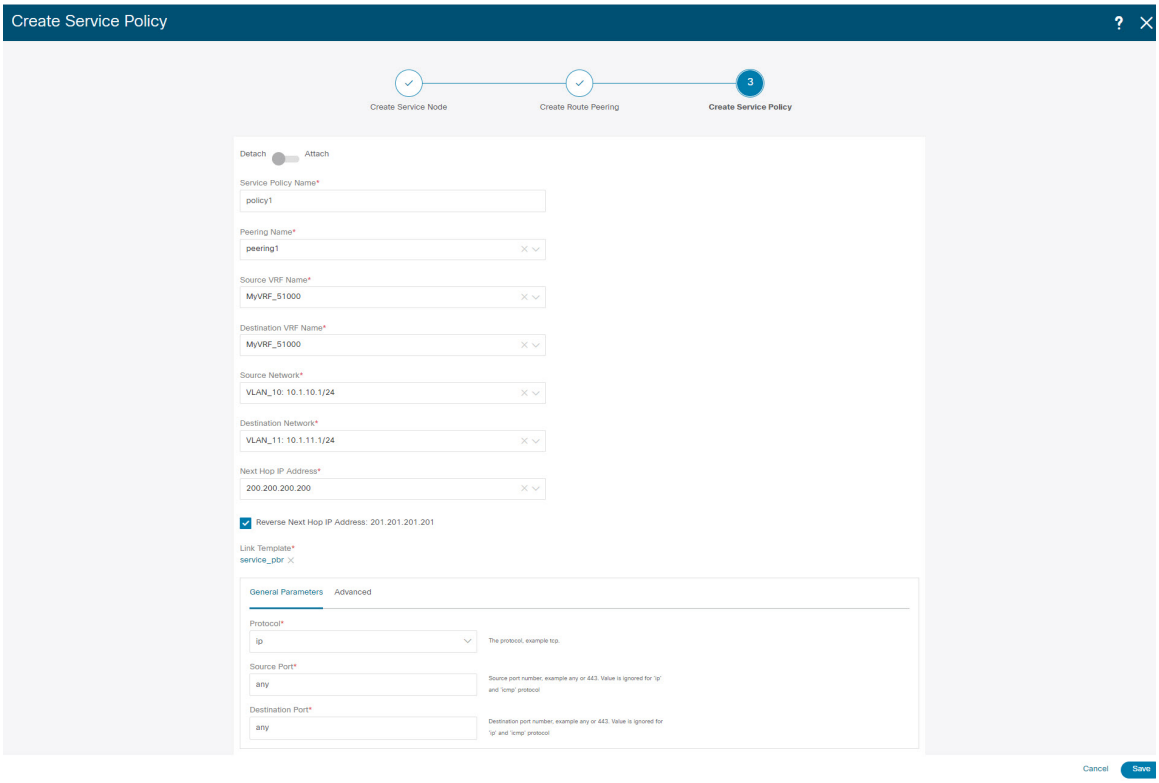
Now, click **Save**. The **Create Policy** window is displayed.

Creating Service Policy

You can navigate to **Service Policy** tab by one of the following below mentioned paths:

LAN > **Services**

The **Create Service Policy** window is displayed as given below.



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

Service Policy Name: Specify a name for the policy.

Peering Name: Select the name of the route peering 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 a network from the drop-down list, or type in an arbitrary network with subnet info. The same is for destination network.

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

Reverse Next Hop IP Address - The reverse next-hop IP address is displayed. By default, the check box will be chosen.

Link Template : Select a template from the drop-down list. For more information on the template fields, refer Templates, on page 13.

General Parameters

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.

The **Advanced** tab allow you to customize the matched traffic redirection. For example, you can specify matched traffic to be redirected using PBR, or for matched traffic to bypass a firewall and use routing table rules instead, or you can specify that any matched traffic has to be dropped. You can choose to override the route map match sequence number for prioritization. You can also customize the ACL name, however ensure that the ACL name that you specify is unique and the same name is not used for another ACL. If you do not specify the route map match sequence number or ACL name, the sequence number will be auto-populated from the designated resource pool and the ACL name will be auto-generated based on 5-tuples. For more information on the fields in the **Advanced** tab, refer Templates, on page 13.

Click **Save**. 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 different supported speeds 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. By default, no is specified.

Enable Port Type Fast: Check this option to enable spanning tree edge port behavior. By default, this is enabled.

Enable Interface: Clear the check box 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: Check this option to enable spanning tree edge port behavior. By default, this is enabled.

Enable Port Channel: Check this option 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.

Local ASN: Specify a local ASN to override the system ASN.

Advertise Host Routes: Select this option to enable advertisement of /32 and /128 routes to edge routers.

Enable Interface: Clear this option to disable the interface. By default, the interface is enabled.

Service Policy Template

service_pbr

General Parameters tab

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.

Advanced tab

Route Map Action: Select an action from the drop-down list. The options are permit or deny. If you select **permit**, the matched traffic is redirected based on the next-hop option and the defined policy. If you select **deny**, the traffic is routed based on the routing table rules.

Next Hop Option: Specify an option for the next-hop. The options are **none**, **drop-on-fail**, and **drop**.If you select **none**, the matched traffic is redirected based on the defined PBR rules. If you select **drop-on-fail**, the matched traffic is dropped if the specified next hop is not reachable. If you select **drop**, the matched traffic is dropped.

ACL Name: Specify a name for the generated access control list (ACL). If not specified, this is auto-generated.

ACL Name for reversed traffic: Specify a name for the ACL that is generated for reversed traffic. If not specified, this is auto-generated.

Route map match number: Specify a route map match number. A valid value ranges from 1 to 65535. If not specified, a route map match sequence number will be retrieved from the predefined resource pool. This number is associated with the name of the ACL.

Route map match number for reversed traffic: Specify a route map match number for reversed traffic. A valid value ranges from 1 to 65535. If not specified, a route map match sequence number will be retrieved from the predefined resource pool. This number is associated with the name of the ACL that has been generated for reversed traffic.

You can also customize the templates based on specific requirements.

Route Peering

UI Path: **LAN** > **Services**, double-click on required service name to view detailed window. Navigate to **Route Peering** tab.

Alternatively, you can choose **LAN > Fabrics**, click on Fabric detail view and on the **Services** to view **Route Peering** tab.

Route peering creates service networks. Nexus Dashboard Fabric Controller 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, Nexus Dashboard Fabric Controller automatically creates the service network under the specified tenant. Note that the terms, tenant and VRF, will be used interchangeably in this guide.

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.

To create Route Peering, refer to Creating Route Peering, on page 7.

The following table describes the fields that appear on Route Peering window.

Field	Description
Service Network One	
Peering Name	Specifies the peering name of service Doube-click on **Peering Name**, detailed window appears. For more information refer to Route Peering Details, on page 18.
Deployment	Specifies the type of deployment. The deployment can be one of the following: • Intra-tenant Firewall • Inter-tenant Firewall • One-arm Load Balancer
Peering Option	Specifies the selected peering option
Status	Specifies the status of service
Attachment Status	Specifies the status of service, whether it is attached or detached
VRF	Specifies the name of VRF attached with the service node

Field	Description
Network Name	Specifies the name of network associated with service node
Gateway IP	Specifies the gateway IP address of the service node
Service Network Two	
VRF	Specifies the name of VRF attached with the service
Network Name	Specifies the name of network associated with service node
Gateway IP	Specifies the gateway IP address
Next Hop IP	Specifies the hop IP address associated with the service node
Reverse Next Hop IP	Specifies the reverse next hop IP address associated with the service node
Next Hop IPv6	Specifies the next hop IPv6 address associated with the service node
Reverse Next Hop IPv6	Specifies the reverse next hop IPv6 address associated with the service node
Last Updated	Specifies the last modification time and date for the service node

The following table describes the action items, in the **Actions** drop-down list, that appears in the **Route Peering** window.

Action Item	Description
Add	Choose **Add**. The **Create Route Peering** window appears. Specify the required parameters and click **Save**.
Edit	Choose required peering and click **Edit**. The **Edit Route Peering** window appears. Use the toggle to attach or detach the route peering. When the service policy is attached or enabled, the corresponding policies are applied to the VRF (tenant), source, and destination networks. Specify the required parameters and click **Save**.
Attach	To attach a specific route peering to a switch, choose the required peering and click **Attach**. **Note** Bulk attachment, detachment, preview and deployment of route peering are supported and they are limited up to 10 route-peerings only.
Detach	To detach a specific route peering from a switch, choose the required peering and click **Detach**.

Action Item	Description
Preview	To display the preview, choose the required peering and click **Preview**. A **Preview Route Peering** window is displayed. Select a specific switch, network, or VRF from the respective drop-down lists to display the route peerings for specific switches, networks, and VRFs. Click **Close** to close the window.
Deploy	To deploy a route peering, choose required peering, click **Deploy**. A pop-up window appears for confirmation to deploy. Click **Deploy**.
Import	To import route peering information as an Excel file, click **Import**. The **Route Peering Import** window appears. Click **Browse**, choose appropriate file, and then click **Import** to import information about the route peerings.
Export	To export route peering information as an Excel file, click **Export**. The **Route Peering Export** window appears. Click **Export** to export information about the selected route peering.
Delete	To delete the route peering, choose appropriate route peering, and click **Delete**.

Route Peering Details

To view peering details window, navigate to **Services**, double-click on required service **Name**, Peering details window appears. You can view below tabs on the window:

- Overview
- Status Details
- Route Peering
- Service Policy

Overview

The **Overivew** tab displays **Route Peering Summary** with Inside and Outside Network details, **Service Policies**, and **Service Node** as cards.

Status Details

This tab provides a peak into the deployed configuration. Hover over the **i** icon next to the **Status Details** field in each row to display more information.

Service Policy

Refer to Service Policy, on page 19.

Viewing Deployment History

This tab displays deployment history of the switches and networks that are involved in the route peering. This tab displays information such as the name of the network, VRF, and switch, status, status message, status details, and time of execution.

Service Policy

You can define service policies with any or arbitrary network and associate it with L3 routed interface on border switches. For more information, see PBR Support on WAN Interfaces of Border Switches. The L4-L7 service does not create any VRF or network other than the service networks that are defined during route peering. When you define the service policy between the created networks, the source and destination network can be a subnet, an individual IP address or the networks that are defined in the **Services** tab of fabric detail screen. Choose **LAN >Fabric**, click on Fabric detail view to view services tab. For intra-tenant firewall, one-arm and two-arm load balancer, the L4-L7 service in Nexus Dashboard Fabric Controller 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, Nexus Dashboard Fabric Controller will collect statistics every 5 minutes and store it in the database for aggregation and analysis. 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. Choose **LAN** > **Fabrics**, to create a VXLAN EVPN fabric and then import Cisco Nexus 9000 Series switches into the fabric with predefined fabric policies.

To create service policy, refer to Creating Service Policy, on page 12.

The following table describes the fields that appear on Route Peering window.

Field	Description
Policy Name	Specifies the policy name of service Doube-click on **Policy Name**, detailed window appears. For more information refer to Service Policy Detail section.
Route Peering	Specifies the route peering name
Status	Specifies the status of service
Attachment Status	Specifies the status of service, whether it is attached or detached
Source VRF	Specifies the name of VRF attached with the service node

Field	Description
Source Network	Specifies the name of source network
Destination VRF	Specifies the name of destination VRF attached with the service node
Destination Network	Specifies the name of destination network
Next Hop IP	Specifies the hop IP address associated with the service node
Reverse Next Hop IP	Specifies the reverse next hop IP address associated with the service node
Next Hop IPv6	Specifies the next hop IPv6 address associated with the service node
Reverse Next Hop IPv6	Specifies the reverse next hop IPv6 address associated with the service node
Reverse Enabled	Specifes if reverse next-hop is enabled or not.
Route Map Action	The options are permit or deny. If you select **permit**, the matched traffic is redirected based on the next-hop option and the defined policy. If you select **deny**, the traffic is routed based on the routing table rules.
Next Hop Option	Specify an option for the next-hop. The options are **none**, **drop-on-fail**, and **drop**.If you select **none**, the matched traffic is redirected based on the defined PBR rules. If you select **drop-on-fail**, the matched traffic is dropped if the specified next hop is not reachable. If you select **drop**, the matched traffic is dropped.
Last Updated	Displays the time at which the service policy was last updated.

The following table describes the action items, in the **Actions** drop-down list, that appears in the **Route Peering** window.

Action Item	Description
Add	Choose **Add**. The **Create Service Policy** window appears. Specify the required parameters and click **Save**.
Edit	Choose required service policy and click **Edit**. The **Edit Service Policy** window appears. Use the toggle to attach or 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. Specify the required parameters and click **Save**.
Attach	To attach a specific service policy to a switch, choose the required policy and click **Attach**. **Note** Bulk attachment, detachment, preview and deployment of route peering are supported and they are limited up to 10 service policy only.

Action Item	Description
Detach	To detach a specific service policy from a switch, choose the required service policy and click **Detach**.
Preview	To display the preview, choose the required peering and click **Preview**. A **Preview Service Policy** window is displayed. Select a specific switch, network, or VRF from the respective drop-down lists to display the service policy for specific switches, networks, and VRFs. Click **Close** to close the window.
Deploy	To deploy a service policy, choose required service policy, click **Deploy**. A pop-up window appears for confirmation to deploy. Click **Deploy**.
Import	To import service policy information as an Excel file, click **Import**. The **Service Policy Import** window appears. Click **Browse**, choose appropriate file, and then click **Import** to import information about the service policy.
Export	To export route service policy information as an Excel file, click **Export**. The **Service Policy Export** window appears. Click **Export** to export information about the selected service policy.
Delete	To delete the service policy, choose appropriate service policy, and click **Delete**.

Service Policy Details

To view service policy window, navigate to **Services**, double-click on required service **Name**, service policy details window appears. You can view below tabs on the window:

- Overview
- Status Details
- Route Peering
- Service Policy

Overview

The **Overivew** tab displays **Policy Summary**, **Service Node**, and **Route Peering** with Inside and Outside Network as cards.

Status Details

This tab displays **Resource Type**, **Fabric Name**, **Resource Name** details associated with the selected service policy

Statistics

This 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.

Click **Clear Stats** to reset the statistics for a specific policy on all involved switches. If multiple policies are sharing the same route map, then the statistics of other policies are also impacted.

Viewing Deployment History

This tab displays deployment history of the switches and networks that are involved in the service policy. This tab displays information such as the name of the network, VRF, switch name, status, status message, status details, and time of execution.

Refreshing a Service Node

To refresh the list of service node that is displayed in the **Service Nodes** window, click the **Refresh** icon .

Viewing Audit History

To view audit history of the switches and networks that are involved in the selected service policy or route peering, click the **Audit History** tab in the **Services** window.

Audit Logs table in the Audit History window displays information about all the actions that have been performed:

Field	Description
User Name	Specifies the user name of service node.
User Role	Specifies the user role name by whom latest action performed.
Action Taken	Specifies the latest action performed
Entity	Specifies the name of service node.
Details	Sepcifies the details of the service node
Status	Sepcifies the status of the service node
Time	Sepcifies the action time on that node
More Info	Click **More Info** to view detailed information of selected service node.

- Creation of service nodes, route peering, and service policies
- Deletion of service nodes, route peering, and service policies

- Update of service nodes, route peering, and service policies
- Attachment and detachment of route peering, and service policies
- Deployment of route peering and service policies

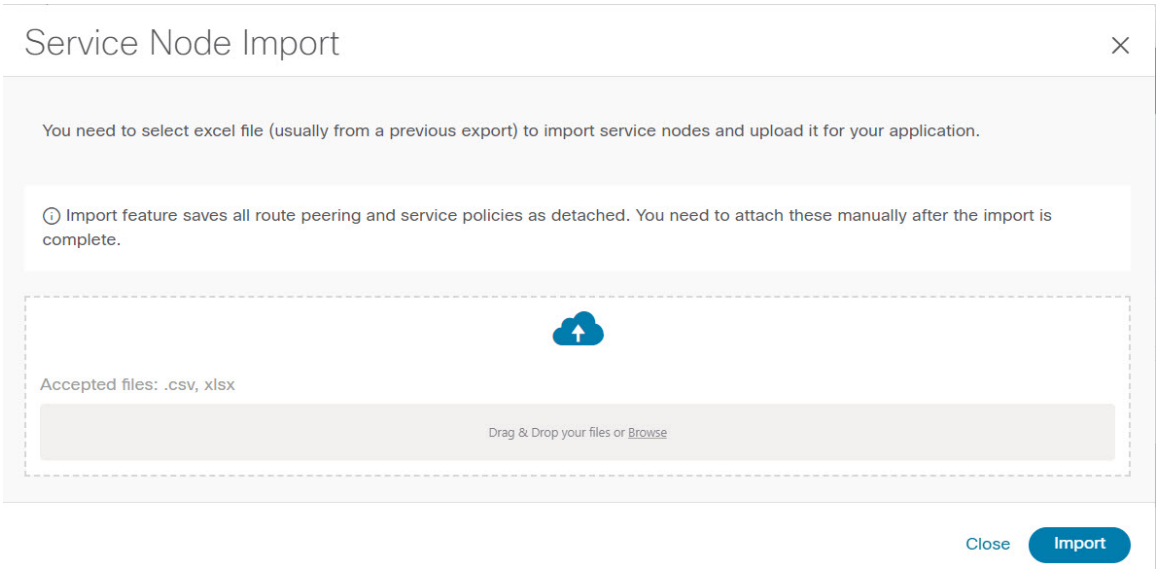
Audit logs are generated when the below actions are performed, these audit log is saved with the name of the user who has performed the action, the role of the user, the action taken, the entity on which the action was performed, details about the action, the status, and the time at which the action was performed.

To delete older audit reports, click **Action** > **Purge Audit History**, specify the maximum retained dates and confirm deletion. Note that only users with the admin role can delete audit log entries.

Importing Service Nodes

To import service nodes from an Excel file, click **Actions > Import** on the **Service Nodes** window. The **Servie Node Import** window appears.

Click **Browser** or drag and drop your file, and click **Import** button on the **Service Node Import** window to import information about the service nodes.



You can also restore the service node level data by clicking **Actions > Import** to import data about the service nodes from an excel file.

Exporting Service Nodes

You can back up data at the Service node level by clicking **Actions > Export** option to export data about the service nodes to an excel file. Data regarding all the service nodes, the respective route peerings, and service policy, is exported.

You can also export data for a specific Service node by selecting the node and clicking **Actions > Export**. A confirmation window appears, click **Export**.

Editing a Service Node

To edit a service node from the Cisco Nexus Dashboard Fabric Controller Web UI, perform the following steps:

Procedure

Step 1 Choose a service node from the table and click **Actions > Edit**.

Step 2 The **Edit Service Node** window is displayed.

Make the required changes and click **Save**.

Deleting a Service Node

To delete a service node from the Cisco Nexus Dashboard Fabric Controller Web UI, perform the following steps:

Procedure

Select a service node from the table and click **Actions > Delete**.

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