Configure Layer 3 TLOC Extension

Contents

Introduction

Prerequisites

- Requirements
- Components Used

Background Information

Configure

- Network Diagram

ConfigureTLOC Extension L3 from vManage GUI

- Step 1. Configuration on cEdge-01
- Step 2. Configuration on cEdge-02
- Configure TlOC Extension L3 from CLI

Verify

Troubleshoot

Introduction

This document describes how to configure TLOC-Extension Layer 3 (L3) on a Software-Defined Wide Area Network (SD-WAN).

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Templates
- TLOC-Extension
- Routing Protocols
- SD-WAN General Overview

Components Used

The information in this document is based on these software and hardware versions:

- vBond Version 20.7.2
- vSmart Version 20.7.2
- vManage Version 20.7.2
- Cisco vManage Release 20.7.x or later

- Integrated Service Routers (ISR)4451/K9 Version 17.7.2

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

The TLOC extension allows a WAN Edge router to:

- Communicate over the WAN transport (connected to the adjacent WAN Edge router) through a TLOC-extension interface.
- Extend the TLOC to have redundancy on the transport side.

There are two ways to configure the TLOC Extension:

Via L2

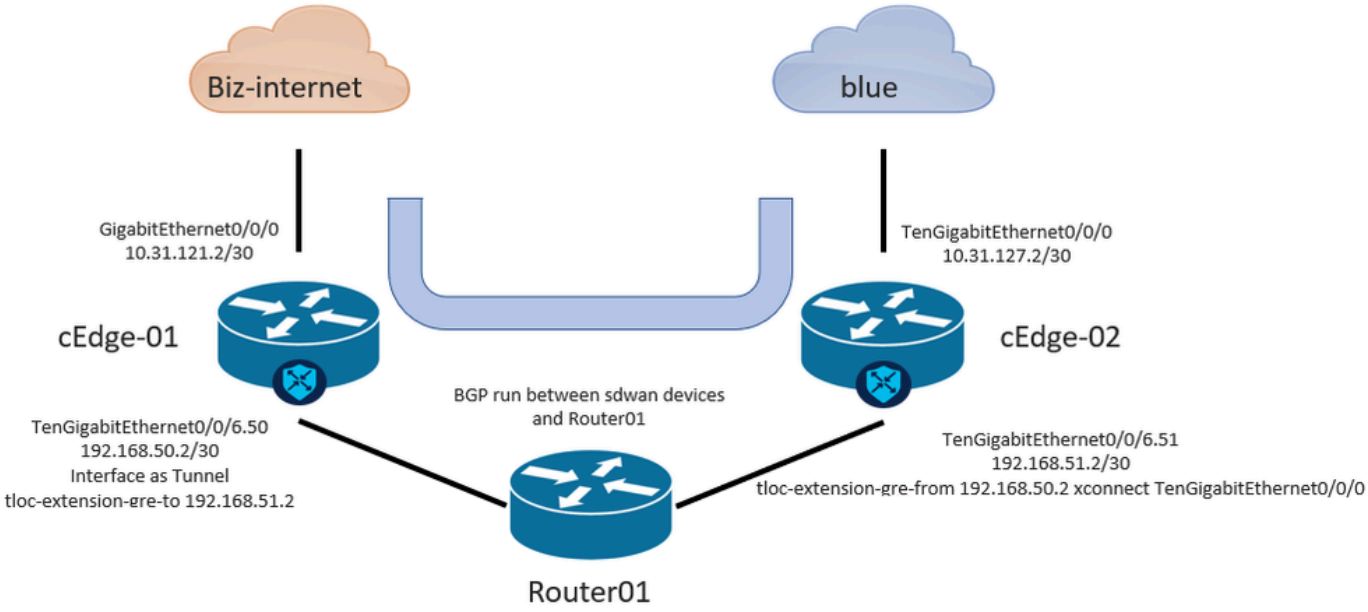
- Connect another SD-WAN router at the same physical site.

Via L3

- Requires a router with L3 capabilities used to configure any routing protocol.
- Connects between SD-WAN devices and non SD-WAN devices.
- Must be via GRE tunnel to extend the TLOC.

Configure

Network Diagram



Configure TLOC Extension L3 from vManage GUI

Note: Must configure a routing protocol to communicate between SD-WAN devices with a non SW-WAN device. In this example, BGP is configured.

Step 1. Configuration on cEdge-01

1. Configure the Interface for TLOC-L3 connection and assign it to tunnel interface.

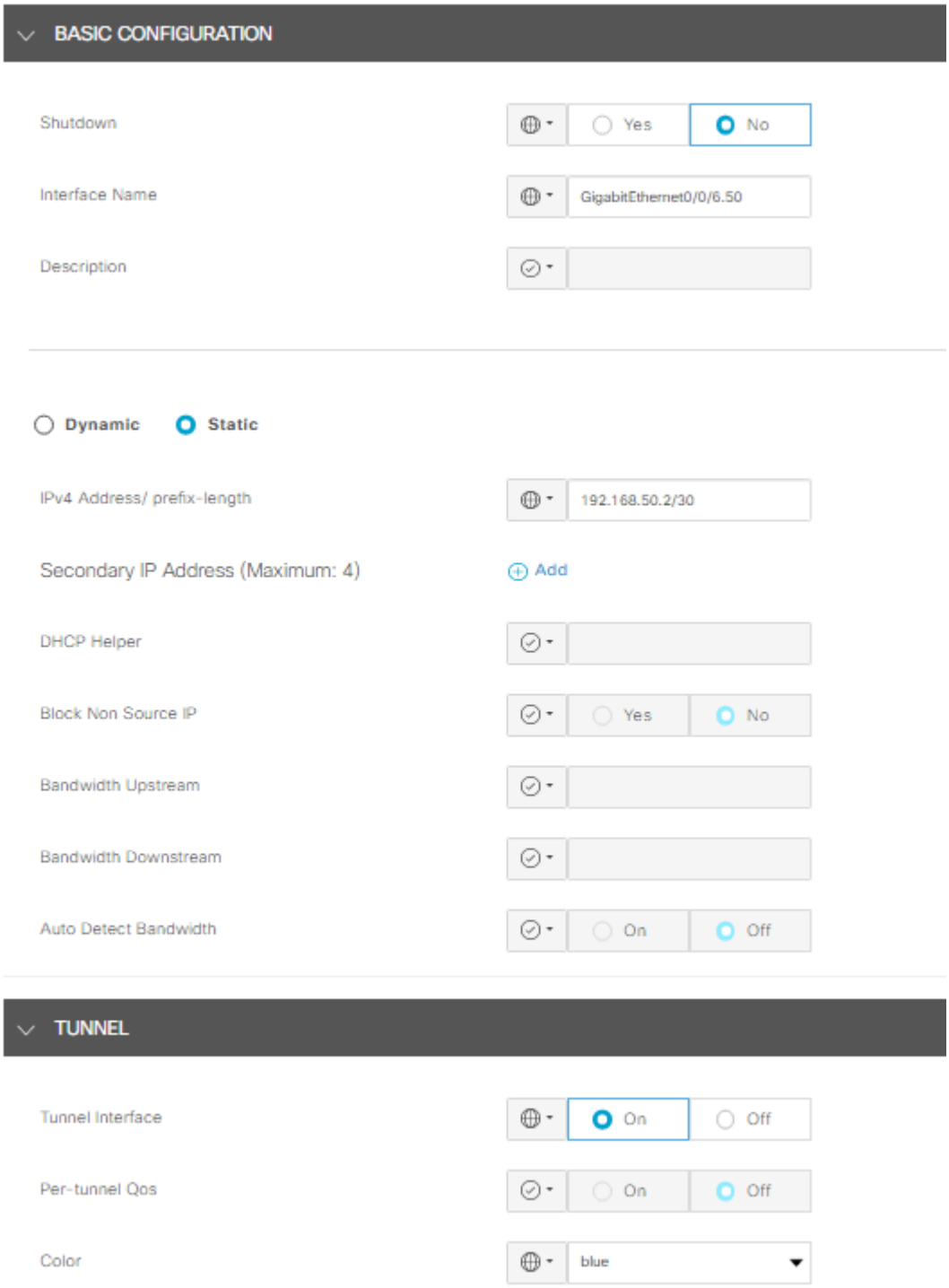
- In vManage GUI, Navigate to **Configuration > Templates > Feature Template > Select Device > VPN Interface Ethernet**.
- Configure basic configuration of the Interface, assign an IP address; in this example, interface GigabitEthernet0/0/6.50.
- Navigate to the **Tunnel** section and turn it **on**. Use the same color the other SD-WAN device used as the local color, in this example, blue.

---

2. Enable the TLOC extension statement from the device that receives the TLOC.

- Navigate to **Tunnel > Advance Option > GRE Tunnel destination IP**.

Note: The IP address must be the interface address assigned to the other SD-WAN device used for L3 connection. An example is the IP address on cEdge-02 of interface TengigabitEthernet0/0/6.51.



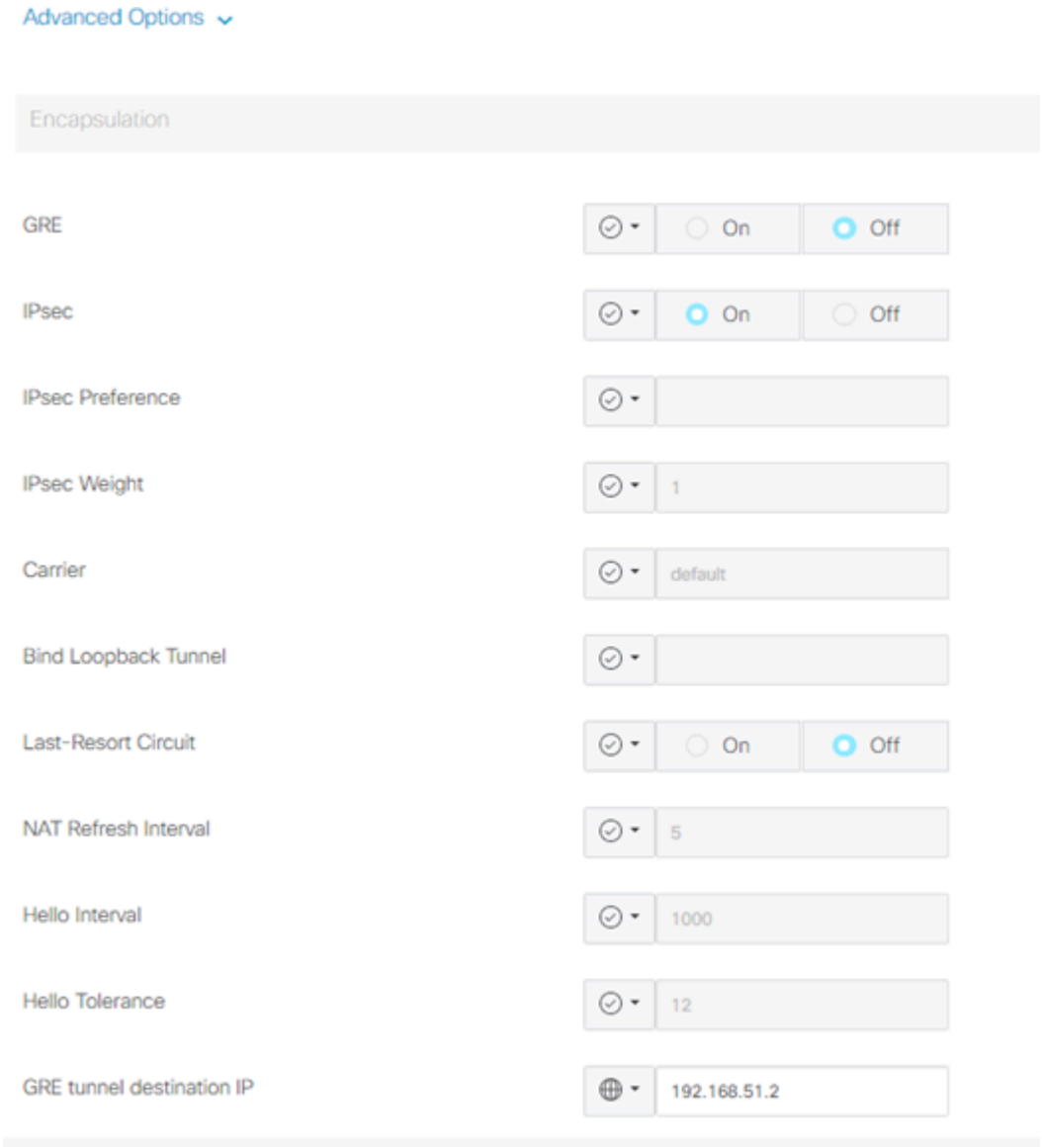
---

3. Enable TLOC extension statement from where the device gets the TLOC.

- Navigate to **Tunnel > Advance Option > GRE Tunnel destination IP**.

---

4. The IP address must be the interface assigned to the other SD-WAN device, which is used for the L3 connection. In this case, the IP address on cEdge-02 of interface TenGigabitEthernet0/0/6.51.

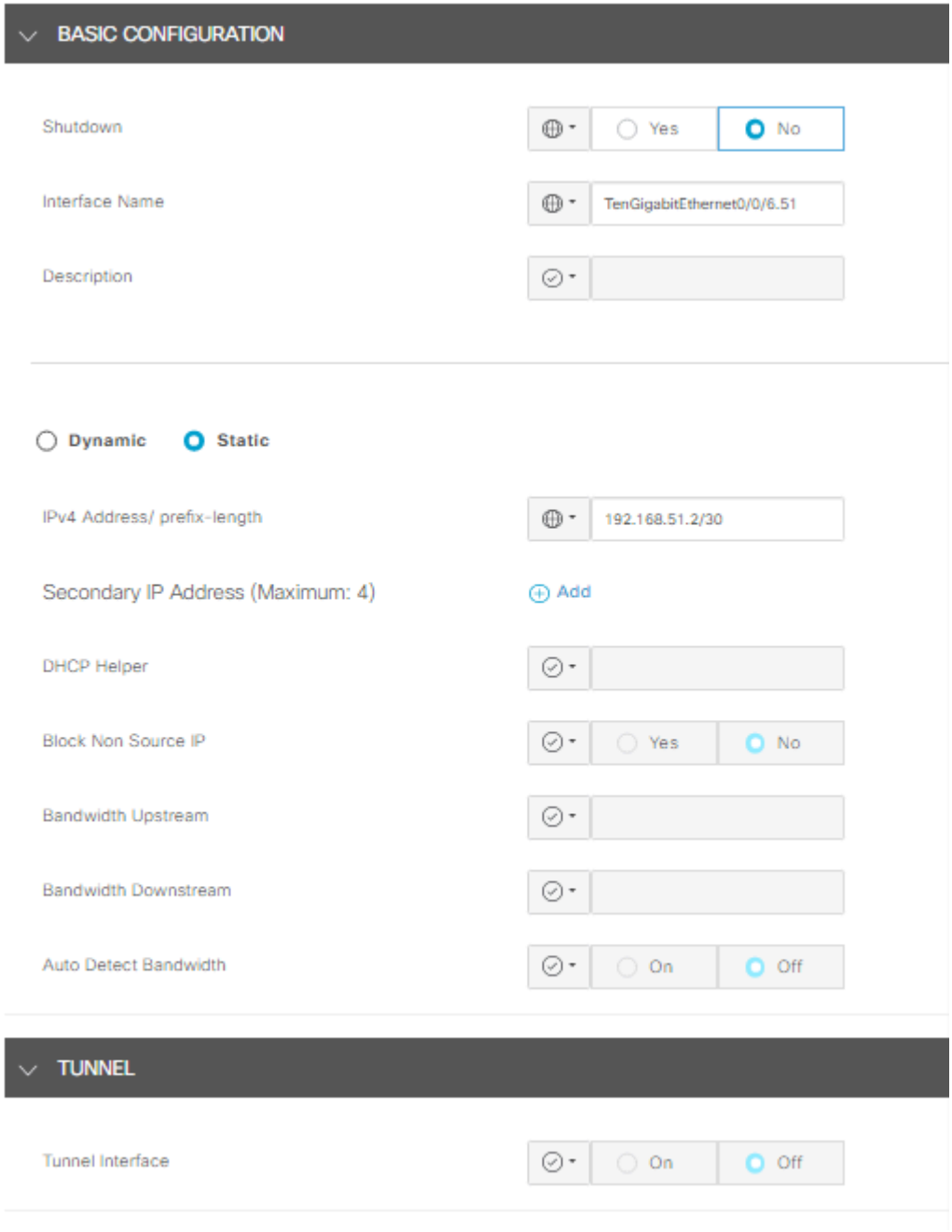


Step 2. Configuration on cEdge-02

1. In the vManage GUI, navigate to **Configuration > Templates > Feature Template > Select Device > VPN Interface Ethernet**.

Note: In this interface, Tunnel must be **OFF**.

- Configure basic configuration of the Interface.
- Assign an IP address (TenGigabitEthernet0/0/6.51 in this case).

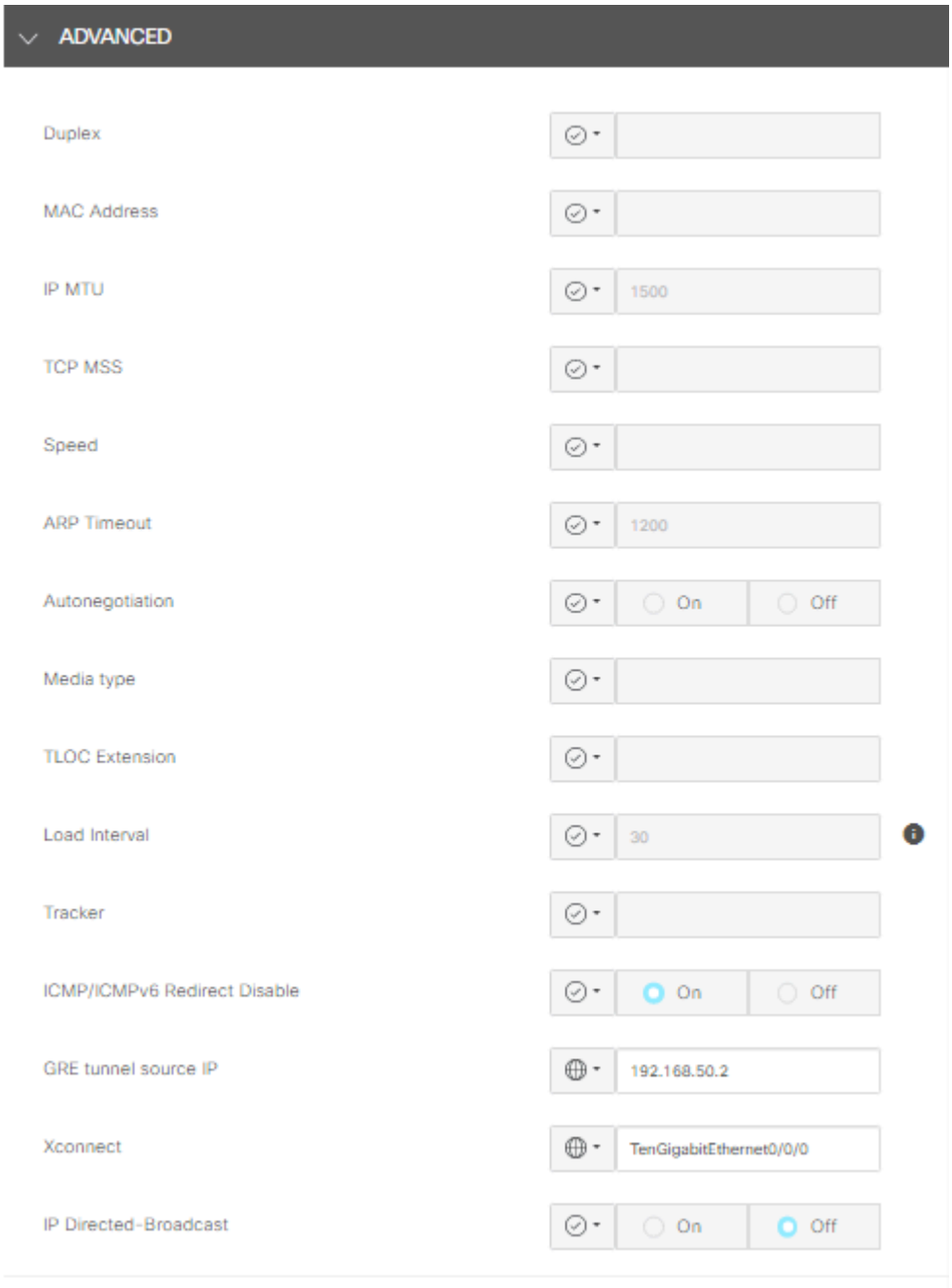


2. Navigate to the **Advance** section and complete the information for **GRE tunnel source IP**.

Note:

- The IP address must be the interface address assigned to the other SD-WAN device used for L3 connection.
- xconnect must be the WAN interface used to send traffic over the extended TLOC.

An example is the IP address on cEdge-02 of interface TengigabitEthernet0/0/6.51.



Configure TlOC Extension L3 from CLI

In this section, you can check how the configuration looks on CLI after the template push.

Configuration on cEdge-01:

```
cEdge-01#show sdwan running-config
system
 system-ip              <system_ip>
 site-id                <site_id>
 organization-name      <organization_name>
```

```
 vbond <vbond>
!
hostname cEdge-01
!
ip route 0.0.0.0 0.0.0.0 10.31.121.1
interface GigabitEthernet0/0/0
 no shutdown
 ip address 10.31.121.2 255.255.255.252
exit
interface GigabitEthernet0/0/6
 no shutdown
 ip mtu 1504
 mtu 1504
 negotiation auto
exit
interface GigabitEthernet0/0/6.50
 no shutdown
 encapsulation dot1Q 50
 ip address 192.168.50.2 255.255.255.252
exit
interface Loopback100
 no shutdown
 ip address 10.10.10.10 255.255.255.255
exit
interface Tunnel0
 no shutdown
 ip unnumbered GigabitEthernet0/0/0
 tunnel source GigabitEthernet0/0/0
 tunnel mode sdwan
exit
interface Tunnel10101012
 no shutdown
 ip unnumbered GigabitEthernet0/0/6.50
 no ip redirects
 ipv6 unnumbered GigabitEthernet0/0/6.50
 no ipv6 redirects
 tunnel source GigabitEthernet0/0/6.50
 tunnel mode sdwan
exit
router bgp 65001
 bgp log-neighbor-changes
 bgp router-id 10.10.10.10
 neighbor 192.168.50.1 remote-as 65003
 address-family ipv4 unicast
  neighbor 192.168.50.1 activate
  network 192.168.50.0 mask 255.255.255.252
  exit-address-family
 !
sdwan
 interface GigabitEthernet0/0/0
  tunnel-interface
   encapsulation ipsec
   color biz-internet
   allow-service all
  exit
 exit
 interface GigabitEthernet0/0/6.50
  tunnel-interface
   encapsulation ipsec
   color blue
   tloc-extension-gre-to 192.168.51.2
  exit
```

```
exit
cEdge-01#
```

Configuration on cEdge-02:

```
cEdge-02#show sdwan running-config
system
 system-ip             <system_ip>
 site-id               <site_id>
 organization-name     <organization_name>
 vbond <vbond>
!
hostname cEdge-02
!
ip route 0.0.0.0 0.0.0.0 10.31.127.1
ip nat inside source list nat-dia-vpn-hop-access-list interface TenGigabitEthernet0/0/0 overload
interface TenGigabitEthernet0/0/0
 no shutdown
 ip address 10.31.127.2 255.255.255.252
 ip nat outside
exit
interface TenGigabitEthernet0/0/6
 no shutdown
 mtu 1504
exit
interface TenGigabitEthernet0/0/6.51
 no shutdown
 encapsulation dot1Q 51
 ip address 192.168.51.2 255.255.255.252
exit
interface Loopback200
 no shutdown
 ip address 10.200.200.200 255.255.255.255
exit
interface Tunnel0
 no shutdown
 ip unnumbered TenGigabitEthernet0/0/0
 ipv6 unnumbered TenGigabitEthernet0/0/0
 tunnel source TenGigabitEthernet0/0/0
 tunnel mode sdwan
exit
router bgp 65002
 bgp log-neighbor-changes
 bgp router-id 10.200.200.200
 neighbor 192.168.51.1 remote-as 65003
 address-family ipv4 unicast
  neighbor 192.168.51.1 activate
  network 192.168.51.0 mask 255.255.255.252
  exit-address-family
 !
sdwan
 interface TenGigabitEthernet0/0/0
  tunnel-interface
   encapsulation ipsec
   color blue
   allow-service all
   allow-service bgp
```

```
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
   allow-service https
   no allow-service snmp
   no allow-service bfd
  exit
 exit
 interface TenGigabitEthernet0/0/6.51
  tloc-extension-gre-from 192.168.50.2 xconnect TenGigabitEthernet0/0/0
 exit
cEdge-02#
```

Verify

Validation on cEdge-01:

cEdge-01 must create control connections with local TLOC (biz-internet) and TLOC Extension (blue).

```
cEdge-01L#show sdwan control connections
                                                                                    PEER
PEER    PEER PEER            SITE       DOMAIN PEER                                 PRIV  PEER
TYPE    PROT SYSTEM IP       ID         ID     PRIVATE IP                           PORT  PUBLIC IP
-------------------------------------------------------------------------------------------------
vsmart  dtls                 10         1      192.168.21.34                        32953 172.18.121
vsmart  dtls                 10         1      192.168.21.34                        32953 172.18.121
vbond   dtls                 0          0      172.18.121.105                       32853 172.18.121
vbond   dtls                 0          0      172.18.121.105                       32853 172.18.121
vmanage dtls                 10         0      192.168.28.25                        32953 172.18.121

cEdge-01#show sdwan control local-properties

                        PUBLIC          PUBLIC PRIVATE         PRIVATE
INTERFACE               IPv4            PORT   IPv4            IPv6

-------------------------------------------------------------------------------------------------
GigabitEthernet0/0/0          10.31.121.87    32853  10.31.121.87    ::
GigabitEthernet0/0/6.50       10.31.127.62    5063   192.168.50.2    ::
```

Troubleshoot

If you have issues, refer to: [Troubleshoot SD-WAN Control Connections]