Configure TVI-Based WAN Interfaces

For supported software information, click here.

For port-level redundancy on WAN interfaces, you can connect two or more physical ports to upstream routers in Layer 3 mode so that they act as a single tunnel virtual interface (TVI)-based WAN interface in the SD-WAN overlay. The TVI-based WAN interface functions as a loopback interface, with its own IP address and transport domains. Physical ports that you use in Layer 3 mode must be virtual network interfaces (VNIs) that you configure with the interface category VNI for WAN TVI.

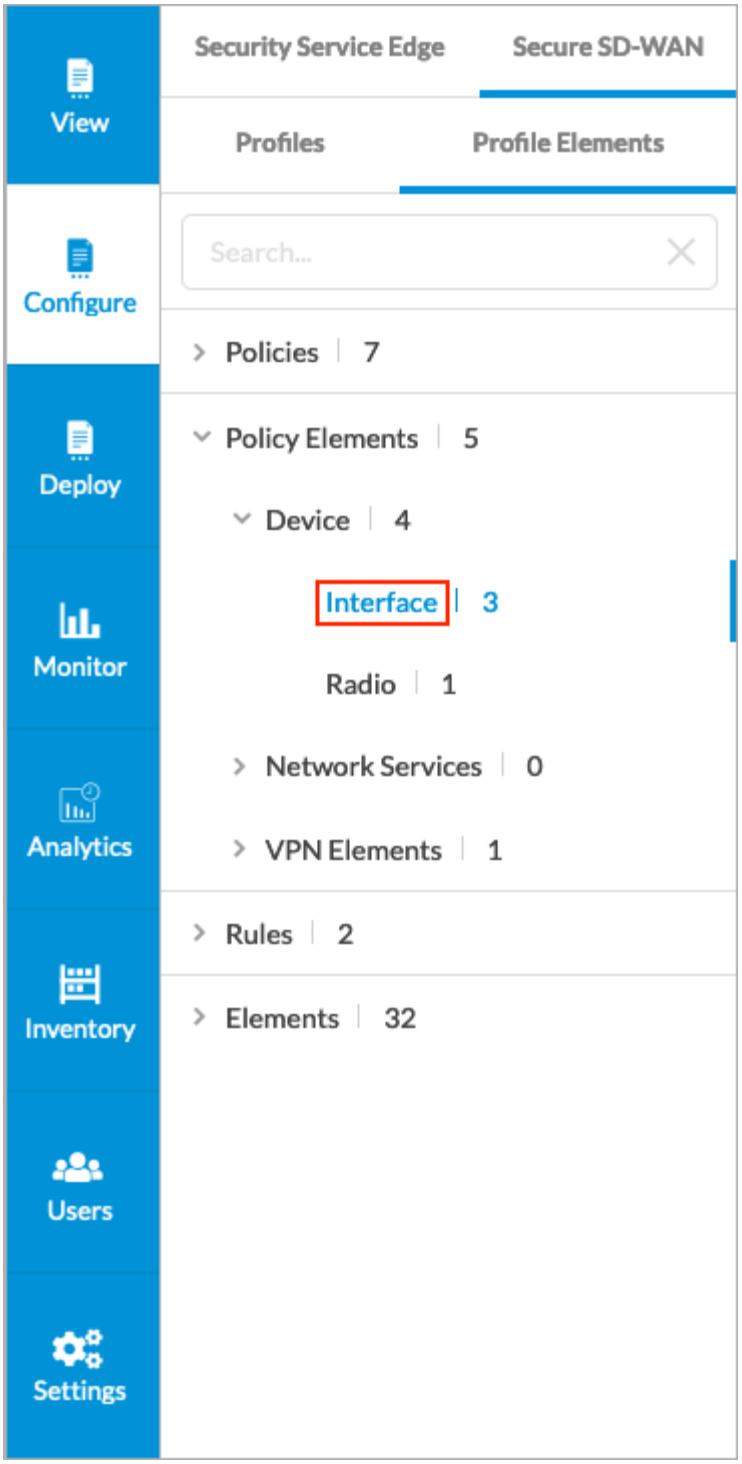
To configure a TVI-based WAN interface, you first configure a WAN TVI logical interface, and then you map it to two or more VNI physical ports that perform IP routing. You create this mapping on a WAN interface that is called a *VNI for WAN TVI interface*.

When you use TVI-based WAN interfaces, the number of SLA paths to remote appliances does not increase with the number of physical local interfaces on the same transport network.

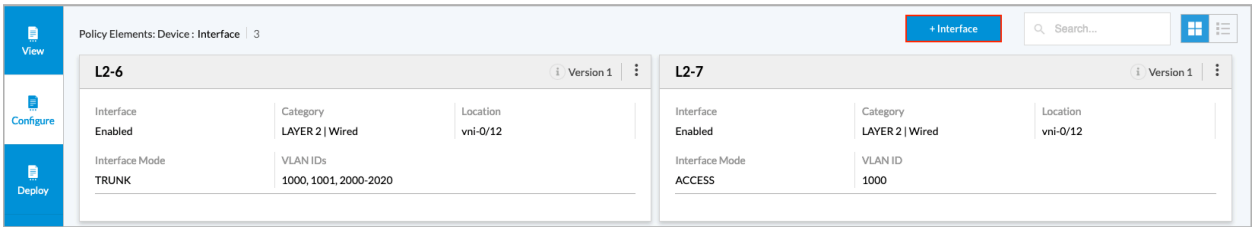
Note that TVI-based WAN interfaces support only static IP addressing. They do not support DHCP. They also do not support QoS.

Configure a TVI-Based WAN Interface

1. In Tenant view, go to Configure > Secure SD-WAN > Profile Elements > Policy Elements > Device > Interface.



2. Click + Interface.



3. In the Create Interface screen, select the General tab, and then enter information for the following fields.

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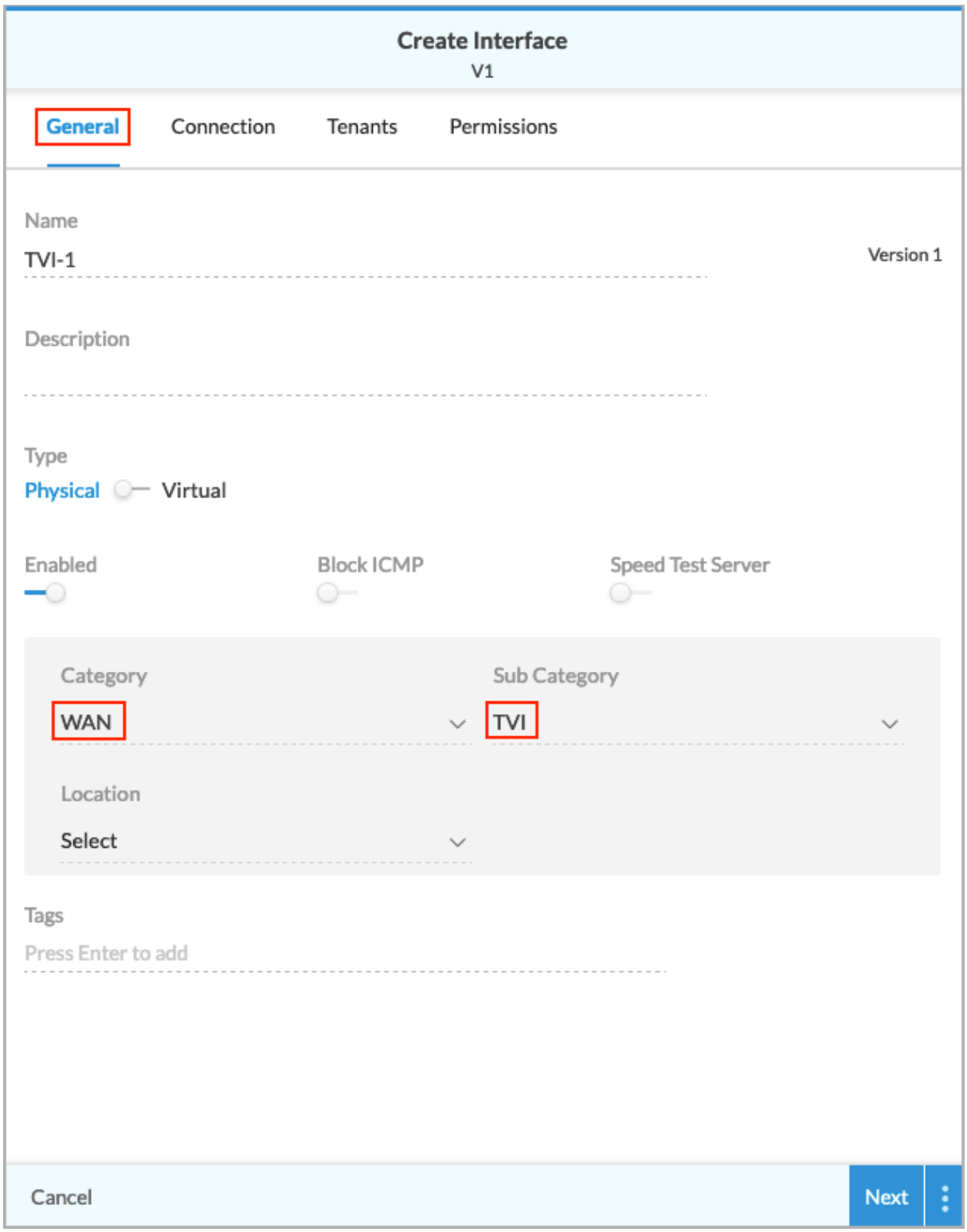

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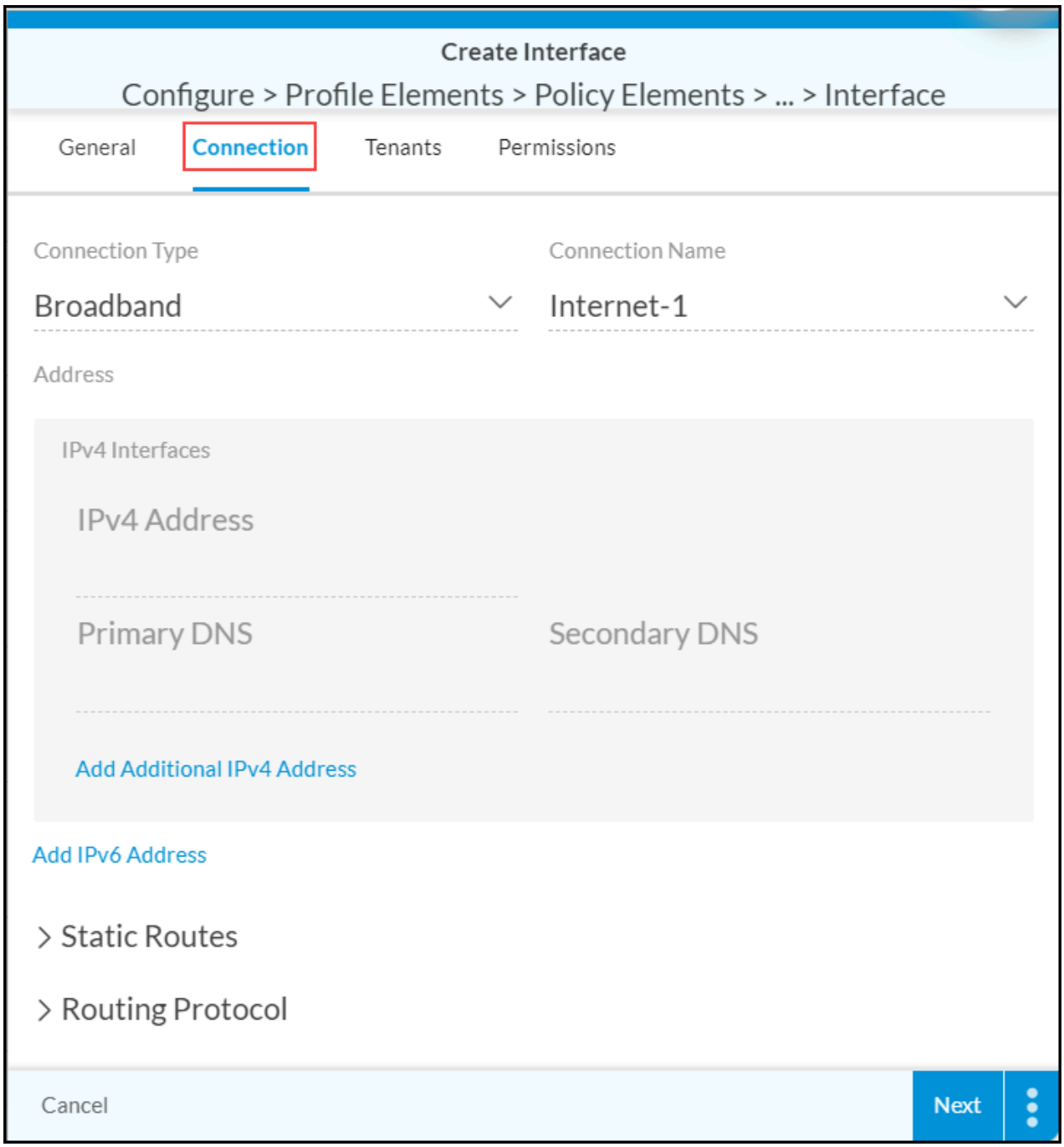
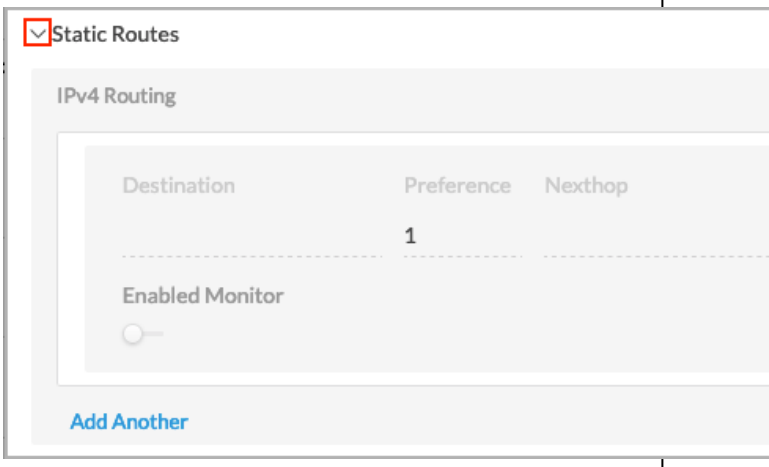
Field	Description
Name	Enter a name for the interface.
Type	Select Physical.
Enabled	Click the slider to enable the interface.
Category	Select WAN.
Sub Category	Select TVI.
Location	Select a TVI interface.
Tags	Enter one or more tags. A tag is an alphanumeric text descriptor with no spaces or special characters. You can specify multiple tags for the same object. The tags are used for searching the objects.

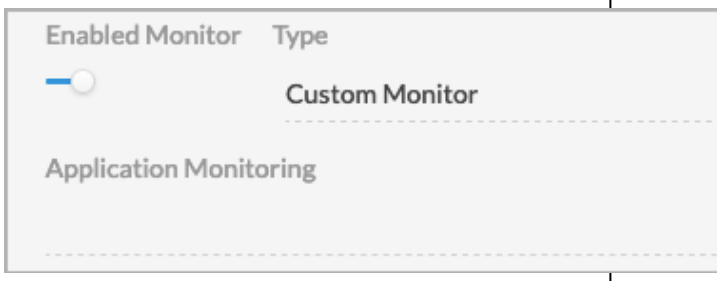
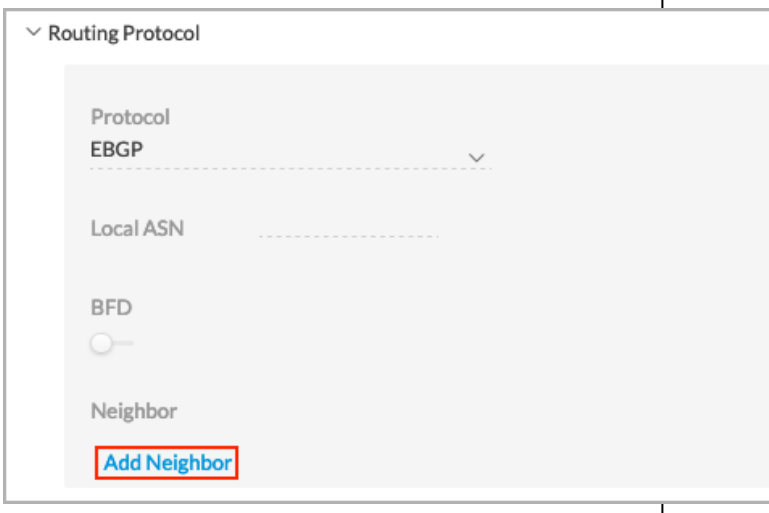
4. Click Next. In the Connection tab, enter information for the following fields.

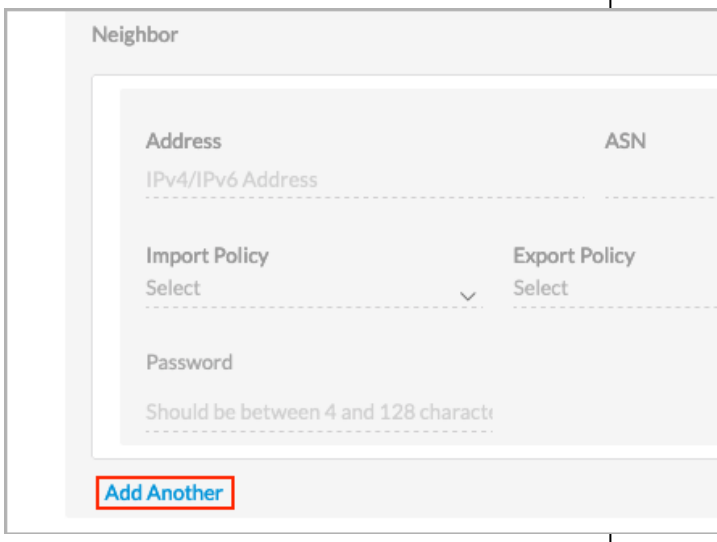


Field	Description
Connection Type	Select a connection type: ◦ Broadband ◦ MPLS

Field	Description
Connection Name	Select a connection name.
Uplink Bandwidth	Enter the uplink bandwidth, in Kbps. *Range*: 1 through 10000000 Kbps *Default*: None
Downlink Bandwidth	Enter the downlink bandwidth, in Kbps. *Range*: 1 through 10000000 Kbps *Default*: None
Address (Group of Fields)	
◦ IPv4 Interfaces	The slider bar is set to Static. You cannot change this setting. DHCP is not supported on TVI-based WAN interfaces.
◦ IPv4 Address	Enter a valid IPv4 address.
◦ Primary DNS	Enter the IPv4 address of the primary DNS server.
◦ Secondary DNS	Enter the IPv4 address of the secondary DNS server.
◦ Add Additional IPv4 Address	(For Releases 12.1.1 and later.) Click to add an additional IPv4 address, and then enter the IPv4 address.
◦ Add IPv6 Address	Click to add an IPv6 address.
◦ IPv6 Interfaces	The slider bar is set to Static. You cannot change this setting. DHCP is not supported on TVI-based WAN interfaces.
◦ IPv6 Address	Enter a valid IPv6 address.
◦ Primary DNS	Enter the IPv6 address of the primary DNS server.

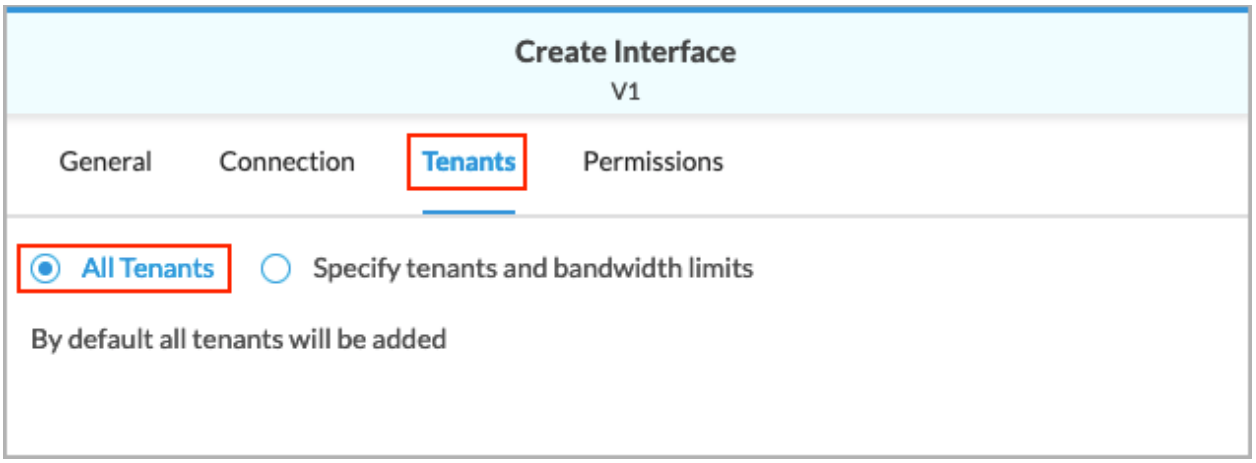
Field	Description
◦ Secondary DNS	Enter the IPv6 address of the secondary DNS server.
◦ Add Additional IPv6 Address	(For Releases 12.1.1 and later.) Click to add an additional IPv6 address, and then enter the IPv6 address.
Static Routes (Group of Fields)	Click Static Routes to configure static routing.
◦ IPv4 Routing	Click the Add button, and then enter information for the following fields.  ◦ Destination—Enter a valid IPv4 subnet, such as 10.1.1.0/24. ◦ Preference—Enter a value for the route preference. ◦ Next Hop—Enter a valid IPv4 address for the next hop, such as 10.2.1.1. ◦ Enabled Monitor—Click the slider bar to enable a monitor for the route.

Field	Description
	 ▪ In the Type field, select a monitor type, either Gateway or Custom Monitor. ▪ If you select Custom Monitor, select an application monitor. ◦ Add Another—Click to add another IPv4 static route.
Routing Protocol (Group of Fields)	Select a routing protocol: ◦ EBGP ◦ IBGP ◦ OSPF ◦ RIPv2
◦ EBGP, IBGP	For EBGP or IBGP, enter information for the following fields. 

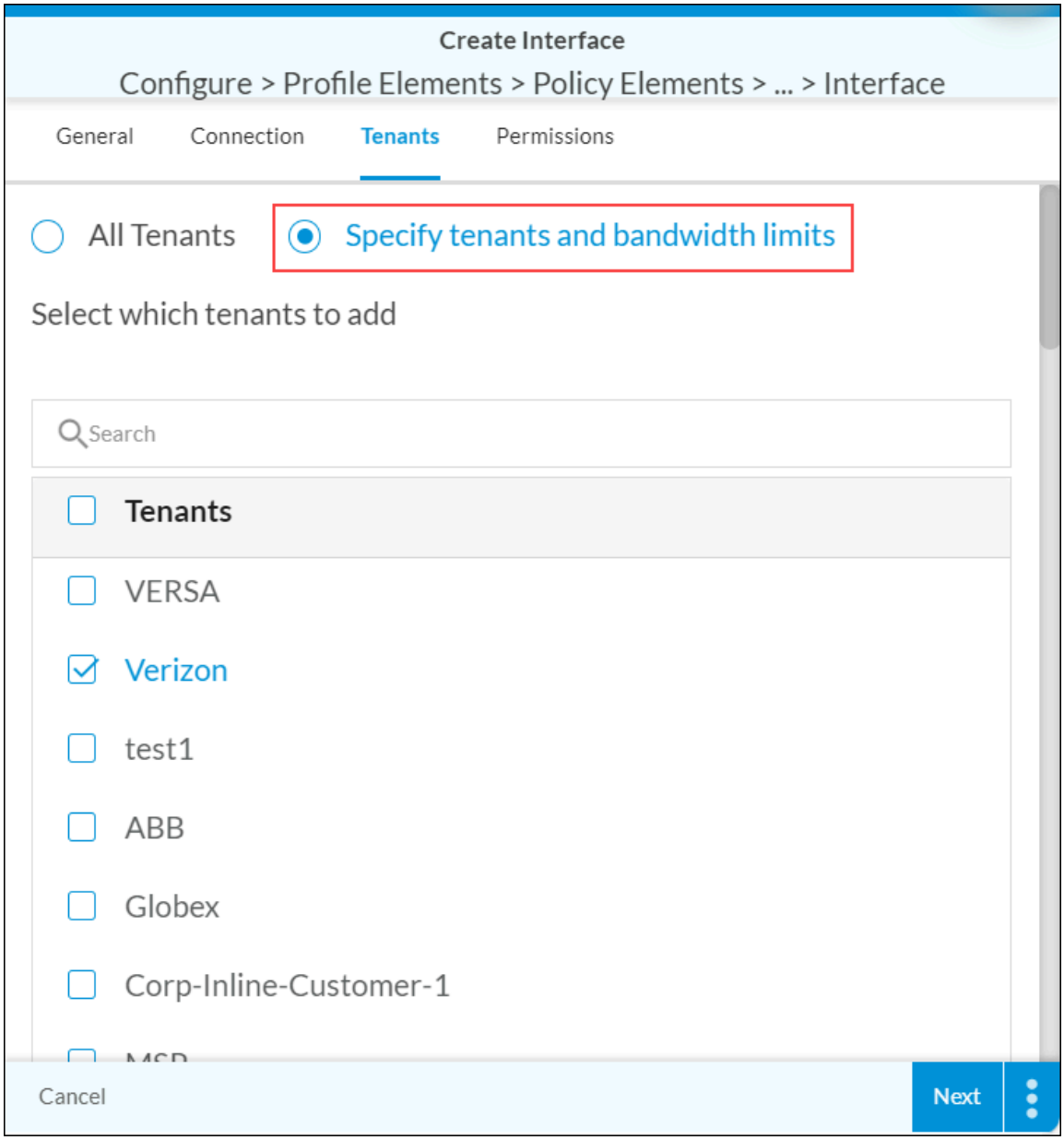
Field	Description
	◦ Protocol—Select EBGP or IBGP. ◦ Local ASN—Enter the local autonomous system (AS) number. ◦ BFD—Click the slider to enable the Bidirectional Forwarding Detection (BFD) protocol. ◦ Neighbor—To add a BGP neighbor, click Add Neighbor, and then enter information for the following fields.  ▪ Address—Enter the IPv4 or IPv6 address of the neighbor. ▪ ASN—Enter the AS number of the neighbor. ▪ Import Policy—Select a BGP import policy. ▪ Export Policy—Select a BGP export policy. ▪ Password—Enter a password between 4 and 128 characters. ◦ Add Another—Click to add another BGP neighbor.
OSPF	For OSPF, enter information for the following fields.

Field	Description
	 ◦ Area ID—Enter an ID for the area. A backbone area has an area ID of 0.0.0.0. Areas with nonzero IDs are nonbackbone areas. ◦ BFD—Click the slider to enable BFD. ◦ Priority—Enter a priority value to use in the election of the designated router (DR) and the backup designated router (BDR). On a multiaccess network, the OSPF router with the highest priority becomes the designated router, and the OSPF router with the second-highest priority becomes the backup router. If you set the priority to 0, the device does not participate in designated router and backup designated router election process. ◦ Metric—Enter a value for the OSPF interface cost, which is used to calculate the total cost to reach a destination. *Range*: 1 through 65535 *Default*: 1
◦ RIPv2	Select to enable RIPv2.

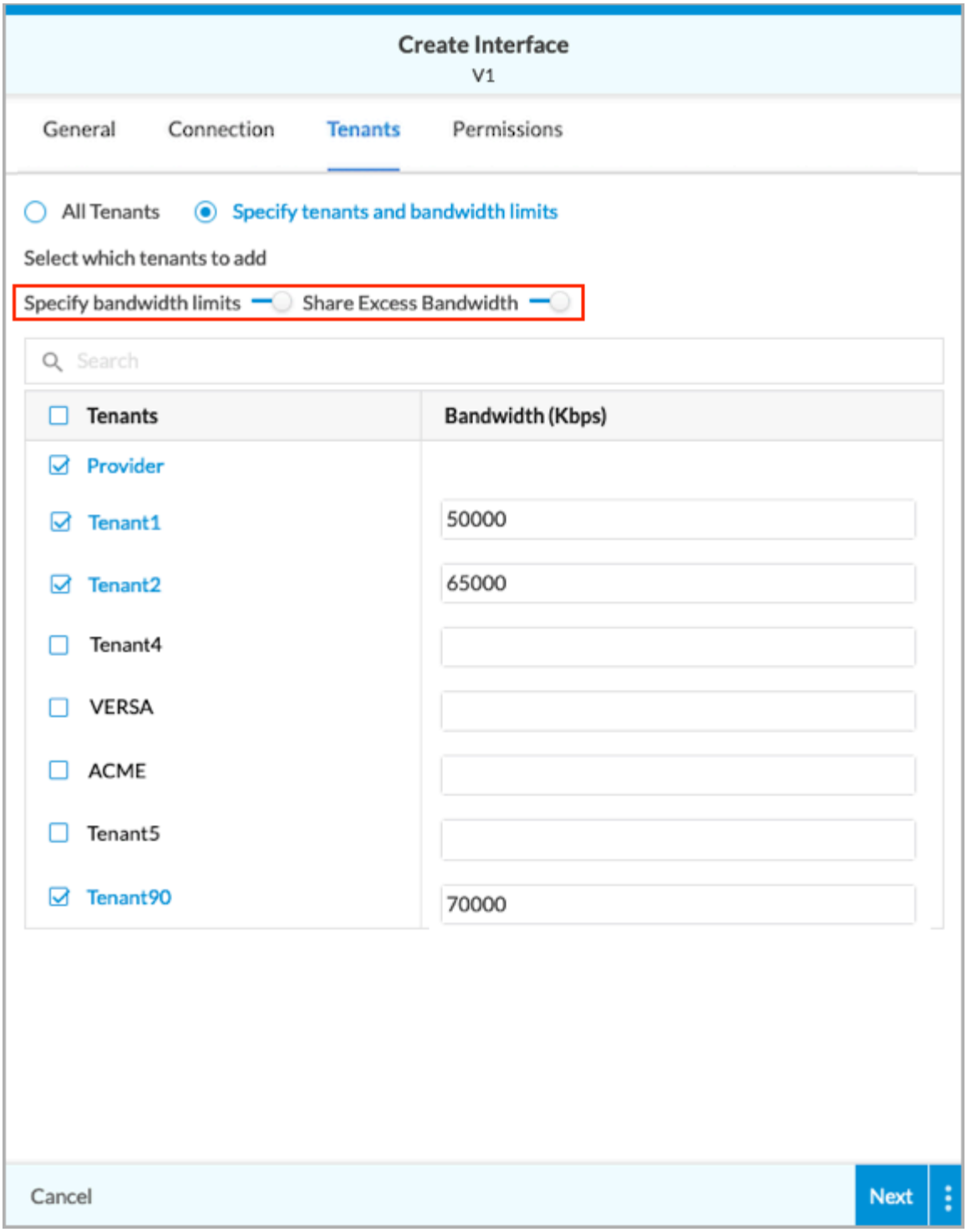
5. Select the Tenants tab. Note that if a tenant has no subtenants, the Tenants tab does not display.
6. To have all the subtenants use the TVI WAN interface, click All Tenants. This is the default setting.



7. To select which tenants can use the WAN interface, click Specify Tenants and Bandwidth Limits, and then select the tenants to share the bandwidth. If you select two or more subtenants, you must also select the provider tenant (that is, the appliance-owner tenant).



8. (For Release 11.1.4.) By default, the system allocates bandwidth to the subtenants automatically. To control the amount of bandwidth allotted to each subtenant, click the Specify Bandwidth Limits slider, and then enter the bandwidth limit, in Kbps, for each selected subtenant. Note that when you select a provider tenant because you have selected more than one subtenant, you cannot enter a bandwidth limit for the provider tenant. To share any excess bandwidth among the subtenants after you have specified bandwidth for specific subtenants, click the Share Excess Bandwidth slider.

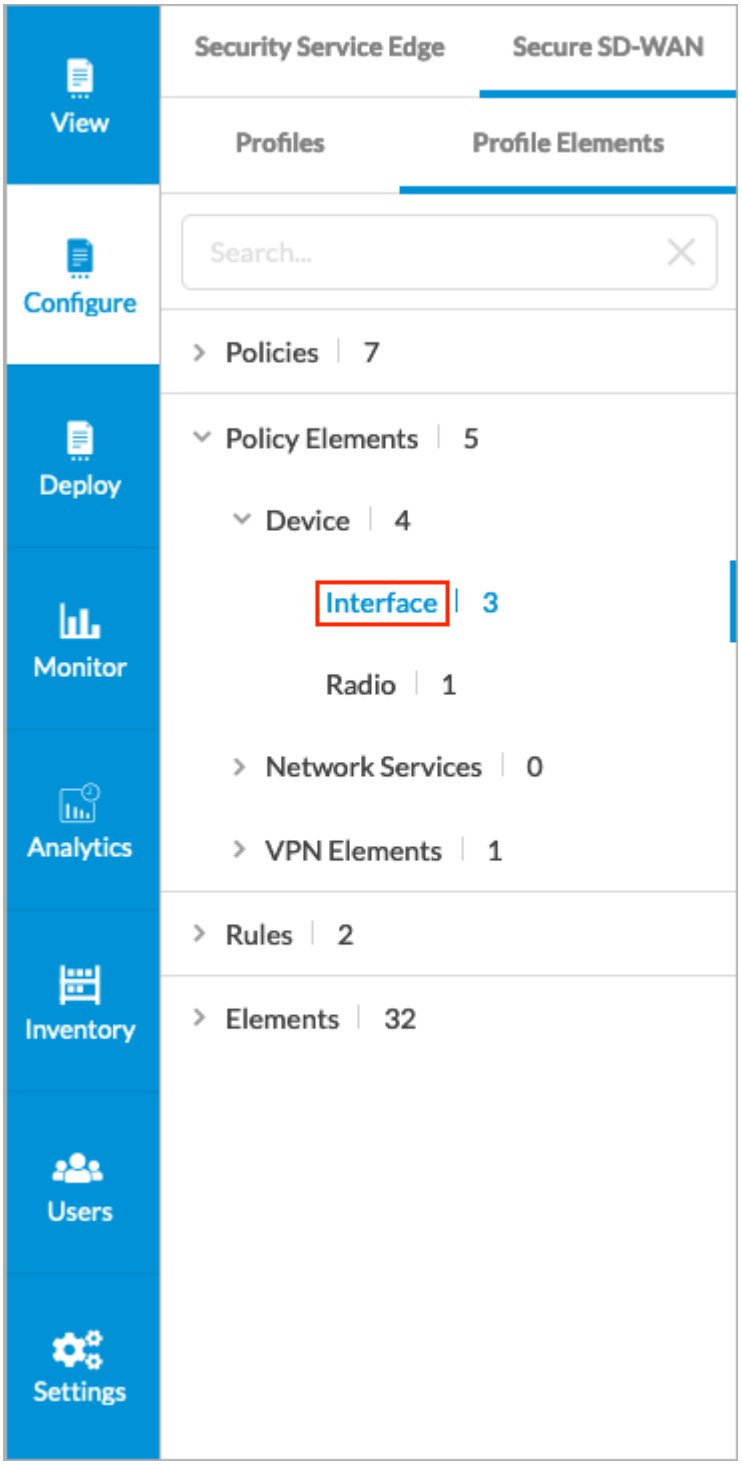


9. Click Next, or select the Permissions tab to customize permissions on the interface.
10. Click OK.

Configure a VNI Interface for a WAN TVI Interface

To configure a virtual network interface (VNI) for a WAN TVI interface:

1. In Tenant view, go to Configure > Profile Elements > Policy Elements > Device > Interface.



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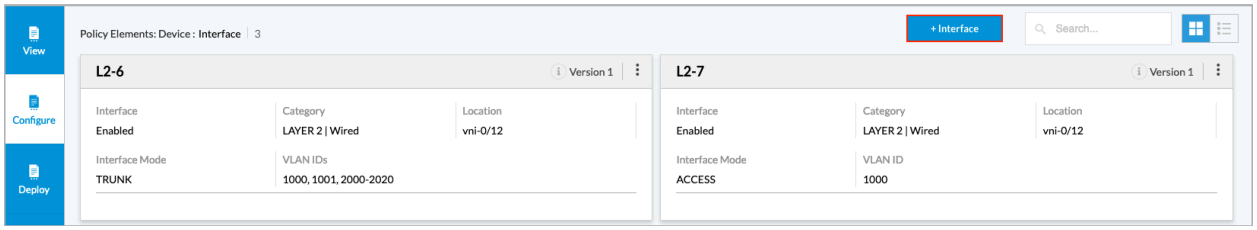
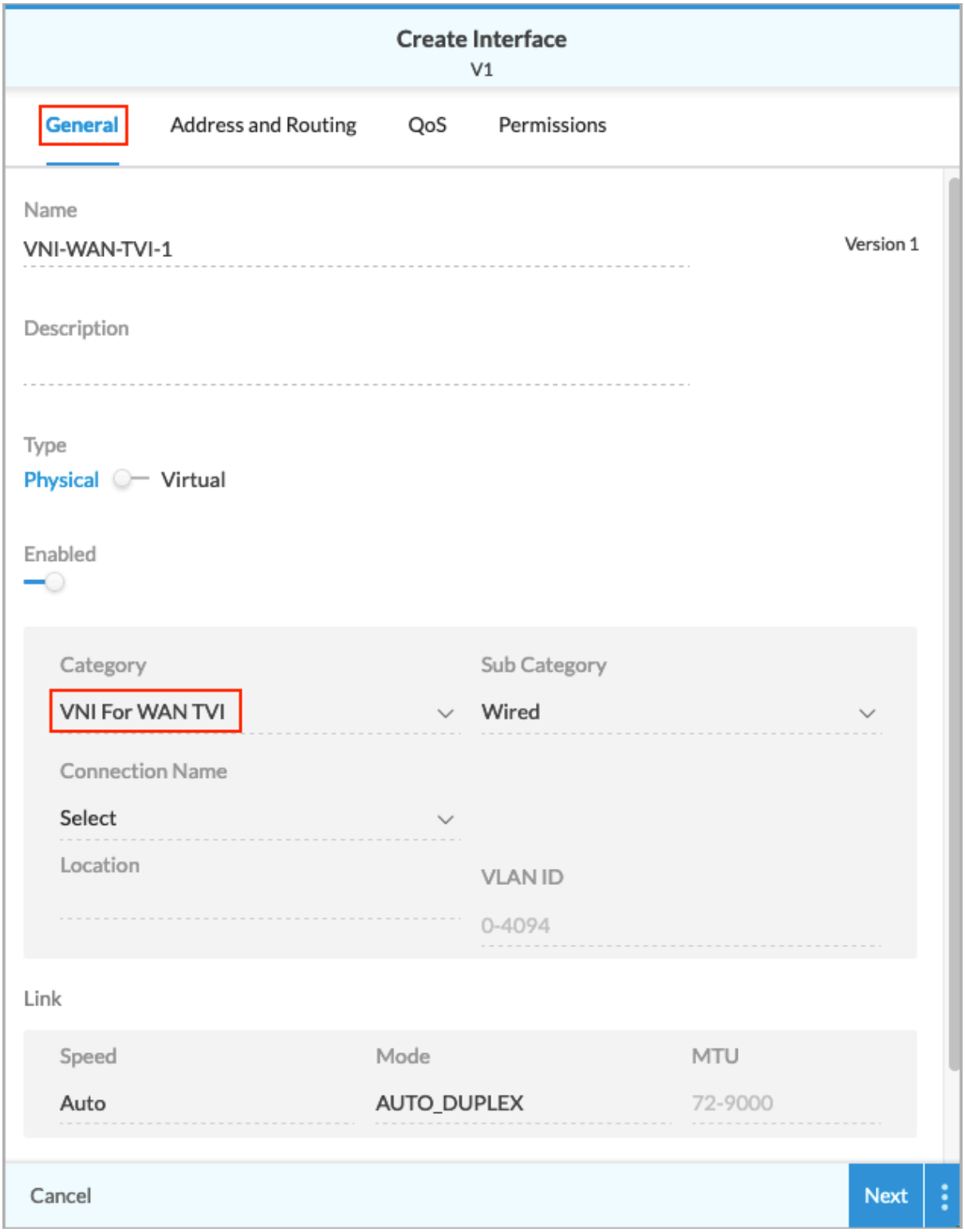
2. Click + Interface.



3. In the Create Interface screen, select the General tab, and then enter information for the following fields.



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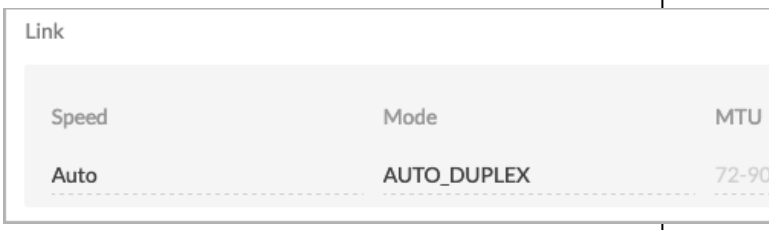
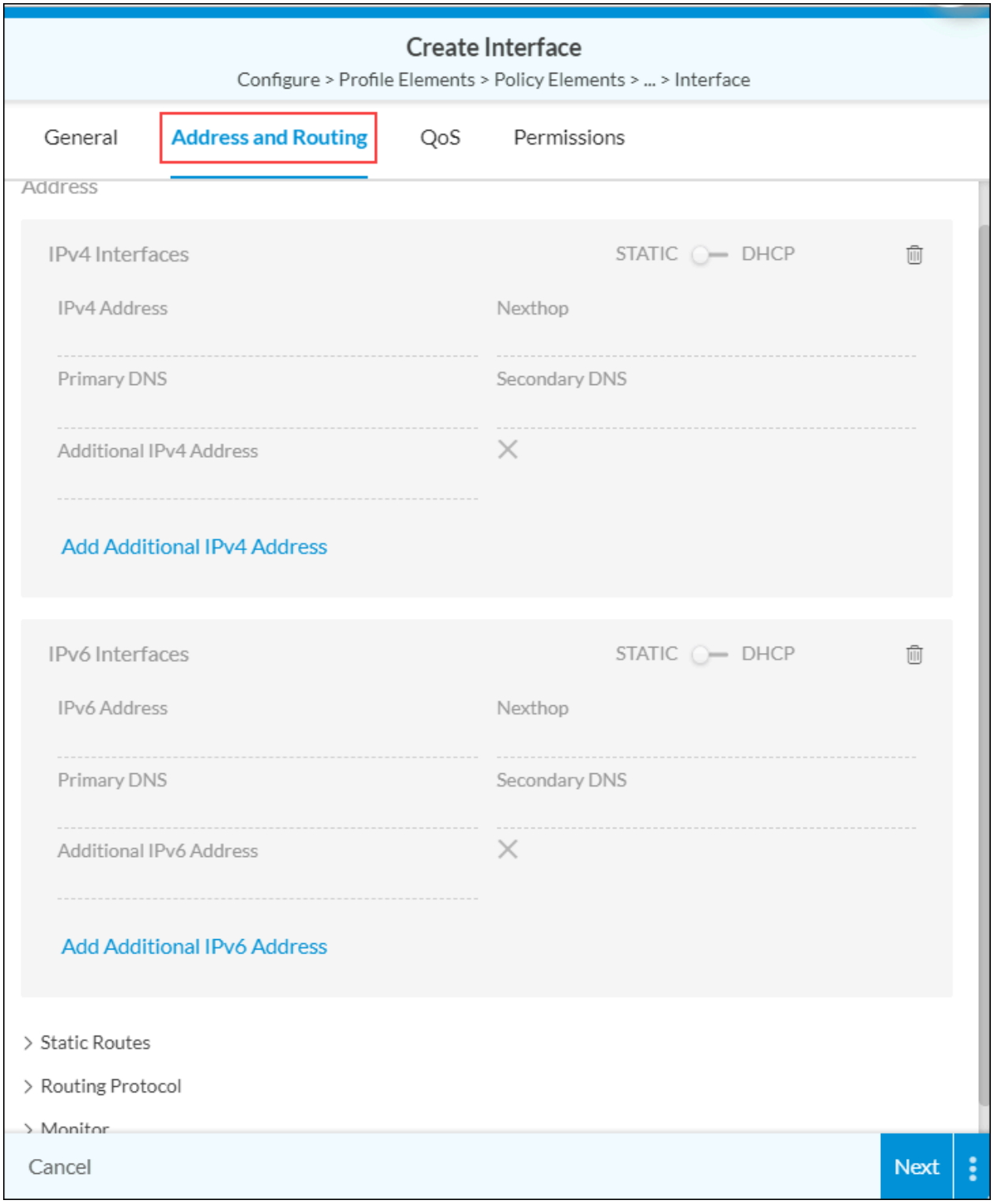
Field	Description
Name	Enter a name for the VNI for WAN TVI interface.
Type	Select Physical.
Enabled	Click the slider to enable the interface.
Category	Select VNI For WAN TVI.
Subcategory	Wired is the only subcategory allowed.
Connection Name	Select the name of a connection. The connection name identifies the transport VR to which this VNI interface is attached. More than one VNI interface on the same appliance can have the same connection name. The connection name is used to map a previously created WAN TVI interface to the VNI for WAN TVI interface.
Location	Select a VNI interface.
VLAN ID	Enter a VLAN ID for the interface. If you enter a VLAN ID, the Inner VLAN ID field displays. Enter an inner VLAN ID.
Link (Group of Fields)	
◦ Speed	Select the link speed: ◦ Auto ◦ 10 Mbps ◦ 100 Mbps ◦ 1 Gbps ◦ 10 Gbps ◦ 40 Gbps ◦ 100 Gbps

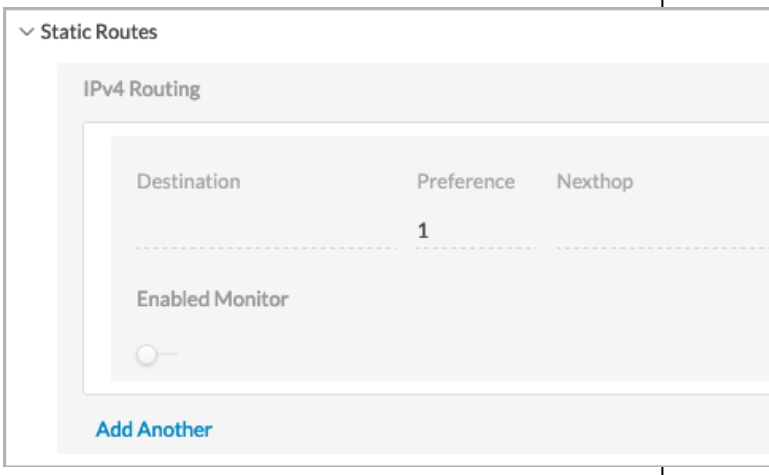
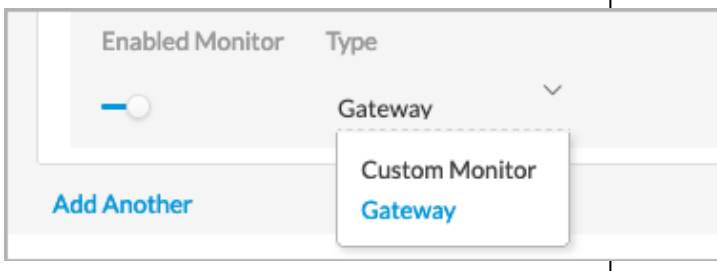
Field	Description
◦ Mode	Select the link mode: ◦ Auto Duplex ◦ Full Duplex ◦ Half Duplex
◦ MTU	Enter the maximum transmission unit (MTU) for the link. *Range*: 72 through 9000 *Default*: None
Tags	Enter one or more tags. A tag is and alphanumeric text descriptor with no spaces or special characters. You can specify multiple tags added for the same object. The tags are used for searching the objects.

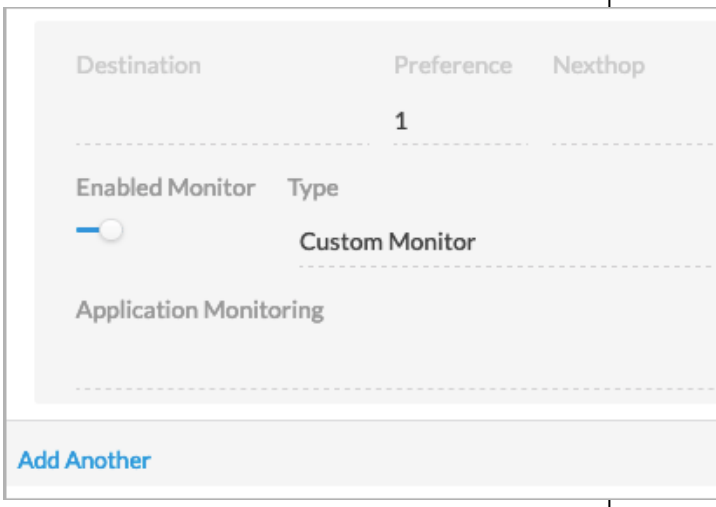
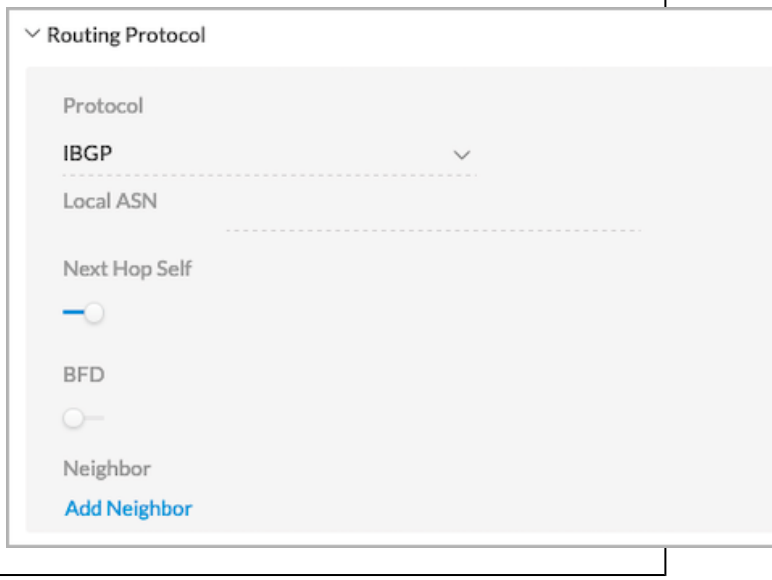
4. For redundancy, create two or more VNI interfaces WAN TVI interfaces. Each additional VNI interface WAN TVI interface should have the same connection name (such as Internet-1, Internet-2), but must use a different VNI port (such as vni-0/1 and vni-0/2).
5. Click Next. The Address and Routing tab displays. Enter information for the following fields.

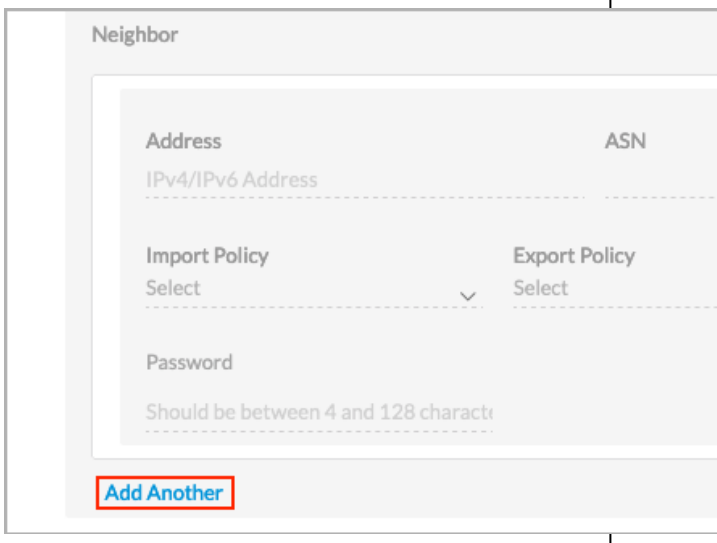


Field	Description
Address (Group of Fields)	

Field	Description
◦ IPv4 Interfaces (Group of Fields)	Click the slider bar to select static or DHCP addressing. If you select DHCP, the IPv4 address is assigned automatically.
◦ IPv4 Address	For static routing, enter a valid IPv4 address.
◦ Next Hop	Enter the IP address of the next hop.
◦ Primary DNS	Enter the IP address of the primary DNS server.
◦ Secondary DNS	Enter the IP address of the secondary DNS server.
◦ Add Additional IPv4 Address	(For Releases 12.1.1 and later.) Click to add additional IPv4 address, and then enter the IPv4 address.
◦ IPv6 Interfaces (Group of Fields)	Click the slider bar to select static or DHCP addressing. If you select DHCP, the IPv6 address is assigned automatically.
◦ IPv6 Address	For static routing enter a valid IPv6 address.
◦ Next Hop	Enter the IP address of the next hop.
◦ Primary DNS	Enter the IP address of the primary DNS server.
◦ Secondary DNS	Enter the IP address of the secondary DNS server.
◦ Add Additional IPv6 Address	(For Releases 12.1.1 and later.) Click to add additional IPv6 address, and then enter the IPv6 address.
Static Routes (Group of Fields)	Click Static Routes to configure IPv4 static routing, and then enter information for the following fields.

Field	Description
	 ◦ Destination—Enter a valid IPv4 address and subnet, for example, 10.1.1.0/24. ◦ Preference—Enter a value for the route preference. *Range*: 1 through 255 *Default*: None ◦ Next Hop—Enter the IP address of the next hop. ◦ Enabled Monitor—Click the slider to enable a monitor for the interface, and then select a monitor type.  If you select Custom Monitor, select a monitor in the Application Monitoring field

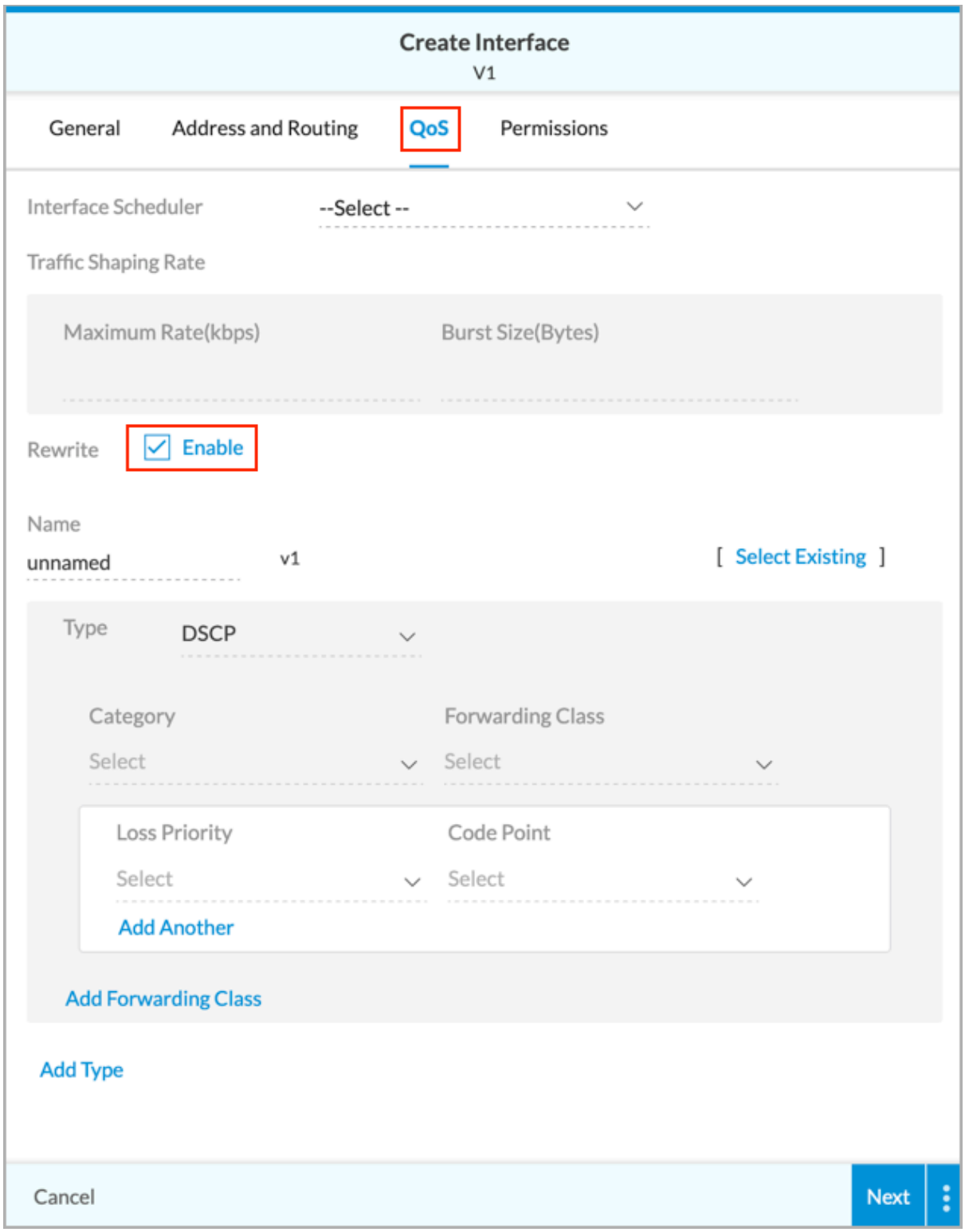
Field	Description
	
Routing Protocol (Group of Fields)	Select a routing protocol: ◦ EBGP ◦ IBGP ◦ OSPF ◦ RIPv2
◦ EBGP or IBGP	For EBGP or IBGP, enter information for the following fields. 

Field	Description
	◦ Protocol—Select EBGP or IBGP. ◦ Local ASN—Enter the local AS number. ◦ Next-Hop Self—(IBGP only.) Next-hop self is enabled by default. Click the slider to disable it. ◦ BFD—Click the slider to enable BFD. ◦ To add a BGP neighbor, click Add Neighbor and then enter information for the following fields..  ▪ Address—Enter the IPv4 or IPv6 address of the neighbor. ▪ ASN—Enter the AS number of the neighbor. ▪ Import Policy—Select a BGP import policy. ▪ Export Policy—Select a BGP export policy. ▪ Password—Enter a password between 4 and 128 characters. ◦ Add Another—Click to add another BGP neighbor.
◦ OSPF	Enter information for the following fields.

Field	Description
	 ◦ Area ID—Enter an ID for the area. A backbone area has an area ID of 0.0.0.0. Areas with nonzero IDs are nonbackbone areas. ◦ BFD—Click the slider to enable BFD. ◦ Priority—Enter a priority value to use in the election of the designated router and the backup designated router. On a multiaccess network, the OSPF router with the highest priority becomes the designated router, and the OSPF router with the second-highest priority becomes the backup router. If you set the priority to 0, the device does not participate in designated router and backup designated router election process. ◦ Metric—Enter a value for the OSPF interface cost, which is used to calculate the total cost to reach a destination. *Range*: 1 through 65535 *Default*: 1
◦ RIPv2	Select to enable RIPv2.
Monitor (Group of Fields)	Select to configure a routing protocol monitor. Enter information for the following fields.

Field	Description
	 ◦ Enable—Click the slider to enable the monitor. ◦ Gateway—Select Gateway or Customer Monitor from the drop-down list.

6. Click Next. The QoS tab displays. Enter information for the following fields.



Field	Description
Interface Scheduler	Select an interface scheduler.
Traffic Shaping Rate (Group of Fields)	
◦ Maximum Rate	Enter the maximum ingress rate, in Kbps. *Range*: 8 through 10000000 Kbps *Default*: None
◦ Burst Size	Enter the packet burst size, in bytes. *Range* : 1000 through 4294967295 bytes *Default*: None
Rewrite	Click Enable to add a QoS rewrite rule. Additional fields then display.
◦ Name or Select Existing	Enter a name for the rewrite rule, or click Select Existing, and then select the name of an existing rewrite rule in the popup window.
◦ Type (Group of Fields)	Select the rewrite table type.
◦ Category	Select the forwarding class category.
◦ Forwarding Class	Select the forwarding class to which to apply the rewrite rule.
◦ Loss Priority	Select the drop loss priority at which the DSCP, DSCPv6, or IEEE 802.1p value should be rewritten: ◦ Low ◦ High
◦ Code Point	Select the standard code point to associate with the forwarding class and the drop loss priority.
◦ Add Another	Click to add another loss priority and code point.
◦ Add Forwarding Class	Click to add an additional forwarding class to the selected rewrite table type.

Field	Description
◦ Add Type	Click to add an additional rewrite table type.

7. Click Next, or click the Permissions tab, and then revise the permissions, if desired.
8. Click Save to create the interface.

Supported Software Information

Releases 11.4.1 and later support all content described in this article, except:

- Release 12.1.1 adds support for additional IPv4 and IPv6 addresses.

Additional Information

Configure Aggregated Ethernet Interfaces in Concerto
Configure Bandwidth Limits for Multitenant WAN Interfaces in Concerto