Service Profile

ACL IPv4

1. In the **Add Feature** window, choose **ACL IPv4** from the drop-down list.
2. Enter the **Feature Name** and the **Description** for the ACL feature.
3. Click **Add ACL Sequence**. The **Add ACL Sequence** window appears.

4. Enter the name in the **ACL Sequence Name** field.
5. Select the required condition from the **Condition** drop-down list.
6. Select the action types **Accept** or **Reject** from the **Action Type** drop-down list.
7. For the **Accept** action type, choose the accept condition from the **Accept Condition** drop-down list.
8. Click **Save**.

   To copy, delete, or rename the ACL policy sequence rule, click **...** next to the rule's name and select the desired option.
9. If no packets match any of the ACL policy sequence rules, the default action is to drop the packets. To change the default action:
   a. Click **Default Action** in the left pane.
   b. Click the Pencil icon.
   c. Change the default action to **Accept**.
   d. Click **Save**.
10. Click **Save ACL IPv4 Policy**.

The following table describe the options for configuring the ACL IPv4 feature.

Field	Description
ACL Sequence Name	Specifies the name of the ACL sequence.
Condition	Specifies the ACL condition. The options are: • DSCP • Packet Length • PLP • Protocol • Source Data Prefix • Source Port • Destination Data Prefix • Destination Port • TCP • Class • Peer
Action Type	Specifies the action type. The options are: Accept or Reject.

Field	Description
Accept Condition	Specifies the accept condition type. The options are: • Counter • DSCP • Log • Next Hop • Mirror List • Class • Policer

You can select the specific ACL sequence in the ACL Policy window to edit, delete or add.

Note You can also configure **ACL Policy** features from Transport and Service Profile configuration groups.

ACL IPv6

1. In the **Add Feature** window, choose **ACL IPv6** from the drop-down list.
2. Enter the **Feature Name** and the **Description** for the ACL feature.
3. Click **Add ACL Sequence**. The **Add ACL Sequence** window appears.
4. Enter the name in the **ACL Sequence Name** field.
5. Select the required condition from the **Condition** drop-down list.
6. Select the action types **Accept** or **Reject** from the **Action Type** drop-down list.
7. For the **Accept** action type, choose the accept condition from the **Accept Condition** drop-down list.
8. Click **Save**.

   To copy, delete, or rename the ACL policy sequence rule, click **...** next to the rule's name and select the desired option.
9. If no packets match any of the route policy sequence rules, the default action is to drop the packets. To change the default action:
   a. Click **Default Action** in the left pane.
   b. Click the Pencil icon.
   c. Change the default action to **Accept**.
   d. Click **Save**.
10. Click **Save ACL IPv6 Policy**.

The following table describe the options for configuring the ACL IPv6 feature.

Field	Description
ACL Sequence Name	Specifies the name of the ACL sequence.
Condition	Specifies the ACL condition. The options are: • Next Header • Packet Length • PLP • Protocol • Source Data Prefix • Source Port • Destination Data Prefix • Destination Port • TCP • Class • Traffic Class
Action Type	Specifies the action type. The options are: Accept or Reject.
Accept Condition	Specifies the accept condition type. The options are: • Counter • Log • Next Hop • Traffic Class • Mirror List • Class • Policer

You can select the specific ACL sequence in the ACL Policy window to edit, delete or add.

Note You can also configure **ACL Policy** features from Transport and Service Profile configuration groups.

AppQoE

Use the AppQoE feature to deploy and manage your SD-WAN network more efficiently by optimizing traffic based on sites and applications.

The following table describes the options for configuring the AppQoE feature.

Basic Configuration

Field	Description
Device AppQoE Role *	
Service Node	Choose the **Service Node** option if you want to configure the device as a service node. **Note** **Service Node** is the default option. Choose both the **Service Node** and **Forwarder** options if you want to configure the device as an integrated service node.

Forwarder:	Choose **Forwarder** if you want to configure the device as a forwarder. The forwarder redirects traffic to other service nodes.
	Note From Cisco IOS XE Catalyst SD-WAN Release 17.14.1a, an AppQoE cluster can either operate on IPv4 protocol or IPv6 protocol in the control plane.
	• **Forwarder IP Address***: IP address of the device you've configured as a forwarder.
	• **AppQoE Service VPN***: Choose the service VPN attached to the interface of the forwarder.
	• **Service Node Group**: Click **Add Service Node Group** and enter the following details for the service node group:
	  • **Group Name**: Select the AppQoe group name.
	  • **Add Service Node**: Click **Add Service Node** and enter the IP address of the service nodes to enable the service controllers to communicate with the service nodes.
	  Click the + icon to add up to 32 service nodes for the group. The starting value for the service node is SNG-APPQOE, following which, you can provide a value in the range SNG-APPQOE1 to SNG-APPQOE31.

Advanced

Field	Description
DRE Optimisation	Enable DRE optimisation

Field	Description
Resource Profile	Choose **Global** to choose a profile size from the options available in the drop-down list. Choose **Default**to apply the default DRE profile size for the device. Choose **Device Specific** to enter a value for the profile.

BGP Routing

Use the Border Gateway Protocol (BGP) feature for service-side routing to provide reachability to networks at the local site.

Table 1: Basic Configuration

Field	Description
AS Number	Enter the local AS number.
Router ID	Enter the BGP router ID, in decimal four-part dotted notation.
Propagate AS Path	Enable this option to carry BGP AS path information into OMP.
Propagate Community	Enable this option to propagate BGP communities between Cisco Catalyst SD-WAN sites, across VPNs using OMP redistribution.
External Routes Distance	Specify the BGP route administrative distance for routes learned from other sites in the overlay network. Range: 1 through 255 Default: 20
Internal Routes Distance	Enter a value to apply as the BGP route administrative distance for routes coming from one AS into another. Range: 1 through 255 Default: 200
Local Routes Distance	Specify the BGP route administrative distance for routes within the local AS. By default, a route received locally from BGP is preferred over a route received from OMP. Range: 1 through 255 Default: 20

Table 2: Unicast Address Family

Field	Description
IPv4 Settings	
Maximum Paths	Specify the maximum number of parallel internal BGP paths that can be installed into a route table to enable internal BGP multipath load sharing. Range: 0 to 32
Originate	Enable this option to allow the default route to be artificially generated and injected into the BGP Route Information Base (RIB), regardless of whether it is present in the routing table. The newly injected default is advertised to all the BGP peers.
Redistribute	
Protocol*	Choose the protocols from which to redistribute routes into BGP, for all BGP sessions. Options are **static**, **connected**, **ospf**, **omp**, **eigrp**, and **nat**. At a minimum, choose **omp**. By default, OMP routes are not redistributed into BGP.
Route Policy	Enter the name of the route policy to apply to redistributed routes. Route policy is not supported in Cisco vManage Release 20.9.1.
Network	
Network Prefix*	Enter a network prefix to be advertised by BGP. The network prefix is composed of the IPv4 subnet and the mask. For example, 192.0.2.0 and 255.255.255.0.
Aggregate Address	
Aggregate Prefix*	Enter the prefix of the addresses to aggregate for all BGP sessions. The aggregate prefix is composed of the IPv4 subnet and the mask. For example, 192.0.2.0 and 255.255.255.0.
AS Set Path	Enable this option to generate set path information for the aggregated prefixes.
Summary Only	Enable this option to filter out more specific routes from BGP updates.
Table Map	
Policy Name	Enter the route map that controls the downloading of routes. Route policy is not supported in Cisco vManage Release 20.9.1.

Field	Description
Filter	When you enable this option, the route map specified in the **Policy Name** field controls whether a BGP route is to be downloaded to the Route Information Base (RIB). A BGP route is not downloaded to the RIB if it is denied by the route map. When you disable this option, the route map specified in the **Policy Name** field is used to set certain properties, such as the traffic index, of the routes for installation into the RIB. The route is always downloaded, regardless of whether it is permitted or denied by the route map.
IPv6 Settings	
Maximum Paths	Specify the maximum number of parallel internal BGP paths that can be installed into a route table to enable internal BGP multipath load sharing. Range: 0 to 32
Originate	Enable this option to allow the default route to be artificially generated and injected into the BGP RIB, regardless of whether it is present in the routing table. The newly injected default is advertised to all the BGP peers.
Redistribute	
Protocol*	Choose the protocols from which to redistribute routes into BGP, for all BGP sessions. Options are **static**, **connected**, **ospf**, **omp**, and **eigrp**. At a minimum, choose **omp**. By default, OMP routes are not redistributed into BGP.
Route Policy	Enter the name of the route policy to apply to redistributed routes. Route policy is not supported in Cisco vManage Release 20.9.1.
Network	
Network Prefix*	Enter a network prefix to be advertised by BGP. The IPv6 network prefix is composed of the IPv6 address and the prefix length (1-128). For example, the IPv6 subnet is 2001:DB8:0000:0000:: and the prefix length is 64.
Aggregate Address	
Aggregate Prefix*	Enter the prefix of the addresses to aggregate for all BGP sessions. The IPv6 aggregate prefix is composed of the IPv6 address and the prefix length (1-128). For example, the IPv6 subnet is 2001:DB8:0000:0000:: and the prefix length is 64.
AS Set Path	Enable this option to generate set path information for the aggregated prefixes.
Summary Only	Enable this option to filter out more specific routes from BGP updates.
Table Map	

Field	Description
Policy Name*	Enter the route map that controls the downloading of routes. Route policy is not supported in Cisco vManage Release 20.9.1.
Filter	When you enable this option, the route map specified in the **Policy Name** field controls whether a BGP route is to be downloaded to the Route Information Base (RIB). A BGP route is not downloaded to the RIB if it is denied by the route map. When you disable this option, the route map specified in the **Policy Name** field is used to set certain properties, such as the traffic index, of the routes for installation into the RIB. The route is always downloaded, regardless of whether it is permitted or denied by the route map.

Table 3: Neighbor

Field	Description
IPv4 Settings	
Address*	Specify the IP address of the BGP neighbor.
Description	Enter a description of the BGP neighbor.
Remote AS*	Enter the AS number of the remote BGP peer.
Interface Name	Enter the interface name. This interface is used as the source of the TCP session when establishing neighborship. We recommend that you use a loopback interface.
Allowas in Number	Enter the number of times to allow the advertisement of the autonomous system number (ASN) of a provider edge (PE) device. The range is 1 to 10. If no number is specified, the default value of three times is used.
AS Override	Enable this option to replace the AS number of the originating router with the AS number of the sending BGP router.
Shutdown	Disable this option to enable BGP for the VPN.
Advanced Options	
Next-Hop Self	Enable this option to configure the router to be the next hop for routes advertised to the BGP neighbor.
Send Community	Enable this option to send the BGP community attribute of the local router to the BGP neighbor.
Send Extended Community	Enable this option to send the BGP extended community attribute of the local router to the BGP neighbor.

Field	Description
EBGP Multihop	Set the time to live (TTL) for BGP connections to external peers. Range: 1 to 255 Default: 1
Password	Enter a password to use to generate an MD5 message digest. Configuring the password enables MD5 authentication on the TCP connection with the BGP peer. The password is case-sensitive and can be up to 25 characters long. It can contain any alphanumeric characters, including spaces. The first character cannot be a number.
Keepalive Time (seconds)	Specify the frequency at which keepalive messages are advertised to a BGP peer. These messages indicate to the peer that the local router is still active and should be considered to be available. Specify the keepalive time for the neighbor, to override the global keepalive time. Range: 0 through 65535 seconds Default: 60 seconds (one-third the hold-time value)
Hold Time (seconds)	Specify the interval after not receiving a keepalive message that the local BGP session considers its peer to be unavailable. The local router then terminates the BGP session to that peer. Specify the hold time for the neighbor, to override the global hold time. Range: 0 through 65535 seconds Default: 180 seconds (three times the keepalive time)
Send Label	Enable this option to allow the routers advertise to each other so that they can send MPLS labels with the routes. If the routers successfully negotiate their ability to send MPLS labels, the routers add MPLS labels to all the outgoing BGP updates.
Add Neighbor Address Family	
Family Type*	Choose the BGP IPv4 unicast address family.
In Route Policy	Specify the name of a route policy to apply to prefixes received from the neighbor. Route policy is not supported in Cisco vManage Release 20.9.1.
Out Route Policy	Specify the name of a route policy to apply to prefixes sent to the neighbor. Route policy is not supported in Cisco vManage Release 20.9.1.

Field	Description
Maximum Prefix Reach Policy*	Choose one of the following options: • **Policy Off**: Policy is off. • **Policy On - Restart**: Configure the time interval at which a peering session is re-established by a device when the number of prefixes that have been received from a peer has exceeded the maximum prefix limit. When you choose this option, the following fields appear: • **Maximum Number of Prefixes***: Enter the maximum prefix limit. Range: 1 to 4294967295 • **Threshold (percentage)**: Enter the threshold value: Range: 1 to 100 Default: 75 • **Restart Interval (minutes)***: Enter the time interval. Range: 1 to 65535 minutes • **Policy On - Warning message**: Configure the device to disable the restart capability to allow you to adjust a peer that is sending too many prefixes. • **Policy On - Disable Peer Neighbor**: When the device receives too many prefixes from a peer, and the maximum prefix limit is exceeded, the peering session is disabled or brought down.
IPv6 Settings	
Address*	Specify the IP address of the BGP neighbor.
Description	Enter a description of the BGP neighbor.
Remote AS*	Enter the AS number of the remote BGP peer.
Interface Name	Enter the interface name. This interface is used as the source of the TCP session when establishing neighborship. We recommend that you use a loopback interface.
Allowas in Number	Enter the number of times to allow the advertisement of the autonomous system number (ASN) of a provider edge (PE) device. The range is 1 to 10. If no number is specified, the default value of three times is used.
AS Override	Enable this option to replace the AS number of the originating router with the AS number of the sending BGP router.
Shutdown	Disable this option to enable BGP for the VPN.

Field	Description
Advanced Options	
Next-Hop Self	Enable this option to configure the router to be the next hop for routes advertised to the BGP neighbor.
Send Community	Enable this option to send the BGP community attribute of the local router to the BGP neighbor.
Send Extended Community	Enable this option to send the BGP extended community attribute of the local router to the BGP neighbor.
EBGP Multihop	Set the time to live (TTL) for BGP connections to external peers. Range: 1 to 255 Default: 1
Password	Enter a password to use to generate an MD5 message digest. Configuring the password enables MD5 authentication on the TCP connection with the BGP peer. The password is case-sensitive and can be up to 25 characters long. It can contain any alphanumeric characters, including spaces. The first character cannot be a number.
Keepalive Time (seconds)	Specify the frequency at which keepalive messages are advertised to a BGP peer. These messages indicate to the peer that the local router is still active and should be considered to be available. Specify the keepalive time for the neighbor, to override the global keepalive time. Range: 0 through 65535 seconds Default: 60 seconds (one-third the hold-time value)
Hold Time (seconds)	Specify the interval after not receiving a keepalive message that the local BGP session considers its peer to be unavailable. The local router then terminates the BGP session to that peer. Specify the hold time for the neighbor, to override the global hold time. Range: 0 through 65535 seconds Default: 180 seconds (three times the keepalive time)
Add IPv6 Neighbor Address Family	
Family Type*	Choose the BGP IPv6 unicast address family.
In Route Policy	Specify the name of a route policy to apply to prefixes received from the neighbor. Route policy is not supported in Cisco vManage Release 20.9.1.
Out Route Policy	Specify the name of a route policy to apply to prefixes sent to the neighbor. Route policy is not supported in Cisco vManage Release 20.9.1.

Field	Description
Maximum Prefix Reach Policy*	Choose one of the following options: • **Policy Off**: Policy is off. • **Policy On - Restart**: Configure the time interval at which a peering session is re-established by a device when the number of prefixes that have been received from a peer has exceeded the maximum prefix limit. When you choose this option, the following fields appear: • **Maximum Number of Prefixes***: Enter the maximum prefix limit. Range: 1 to 4294967295 • **Threshold (percentage)**: Enter the threshold value: Range: 1 to 100 Default: 75 • **Restart Interval (minutes)***: Enter the time interval. Range: 1 to 65535 minutes • **Policy On - Warning message**: Configure the device to disable the restart capability to allow you to adjust a peer that is sending too many prefixes. • **Policy On - Disable Peer Neighbor**: When the device receives too many prefixes from a peer, and the maximum prefix limit is exceeded, the peering session is disabled or brought down.

BGP Routing

This feature helps you configure the Border Gateway Protocol (BGP) routing in VPN 0 or the WAN VPN.

For each parameter of the feature that has a default value, the scope is set to Default (indicated by a check mark), and the default setting or value is shown. To change the default or to enter a value, click the scope drop-down to the left of the parameter field and choose one of the following:

Basic Configuration

Field	Description
AS Number	Enter the local AS number.
Router ID	Enter the BGP router ID, in decimal four-part dotted notation.
Propagate AS Path	Enable this option to carry BGP AS path information into OMP.

Field	Description
Propagate Community	Enable this option to propagate BGP communities between Cisco Catalyst SD-WAN sites, across VPNs using OMP redistribution.
External Routes Distance	Specify the BGP route administrative distance for routes learned from other sites in the overlay network. Range: 1 through 255 Default: 20
Internal Routes Distance	Enter a value to apply as the BGP route administrative distance for routes coming from one AS into another. Range: 1 through 255 Default: 200
Local Routes Distance	Specify the BGP route administrative distance for routes within the local AS. By default, a route received locally from BGP is preferred over a route received from OMP. Range: 1 through 255 Default: 20

Unicast Address Family

Field	Description
IPv4 Settings	
Maximum Paths	Specify the maximum number of parallel internal BGP paths that can be installed into a route table to enable internal BGP multipath load sharing. Range: 0 to 32
Originate	Enable this option to allow the default route to be artificially generated and injected into the BGP Route Information Base (RIB), regardless of whether it is present in the routing table. The newly injected default is advertised to all the BGP peers.
Redistribute	
Protocol*	Choose the protocols from which to redistribute routes into BGP, for all BGP sessions. Options are **static**, **connected**, **ospf**, **omp**, **eigrp**, and **nat**. At a minimum, choose **connected**, and then under **Route Policy**, specify a route policy that has BGP advertise the loopback interface address to its neighbors. Route policy is not supported in Cisco vManage Release 20.9.1.
Route Policy	Enter the name of the route policy to apply to redistributed routes. Route policy is not supported in Cisco vManage Release 20.9.1.

Field	Description
Network	
Network Prefix*	Enter a network prefix to be advertised by BGP. The network prefix is composed of the IPv4 subnet and the mask. For example, 192.0.2.0 and 255.255.255.0.
Aggregate Address	
Aggregate Prefix*	Enter the prefix of the addresses to aggregate for all BGP sessions. The aggregate prefix is composed of the IPv4 subnet and the mask. For example, 192.0.2.0 and 255.255.255.0.
AS Set Path	Enable this option to generate set path information for the aggregated prefixes.
Summary Only	Enable this option to filter out more specific routes from BGP updates.
Table Map	
Policy Name	Enter the route map that controls the downloading of routes. Route policy is not supported in Cisco vManage Release 20.9.1.
Filter	When you enable this option, the route map specified in the **Policy Name** field controls whether a BGP route is to be downloaded to the Route Information Base (RIB). A BGP route is not downloaded to the RIB if it is denied by the route map. When you disable this option, the route map specified in the **Policy Name** field is used to set certain properties, such as the traffic index, of the routes for installation into the RIB. The route is always downloaded, regardless of whether it is permitted or denied by the route map.
IPv6 Settings	
Maximum Paths	Specify the maximum number of parallel internal BGP paths that can be installed into a route table to enable internal BGP multipath load sharing. Range: 0 to 32
Originate	Enable this option to allow the default route to be artificially generated and injected into the BGP Route Information Base (RIB), regardless of whether it is present in the routing table. The newly injected default is advertised to all the BGP peers.
Redistribute	
Protocol*	Choose the protocols from which to redistribute routes into BGP, for all BGP sessions. Options are **static**, **connected**, **ospf**, **omp**, and **eigrp**. At a minimum, choose **connected**, and then under **Route Policy**, specify a route policy that has BGP advertise the loopback interface address to its neighbors. Route policy is not supported in Cisco vManage Release 20.9.1.

Field	Description
Route Policy	Enter the name of the route policy to apply to redistributed routes. Route policy is not supported in Cisco vManage Release 20.9.1.
Network	
Network Prefix*	Enter a network prefix to be advertised by BGP. The IPv6 network prefix is composed of the IPv6 address and the prefix length (1-128). For example, the IPv6 subnet is 2001:DB8:0000:0000:: and the prefix length is 64.
Aggregate Address	
Aggregate Prefix*	Enter the prefix of the addresses to aggregate for all BGP sessions. The IPv6 aggregate prefix is composed of the IPv6 address and the prefix length (1-128). For example, the IPv6 subnet is 2001:DB8:0000:0000:: and the prefix length is 64.
AS Set Path	Enable this option to generate set path information for the aggregated prefixes.
Summary Only	Enable this option to filter out more specific routes from BGP updates.
Table Map	
Policy Name	Enter the route map that controls the downloading of routes. Route policy is not supported in Cisco vManage Release 20.9.1.
Filter	When you enable this option, the route map specified in the **Policy Name** field controls whether a BGP route is to be downloaded to the Route Information Base (RIB). A BGP route is not downloaded to the RIB if it is denied by the route map. When you disable this option, the route map specified in the **Policy Name** field is used to set certain properties, such as the traffic index, of the routes for installation into the RIB. The route is always downloaded, regardless of whether it is permitted or denied by the route map.

MPLS Interface

Field	Description
Interface Name*	Enter a name for the MPLS interface.

Neighbor

Field	Description
IPv4 Settings	
Address*	Specify the IP address of the BGP neighbor.

Field	Description
Description	Enter a description of the BGP neighbor.
Remote AS*	Enter the AS number of the remote BGP peer.
Interface Name	Enter the interface name. This interface is used as the source of the TCP session when establishing neighborship. We recommend that you use a loopback interface.
Allows in Number	Enter the number of times to allow the advertisement of the autonomous system number (ASN) of a provider edge (PE) device. The range is 1 to 10. If no number is specified, the default value of three times is used.
AS Override	Enable this option to replace the AS number of the originating router with the AS number of the sending BGP router.
Shutdown	Disable this option to enable BGP for the VPN.
Advanced Options	
Next-Hop Self	Enable this option to configure the router to be the next hop for routes advertised to the BGP neighbor.
Send Community	Enable this option to send the BGP community attribute of the local router to the BGP neighbor.
Send Extended Community	Enable this option to send the BGP extended community attribute of the local router to the BGP neighbor.
EBGP Multihop	Set the time to live (TTL) for BGP connections to external peers. Range: 1 to 255 Default: 1
Password	Enter a password to use to generate an MD5 message digest. Configuring the password enables MD5 authentication on the TCP connection with the BGP peer. The password is case-sensitive and can be up to 25 characters long. It can contain any alphanumeric characters, including spaces. The first character cannot be a number.
Keepalive Time (seconds)	Specify the frequency at which keepalive messages are advertised to a BGP peer. These messages indicate to the peer that the local router is still active and should be considered to be available. Specify the keepalive time for the neighbor, to override the global keepalive time. Range: 0 through 65535 seconds Default: 60 seconds (one-third the hold-time value)

Field	Description
Hold Time (seconds)	Specify the interval after not receiving a keepalive message that the local BGP session considers its peer to be unavailable. The local router then terminates the BGP session to that peer. Specify the hold time for the neighbor, to override the global hold time. Range: 0 through 65535 seconds Default: 180 seconds (three times the keepalive time)
Send Label	Enable this option to allow the routers advertise to each other so that they can send MPLS labels with the routes. If the routers successfully negotiate their ability to send MPLS labels, the routers add MPLS labels to all the outgoing BGP updates.
Add Neighbor Address Family	
Family Type*	Choose the BGP IPv4 unicast address family.
In Route Policy	Specify the name of a route policy to apply to prefixes received from the neighbor. Route policy is not supported in Cisco vManage Release 20.9.1.
Out Route Policy	Specify the name of a route policy to apply to prefixes sent to the neighbor. Route policy is not supported in Cisco vManage Release 20.9.1.

Field	Description
Maximum Prefix Reach Policy*	Choose one of the following options: • **Policy Off**: Policy is off. • **Policy On - Restart**: Configure the time interval at which a peering session is re-established by a device when the number of prefixes that have been received from a peer has exceeded the maximum prefix limit. When you choose this option, the following fields appear: • **Maximum Number of Prefixes***: Enter the maximum prefix limit. Range: 1 to 4294967295 • **Threshold (percentage)**: Enter the threshold value: Range: 1 to 100 Default: 75 • **Restart Interval (minutes)***: Enter the time interval. Range: 1 to 65535 minutes • **Policy On - Warning message**: Configure the device to disable the restart capability to allow you to adjust a peer that is sending too many prefixes. • **Policy On - Disable Peer Neighbor**: When the device receives too many prefixes from a peer, and the maximum prefix limit is exceeded, the peering session is disabled or brought down.
IPv6 Settings	
Address*	Specify the IP address of the BGP neighbor.
Description	Enter a description of the BGP neighbor.
Remote AS*	Enter the AS number of the remote BGP peer.
Interface Name	Enter the interface name. This interface is used as the source of the TCP session when establishing neighborship. We recommend that you use a loopback interface.
Allowas in Number	Enter the number of times to allow the advertisement of the autonomous system number (ASN) of a provider edge (PE) device. The range is 1 to 10. If no number is specified, the default value of three times is used.
AS Override	Enable this option to replace the AS number of the originating router with the AS number of the sending BGP router.
Shutdown	Disable this option to enable BGP for the VPN.

Field	Description
Advanced Options	
Next-Hop Self	Enable this option to configure the router to be the next hop for routes advertised to the BGP neighbor.
Send Community	Enable this option to send the BGP community attribute of the local router to the BGP neighbor.
Send Extended Community	Enable this option to send the BGP extended community attribute of the local router to the BGP neighbor.
EBGP Multihop	Set the time to live (TTL) for BGP connections to external peers. Range: 1 to 255 Default: 1
Password	Enter a password to use to generate an MD5 message digest. Configuring the password enables MD5 authentication on the TCP connection with the BGP peer. The password is case-sensitive and can be up to 25 characters long. It can contain any alphanumeric characters, including spaces. The first character cannot be a number.
Keepalive Time (seconds)	Specify the frequency at which keepalive messages are advertised to a BGP peer. These messages indicate to the peer that the local router is still active and should be considered to be available. Specify the keepalive time for the neighbor, to override the global keepalive time. Range: 0 through 65535 seconds Default: 60 seconds (one-third the hold-time value)
Hold Time (seconds)	Specify the interval after not receiving a keepalive message that the local BGP session considers its peer to be unavailable. The local router then terminates the BGP session to that peer. Specify the hold time for the neighbor, to override the global hold time. Range: 0 through 65535 seconds Default: 180 seconds (three times the keepalive time)
Add IPv6 Neighbor Address Family	
Family Type*	Choose the BGP IPv6 unicast address family.
In Route Policy	Specify the name of a route policy to apply to prefixes received from the neighbor. Route policy is not supported in Cisco vManage Release 20.9.1.
Out Route Policy	Specify the name of a route policy to apply to prefixes sent to the neighbor. Route policy is not supported in Cisco vManage Release 20.9.1.

Field	Description
Maximum Prefix Reach Policy*	Choose one of the following options: • **Policy Off**: Policy is off. • **Policy On - Restart**: Configure the time interval at which a peering session is re-established by a device when the number of prefixes that have been received from a peer has exceeded the maximum prefix limit. When you choose this option, the following fields appear: • **Maximum Number of Prefixes***: Enter the maximum prefix limit. Range: 1 to 4294967295 • **Threshold (percentage)**: Enter the threshold value: Range: 1 to 100 Default: 75 • **Restart Interval (minutes)***: Enter the time interval. Range: 1 to 65535 minutes • **Policy On - Warning message**: Configure the device to disable the restart capability to allow you to adjust a peer that is sending too many prefixes. • **Policy On - Disable Peer Neighbor**: When the device receives too many prefixes from a peer, and the maximum prefix limit is exceeded, the peering session is disabled or brought down.

Advanced

Field	Description
Keepalive (seconds)	Specify the frequency at which keepalive messages are advertised to a BGP peer. These messages indicate to the peer that the local router is still active and should be considered to be available. This keepalive time is the global keepalive time. Range: 0 through 65535 seconds Default: 60 seconds (one-third the hold-time value)
Hold Time (seconds)	Specify the interval after not receiving a keepalive message that the local BGP session considers its peer to be unavailable. The local router then terminates the BGP session to that peer. This hold time is the global hold time. Range: 0 through 65535 seconds Default: 180 seconds (three times the keepalive time)

Field	Description
Compare MED	Enable this option to compare the router IDs among BGP paths to determine the active path.
Deterministic MED	Enable this option to compare MEDs from all routes received from the same AS regardless of when the route was received.
Missing MED as Worst	Enable this option to consider a path as the worst path if the path is missing a MED attribute.
Compare Router ID	Enable this option to always compare MEDs regardless of whether the peer ASs of the compared routes are the same.
Multipath Relax	Enable this option to have the BGP best-path process select from routes in different ASs. By default, when you are using BGP multipath, the BGP best-path process selects from routes in the same AS to load-balance across multiple paths.

DHCP Server

This feature allows an interface to be configured as a DHCP helper so that it forwards the broadcast DHCP requests that it receives from the DHCP servers.

For each parameter of the feature that has a default value, the scope is set to Default (indicated by a check mark), and the default setting or value is shown. To change the default or to enter a value, click the scope drop-down to the left of the parameter field and choose one of the following:

Basic Configuration

Field	Description
Address Pool*	Enter the IPv4 prefix range, in the format **`prefix/length`**, for the pool of addresses in the service-side network for which the router interface acts as the DHCP server.
Exclude	Enter one or more IP addresses to exclude from the DHCP address pool. To specify multiple individual addresses, list them separated by a comma. To specify a range of addresses, separate them with a hyphen.
Lease Time(seconds)	Specify how long a DHCP-assigned IP address is valid. Range: 60 through 31536000 seconds Default: 86400

Static Lease

Field	Description
Add Static Lease	

Field	Description
MAC Address*	Enter the MAC address of the client to which the static IP address is being assigned.
IP*	Enter the static IP address to assign to the client.

DHCP Options

Field	Description
Add Option Code	
Code*	Configure the option code. Range: 1-254
Type	Choose one of the three types: • **ASCII**: Specify an ASCII value. • **Hex**: Specify a hex value. • **IP**: Specify IP addresses. You can specify up to eight IP addresses.

Advanced

Field	Description
Interface MTU	Specify the maximum MTU size of packets on the interface. Range: 68 to 65535 bytes
Domain Name	Specify the domain name that the DHCP client uses to resolve hostnames.
Default Gateway	Enter the IP address of a default gateway in the service-side network.
DNS Servers	Enter one or more IP address for a DNS server in the service-side network. Separate multiple entries with a comma. You can specify up to eight addresses.
TFTP Servers	Enter the IP address of a TFTP server in the service-side network. You can specify one or two addresses. If two, separate them with a comma.

Dual Router High Availability

This feature helps you configure the high-availability feature in Cisco Catalyst SD-WAN using the Cisco IOS XE Catalyst SD-WAN devices.

The following table describes the options for configuring the high-availability feature on Cisco IOS XE Catalyst SD-WAN devices.

Basic Configuration

Field	Description
Name	Enter a name for the high availability feature profile.
Description	Enter a description for the high availability feature profile.
VPN	Displays all available service-side VPNs.
EdgeDevice_01	When selected, the Cisco IOS XE Catalyst SD-WAN device is set as active for the specific VPN, while the other corresponding device is configured as standby.
EdgeDevice_02	When selected, the Cisco IOS XE Catalyst SD-WAN device is set as active for the specific VPN, while the other corresponding device is configured as standby.
None	Set the status to **None** for VPNs that are not configured for High Availability.
Preempt to home router	Click to allow the configured active Cisco IOS XE Catalyst SD-WAN device to automatically reclaim the active role upon recovery from a failure.
Optimize paths after switchover	Click to enable OMP Affinity to optimize routing paths after a failover.

EIGRP Routing

Use the EIGRP routing feature to configure a routing process and specify which networks the protocol should run over.

Basic Configuration

Parameter Name	Description
Autonomous System ID *	Enter the local autonomous system (AS) number. Range: 1 through 65535 Default: None
Network	
IP Address*	Enter the IPv4 address.
Mask*	Enter the subnet mask.
Interface	

Parameter Name	Description
Add Interface	Provide values for the following fields: • **AF Interface**: Enter a value for the Address Family (AF) interface. • **Shutdown**: Enables the interface to run EIGRP by default. Toggle ON to disable the interface. • **Add Summary Address**: Enter an IPv4 address and choose a subnet mask.

IPv4 Unicast Address Family

Parameter Name	Description
Protocol *	Select one of the protocols from which to redistribute routes into EIGRP, for all EIGRP sessions: • **bgp**: Redistribute Border Gateway Protocol (BGP) routes into EIGRP. • **connected**: Redistribute connected routes into EIGRP. • **nat-route**: Redistribute network address translation (NAT) routes into EIGRP. • **omp**: Redistribute Overlay Management Protocol (OMP) routes into EIGRP. • **ospf**: Redistribute Open Shortest Path First (OSPF) routes into EIGRP. **Note** From Cisco IOS XE Catalyst SD-WAN Release 16.12.1b and later, you can set metric values for redistribution by using the CLI add-on feature template. Use the following command: `redistribute ospf 1 metric 1000000 1 1 1 1500` For more information, see CLI Add-on Feature Templates. • **ospfv3**: OSPFv3 routes into EIGRP. • **static**: Redistribute static routes into EIGRP.
Route Policy *	Enter the name of the route policy to apply to redistributed routes.

Authentication

Parameter	Description
MD5*	**MD5 Key ID**: Enter an MD5 key ID to compute an MD5 hash over the contents of the EIGRP packet using that value.
	MD5 Authentication Key: Enter an MD5 authentication key to use an encoded MD5 checksum in the transmitted packet.
	Authentication Key: A 256-byte unique key that is used to compute the Hashed Message Authentication Code (HMAC) and is known both by the sender and the receiver of the message.
HMAC-SHA-256	**Authentication Key**: A 256-byte unique key that is used to compute the HMAC and is known both by the sender and the receiver of the message.

Advanced

Parameter Name	Description
Hold Time (seconds)	Set the interval after which EIGRP considers a neighbor to be down. The local router then terminates the EIGRP session to that peer. This acts as the global hold time. Range: 0 through 65535 Default: 15 seconds
Hello Interval (seconds)	Set the interval at which the router sends EIGRP hello packets. Range: 0 through 65535 Default: 5 seconds
Route Policy	Enter the name of an EIGRP route policy.
Filter	Toggle **ON** to filter routes that do not match the policy.

EIGRP Routing

Use the EIGRP routing feature to configure a routing process and specify which networks the protocol should run over.

Basic Configuration

Parameter Name	Description
Autonomous System ID *	Enter the local autonomous system (AS) number. Range: 1 through 65535 Default: None
Network	
IP Address*	Enter the IPv4 address.
Mask*	Enter the subnet mask.
Interface	
Add Interface	Provide values for the following fields: • **AF Interface**: Enter a value for the Address Family (AF) interface. • **Shutdown**: Enables the interface to run EIGRP by default. Toggle ON to disable the interface. • **Add Summary Address**: Enter an IPv4 address and choose a subnet mask.

IPv4 Unicast Address Family

Parameter Name	Description
Protocol *	Select one of the protocols from which to redistribute routes into EIGRP, for all EIGRP sessions: • **bgp**: Redistribute Border Gateway Protocol (BGP) routes into EIGRP. • **connected**: Redistribute connected routes into EIGRP. • **nat-route**: Redistribute network address translation (NAT) routes into EIGRP. • **omp**: Redistribute Overlay Management Protocol (OMP) routes into EIGRP. • **ospf**: Redistribute Open Shortest Path First (OSPF) routes into EIGRP. **Note** From Cisco IOS XE Catalyst SD-WAN Release 16.12.1b and later, you can set metric values for redistribution using the CLI add-on feature template. Use the following command: `redistribute ospf 1 metric 1000000 1 1 1 1500` For more information, see CLI Add-on Feature Templates. • **ospfv3**: OSPFv3 routes into EIGRP. • **static**: Redistribute static routes into EIGRP.

Parameter Name	Description
Route Policy *	Enter the name of the route policy to apply to redistributed routes.

Authentication

Parameter	Description
MD5*	**MD5 Key ID**: Enter an MD5 key ID to compute an MD5 hash over the contents of the EIGRP packet using that value.
	MD5 Authentication Key: Enter an MD5 authentication key to use an encoded MD5 checksum in the transmitted packet.
	Authentication Key: A 256-byte unique key that is used to compute the Hashed Message Authentication Code (HMAC) and is known both by the sender and the receiver of the message.
HMAC-SHA-256	**Authentication Key**: A 256-byte unique key that is used to compute the HMAC and is known both by the sender and the receiver of the message.

Advanced

Parameter Name	Description
Hold Time (seconds)	Set the interval after which EIGRP considers a neighbor to be down. The local router then terminates the EIGRP session to that peer. This acts as the global hold time. Range: 0 through 65535 Default: 15 seconds
Hello Interval (seconds)	Set the interval at which the router sends EIGRP hello packets. Range: 0 through 65535 Default: 5 seconds
Route Policy	Enter the name of an EIGRP route policy.
Filter	Toggle **ON** to filter routes that do not match the policy.

Ethernet Interface

This feature helps you configure the Ethernet interface on a service VPN (range 1 – 65527, except 512).

The following table describes the options for configuring the Ethernet Interface feature.

Field	Description
Type	Choose a feature from the drop-down list.
Feature Name*	Enter a name for the feature.
Description	Enter a description of the feature. The description can contain any characters and spaces.
Associated VPN	The service VPN.

Basic Configuration

Field	Description
Shutdown	Enable or disable the interface.
Interface Name	Enter a name for the interface. Spell out the interface names completely (for example, GigabitEthernet0/0/0). Configure all the interfaces of the router, even if you are not using them, so that they are configured in the shutdown state and so that all default values for them are configured.
Description	Enter a description for the interface.
IPv4 Settings	Configure an IPv4 VPN interface. • **Dynamic**: Choose **Dynamic** to set the interface as a Dynamic Host Configuration Protocol (DHCP) client so that the interface receives its IP address from a DHCP server. • **Static**: Choose **Static** to enter an IP address that doesn't change.
Dynamic DHCP Distance	Enter an administrative distance value for routes learned from a DHCP server. This option is available when you choose **Dynamic**. Default: 1
IP Address	Enter a static IPv4 address. This option is available when you choose **Static**.
Subnet Mask	Enter the subnet mask.
Add Secondary IP Address	Enter up to four secondary IPv4 addresses for a service-side interface. • **IP Address***: Enter the IP address. • **Subnet Mask:** Enter the subnet mask.
DHCP Helper	To designate the interface as a DHCP helper on a router, enter up to eight IP addresses, separated by commas, for DHCP servers in the network. A DHCP helper interface forwards BOOTP (broadcast) DHCP requests that it receives from the specified DHCP servers.

Field	Description
IPv6 Settings	Configure an IPv6 VPN interface. • **Dynamic**: Choose **Dynamic** to set the interface as a Dynamic Host Configuration Protocol (DHCP) client so that the interface receives its IP address from a DHCP server. • **Static**: Choose **Static** to enter an IP address that doesn't change. • **None**
IPv6 Address Primary	Enter a static IPv6 address. This option is available when you choose **Static**.
Add Secondary Ipv6	Enter up to two secondary IPv6 addresses for a service-side interface.
Add DHCP Helper	
DHCPv6 Helper*	To designate the interface as a DHCP helper on a router, enter up to eight IP addresses for DHCP servers in the network. A DHCP helper interface forwards BOOTP (broadcast) DHCP requests that it receives from the specified DHCP servers.
DHCPv6 Helper VPN	Enter the VPN ID of the VPN source interface for the DHCP helper.

NAT

Field	Description
IPv4 Settings	
NAT	Enable this option to have the interface act as a NAT device.
NAT Type*	Choose the NAT translation type for IPv4: • **pool** • **loopback** Default: **pool**
Range Start	Enter a starting IP address for the NAT pool.
Range End	Enter a closing IP address for the NAT pool.
Prefix Length	Enter the NAT pool prefix length.
Overload	Enable this option to configure per-port translation. If this option is disabled, only dynamic NAT is configured on the end device. Per-port NAT is not configured. Default: Enabled
NAT Loopback	Enter the IP address of the loopback interface.

Field	Description
UDP Timeout	Specify when NAT translations over UDP sessions time out. Range: 1 through 8947 minutes Default: 1 minutes
TCP Timeout	Specify when NAT translations over TCP sessions time out. Range: 1 through 8947 minutes Default: 60 minutes (1 hour)
Add New Static NAT	
Source IP*	Enter the source IP address to be translated.
Translate IP*	Enter the translated source IP address.
Direction	Choose the direction in which to perform network address translation. • **inside**: Translates the IP address of packets that are coming from the service side of the device and that are destined for the transport side of the router. • **outside**: Translates the IP address of packets that are coming to the device from the transport side device and that are destined for a service-side device.
Source VPN*	Enter the source VPN ID.
IPv6 Settings	
NAT	Enable this option to have the interface act as a NAT device.
Select NAT	Choose NAT64 or NAT66. When you choose NAT66 and click **Add Static NAT66**, the following fields appear: • **Source Prefix***: Enter the source IPv6 prefix. • **Translated Source Prefix***: Enter the translated source prefix. • **Source VPN ID***: Enter the source VPN ID.

VRRP

Field	Description
IPv4 Settings	
Add Vrrp Ipv4	
Group ID*	Enter the virtual router ID, which is a numeric identifier of the virtual router. You can configure a maximum of 24 groups. Range: 1 through 255

Field	Description
Priority*	Enter the priority level of the router. The router with the highest priority is elected as the primary router. If two routers have the same priority, the one with the higher IP address is elected as the primary router. Range: 1 through 254 Default: 100
Timer*	Specify how often the primary VRRP router sends VRRP advertisement messages. If secondary routers miss three consecutive VRRP advertisements, they elect a new primary router . Range: 100 through 40950 seconds Default: 100 seconds
Track OMP*	When you enable this option, VRRP tracks the Overlay Management Protocol (OMP) session running on the WAN connection. If the primary VRRP router loses all its OMP sessions, VRRP elects a new default gateway from those that have at least one active OMP session.
Prefix List	Track both the OMP session and a list of remote prefixes, which is defined in a prefix list configured on the local router. If the primary VRRP router loses all its OMP sessions, VRRP failover occurs as described for the **Track OMP** option. In addition, if the reachability to one of the prefixes in the list is lost, VRRP failover occurs immediately, without waiting for the OMP hold timer to expire, thus minimizing the amount of overlay traffic while the Cisco IOS XE Catalyst SD-WAN device determines the primary VRRP router.
IP Address*	Enter the IP address of the virtual router. This address must be different from the configured interface IP addresses of both the local router and the peer running VRRP.
Tloc Prefix Change*	Enable or disable this option to set whether the TLOC preference can be changed or not.
Tloc Prefix Change Value	Enter the TLOC preference change value. Range: 100 to 4294967295
Add VRRP IP Address Secondary	
IP Address*	Enter an IP address for the secondary VRRP router.
Subnet Mask	Enter the subnet mask.
Add VRRP Tracking Object	
Tracker ID*	Enter the interface object ID or object group tracker ID.

Field	Description
Tracker Action*	Choose one of the options: • **decrement** • **shutdown**
Decrement Value*	Enter a decrement value. Range: 1-255
IPv6 Settings	
Add Vrrp Ipv6	
Group ID*	Enter the virtual router ID, which is a numeric identifier of the virtual router. You can configure a maximum of 24 groups. Range: 1 through 255
Priority*	Enter the priority level of the router. The router with the highest priority is elected as the primary router. If two routers have the same priority, the one with the higher IP address is elected as the primary router. Range: 1 through 254 Default: 100
Timer*	Specify how often the primary VRRP router sends VRRP advertisement messages. If secondary routers miss three consecutive VRRP advertisements, they elect a new primary router . Range: 100 through 40950 seconds Default: 100 seconds
Track OMP*	When you enable this option, VRRP tracks the Overlay Management Protocol (OMP) session running on the WAN connection. If the primary VRRP router loses all its OMP sessions, VRRP elects a new default gateway from those that have at least one active OMP session.
Track Prefix List	Track both the OMP session and a list of remote prefixes, which is defined in a prefix list configured on the local router. If the primary VRRP router loses all its OMP sessions, VRRP failover occurs as described for the **Track OMP** option. In addition, if the reachability to one of the prefixes in the list is lost, VRRP failover occurs immediately, without waiting for the OMP hold timer to expire, thus minimizing the amount of overlay traffic while the Cisco IOS XE Catalyst SD-WAN device determines the primary VRRP router.
Link Local IPv6 Address*	Enter a virtual link local IPv6 address, which represents the link local address of the group. The address should be in standard link local address format. For example, FE80::AB8.

Field	Description
Global IPv6 Prefix	Enter a virtual global unicast IPv6 address, which represents the global address of the group. The address should be an IPv6 global prefix address that has the same mask as the interface forwarding address on which the VRRP group is configured. For example, 2001::2/124. You can configure up to three global IPv6 addresses.

ARP

Field	Description
Add ARP	
IP Address*	Enter the IP address for the ARP entry in dotted decimal notation or as a fully qualified host name.
MAC Address*	Enter the MAC address in colon-separated hexadecimal notation.

TrustSec

Field	Description
Enable SGTPropogation	Enable this option to use the Cisco TrustSec Security Group Tag (SGT) propagation feature.
Propagate	Enable this option to propagate SGT in Cisco Catalyst SD-WAN.
Security Group Tag	Enter a value that can be used as a tag.
Enable Enforced Propagation	Enable this option to start SGT enforcement on the interface.
Enforced Security Group Tag	Enter a value that can be used as a tag for enforcement.

Advanced

Field	Description
Duplex	Specify whether the interface runs in full-duplex or half-duplex mode. Default: full
MAC Address	Specify a MAC address to associate with the interface, in colon-separated hexadecimal notation.
IP MTU	Specify the maximum MTU size of packets on the interface. Range: 576 through 9216 Default: 1500 bytes

Field	Description
Interface MTU	Enter the maximum transmission unit size for frames received and transmitted on the interface. Range: 1500 through 1518 (GigabitEthernet0), 1500 through 9216 (other GigabitEthernet) Default: 1500 bytes
TCP MSS	Specify the maximum segment size (MSS) of TPC SYN packets passing through the router. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 500 to 1460 bytes Default: None
Speed	Specify the speed of the interface, for use when the remote end of the connection does not support autonegotiation. Values: 10, 100, 1000, 2500, or 10000 Mbps
ARP Timeout	ARP timeout controls how long we maintain the ARP cache on a router. Specify how long it takes for a dynamically learned ARP entry to time out. Range: 0 through 2147483 seconds Default: 1200 seconds
Autonegotiate	Enable this option to turn on autonegotiation.
Media Type	Specify the physical media connection type on the interface. Choose one of the following: • **auto-select**: A connection is automatically selected. • **rj45**: Specifies an RJ-45 physical connection. • **sfp**: Specifies a small-form factor pluggable (SFP) physical connection for fiber media.
Load Interval	Enter an interval value for interface load calculation.
Tracker	Static-route tracking for service VPNs enables you to track the availability of the configured endpoint address to determine if the static route can be included in the routing table of a device. Enter the name of the gateway tracker to determine whether the next hop is reachable before adding that route to the route table of the device.
ICMP Redirect Disable	ICMP redirects are sent by a router to the sender of an IP packet when a packet is being routed sub-optimally. The ICMP redirect informs the sending host to forward subsequent packets to that same destination through a different gateway. By default, an interface allows ICMP redirect messages.

Field	Description
XConnect	Enter the name of a physical interface on the same router that connects to the WAN transport.
IP Directed Broadcast	An IP directed broadcast is an IP packet whose destination address is a valid broadcast address for some IP subnet but which originates from a node that is not itself part of that destination subnet. A device that is not directly connected to its destination subnet forwards an IP directed broadcast in the same way it would forward unicast IP packets destined to a host on that subnet. When a directed broadcast packet reaches a device that is directly connected to its destination subnet, that packet is broadcast on the destination subnet. The destination address in the IP header of the packet is rewritten to the configured IP broadcast address for the subnet, and the packet is sent as a link-layer broadcast. If directed broadcast is enabled for an interface, incoming IP packets whose addresses identify them as directed broadcasts intended for the subnet to which that interface is attached are broadcast on that subnet.

GRE

Use the service VPN Interface GRE feature for all Cisco vEdge Cloud and Cisco vEdge router devices.

The following tables describe the options for configuring the service VPN Interface GRE feature.

Basic Configuration

Field	Description
Interface Name (1..255)*	Enter the name of the GRE interface, in the format **grenumber**. The value for **number** can be from 1 through 255.
Interface Description	Enter a description of the GRE interface.
Tunnel Mode	Choose from one of the following GRE tunnel modes: • **ipv4 underlay**: GRE tunnel with IPv4 underlay. IPv4 underlay is the default value. • **ipv6 underlay**: GRE tunnel with IPv6 underlay.
Preshared Key for IKE	Enter the preshared key (PSK) for authentication.

Tunnel

Field	Description
Source	Enter the source of the GRE interface: • **IP Address**: Enter the source IP address of the GRE tunnel interface. Based on the option you selected in the **Tunnel Mode** drop-down list, enter an IPv4 or an IPv6 address. This address is on the local router. • **Interface**: Enter the egress interface name for the GRE tunnel. • **Tunnel Route Via***: Specify the tunnel route details to steer the GRE tunnel traffic through. **Note** If the Tunnel Source Interface type is a loopback interface, enter the interface for traffic to be routed to. You cannot use the tunnel route via option to configure IPSec tunnels on a cellular interface because cellular interfaces do not include a next hop IP address for the default route.
Destination	Enter the source of the GRE interface: • **GRE Destination IP Address***: Enter the destination IP address of the GRE tunnel interface. This address is on a remote device. • **IP Address**: Based on the option you selected in the **Tunnel Mode** drop-down list, enter an IPv4 or an IPv6 address for the GRE tunnel. • **Mask***: Enter the subnet mask. • **IPv6 Address**: Enter the destination IPv6 or address for the GRE tunnel.

IKE

Field	Description
IKE Version	Enter 1 to choose IKEv1. Enter 2 to choose IKEv2. Default: IKEv1
IKE Integrity Protocol	Choose one of the following modes for the exchange of keying information and setting up IKE security associations: • **Main**: Establishes an IKE SA session before starting IPsec negotiations. • **Aggressive**: Negotiation is quicker, and the initiator and responder ID pass in the clear. Aggressive mode does not provide identity protection for communicating parties. Default: Main mode

Field	Description
IKE Rekey Interval	Specify the interval for refreshing IKE keys. Range: 3600 through 1209600 seconds (1 hour through 14 days) Default: 14400 seconds (4 hours)
IKE Cipher Suite	Specify the type of authentication and encryption to use during IKE key exchange. Values: aes128-cbc-sha1, aes128-cbc-sha2, aes256-cbc-sha1, aes256-cbc-sha2 Default: aes256-cbc-sha1
IKE Diffie-Hellman Group	Specify the Diffie-Hellman group to use in IKE key exchanges. Values: 2, 14, 15, 16, 19, 20, 21, 24 Default: 16
IKE ID for Local End Point	If the remote IKE peer requires a local endpoint identifier, specify it. Range: 1 through 64 characters Default: Source IP address of the tunnel
IKE ID for Remote End Point	If the remote IKE peer requires a remote end point identifier, specify it. Range: 1 through 64 characters Default: Destination IP address of the tunnel There is no default option if you have chosen IKEv2.

IPSEC

Field	Description
IPsec Rekey Interval (Seconds)	Specify the interval for refreshing IKE keys. Range: 3600 through 1209600 seconds (1 hour through 14 days) Default: 3600 seconds
IPsec Replay Window	Specify the replay window size for the IPsec tunnel. Values: 64, 128, 256, 512, 1024, 2048, 4096, 8192 bytes Default: 512 bytes
IPsec Cipher Suite	Specify the authentication and encryption to use on the IPsec tunnel. Values: **aes256-cbc-sha1**, **aes256-gcm**, **null-sha1** Default: **aes256-gcm**

Field	Description
Perfect Forward Secrecy	Specify the PFS settings to use on the IPsec tunnel by choosing one of the following values: • **group-2**: Use the 1024-bit Diffie-Hellman prime modulus group • **group-14**: Use the 2048-bit Diffie-Hellman prime modulus group • **group-15**: Use the 3072-bit Diffie-Hellman prime modulus group • **group-16**: Use the 4096-bit Diffie-Hellman prime modulus group • **none**: Disable PFS Default: **group-16**
DPD Interval	Specify the interval for IKE to send Hello packets on the connection. Range: 10 through 3600 seconds (1 hour) Default: 10 seconds
DPD Retries	Specify how many unacknowledged packets to accept before declaring an IKE peer to be dead and then removing the tunnel to the peer. Range: 2 through 60 Default: 3
Application	Choose an application from the drop-down list: • None • Sig

Advanced

Field	Description
Shutdown	Click **Off** to enable the interface.
IP MTU	Based on your choice in the **Tunnel Mode** option, specify the maximum MTU size of the IPv4 or IPv6 packets on the interface. Range: 576 through 9216 Default: 1500 bytes
TCP MSS	Specify the maximum segment size (MSS) of the IPv4 TPC SYN packets passing through the Cisco vEdge device. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 552 through 1460 bytes Default: None

Field	Description
IPv6 TCP MSS	Specify the maximum segment size (MSS) of the IPv6 TPC SYN packets passing through the Cisco vEdge device. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 552 through 1460 bytes Default: None
Clear-Dont-Fragment	Click **On** to clear the Don't Fragment bit in the IPv4 packet header for packets being transmitted out the interface.
Tunnel Protection	Choose **Yes** to enable tunnel protection. Default: No

IPSEC

Use the IPsec feature to configure IPsec tunnels on Cisco IOS XE Catalyst SD-WAN devices, used for Internet Key Exchange (IKE) sessions.

Some parameters have a scope drop-down list that enables you to choose **Global**, **Device Specific**, or **Default** for the parameter value. Choose one of the following options, as described in the table below:

Parameter Scope	Scope Description
Global (Indicated by a globe icon)	Enter a value for the parameter and apply that value to all devices. Examples of parameters that you might apply globally to a group of devices are DNS server, syslog server, and interface MTUs.
Device Specific (Indicated by a host icon)	Use a device-specific value for the parameter. Choose **Device Specific** to provide a value for the key in the field. The key is a unique string that helps identify the parameter. To change the default key, type a new string in the field. Examples of device-specific parameters are system IP address, host name, GPS location, and site ID.
Default (indicated by a check mark)	The default value is shown for parameters that have a default setting.

The following tables describe the options for configuring the VPN Interface IPsec feature.

Field	Description
Type	Choose a feature from the drop-down list.
Feature Name*	Enter a name for the feature.
Description	Enter a description of the feature. The description can contain any characters and spaces.

Basic Configuration

Field	Description
Interface Name	Enter the name of the IPsec interface.
Description	Enter a description of the IPsec interface.
Tunnel Mode	Choose from one of the following IPsec tunnel modes: • **ipv4**: IPsec tunnel with IPv4 overlay and IPv4 underlay. IPv4 underlay is the default value. • **ipv6**: IPsec tunnel with IPv6 overlay and IPv6 underlay. • **ipv4-v6overlay**: IPsec tunnel with IPv6 overlay and IPv4 underlay.
Interface Address	Enter the IPv4 or IPv6 address of the IPsec interface, based on your choice from the **Tunnel Mode** drop-down list.
Mask	Enter the subnet mask.
Tunnel Source	Enter the source of the IPsec interface: • **IP Address**: Enter the IPv4 or IPv6 address of the IPsec interface, based on your choice from the **Tunnel Mode** drop-down list.. This address is on the local router. • **Interface**: Enter the physical interface that is the source of the IPsec tunnel.
Tunnel Destination	Enter the destination of the IPsec interface: • **Address**: Enter the destination IPv4 or IPv6 address of the IPsec interface, based on your choice from the **Tunnel Mode** drop-down list. This address is on a remote device. • **Application**: Choose an application from the drop-down list. • None • Sig
TCP MSS	Specify the maximum segment size (MSS) of TPC SYN packets passing through the vEdge router. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 552 through 1460 bytes Default: None
Clear-Dont-Fragment	Click On to clear the Don't Fragment bit in the IPv4 packet header for packets being transmitted out the interface.

Field	Description
IP MTU	Specify the maximum MTU size of packets on the interface. Range: 576 through 1804 Default: 1500 bytes

Internet Key Exchange

Field	Description
IKE Version	Enter 1 to choose IKEv1. Enter 2 to choose IKEv2. Default: IKEv1
IKE Integrity Protocol	Choose one of the following modes for the exchange of keying information and setting up IKE security associations: • **Main**: Establishes an IKE SA session before starting IPsec negotiations. • **Aggressive**: Negotiation is quicker, and the initiator and responder ID pass in the clear. Aggressive mode does not provide identity protection for communicating parties. Default: Main mode
IPsec Rekey Interval (Seconds)	Specify the interval for refreshing IKE keys. Range: 3600 through 1209600 seconds (1 hour through 14 days) Default: 14400 seconds (4 hours)
IKE Cipher Suite	Specify the type of authentication and encryption to use during IKE key exchange. Values: aes128-cbc-sha1, aes128-cbc-sha2, aes256-cbc-sha1, aes256-cbc-sha2 Default: aes256-cbc-sha1
IKE Diffie-Hellman Group	Specify the Diffie-Hellman group to use in IKE key exchanges. Values: 2, 14, 15, 16, 19, 20, 21, 24 Default: 16
IKE ID for Local End Point	If the remote IKE peer requires a local endpoint identifier, specify it. Range: 1 through 64 characters Default: Source IP address of the tunnel

Field	Description
IKE ID for Remote End Point	If the remote IKE peer requires a remote end point identifier, specify it. Range: 1 through 64 characters Default: Destination IP address of the tunnel There is no default option if you have chosen IKEv2.

IPSEC

Field	Description
IPsec Rekey Interval	Specify the interval for refreshing IKE keys. Range: 3600 through 1209600 seconds (1 hour through 14 days) Default: 3600 seconds
IPsec Replay Window	Specify the replay window size for the IPsec tunnel. Values: 64, 128, 256, 512, 1024, 2048, 4096, 8192 bytes Default: 512 bytes
IPsec Cipher Suite	Specify the authentication and encryption to use on the IPsec tunnel. Values: **aes256-cbc-sha1**, **aes256-gcm**, **null-sha1** Default: **aes256-gcm**
Perfect Forward Secrecy	Specify the PFS settings to use on the IPsec tunnel by choosing one of the following values: • **group-2**: Use the 1024-bit Diffie-Hellman prime modulus group • **group-14**: Use the 2048-bit Diffie-Hellman prime modulus group • **group-15**: Use the 3072-bit Diffie-Hellman prime modulus group • **group-16**: Use the 4096-bit Diffie-Hellman prime modulus group • **none**: Disable PFS Default: **group-16**

Advanced

Field	Description
Associated VPN	Select a VPN from the drop-down list to associate with the IPsec tunnel.
Tunnel Route Via	Specify the tunnel route details to steer the application traffic through. **Note** You cannot use the tunnel route via option to configure IPSec tunnels on a cellular interface because cellular interfaces do not include a next hop IP address for the default route.

Field	Description
DPD Interval	Specify the interval for IKE to send Hello packets on the connection. Range: 10 through 3600 seconds (1 hour) Default: 10 seconds
DPD Retries	Specify how many unacknowledged packets to accept before declaring an IKE peer to be dead and then removing the tunnel to the peer. Range: 2 through 60 Default: 3
TCP MSS	Specify the maximum segment size (MSS) of TPC SYN packets passing through the Cisco vEdge device. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 552 through 1460 bytes Default: None
Clear-Dont-Fragment	Click **On** to clear the Don't Fragment bit in the IPv4 packet header for packets being transmitted out the interface.
IP MTU	Based on your choice in the **Tunnel Mode** option, specify the maximum MTU size of the IPv4 or IPv4 packets on the interface. Range: 576 through 9216 Default: 1500 bytes
Shutdown	Click **Off** to enable the interface.

Multicast

The Cisco IOS XE Catalyst SD-WAN multicast overlay software extends Protocol Independent Multicast Source-Specific Multicast (PIM-SSM) over the Cisco Catalyst SD-WAN overlay using Overlay Management Protocol (OMP). Protocol Independent Multicast Sparse-Mode (PIM-SM) is deployed in the customer VPNs, and the Cisco IOS XE MVPN is used to integrate PIM in customer VPNs and OMP in the overlay. The OMP replicator is used in overlay multicast to optimize the multicast distribution tree across the overlay topology. The Cisco IOS XE Catalyst SD-WAN router supports IGMPv2 and IGMPv3 reports and advertises receiver's multicast interest to remote Cisco Catalyst SD-WAN routers using OMP. Depending on the level of optimization required, the Cisco Catalyst SD-WAN routers join or prune to or from the replicators, and replicators use OMP to relay the join or prune to the Cisco Catalyst SD-WAN router providing overlay connectivity to the PIM-RP or source.

The Cisco IOS XE Catalyst SD-WAN overlay multicast network supports the following protocols:

- Protocol Independent Multicast (PIM)
- Internet Group Management Protocol (IGMP)
- MSDP

Some parameters have a scope drop-down list that enables you to choose **Global**, **Device Specific**, or **Default** for the parameter value. Choose one of the following options, as described in the table below:

Parameter Scope	Scope Description
Global (Indicated by a globe icon)	Enter a value for the parameter and apply that value to all devices. Examples of parameters that you might apply globally to a group of devices are DNS server, syslog server, and interface MTUs.
Device Specific (Indicated by a host icon)	Use a device-specific value for the parameter. Choose **Device Specific** to provide a value for the key in the **Enter Key** field. The key is a unique string that helps identify the parameter. To change the default key, type a new string in the **Enter Key** field. Examples of device-specific parameters are system IP address, host name, GPS location, and site ID.
Default (indicated by a check mark)	The default value is shown for parameters that have a default setting.

The following tables describe the options for configuring the Multicast feature.

Field	Description
Type	Choose a feature from the drop-down list.
Feature Name*	Enter a name for the feature.
Description	Enter a description of the feature. The description can contain any characters and spaces.

Table 4: Basic Configuration

Field	Description
SPT Only	Enable this option to ensure that the Rendezvous Points (RPs) can communicate with each other using the shortest-path tree.
Local Replicator	Enable this option to configure the Cisco IOS XE Catalyst SD-WAN device as a multicast replicator.
Threshold	Specify a value. Optional, keep it set to the default value if you are not configuring a replicator.

Table 5: PIM

Field	Description
Source Specific Multicast (SSM)	Enable this option to configure SSM.

Field	Description
ACL	Specify an access control list value. An access control list allows you to filter multicast traffic streams using the group and sometimes source IPv4 or IPv6 addresses. Configure an IPv4 access control list using a standard or extended access list and attach it to your device before enabling PIM. You must have created a valid standard or extended ACL before using the ACL in your multicast configuration. **Note** You cannot configure an ACL for a PIM feature template using Cisco SD-WAN Manager. You must configure the ACL using a CLI add-on template. For information on configuring ACL using the CLI add-on template, see the section **Configure an ACL for Multicast Using a CLI Add-On Template** in chapter **Multicast Overlay Routing** of the Cisco Catalyst SD-WAN Routing Configuration Guide.
SPT Threshold	Specify the traffic rate, in kbps, at which to switch from the shared tree to the shortest-path tree (SPT). Configuring this value forces traffic to remain on the shared tree and travel via the RP instead of via the SPT.
Add Interface	
Interface Name	Enter the name of an interface that participates in the PIM domain, in the format **ge** *slot /port*.
Query Interval(sec)	Specify how often the interface sends PIM query messages. Query messages advertise that PIM is enabled on the router.
Join/Prune Interval(sec)	Specify how often PIM multicast traffic can join or be removed from a rendezvous point tree (RPT) or shortest-path tree (SPT). Cisco IOS XE Catalyst SD-WAN device send join and prune messages to their upstream RPF neighbor.
How do you want to configure your Rendezvous Point (RP) Cisco IOS XE SD-WAN supports the following modes:	
Static	Click this check box to a specify the static IP address of a rendezvous point (RP).
Add Static RP	
IP Address	Specify the static IP address of a rendezvous point (RP).
ACL	Specify an ACL value.

Field	Description
Override	Enable this option for cases when dynamic and static group-to-RP mappings are used together and there is an RP address conflict. In this case, the RP address configured for a static group-to-RP mapping takes precedence. If you do not enable this option, and there is RP address conflict, dynamic group-to-RP mappings will take precedence over static group-to-RP mappings.
Auto RP	Click this check box to enable reception of PIM group-to-RP mapping updates. This enables reception on the Auto-RP multicast groups, 224.0.1.39 and 224.0.1.40.
RP Announce	Click this check box to enable transmission of Auto-RP multicast messages.
RP Discovery	Click this check box to enable Auto-RP automatic discovery of rendezvous points (RPs) in the PIM network so that the router can serve as an Auto-RP mapping agent. An Auto-RP mapping receives all the RPs and their respective multicast groups and advertise consistent group-to-RP mapping updates.
Interface	Specify the source interface for Auto-RP RP Announcements or RP Discovery messages.
Scope	Specify the IP header Time-to-Live (TTL) for Auto-RP RP Announcements or RP Discovery messages.
PIM-BSR	Configure a PIM BSR.
RP Candidate	
Interface Name	Choose the interface that you used for configuring the PIM feature template.
Access List	Add an access list value if you have configured the access list with a value.
Interval	Add an interval value if you have configured the interval with a value.
Priority	Specify a higher priority on the Cisco IOS XE Catalyst SD-WAN device than on the service-side device.
BSR Candidate (Maximum: 1)	
Interface Name	Chose the same interface from the drop-down list that you used for configuring the PIM feature template.
Hash Mask Length	Specify the hash mask length. Valid values for hash mask length are 0–32.
Priority	Specify a higher priority on the Cisco IOS XE Catalyst SD-WAN device than on the service-side device.
RP Candidate Access List	Add a value if you have configured the RP candidate access list with a value. An RP candidate uses a standard ACL where you can enter the name for the access list.

Table 6: IGMP

Field	Description
Add IGMP	
Interface	Enter the name of the interface to use for IGMP. To add another interface, click **Add**.
Version	Specify a version number. Optional, keep it set to the default version number.
Group Address	Enter a group address to join a multicast group.
Source Address	Enter a source address to join a multicast group.
Add	Click **Add** to add the IGMP for the group.

Table 7: MSDP

Field	Description
Originator-ID	Specify the ID of the originating device. This ID is the IP address of the interface that is used as the RP address.
Connection Retry Interval	Configure an interval at which MSDP peers will wait after peering sessions are reset before attempting to re-establish the peering sessions.
Mesh Group	
Mesh Group Name	Enter a mesh group name. This configures an MSDP mesh group and indicates that an MSDP peer belongs to that mesh group. **Note** All MSDP peers present on a device that participate in a mesh group must be in a full mesh with all other MSDP peers in the group. Each MSDP peer on each device must be configured as a peer using the **ip msdp peer** command, and as a member of the mesh group using the **ip msdp mesh-group** command.
Peer-IP	Configure an MSDP peer specified by an IP address.
Advanced Settings	
Connect-Source Interface	Enter the primary address of a specified local interface that is used as the source IP address for the TCP connection.
Peer Authentication Password	Enables MD5 password encryption for a TCP connection between two MSDP peers. **Note** MD5 authentication must be configured with the same password on both MSDP peers. Otherwise, a connection between them cannot be established.
Keep Alive	Configure an interval at which an MSDP peer will send keepalive messages.

Field	Description
Hold-Time	Configure an interval at which the MSDP peer will wait for keepalive messages from other peers before declaring them as down.
Remote AS	Specifies the autonomous system number of the MSDP peer. This keyword and argument are used for display purposes only.
SA Limit	Limits the number of SA messages allowed in the SA cache from the specified MSDP.
Default Peer	Configure a default peer from which to accept all MSDP SA messages.

OSPF Routing

Open Shortest Path First (OSPF) is a routing protocol for IP networks. It can be used for service-side routing to provide reachability to networks at the local site.

For each parameter of the feature that has a default value, the scope is set to Default (indicated by a check mark), and the default setting or value is shown.

Basic Configuration

Field	Description
Router ID	Enter the OSPF router ID, in decimal four-part dotted notation. This is the IP address associated with the router for OSPF adjacencies.
Distance for External Routes	Specify the OSPF route administration distance for routes learned from other domains. Range: 1 through 255 Default: 110
Distance for Inter-Area Routes	Specify the OSPF route administration distance for routes coming from one area into another. Range: 1 through 255 Default: 110
Distance for Intra-Area Routes	Specify the OSPF route administration distance for routes within an area. Range: 0 through 255 Default: 110

Redistribute

Field	Description
Add Redistribute	

Field	Description
Protocol	Choose the protocol from which to redistribute routes into OSPF. • Static • Connected • BGP • OMP • NAT • EIGRP

Maximum Metric (Router LSA)

Field	Description
Add Router LSA	
Type	Configure OSPF to advertise a maximum metric so that other routers do not prefer this router as an intermediate hop in their Shortest Path First (SPF) calculation. Choose a type: • **administrative**: Force the maximum metric to take effect immediately, through operator intervention. • **on-startup**: Advertise the maximum metric for the specified time.

Area

Field	Description
Add Area	
Area Number*	Enter the number of the OSPF area. Range: 32-bit number
Set the area type	Choose the type of OSPF area: • Stub • NSSA
Add Interface	Configure the properties of an interface in an OSPF area.
Name*	Enter the name of the interface, in the format **`ge`**`slot/port` or **`loopback number`**.

Field	Description
Hello Interval (seconds)*	Specify how often the router sends OSPF hello packets. Range: 1 through 65535 seconds Default: 10 seconds
Dead Interval (seconds)*	Specify how often the router must receive an OSPF hello packet from its neighbor. If no packet is received, the router assumes that the neighbor is down. Range: 1 through 65535 seconds Default: 40 seconds (four times the default hello interval)
LSA Retransmission Interval (seconds)*	Specify how often the OSPF protocol retransmits LSAs to its neighbors. Range: 1 through 65535 seconds Default: 5 seconds
Interface Cost	Specify the cost of the OSPF interface. Range: 1 through 65535
Designated Router Priority*	Set the priority of the router to be elected as the designated router (DR). The router with the highest priority becomes the DR. If the priorities are equal, the node with the highest router ID becomes the DR or the backup DR. Range: 0 through 255 Default: 1
OSPF Network Type	Choose the OSPF network type to which the interface is to connect: • Broadcast network • Point-to-point network • Non-broadcast network • Point-to-multipoint network
Passive Interface*	Specify whether to set the OSPF interface to be passive. A passive interface advertises its address, but does not actively run the OSPF protocol. Default: Disabled
Authentication Type	Choose the authentication type: • **simple**: Password is sent in clear text. • **message-digest**: MD5 algorithm generates the password.
Message Digest Key	Enter the MD5 authentication key, in clear text or as an AES-encrypted key. It can be from 1 to 255 characters.

Field	Description
md5	Enter the key ID for message digest (MD5 authentication). It can be 1 to 32 characters.
Add Range	Configure the area range of an interface in an OSPF area.
IP Address*	Enter the IP address.
Subnet Mask*	Enter the subnet mask.
Cost	Specify a number for the Type 3 summary LSA. OSPF uses this metric during its SPF calculation to determine the shortest path to a destination. Range: 0 through 16777214
No-advertise*	Enable this option to not advertise the Type 3 summary LSAs.

Advanced

Field	Description
Reference Bandwidth (Mbps)	Specify the reference bandwidth for the OSPF auto-cost calculation for the interface. Range: 1 through 4294967 Mbps Default: 100 Mbps
RFC 1583 Compatible	By default, the OSPF calculation is done per RFC 1583. Disable this option to calculate the cost of summary routes based on RFC 2328.
Originate	Enable this option to generate a default external route into an OSPF routing domain. When you enable this option, the following fields appear: • **Always**: Enable this option to always advertise the default route in an OSPF routing domain. • **Default Metric**: Set the metric used to generate the default route. Range: 0 through 16777214 Default: 10 • **Metric Type**: Choose to advertise the default route as an OSPF Type 1 external route or an OSPF Type 2 external route.
SPF Calculation Delay (milliseconds)	Specify the amount of time between when the first change to a topology is received until performing the SPF calculation. Range: 1 through 600000 milliseconds (60 seconds) Default: 200 milliseconds

Field	Description
Initial Hold Time (milliseconds)	Specify the amount of time between consecutive SPF calculations. Range: 1 through 600000 milliseconds (60 seconds) Default: 1000 milliseconds
Maximum Hold Time (milliseconds)	Specify the longest time between consecutive SPF calculations. Range: 1 through 600000 Default: 10000 milliseconds (60 seconds)

OSPFv3 IPv4 Routing

Use this feature to configure the Open Shortest Path First version 3 (OSPFv3) IPv4 link-state routing protocol for IPv4 unicast address families.

The following tables describe the options for configuring the OSPFv3 IPv4 Routing feature.

Basic Settings

Field	Description
Router ID	Enter the OSPF router ID, in decimal four-part dotted notation. This value is the IP address that is associated with the router for OSPF adjacencies. Default: No Router ID is configured.
Add Redistribute	
Protocol	Choose the protocol from which to redistribute routes into OSPFv3, for all OSPFv3 sessions. • **Connected** • **Static** • **Nat-route** • **BGP**
Select Route Policy	Enter the name of a localized control policy to apply to routes before they are redistributed into OSPF.

Area

Field	Description
Area Number*	Enter the number of the OSPFv3 area. Allowed value: Any 32-bit integer

Field	Description
Area Type	Choose the type of OSPFv3 area: • **Stub**: No external routes • **NSSA**: Not-so-stubby area, allows external routes • **Normal** **Note** You can't enter a value for **Area type** if you have entered 0 as a value for **Area Number**.
Interface	
Add Interface	Configure the properties of an interface in an OSPFv3 area.
Name*	Enter the name of the interface. Examples of interface names: GigabitEthernet0/0/1, GigabitEthernet0/1/2.1, GigabitEthernet0, or Loopback1.
Cost	Specify a number for the Type 3 summary link-state advertisement (LSA). OSPFv3 uses this metric during its SPF calculation to determine the shortest path to a destination. Range: 0 through 16777215
Authentication Type	Specify the SPI and authentication key if you use IPSec SHA1 authentication type. • **no-auth**: Select no authentication. • **ipsec-sha1**: Enter the value for the IPSEC Secure Hash Algorithm 1 (SHA-1) authentication.
SPI	Specifies the Security Policy Index (SPI) value. Range: 256 through 4294967295
Authentication Key	Provide a value for the authentication key. When IPSEC SHA-1 authentication is used, the key must be 40 hex digits long.
Passive Interface	Specify whether to set the OSPFv3 interface to be passive. A passive interface advertises its address, but does not actively run the OSPFv3 protocol. Default: Disabled
IPv4 Range	
Add IPv4 Range	Configure the area range of an interface in an OSPFv3 area.
Network Address*	Enter the IPv4 address.
Subnet Mask*	Enter the subnet mask.
No Advertise*	Enable this option to not advertise the Type 3 summary LSAs.

Field	Description
Cost	Specify the cost of the OSPFv3 interface. Range: 1 through 65535

Advanced

Field	Description
Route Policy	Enter the name of a localized control policy to apply to routes coming from OSPFv3 neighbors.
Reference Bandwidth (Mbps)	Specify the reference bandwidth for the OSPFv3 autocost calculation for the interface. Range: 1 through 4294967 Mbps Default: 100 Mbps
RFC 1583 Compatible	By default, the OSPFv3 calculation is done per RFC 1583. Disable this option to calculate the cost of summary routes based on RFC 2328.
Originate	Enable this option to generate a default external route into an OSPF routing domain. When you enable this option, the following fields appear: • **Always**: Enable this option to always advertise the default route in an OSPF routing domain. • **Default Metric**: Set the metric used to generate the default route. Range: 0 through 16777214 Default: 10 • **Metric Type**: Choose to advertise the default route as an OSPF Type 1 external route or an OSPF Type 2 external route.
Distance	Define the OSPFv3 route administration distance based on route type. Default: 100
Distance for External Routes	Set the OSPFv3 distance for routes learned from other domains. Range: 0 through 255 Default: 110
Distance for Inter-Area Routes	Set the distance for routes coming from one area into another. Range: 0 through 255 Default: 110
Distance for Intra-Area Routes	Set the distance for routes within an area. Range: 0 through 255 Default: 110

Field	Description
SPF Calculation Timers	Configure the amount of time between when OSPFv3 detects a topology and when it runs its SPF algorithm.
SPF Calculation Delay (milliseconds)	Specify the amount of time between when the first change to a topology is received until performing the SPF calculation. Range: 1 through 600000 ms (600 seconds) Default: 200 ms
Initial Hold Time (milliseconds)	Specify the amount of time between consecutive SPF calculations. Range: 1 through 600000 ms (600 seconds) Default: 1000 ms
Maximum Hold Time (milliseconds)	Specify the longest time between consecutive SPF calculations. Range: 1 through 600000 ms (600 seconds) Default: 10000 ms (10 seconds)
Maximum Metric (Router LSA)	Configure OSPFv3 to advertise a maximum metric so that other routers do not prefer this vEdge router as an intermediate hop in their Shortest Path First (SPF) calculation. • **Immediately**: Force the maximum metric to take effect immediately, through operator intervention. • **On-startup**: Advertise the maximum metric for the specified number of seconds after the router starts up. Range: 5 through 86400 seconds Maximum metric is disabled by default.

OSPFv3 IPv6 Routing

Use this feature to configure the Open Shortest Path First version 3 (OSPFv3) IPv6 link-state routing protocol for IPv6 unicast address families.

The following tables describe the options for configuring the OSPFv3 IPv6 Routing feature.

Basic Settings

Field	Description
Router ID	Enter the OSPF router ID, in decimal four-part dotted notation. This value is the IP address that is associated with the router for OSPF adjacencies. Default: No Router ID is configured.
Add Redistribute	

Field	Description
Protocol	Choose the protocol from which to redistribute routes into OSPFv3, for all OSPFv3 sessions. • **Connected** • **Static** • **BGP**
Select Route Policy	Enter the name of a localized control policy to apply to routes before they are redistributed into OSPF.

Area

Field	Description
Area Number*	Enter the number of the OSPFv3 area. Allowed value: Any 32-bit integer
Area Type	Choose the type of OSPFv3 area: • **Stub**: No external routes • **NSSA**: Not-so-stubby area, allows external routes • **Normal** **Note** You can't enter a value for **Area type** if you have entered 0 as a value for **Area Number**.
Interface	
Add Interface	Configure the properties of an interface in an OSPFv3 area.
Name*	Enter the name of the interface. Examples of interface names: GigabitEthernet0/0/1, GigabitEthernet0/1/2.1, GigabitEthernet0, or Loopback1.
Cost	Specify a number for the Type 3 summary link-state advertisement (LSA). OSPFv3 uses this metric during its SPF calculation to determine the shortest path to a destination. Range: 0 through 16777215
Authentication Type	Specify the SPI and authentication key if you use IPSec SHA1. • **no-auth**: Select no authentication. • **ipsec-sha1**: Enter the value for the IPSEC Secure Hash Algorithm 1 (SHA-1) authentication.

Field	Description
SPI	Specifies the Security Policy Index (SPI) value. Range: 256 through 4294967295
Authentication Key	Provide a value for the authentication key. When IPSEC SHA-1 authentication is used, the key must be 40 hex digits long.
Passive Interface	Specify whether to set the OSPFv3 interface to be passive. A passive interface advertises its address, but does not actively run the OSPFv3 protocol. Default: Disabled
IPv6 Range	
Add IPv6 Range	Configure the area range of an interface in an OSPFv3 area.
Network Address*	Enter the IPv6 address.
Subnet Mask*	Enter the subnet mask.
No Advertise*	Enable this option to not advertise the Type 3 summary LSAs.
Cost	Specify the cost of the OSPFv3 interface. Range: 1 through 65535

Advanced

Field	Description
Route Policy	Enter the name of a localized control policy to apply to routes coming from OSPFv3 neighbors.
Reference Bandwidth (Mbps)	Specify the reference bandwidth for the OSPFv3 autocost calculation for the interface. Range: 1 through 4294967 Mbps Default: 100 Mbps
RFC 1583 Compatible	By default, the OSPFv3 calculation is done per RFC 1583. Disable this option to calculate the cost of summary routes based on RFC 2328.

Field	Description
Originate	Enable this option to generate a default external route into an OSPF routing domain. When you enable this option, the following fields appear: • **Always**: Enable this option to always advertise the default route in an OSPF routing domain. • **Default Metric**: Set the metric used to generate the default route. Range: 0 through 16777214 Default: 10 • **Metric Type**: Choose to advertise the default route as an OSPF Type 1 external route or an OSPF Type 2 external route.
Distance	Define the OSPFv3 route administration distance based on route type. Default: 100
Distance for External Routes	Set the OSPFv3 distance for routes learned from other domains. Range: 0 through 255 Default: 110
Distance for Inter-Area Routes	Set the distance for routes coming from one area into another. Range: 0 through 255 Default: 110
Distance for Intra-Area Routes	Set the distance for routes within an area. Range: 0 through 255 Default: 110
SPF Calculation Timers	Configure the amount of time between when OSPFv3 detects a topology and when it runs its SPF algorithm.
SPF Calculation Delay (milliseconds)	Specify the amount of time between when the first change to a topology is received until performing the SPF calculation. Range: 1 through 600000 ms (600 seconds) Default: 200 ms
Initial Hold Time (milliseconds)	Specify the amount of time between consecutive SPF calculations. Range: 1 through 600000 ms (600 seconds) Default: 1000 ms
Maximum Hold Time (milliseconds)	Specify the longest time between consecutive SPF calculations. Range: 1 through 600000 ms (600 seconds) Default: 10000 ms (10 seconds)

Field	Description
Maximum Metric (Router LSA)	Configure OSPFv3 to advertise a maximum metric so that other routers do not prefer this vEdge router as an intermediate hop in their Shortest Path First (SPF) calculation. • **Immediately**: Force the maximum metric to take effect immediately, through operator intervention. • **On-startup**: Advertise the maximum metric for the specified number of seconds after the router starts up. Range: 5 through 86400 seconds Maximum metric is disabled by default.

Object Tracker

Use the object tracker feature to configure an object tracker.

Basic Settings

Parameter Name	Description
Tracker Type*	
Interface	Configure the following interface values: • **Object tracker ID***: Enter the object tracker ID number. Range: 1-1000 • **Interface name***: Enter the global or device-specific tracker interface name. For example, Gigabitethernet1 or Gigabitethernet2.
SIG	**Object tracker ID***: Enter the object tracker ID number.
Route	Configure the route details: • **Object tracker ID***: Enter the object tracker ID number. Range: 1-1000 • **Route IP***: Enter the IPv4 address of the route. • **Route IP Mask***: Select a value for the subnet mask. • **VPN**: Enter a value for the VPN.

Object Tracker Group

Use this feature to configure an object tracker group. To ensure accurate tracking, add at least two object trackers before creating an object tracker group.

Basic Settings

Parameter Name	Description
Object tracker ID *	Enter an ID for the object tracker group. Range: 1 through 1000
Object tracker *	Select a minimum of two previously created object trackers from the drop-down list.
Reachable *	Choose one of the following values: • **Either**: Ensures that the transport interface status is reported as active if either one of the associated trackers of the tracker group reports that the route is active. • **Both**: Ensures that the transport interface status is reported as active if both the associated trackers of the tracker group report that the route is active.

Route Policy

You can configure quality of service (QoS) to classify data packets and control how traffic flows out of and in to the interfaces and on the interface queues. With access lists, you can provision QoS which allows you to classify data traffic by importance, spread it across different interface queues, and control the rate at which different classes of traffic are transmitted.

1. In **Add Feature** window, choose **Route Policy** from the drop-down list.
2. Enter a name and description for the route policy.
3. Click **Add Routing Sequence**. The Add Route Sequence window displays.
4. Enter **Routing Sequence Name**.
5. Select a desired protocol from the **Protocol** drop-down list. The options are: IPv4, IPv6, or both.
6. Select a condition from the **Condition** drop-down list.
7. Select the action types **Accept** or **Reject** from the **Action Type** drop-down list.
8. For the **Accept** action type, choose the accept condition from the **Accept Condition** drop-down list.
9. Click **Save**.

   To copy, delete, or rename the route policy sequence rule, click **...** next to the rule's name and select the desired option.
10. If no packets match any of the route policy sequence rules, the default action is to drop the packets. To change the default action:

a. Click **Default Action** in the left pane.

b. Click the Pencil icon.

c. Change the default action to **Accept**.

d. Click **Save**.

11. Click **Save Route Policy**.

The following table describe the options for configuring the QoS Map feature.

Field	Description
Routing Sequence Name	Specifies the name of the routing sequence.
Protocol	Specifies the internet protocol. The options are IPv4, IPv6, or Both.
Condition	Specifies the routing condition. The options are: • Address • AS Path List • Community List • Extended Community List • BGP Local Preference • Metric • Next Hop • OMP Tag • Origin • OSPF Tag • Peer
Action Type	Specifies the action type. The options are: Accept or Reject.

Field	Description
Accept Condition	Specifies the accept condition type. The options are: • Aggregator • AS Path • Atomic Aggregate • Community • Local Preference • Metric • Metric Type • Next Hop • OMP Tag • Origin • Originator • OSPF Tag • Weight

You can select the specific route sequence in the Route Policy window to edit, delete or add.

Service VPN

This feature helps you configure a service VPN (range 1 – 65527, except 512) or the LAN VPN.

The following table describes the options for configuring the Service VPN feature.

Basic Configuration

Field	Description
VPN*	Enter the numeric identifier of the VPN.
Name*	Enter a name for the VPN.
OMP Admin Distance IPv4	Administrative distance for OMP routes. The Cisco SD-WAN Controllers learn the topology of the overlay network and the services available in the network using OMP routes. The distance can be a value between 1–255.
OMP Admin Distance IPv6	Administrative distance for OMP routes. The Cisco SD-WAN Controllers learn the topology of the overlay network and the services available in the network using OMP routes. The distance can be a value between 1–255.

DNS

Field	Description
Add DNS IPv4	
Primary DNS Address (IPv4)	Enter the IP address of the primary IPv4 DNS server in this VPN.
Secondary DNS Address (IPv4)	Enter the IP address of a secondary IPv4 DNS server in this VPN.
Add DNS IPv6	
Primary DNS Address (IPv6)	Enter the IP address of the primary IPv6 DNS server in this VPN.
Secondary DNS Address (IPv6)	Enter the IP address of a secondary IPv6 DNS server in this VPN.

Host Mapping

Field	Description
Add New Host Mapping	
Hostname*	Enter the hostname of the DNS server. The name can be up to 128 characters.
List of IP*	Enter up to eight IP addresses to associate with the hostname. Separate the entries with commas.

Advertise OMP

Field	Description
Add OMP Advertise IPv4	

Field	Description
Protocol	Choose a protocol to configure route advertisements to OMP, for this VPN: • **bgp** • **ospf** • **ospfv3** • **connected** • **static** • **network** • **aggregate** **Applied to Region**: (Minimum supported release: Cisco Catalyst SD-WAN Manager Release 20.13.1) In a Multi-Region Fabric scenario, route aggregation is a method for reducing the number of entries that routers in a network must maintain in routing tables, for better scaling. Choose **core**, **access**, or **core-and-access**, to apply route aggregation only to access regions, the core region, or both. This option is applicable only to a Multi-Region Fabric border router, not an edge router or a transport gateway. • **eigrp** • **lisp** • **isis**
Select Route Policy	Enter the name of the route policy. Route policy is not supported in Cisco vManage Release 20.9.1.
Add OMP Advertise IPv6	

Field	Description
Protocol	Choose a protocol to configure route advertisements to OMP, for this VPN: • **BGP** • **OSPF** • **Connected** • **Static** • **Network** • **Aggregate** **Applied to Region**: (Minimum supported release: Cisco Catalyst SD-WAN Manager Release 20.13.1) In a Multi-Region Fabric scenario, route aggregation is a method for reducing the number of entries that routers in a network must maintain in routing tables, for better scaling. Choose **core**, **access**, or **core-and-access**, to apply route aggregation only to access regions, the core region, or both. This option is applicable only to a Multi-Region Fabric border router, not an edge router or a transport gateway.
Select Route Policy	Enter the name of the route policy. Route policy is not supported in Cisco vManage Release 20.9.1.
Protocol Sub Type	When you choose the OSPF protocol, specify the sub type as external.

Route

Field	Description
Add IPv4 Static Route	
Network Address*	Enter the IPv4 address or prefix, in decimal four-point-dotted notation, and the prefix length of the IPv4 static route to configure in the VPN.
Subnet Mask*	Enter the subnet mask.

Field	Description
Next Hop/Null 0/VPN/DHCP	Choose one of the following options to configure the next hop to reach the static route: • **Next Hop**: When you choose this option, the **IPv4 Route Gateway Next Hop** field appears. Enable this option to add the next hop. You can add a hop with and without a tracker. When you click **Add Next Hop**, the following fields appear: • **Address***: Enter the next-hop IPv4 address. • **Administrative Distance***: Enter the administrative distance for the route. When you click **Add Next Hop with Tracker**, the following fields appear: • **Address***: Enter the next-hop IPv4 address. • **Administrative Distance***: Enter the administrative distance for the route. • **Tracker***: Enter the name of the gateway tracker to determine whether the next hop is reachable before adding that route to the route table of the device. • **Null 0**: When you choose this option, the following field appears: • **IPv4 Route Null 0***: Enable this option to set the next hop to be the null interface. All packets sent to this interface are dropped without sending any ICMP messages. • **VPN**: When you choose this option, the following field appears: • **IPv4 Route VPN***: Selects VPN as the gateway to direct packets to the transport VPN. • **DHCP**: When you choose this option, the following field appears: • **IPv4 Route Gateway DHCP***: Assigns a static route for the default next-hop router when the DHCP server is accessed for an IP address.
Add BGP Routing	Choose a BGP route.
Add OSPF Routing	Choose an OSPF route.
Add IPv6 Static Route	
Prefix*	Enter the IPv6 address or prefix, in decimal four-point-dotted notation, and the prefix length of the IPv6 static route to configure in the VPN.

Field	Description

Next Hop/Null 0/NAT	Choose one of the following options to configure the next hop to reach the static route:
	• **Next Hop**: When you choose this option and click **Add Next Hop**, the following fields appear:
	  • **Address***: Enter the next-hop IPv6 address.
	  • **Administrative distance***: Enter the administrative distance for the route.
	• **Null 0**: When you choose this option, the following field appears:
	  • **IPv6 Route Null 0***: Enable this option to set the next hop to be the null interface. All packets sent to this interface are dropped without sending any ICMP messages.
	• **NAT**: When you choose this option, the following field appears:
	  • **IPv6 NAT***: Choose NAT64 or NAT66.
	• **Interface**: When you choose this option, the following fields appear:
	  • **Interface Name**: Choose IPv6 interface name for the IPsec tunnel.
	  • **Next Hop**: Enter the IPv6 address and the administrative distance for the next hop.

Service

Field	Description
Add Service	
Service Type	Choose a service available at the local site and in the VPN. Values: **FW**, **IDS**, **IDP**, **netsvc1**, **netsvc2**, **netsvc3**, **netsvc4**, **TE**, **SIG**
IPv4 Addresses (Maximum: 4)*	Enter up to four IP address, separated by commas. The service is advertised to the Cisco SD-WAN Controller only if one of the addresses can be resolved locally, at the local site, not via routes learned through OMP. You can configure up to four IP addresses.
Tracking*	Cisco Catalyst SD-WAN tests each service device periodically to check whether it is operational. Tracking saves the results of the periodic tests in a service log. Tracking is enabled by default.

Service Route

Field	Description
Add Service Route	
Prefix*	Enter the IP address or prefix, in decimal four-part-dotted notation, and prefix length of the GRE-specific static route.
Service*	Configure routes pointing to any service. Values: **FW**, **IDS**, **IDP**, **netsvc1**, **netsvc2**, **netsvc3**, **netsvc4**.
VPN*	Destination VPN to resolve the prefix.

GRE Route

Field	Description
Add GRE Route	
Prefix*	Enter the IP address or prefix, in decimal four-part-dotted notation, and prefix length of the GRE-specific static route.
Interface*	Enter the name of one or two GRE tunnels to use to reach the service.
VPN*	Enter the number of the VPN to reach the service. This must be VPN 0.

IPSEC Route

Field	Description
Add ipSec Route	
Prefix*	Enter the IP address or prefix, in decimal four-part-dotted notation, and prefix length of the IPsec-specific static route.
Interface*	Enter the name of one or two IPsec tunnel interfaces. If you configure two interfaces, the first is the primary IPsec tunnel, and the second is the backup. All packets are sent only to the primary tunnel. If that tunnel fails, all packets are then sent to the secondary tunnel. If the primary tunnel comes back up, all traffic is moved back to the primary IPsec tunnel.

NAT

Field	Description
Nat Pool	
NatPool Name*	Enter a NAT pool number configured in the centralized data policy. The NAT pool name must be unique across VPNs and VRFs. You can configure up to 31 (1–32) NAT pools per router.

Field	Description
Prefix Length*	Enter the NAT pool prefix length.
Range Start*	Enter a starting IP address for the NAT pool.
Range End*	Enter a closing IP address for the NAT pool.
Overload*	Enable this option to configure per-port translation. If this option is disabled, only dynamic NAT is configured on the end device. Per-port NAT is not configured. Default: Enabled
Direction*	Choose the NAT direction.
Nat64 V4 Pool	
Nat64 V4 Pool Name*	Enter a NAT pool number configured in the centralized data policy. The NAT pool name must be unique across VPNs and VRFs. You can configure up to 31 (1–32) NAT pools per router.
Nat 64 V4 Pool Range Start*	Enter a starting IP address for the NAT pool.
Nat 64 V4 Pool Range End*	Enter a closing IP address for the NAT pool.
Overload*	Enable this option to configure per-port translation. If this option is disabled, only dynamic NAT is configured on the end device. Per-port NAT is not configured. Default: Disabled

Route Leak

Field	Description
Route leak from Global VPN	
Route Protocol*	Choose a protocol from the available options to leak routes from global VPN to the service VPN that you are configuring.
Select Route Policy	Choose a route policy from the drop-down list.
Redistribution (in service VPN)	
Protocol*	Choose a protocol from the available options to redistribute the leaked routes.
Select Route Policy	Choose a route policy from the drop-down list.
Route leak to Global VPN	
Route Protocol*	Choose a protocol from the available options to leak routes from the service VPN that you are configuring to the global VPN.

Field	Description
Select Route Policy	Choose a route policy from the drop-down list.
Redistribution (in global VPN)	
Protocol*	Choose a protocol from the available options to redistribute the leaked routes.
Select Route Policy	Enter the name of the route policy.
Route leak from other Service VPN(s)	
Source VPN	Enter a value of the source VPN.
Route Protocol*	Choose a protocol from the available options to leak routes from the source service VPN to the service VPN that you are configuring.
Select Route Policy	Choose a route policy from the drop-down list.
Redistribution (in Service VPN)	
Protocol*	Choose a protocol from the available options to redistribute the leaked routes.
Select Route Policy	Choose a route policy from the drop-down list.

Route Target

Field	Description
IPv4 Settings	
Import Route Target List: Route Target*	Configure a route target for IPv4 interfaces. It imports routing information from the target VPN extended community.
Export Route Target List: Route Target*	Configure a route target for IPv4 interfaces. It exports routing information to the target VPN extended community.
IPv6 Settings	
Import Route Target List: Route Target*	Configure a route target for IPv6 interfaces. It imports routing information from the target VPN extended community.
Export Route Target List: Route Target*	Configure a route target for IPv6 interfaces. It exports routing information to the target VPN extended community.

SVI Interface

This feature helps you configure a switch virtual interface (SVI) to configure a VLAN interface.

For each parameter of the feature that has a default value, the scope is set to Default (indicated by a check mark), and the default setting or value is shown. To change the default or to enter a value, click the scope drop-down to the left of the parameter field and choose one of the following:

Parameter Scope	Scope Description
Device Specific (indicated by a host icon)	Use a device-specific value for the parameter. For device-specific parameters, you cannot enter a value in the feature template. You enter the value when you attach a Cisco Catalyst SD-WAN device to a device template. When you click Device Specific, the Enter Key box opens. This box displays a key, which is a unique string that identifies the parameter in a CSV file that you create. This file is an Excel spreadsheet that contains one column for each key. The header row contains the key names (one key per column), and each row after that corresponds to a device and defines the values of the keys for that device. You upload the CSV file when you attach a Cisco Catalyst SD-WAN device to a device template. To change the default key, type a new string and move the cursor out of the Enter Key box. Examples of device-specific parameters are system IP address, host name, GPS location, and site ID.
Global (indicated by a globe icon)	Enter a value for the parameter, and apply that value to all devices. Examples of parameters that you might apply globally to a group of devices are DNS server, syslog server, and interface MTUs.

The following tables describe the options for configuring the SVI Interface feature.

Field	Description
Type	Choose a feature from the drop-down list.
Feature Name*	Enter a name for the feature.
Description	Enter a description of the feature. The description can contain any characters and spaces.
Associated VPN: VPN*	Choose a VPN.

Basic Configuration

Field	Description
Shutdown	Enable or disable the VLAN interface.
VLAN Interface Name*	Enter a name for the VLAN interface. The name must contain a minimum of five characters. The name must be in the following format: `^Vlan(([1-9]\d|\d)/){0,2}(0|[1-9]\d*)([:|\.][1-9]\d*)?`
Interface Description	Enter a description for the interface.

Field	Description
Interface MTU	Enter the maximum transmission unit size for frames received and transmitted on the interface. Range: 1500 through 9216 Default: 1500 bytes
IP MTU	Enter the maximum transmission unit (MTU) size of IP packets sent on an interface. Range: 576 through 9216 Default: 1500 bytes
Configure IPV4 Address	
IPv4 Address Prefix*	Enter the IPv4 address for the interface.
List of DHCP helper addresses*	Enter up to eight IP addresses for DHCP servers in the network to have the interface be a DHCP helper. Separate each address with a comma. A DHCP helper interface forwards BOOTP (Broadcast) DHCP requests that it receives from the specified DHCP servers.
Configure IPV4 Secondary Address	
Secondary IP Address*	Enter up to four secondary IP addresses.
Configure IPV6 Address	
IPV6 address*	Enter the IPv6 address for the interface.
Configure IPV6 Secondary Address	
Address*	Enter up to four secondary IP addresses.
Configure IPV6 DHCP Helper	
Address*	Enter an IP address for DHCP servers in the network to have the interface be a DHCP helper. A DHCP helper interface forwards BOOTP (Broadcast) DHCP requests that it receives from the specified DHCP servers.
VPN	VPN ID for the DHCP helper address.

ACL

Field	Description
Configure Access List V4	
Direction*	Choose a direction of the ACL: **in** or **out**.
Name of ACL*	Enter the name of the access list.
Configure Access List V6	

Field	Description
Direction*	Choose a direction of the ACL: **in** or **out**.
Name of ACL*	Enter the name of the access list.

VRRP

Field	Description
Configure VRRP	
Group ID*	Enter the virtual router ID, which is a numeric identifier of the virtual router. You can configure a maximum of 24 groups. Range: 1 through 255
Priority*	Enter the priority level of the router. The router with the highest priority is elected as the primary router. If two routers have the same priority, the one with the higher IP address is elected as the primary router. Range: 1 through 254 Default: 100
Timer*	Specify how often the primary VRRP router sends VRRP advertisement messages. If secondary routers miss three consecutive VRRP advertisements, they elect a new primary router . Range: 100 through 40950 seconds Default: 100 seconds
Track OMP	When you enable this option, VRRP tracks the Overlay Management Protocol (OMP) session running on the WAN connection. If the primary VRRP router loses all its OMP sessions, VRRP elects a new default gateway from those that have at least one active OMP session.
Prefix List*	Track both the OMP session and a list of remote prefixes, which is defined in a prefix list configured on the local router. If the primary VRRP router loses all its OMP sessions, VRRP failover occurs as described for the **Track OMP** option. In addition, if the reachability to one of the prefixes in the list is lost, VRRP failover occurs immediately, without waiting for the OMP hold timer to expire, thus minimizing the amount of overlay traffic while the Cisco IOS XE Catalyst SD-WAN device determines the primary VRRP router.
IP Address	Enter the IP address of the virtual router. This address must be different from the configured interface IP addresses of both the local router and the peer running VRRP.
Add VRRP IP Address Secondary	
Address*	Enter an IP address for the secondary VRRP router.

Field	Description
TLOC Preference Change	Enable or disable this option to set whether the TLOC preference can be changed or not.
Add VRRP Tracking Object	
Tracker Id*	Enter the interface object ID or object group tracker ID.
Track Action*	Choose one of the options: • **decrement** • **shutdown**
Decrement Value	Enter a decrement value. Range: 1-255 From Cisco vManage Release 20.10.1, this option is enabled only when you choose **decrement** in **Track Action**.
Configure VRRP IPv6	
Group ID*	Enter the virtual router ID, which is a numeric identifier of the virtual router. You can configure a maximum of 24 groups. Range: 1 through 255
Priority*	Enter the priority level of the router. The router with the highest priority is elected as the primary router. If two routers have the same priority, the one with the higher IP address is elected as the primary router. Range: 1 through 254 Default: 100
Timer*	Specify how often the primary VRRP router sends VRRP advertisement messages. If secondary routers miss three consecutive VRRP advertisements, they elect a new primary router . Range: 100 through 40950 seconds Default: 100 seconds
Track OMP*	When you enable this option, VRRP tracks the Overlay Management Protocol (OMP) session running on the WAN connection. If the primary VRRP router loses all its OMP sessions, VRRP elects a new default gateway from those that have at least one active OMP session.

Field	Description
Track Prefix List	Track both the OMP session and a list of remote prefixes, which is defined in a prefix list configured on the local router. If the primary VRRP router loses all its OMP sessions, VRRP failover occurs as described for the **Track OMP** option. In addition, if the reachability to one of the prefixes in the list is lost, VRRP failover occurs immediately, without waiting for the OMP hold timer to expire, thus minimizing the amount of overlay traffic while the Cisco IOS XE Catalyst SD-WAN device determines the primary VRRP router.
Add VRRP IPv6 Primary	
IPv6 Link Local*	Enter a virtual link local IPv6 address, which represents the link local address of the group. The address should be in standard link local address format. For example, FE80::AB8.
Prefix	Enter the IPv6 address of the primary VRRP router.

ARP

Field	Description
Configure ARP	
IP Address*	Enter the IP address for the ARP entry in dotted decimal notation or as a fully qualified host name.
MAC Address*	Enter the MAC address in colon-separated hexadecimal notation.

Advanced

Field	Description
TCP MSS	Specify the maximum segment size (MSS) of TPC SYN packets passing through the router. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 552 to 1960 bytes Default: None
ARP Timeout	Specify how long it takes for a dynamically learned ARP entry to time out. Range: 0 through 2678400 seconds (744 hours) Default: 1200 (20 minutes)

Field	Description
IP Directed-Broadcast	An IP directed broadcast is an IP packet whose destination address is a valid broadcast address for some IP subnet but which originates from a node that is not itself part of that destination subnet. A device that is not directly connected to its destination subnet forwards an IP directed broadcast in the same way it would forward unicast IP packets destined to a host on that subnet. When a directed broadcast packet reaches a device that is directly connected to its destination subnet, that packet is broadcast on the destination subnet. The destination address in the IP header of the packet is rewritten to the configured IP broadcast address for the subnet, and the packet is sent as a link-layer broadcast. If directed broadcast is enabled for an interface, incoming IP packets whose addresses identify them as directed broadcasts intended for the subnet to which that interface is attached are broadcast on that subnet.
ICMP/ICMPv6 Redirect Disable	ICMP redirects are sent by a router to the sender of an IP packet when a packet is being routed sub-optimally. The ICMP redirect informs the sending host to forward subsequent packets to that same destination through a different gateway. By default, an interface allows ICMP redirect messages.

Switch Port

Use the Switch Port feature to configure bridging for Cisco Catalyst SD-WAN.

The following table describes the options for configuring the Switch Port feature.

Field	Description
Age Out Time	Enter how long an entry is in the MAC table before it ages out. Set the value to 0 to prevent entries from timing out. Range: 0, 10 through 1000000 seconds Default: 300 seconds
Configure Interface	
Interface Name	Enter the name of the interface to associate with the bridging domain, in the format **`geslot/port`**.

Field	Description
Mode	Choose the switch port mode. • **access**: Configure the interface as an access port. You can configure only one VLAN on an access port, and the port can carry traffic only for one VLAN. When you choose **access**, the following field appears: **Switchport Access Vlan**: Enter the VLAN number, which can be a value from 1 through 4094. • **trunk**: Configure the interface as a trunk port. You can configure one or more VLANs on a trunk port, and the port can carry traffic for multiple VLANs. When you choose **trunk**, the following fields appear: • **Allowed Vlans**: Enter the number of the VLANs for which the trunk can carry traffic and a description for the VLAN. • **Switchport Trunk Native Vlan**: Enter the number of the VLAN allowed to carry untagged traffic.
Shutdown	Enable the interface. By default, an interface is disabled.
Speed	Enter the speed of the interface.
Duplex	Choose **full** or **half** to specify whether the interface runs in full-duplex or half-duplex mode.
Port Control	Choose the port control mode to enable IEEE 802.1X port-based authentication on the interface. • **auto**: Enables IEEE 802.1X authentication and starts the port in the unauthorized state, allowing only EAPOL frames to be sent and received through the port. The authentication process begins when the link state of the port changes from down to up or when an EAPOL-start frame is received. The device requests the identity of the supplicant and starts relaying authentication messages between the supplicant and the authentication server. Each supplicant attempting to access the network is uniquely identified by the device by using the supplicant MAC address. • **force-unauthorized**: Causes the port to remain in the unauthorized state, ignoring all attempts by the supplicant to authenticate. The device cannot provide authentication services to the supplicant through the port. • **force-authorized**: Disables IEEE 802.1X authentication and causes the port to change to the authorized state without any authentication exchange required. The port sends and receives normal traffic without IEEE 802.1X-based authentication of the client.
Voice VLAN	Enter the Voice VLAN ID.

Field	Description
Pae Enable	The Cisco Catalyst SD-WAN device acts as a port access entity (PAE), allowing authorized network traffic and preventing unauthorized network traffic ingressing to and egressing from the controlled port.
MAC Authentication Bypass	Enable this option to allow MAC authentication bypass (MAB) on the RADIUS server and to authenticate non-IEEE 802.1X–compliant clients using a RADIUS server.
Host Mode	Choose whether an IEEE 802.1X interface grants access to a single host (client) or to multiple hosts (clients). • **single-host**: Grant access only to the first authenticated host. This is the default. • **multi-auth**: Grant access to one host on a voice VLAN and multiple hosts on data VLANs. • **multi-host**: Grant access to multiple hosts. • **multi-domain**: Grant access to both a host and a voice device, such as an IP phone on the same switch port.
Enable Periodic Reauth	Enable periodic re-authentication. By default, this option is enabled.
Inactivity	Enter the inactivity timeout time in seconds. Default: 60 seconds
Reauthentication	Enter the re-authentication interval in seconds.
Control Direction	Choose **both** (bidirectional) or **in** (unidirectional) authorization mode.
Restricted VLAN	Enter the restricted VLAN (or authentication-failed VLAN) for IEEE 802.1x-compliant clients. Configure limited services to IEEE 802.1X-compliant clients that failed RADIUS authentication.
Guest VLAN	Enter the guest VLAN to drop non-IEEE 802.1X enabled clients, if the client is not in the MAB list.
Critical VLAN	Enter the critical VLAN (or authentication-failed VLAN) for IEEE 802.1x-compliant clients. Configure network access when RADIUS authentication or the RADIUS server fails.
Enable Voice	Enable the critical voice VLAN.
Configure Static Mac Address	
MAC Address	Enter the static MAC address to map to the switch port interface.
Interface Name	Enter the name of the switch port interface.
VLAN ID	Enter the number of the VLAN for the switch port.

Tracker

This feature helps you configure the tracker for the VPN interface.

For each parameter of the feature that has a default value, the scope is set to Default (indicated by a check mark), and the default setting or value is shown. To change the default or to enter a value, click the scope drop-down to the left of the parameter field and choose one of the following:

The following table describes the options for configuring the Tracker feature.

Field	Description
Tracker Name*	Name of the tracker. The name can be up to 128 alphanumeric characters.
Endpoint Tracker Type*	Choose a tracker type to configure endpoint trackers: • **http**
Endpoint	Choose an endpoint type: • **Endpoint IP**: When you choose this option, the following field appears: **Endpoint IP**: IP address of the endpoint. This is the destination on the internet to which the probes are sent to determine the status of an endpoint. • **Endpoint DNS Name**: When you choose this option, the following field appears: **Endpoint DNS Name**: DNS name of the endpoint. This is the destination on the internet to which probes are sent to determine the status of the endpoint. The DNS name can contain a minimum of one character and a maximum of 253 characters. • **Endpoint API URL**: When you choose this option, the following field appears: **API URL of endpoint***: API URL for the endpoint of the tunnel. This is the destination on the internet to which probes are sent to determine the status of the endpoint.
Interval	Time interval between probes to determine the status of the configured endpoint. Range: 20 to 600 seconds Default: 60 seconds (1 minute).
Multiplier	Number of times probes are sent before declaring that the endpoint is down. Range: 1 to 10 Default: 3

Field	Description
Threshold	Wait time for the probe to return a response before declaring that the configured endpoint is down. Range: 100 to 1000 milliseconds Default: 300 milliseconds

Tracker Group

Use the Tracker Group feature to track the status of service interfaces.

Note Ensure that you have created two trackers to form a tracker group.

The following tables describe the options for configuring the Tracker Group feature.

Field	Description
Tracker Elements*	This field is displayed only if you chose **Tracker-group** as the tracker type. Add the existing interface tracker names, separated by a space. When you add this tracker to the template, the tracker group is associated with these individual trackers, and you can then associate the tracker group to a static route. The tracker name must not contain capital letters and special characters.
Tracker Boolean	From the drop-down list, choose **Global**. This field is displayed only if you chose **tracker-group** as the **Tracker Type**. By default, the **OR** option is selected. Choose **AND** or **OR**. **OR** ensures that the static route status is reported as active if either one of the associated trackers of the tracker group report that the route is active. If you select **AND**, the static route status is reported as active if both the associated trackers of the tracker group report that the route is active.

Wireless LAN

This feature helps you configure a wireless controller.

The following tables describe the options for configuring the Wireless LAN feature.

Basic Configuration

Field	Description
Enable 2.4G*	Disable this option to shut down the radio type of 2.4 GHz. Default: Enabled

Field	Description
Enable 5G*	Disable this option to shut down the radio type of 5 GHz. Default: Enabled
Country*	Choose the country where the router is installed.
Username*	Specify the username of Cisco Mobility Express.
Password*	Specify the password of Cisco Mobility Express.

ME IP Config

Field	Description
ME Dynamic IP*	Enable this option so that the interface receives its IP address dynamically from a DHCP server.
ME IP Address	Specify the IP address of Cisco Mobility Express.
Subnet Mask	Specify the subnet mask of Cisco Mobility Express.
Default Gateway	Specify the default gateway address of Cisco Mobility Express.

SSID

Field	Description
Add SSID	
SSID Name*	Enter a name for the wireless SSID. It can be a string from 4 to 32 characters. The SSID must be unique.
Admin State*	Enable this option to indicate that the interface has been configured.
Broadcast SSID*	Enable this option if you want to broadcast the SSID. Disable this option if you do not want the SSID to be visible to all the wireless clients.
VLAN (Range 1-4094)*	Enter a VLAN ID for the wireless LAN traffic.
Radio Type	Choose one of the following radio types: • **2.4GHz** • **5GHz** • **All**

Field	Description
Security Type*	Choose a security type: • **WPA2 Enterprise**: Choose this option for an enterprise where you authenticate and authorize network users with a remote RADIUS server. • **WPA2 Personal**: Choose this option to authenticate users who want to access the wireless network using a passphrase. • **Open**: Choose this option to allow access to the wireless network without authentication.
Passphrase*	This field is available if you choose **WPA2 Personal** as the security type. Set a pass phrase. This pass phrase provides users access to the wireless network.
QoS Profile	Choose a QoS profile.

VPN Interface Multilink

Use the VPN Interface Multilink feature to configure multilink interface properties for Cisco IOS XE Catalyst SD-WAN devices.

Basic Configuration

Parameter Name	Description
Interface Name	Enter the name of the multilink interface.
Multilink Group Number *	Enter the number of the multilink group. It must be the same as the number you enter in the multilink interface name parameter. Range: 1 through 65535
PPP Authentication Protocol	Select the authentication protocol used by the multilink interface: • **CHAP**: Enter the hostname and password provided by your Internet Service Provider (ISP). *hostname* can be up to 255 characters. • **PAP**: Enter the username and password provided by your ISP. *username* can be up to 255 characters. • **PAP** and **CHAP**: Configure both authentication protocols. Enter the login credentials for each protocol. To use the same username and password for both, click Same Credentials for PAP and CHAP.
Hostname *	Enter hostname for PPP CHAP Authentication.
CHAP Password *	Enter password for PPP CHAP Authentication.

Parameter Name	Description
IPv4 Address *	To configure a static address, click **Static** and enter an IPv4 address. To set the interface as a DHCP client so that the interface to receive its IP address from a DHCP server, click Dynamic. You can optionally set the DHCP distance to specify the administrative distance of routes learned from a DHCP server. Default: 1
Mask	Choose a value for the subnet mask.
IPv6 Address *	To configure a static address for an interface in VPN 0, click Static and enter an IPv6 address. To set the interface as a DHCP client so that the interface to receive its IP address from a DHCP server, click Dynamic. You can optionally set the DHCP distance to specify the administrative distance of routes learned from a DHCP server. The default DHCP distance is 1. You can optionally enable DHCP rapid commit, to speed up the assignment of IP addresses.

Multilink

Parameter Name	Description
Add T1/E1 Interface	
T1	
Description	Enter a description for the T1controller.
Slot*	Enter the number of the slot in slot/subslot/port format, where the T1 NIM is installed. For example, 0/1/0.
Framing	Enter the T1 frame type: • **esf**: Send T1 frames as extended superframes. This is the default. • **sf**: Send T1 frames as superframes. Superframing is sometimes called D4 framing.
Clock Source	Select the clock source: • **line**: Use phase-locked loop (PLL) on the interface. This is the default. When both T1 ports use line clocking and neither port is configured as the primary, by default, port 0 is the primary clock source and port 1 is the secondary clock source. • **internal**: Use the controller framer as the primary clock.
Line Code	Select the line encoding to use to send T1 frames: • **ami**: Use alternate mark inversion (AMI) as the linecode. AMI signaling uses frames grouped into superframes. • **b8zs**: Use bipolar 8-zero substitution as the linecode. This is the default. B8ZS uses frames that are grouped into extended superframes.

Parameter Name	Description
Cable Length	Select the cable length to configure the attenuation • **short**: Set the transmission attenuation for cables that are 660 feet or shorter. • **long**: Attenuate the pulse from the transmitter using pulse equalization and line buildout. You can configure a long cable length for cables longer that 660 feet. There is no default length.
E1	
Description	Enter a description for the E1 controller.
Slot*	Enter the number of the slot in slot/subslot/port format, where the E1 NIM is installed. For example, 0/1/0.
Framing	Enter the E1 frame type: • **crc4**: Use cyclic redundancy check 4 (CRC4). This is the default. • **no-crc4**: Do no use CRC4.
Clock Source	Select the clock source: • **line**: Use phase-locked loop (PLL) on the interface. This is the default. When both E1 ports use line clocking and neither port is configured as the primary, by default, port 0 is the primary clock source and port 1 is the secondary clock source. • **internal**: Use the controller framer as the primary clock.
Line Code	Select the line encoding to use to send E1 frames: • **ami**: Use alternate mark inversion (AMI) as the linecode. • **hdb3**: Use high-density bipolar 3 as the linecode. This is the default.
Add Channel Group	
Channel Group	To configure the serial WAN on the interface, enter a channel group number. Range: 0 through 30
Time Slot	To configure the serial WAN on the interface, enter a value for the timeslot. Range: 0 through 31
Add New A/S Serial Interface	
Interface Name	Enter the name of the serial interface.
Description	Enter a description for the serial interface.
Bandwidth	For transmitted traffic, set the bandwidth above which to generate notifications.

Parameter Name	Description
Clock Rate	Specify a value for the clock rate. Range: 1200 through 800000

Tunnel

Parameter Name	Description
Color	Choose a color for the TLOC.
Restrict	Enable this option to drop packets when a tunnel to the service is unreachable.
Groups	Enter the list of groups in the field.
Border	From the drop-down list, select **Global**. Click **On** to set TLOC as border TLOC.
Maximum Control Connections	Specify the maximum number of Cisco SD-WAN Controllers that the WAN tunnel interface can connect to. To have the tunnel establish no control connections, set the number to 0. Range: 0 through 8 Default: 2
Validator As Stun Server	Click **On** to enable Session Traversal Utilities for NAT (STUN) to allow the tunnel interface to discover its public IP address and port number when the router is located behind a NAT.
Exclude Controller Group List	Set the Cisco SD-WAN Controllers that the tunnel interface is not allowed to connect to. Range: 0 through 100
Cisco SD-WAN Manager Connection Preference	Set the preference for using a tunnel interface to exchange control traffic with Cisco SD-WAN Manager. Range: 0 through 8 Default: 5
Port Hop	From the drop-down list, select **Global**. Click **Off** to allow port hopping on tunnel interface. Default: **On**, which disallows port hopping on tunnel interface
Low-Bandwidth Link	Click **On** to set the tunnel interface as a low-bandwidth link. Default: **Off**
Network Broadcast	From the drop-down list, select **Global**. Click **On** to accept and respond to network-prefix-directed broadcasts. Enable this parameter only if the **Directed Broadcast** is enabled on the LAN interface feature template. Default: **Off**

Parameter Name	Description
Tunnel TCP MSS	TCP MSS affects any packet that contains an initial TCP header that flows through the router. When configured, TCP MSS is examined against the MSS exchanged in the three-way handshake. The MSS in the header is lowered if the configured TCP MSS setting is lower than the MSS in the header. If the MSS header value is already lower than the TCP MSS, the packets flow through unmodified. The host at the end of the tunnel uses the lower setting of the two hosts. To configure TCP MSS, provide a value that is 40 bytes lower than the minimum path MTU. Specify the MSS of TPC SYN packets passing through the Cisco IOS XE Catalyst SD-WAN. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 552 through 1460 bytes

ACL

Parameter Name	Description
Ingress ACL - IPv4	Enter the name of an IPv4 access list to packets being received on the interface.
Egress ACL - IPv4	Enter the name of an IPv4 access list to packets being transmitted on the interface.
Igress ACL - IPv6	Enter the name of an IPv6 access list to packets being received on the interface.
Egress ACL - IPv6	Enter the name of an IPv6 access list to packets being transmitted on the interface.

Advanced

Parameter Name	Description
Shutdown	Click **No** to enable the multilink interface.
Description	Enter a description for the multilink interface.
PPP Authentication Type	Select the type authentication from one of the following options.: • **Unidirectional**: The server initiates the authentication. • **Bidirectional**: Both the client and the server can initiate the authentication.
TCP MSS	Specify the maximum segment size (MSS) of TPC SYN packets passing through the Cisco Catalyst SD-WAN device. By default, the MSS is dynamically adjusted based on the interface or tunnel MTU such that TCP SYN packets are never fragmented. Range: 500 through 1460 bytes Default: 536

Parameter Name	Description
Disable Fragmentation	Click **On** to disable fragmentation for PPP Multilink Protocol data units (PDUs).
Fragment Max Delay	Configure the delay between the transmission of fragments in a PPP Multilink Protocol link. Range: 0 through 1000 Default: No CLI Command
Interleaving Fragments	Enable interleave fragmentation for PPP Multilink Protocol data units (PDUs).
TLOC Extension	Enter the name of a physical interface on the same router that connects to the WAN transport. This configuration binds the service-side interface to the WAN transport by enabling a device to access the opposite WAN transport connected to the neighbouring device using a TLOC-extension interface.
IP MTU	Specify the maximum MTU size of packets on the interface. MLP encapsulation adds 6 extra bytes (4 header, 2 checksum) to each outbound packet. These overhead bytes reduce the effective bandwidth on the connection; therefore, the throughput for an MLP bundle is slightly less than an equivalent bandwidth connection that is not using MLP. Range: 576 through 1804 Default: 1500 bytes
IP Directed-Broadcast	Enable the translation of a directed broadcast to physical broadcasts.
Shaping Rate (Kbps)	Configure the aggregate traffic transmission rate on the interface to be less than line rate, in kilobits per second (kbps).