CHAPTER 63

Failure Scenarios

This chapter provides details of all failure scenarios reported by the Cisco Prime Diagnostics application. It also details IOS XR support caveats.

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Note Prime Diagnostics only supports L3 services implemented on sub-interfaces/interfaces.

Failure Scenarios

This section lists the failure scenarios reported by Diagnostics, as follows:

Each failure scenario provides a table that lists whether the failure scenario is supported by each of the five Diagnostics test types. This table details whether the failure scenario is supported on IOS and IOS XR. The table also details if the failure scenario is supported for IPv4 and IPv6.

Note In the following tables, NA stands for Not Applicable and NS stands for Not Supported.

Access Circuit

Access Circuit Blocking IP Connectivity

There is a blocking access list preventing IP connectivity from an access circuit interface on the provider (PE) router to the destination.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

An Invalid PE Interface has been Specified

Interface does not exist on the PE router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes

ATM Interface Has No VPI/VCI

An asynchronous transfer mode (ATM) access circuit interface on a PE router has no virtual path identifier (VPI), or virtual channel identifier (VCI) assigned to it, or no VPI/VCI maps to the destination IP address.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

ATM Interface Is Protocol Down

An ATM access circuit interface on a PE router is protocol down. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

ATM Sub-interface is Protocol Down

An ATM access circuit subinterface on a PE router is protocol down. This might be caused by incorrect subinterface parameters or by ATM Operation, Administration, and Maintenance (OAM) detecting a fault and bringing the interface down automatically. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Calculation of the CE Access Circuit Interface IP Address is only possible if the PE interface is not Unnumbered and has a /30 Subnet mask Interface on PE

Unable to calculate the customer edge (CE) access circuit interface IP address for the PE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NA

For more details see the "IPv6 Support" section on page 63-29.

eBGP Max Prefix Exceeded for Peer

Exterior border gateway protocol (eBGP) is running between the PE and CE, however the border gateway protocol (BGP) neighbor is not established. The peer has exceeded the configured maximum number of prefixes.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

eBGP Neighbor Not Established, No Route Present

eBGP is running between the PE and CE, but the BGP neighbor on the PE is not established. The BGP neighbor is on a different subnet from the PE and there is no route to the neighbor in the VPN routing/forwarding (VRF).

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

eBGP Neighbor Not Established, Possible Misconfiguration

eBGP is running between the PE and CE, but the BGP neighbor on the PE is not established. There is a route to the BGP neighbor in the VRF and it is reachable via ping. Possible CE or PE BGP configuration problem.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

eBGP Neighbor Not Established, Route Present

eBGP is running between the PE and CE, but the BGP neighbor on the PE is not established. The BGP neighbor is on a different subnet from the PE and there is a route to the neighbor in the VRF. However, the BGP neighbor is unreachable via ping.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

eBGP sites use the same AS number

The local and remote sites use eBGP and share the same AS number and neither "allowas-in" nor "as-override" is configured for the BGP neighbor within the vrf on the local PE router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	NA	NA	NA	NA	Yes	Yes	Yes

EIGRP Not Exchanging Routes

The enhanced interior gateway routing protocol (EIGRP) is running between the PE and CE and a peer relationship has been established. However, no routes have been received from EIGRP on the CE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Ethernet Interface Protocol Down

An Ethernet access circuit interface on the PE router protocol is down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Ethernet Sub-Interface Protocol Down

An Ethernet access circuit subinterface on the PE router protocol is down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Frame Relay Interface Has No DLCI

A Frame Relay access circuit interface on the PE router has no data-link connection identifier (DLCI) assigned to it, or no DLCI maps to the destination IP address.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Frame Relay Interface Protocol Down

A Frame Relay access circuit interface on the PE router protocol is down. This might be because of line parameters or cabling faults.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Frame Relay Interface Has No DLCI

A multipoint Frame Relay permanent virtual circuit (PVC) on an access circuit interface on the PE router has no DLCI that maps to the destination IP address.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Frame Relay Interface Has No DLCI

A point-to-point Frame Relay PVC on an access circuit interface on the PE router has no DLCI assigned to it.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Frame Relay PVC Marked as Deleted

A Frame Relay PVC on an access circuit interface on the PE router is marked as deleted.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	NA	Yes	NS

Frame Relay PVC Marked as Down

A multipoint Frame Relay PVC on an access circuit interface on the PE router is marked as down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	NA	Yes	NS

Frame Relay PVC Marked as Down

A point-to-point Frame Relay PVC on an access circuit interface on the PE router is marked as down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Incomplete Carrier on Serial Interface

A serial access circuit interface on the PE router has an incomplete carrier.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Interface Administratively Down

An access circuit interface (or subinterface) on the PE router is administratively down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Interface Administratively Down

An access circuit subinterface on the PE router is administratively down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Interface in Protocol Down State

An access circuit interface on the PE router protocol is down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Interface on the PE is a Bundle Link Virtual-Access Interface

The interface on the PE is not a valid access circuit interface.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	NA	Yes	NS

Interface Operationally Down

An access circuit interface on the PE router is operationally down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Intermittent ATM Failure (to the ATM Next Hop)

An ATM access circuit has intermittent ATM access to the ATM next hop. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Intermittent ATM Failure (to the Destination)

An ATM access circuit has intermittent ATM access to the destination. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Invalid Access Circuit IP Address Configuration

The CE router access circuit interface IP address is not in the same subnet as the attached PE access circuit interface IP address.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Invalid Access Circuit IP Address Configuration

The CE access circuit interface IP address is a network address.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NA

For more details see the "IPv6 Support" section on page 63-29.

Invalid Access Circuit IP Address Configuration

The CE access circuit interface IP address is a network broadcast address.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NA

For more details see the "IPv6 Support" section on page 63-29.

Invalid Access Circuit IP Address Configuration

The CE access circuit interface IP address is the same as the attached PE access circuit interface IP address.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

IP Connectivity Problem

Unknown IP connectivity issue. An access circuit connectivity problem in the VRF instance from the PE interface to the CE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
NA	Yes	NA	NA	NA	Yes	Yes	Yes	Yes

Missing Route

There is no route from the access circuit interface on the PE router to the destination.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Missing Route

There is no route from the access circuit interface on the PE router to the customer destination.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

No EIGRP Peer Relationship Established

The routing protocol EIGRP is running between the PE and CE, however no peer relationship has been established.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

No EIGRP Peer Relationship Established

The routing protocol EIGRP is running between the PE and CE. The PE and CE interfaces are on different subnets and are not using IP unnumbered. No peer relationship has been established as the PE and CE are on different subnets.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Route redistribution does not specify a route-policy

The routing protocol EIGRP is running between the PE and CE and is redistributing routes into MP-BGP. However no outbound route policy has been specified, which means all routes will be dropped rather than advertised.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	NA	Yes	Yes	NS

No OSPF Peers

Open shortest path first (OSPF) is running between the PE and CE, but no peer exists on the PE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

OSPF not enabled on peer interface

The interface on the router does not have OPSF enabled. OSPF must be enabled on both neighboring interface.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	NS

OSPF in passive mode on peer interface

OSPF on interface on the router is in passive mode.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	NS

OSPF Area Mismatch

OSPF is enabled on the neighboring interfaces; however the interfaces are configured in different areas.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	NS

OSPF Area Type Mismatch

OSPF is enabled on the neighboring interfaces; however the interfaces are configured as different area types.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	NS

No Routing Protocol has been Determined Running between the PE and CE and no Static Route is Present

An access circuit connectivity problem in VRF.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

OSPF Not Exchanging Routes

OSPF is running between the PE and CE, but a peer relationship has been established. However, no routes have been received from OSPF on the CE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

OSPF Peers Not Established

OSPF is running between the PE and CE, but a peer relationship has not been established.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NA

OSPF Timer Mismatch

OSPF is enabled on the neighboring interfaces; however the interfaces have different values configured for their [hello|dead] timers.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	NS

OSPF Peers Not Established

OSPF is running between the PE and CE. However, a peer relationship has not been established as PE and CE interfaces are on different subnets and are not using IP unnumbered.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Route redistribution does not specify a route-policy

The routing protocol OSPF is running between the PE and CE and is redistributing routes into MP-BGP. However no outbound route policy has been specified, which means all routes will be dropped rather than advertised.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	NS	Yes	Yes	NS

PE has No Route to CE

Connected PE and CE interfaces are on different subnets. No routing protocol has been determined running between the PE and CE and no static route to the CE is present.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	NA	Yes	NS

RIB Failure

A route from the PE to a destination in a VRF has not been installed in the VRF routing table. This has been identified as a Routing Information Base (RIB) failure.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	NA	Yes	NS

RIP Misconfiguration

Routing information protocol (RIP) is running between the PE and CE, but no routes have been received from RIP on the CE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

RIP Not Exchanging Routes

RIP is running between the PE and CE, but no routes have been received from RIP on the CE as the PE and CE interfaces are on different subnets and are not using IP unnumbered.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Route redistribution does not specify a route-policy

The routing protocol RIP is running between the PE and CE and is redistributing routes into MP-BGP. However no outbound route policy has been specified, which means all routes will be dropped rather than advertised.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	NA	Yes	Yes	NS

Serial Interface in Loopback Mode

A serial access circuit interface on the PE router is configured in loopback mode.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Serial Interface Operationally Down

A serial access circuit interface on the PE router is operationally down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Static IP address on ATM Point-to-Point Interface

An ATM access circuit has a static IP address mapping on an ATM point-to-point subinterface. Neither a static mapping nor an address resolution protocol (ARP) are required on a point-to-point subinterface because there is a single VC and a single path for the traffic. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Sub-interface in Protocol Down State

An access circuit subinterface on the PE router protocol is down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Undiagnosed ATM Failure (ATM Pings Failed but the ATM Segment Ping Succeeded)

An ATM access circuit connection is broken. The end-to-end ATM ping failed, but the ATM segment ping succeeded. This might be caused by various issues such as incorrect ATM line parameters, misconfigured ATM routing, CE or ATM cloud interfaces being down, or devices being down. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Undiagnosed ATM Failure (End to End and Segment ATM Pings Failed)

An ATM access circuit connection is broken. Both the end-to-end and segment ATM pings failed. This might be caused by various issues such as incorrect ATM line parameters, misconfigured ATM routing on the ATM next hop, next hop interfaces being down, or devices being down. See the IOS XR Support, page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Virtual Template Interface has been Specified for the PE Access Circuit Interface

The PE interface on the PE is not a valid access circuit interface.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	NA	Yes	NS

MPLS Edge

BGP Next Hop Interface Admin Down

BGP next hop on PE is assigned to a loopback interface. However, that interface is administratively down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

BGP Next Hop is Not Assigned to an Interface

The BGP next hop for routes to the remote site PE is not assigned to an interface on the remote PE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

BGP Not Active

BGP is not active on the PE router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes

BGP Peers Using Same BGP Next Hop

BGP VPNv4/VPNv6 peers use the same BGP next hop. This prevents correct route distribution of PE routes. Other routing problems might also be encountered.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

BGP Peers Using Same Router Identifier (RID)

BGP VPNv4/VPNv6 peers use the same router identifier. This prevents correct route distribution of PE routes. Other routing problems might also be encountered.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Multiple Access Circuits in the same subnet

LSP Connectivity problem, control plane issue. The next-hop for the current BGP selected route(s) to the remote PE router is not assigned to an interface on the local PE router. There are multiple VPNv4/VPNv6 routes found within the vrf on the locale PE router to the remote prefix.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	NA	NA	NA	Yes	Yes	Yes	Yes

BGP to LFIB Mismatch

Untagged entry has mismatch between BGP and label forwarding information base (LFIB) tables.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes

BGP to LFIB Mismatch

The forwarding information base (FIB) and BGP entries are inconsistent.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes

Duplicate BGP Next Hop

Duplicate IP address found in the network for the BGP next hop on PE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Duplicate IP Address

There is a duplicate IP address configured on the PE router that conflicts with an access circuit interface.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Duplicate IP Address

Duplicate IP address found in the network for the BGP router identifier on PE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

eBGP not Redistributing Connected Routes into MP-BGP

The routing protocol eBGP is running between the PE and CE, but eBGP on the PE is not redistributing connected routes into Multi Protocol (MP)-BGP, also there is no explicit network statement.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

FIB to LFIB Mismatch

Aggregate entry has mismatch between FIB and LFIB tables.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Ingress FIB to Egress LFIB Mismatch

Egress LFIB and Ingress FIB inconsistency.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes

Inconsistent BGP Entries

BGP entries are inconsistent for the VRF.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes

Label mismatch or interfaces on different VPNs Down

VPN connectivity problem in VRF from PE to destination. BGP VPNv4/VPNv6 label for prefix do not match. This might indicate a label mismatch or interfaces on different VPNs. Check that the interfaces selected are on the same VRF.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
NA	NA	NA	Yes	NA	Yes	Yes	Yes	Yes

PE interface is administratively down

The access circuit interface on the PE router is administratively down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	NS

Missing Router Identifier (RID)

Unable to determine the local router identifier on the PE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes

Missing VPNv4 Address Family Configuration

VPNv4 configuration missing; Virtual private network (VPN) label exchange problem. VPNv4 address family configuration missing from BGP router configuration on the PE router. This results in routes being dropped.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

Missing VPNv6 Address Family Configuration

VPNv6 configuration missing; Virtual private network (VPN) label exchange problem. VPNv6 address family configuration missing from BGP router configuration on the PE router. This results in routes being dropped.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	NA	Yes	NA	Yes

MPLS LDP Package not enabled on IOS XR Router

The MPLS LDP package is not enabled on the IOS XR router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NA	Yes	Yes	Yes

MPLS Package installed but not active on IOS XR Router

The MPLS package is installed, but it is not active on the IOS XR router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NA	Yes	Yes	Yes

MPLS Package not installed on IOS XR Router

The MPLS package is not installed on the IOS XR router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NA	Yes	Yes	Yes

No MP-BGP Neighbors

There are no MP-BGP neighbors defined on the PE router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

No MP-BGP Neighbor Session Established

No MP-BGP neighbor session established on the PE router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

No VPN Label For Prefix

No VPN label has been allocated for the prefix.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

No VRF Associated with PE Interface

An interface on the PE router has no VRF associated.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

OSPF Loopback Interface Uses A Non /32 Netmask

VPNv4 routes are being advertised to IBGP neighbors by the PE. The address of the next hop is a loopback interface that does not have a /32 mask defined. OSPF is being used on this loopback interface, and the OSPF network type of this interface is loopback. OSPF advertises this IP address as a host route (with mask /32), regardless of what mask is configured. This advertising conflicts with TDP/LDP, that uses configured masks, so the TDP/LDP neighbors might not receive a label for the routes advertised by this router. This condition could break connectivity between sites that belong to the same VPN.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	NA

PE Interface Has No IP Address

An interface on the PE router has no IP address.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

Router ID Loopback Interface Down

The loopback interface used to assign the local router ID on the PE is administratively down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

Routes not Redistributed to or from MP-BGP

Routes are not being redistributed to or from MP-BGP on the PE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	NA	Yes	NA

Static Route to Remote Prefix

A static route to a remote prefix has been configured within a VRF on the PE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

Traffic Administratively Blocked

VPN connectivity problem from the PE to the destination due to traffic being administratively blocked.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	NA	NA	Yes	Yes	Yes	Yes

Troubleshooting of the Layer 3 VPN has been Unable to Find the Cause of the Failure

LSP connectivity problem.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Troubleshooting of the Layer 3 VPN has been Unable to Find the Cause of the Failure

VPN connectivity problem in VRF from PE to destination.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

VRF Route Target Import/Export Mismatch

VRF route target import/export mismatch between the PE devices.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

MPLS Core

An Invalid PE Interface has been Specified

Interface supplied as the LSP Endpoint does not exist on the PE router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
NA	NA	NA	NA	Yes	Yes	Yes	Yes	NA

Broken LDP Neighbor Session

LDP session with downstream neighbor broken. Route processor/line card forwarding discrepancy on the router. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

CEF Not Enabled On Router

CEF has not been enabled on a router. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

Distributed LFIB Table Discrepancy

There is a discrepancy in the LFIB table between the route processor and line cards.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

Distributed FIB Table Discrepancy

There is a discrepancy in the FIB table between the route processor and line cards.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	NA	Yes	Yes	Yes	Yes

Label Inconsistency

LFIB local tag, received packet, and LDP local binding label inconsistent on the router. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

LDP Host Not Reachable

The host is not reachable from the label switch router (LSR). This could be caused by no LDP session on router for the downstream router, LDP ID not reachable because of IGP problem, ACL configured that is blocking LDP packets, or an authentication problem.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

LDP Label Mismatch

Label received for a prefix did not match the label sent. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

LDP Neighbors Not Discovered

LDP neighbors have not been discovered. Generic LDP discovery problem found on an interface of the device with its downstream neighbor. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

LDP Neighbors Not Discovered

LDP neighbors have not been discovered. An interface on a router has an ACL configured that could be preventing LDP neighbor discovery.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

LDP Neighbors Not Established

LSP connectivity problem, control plane issue. The LDP session is not established. The interface has an ACL configured that could be blocking LDP session establishment on port 646.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

LDP/TDP Mismatch

LDP and TDP have been enabled on opposite ends of a link. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

LSP Reply Path Problem

LSP connectivity problem with the reply path. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

Missing LFIB Entry

LFIB entry missing. Could be because of misrouting in an earlier router, or due to duplicate loopbacks. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

Missing or Untagged Return Path

Return path from the core router absent or untagged for the prefix. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

MPLS Label Space Exhausted

MPLS label space exhausted on a router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

MPLS Not Enabled Globally

MPLS has not been enabled globally on router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

MPLS Not Enabled On Interface

MPLS has not been enabled on an interface. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

No Entry for Label

No entry in LFIB for incoming label going to the destination prefix. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

No LDP Session with Neighbor

No LDP session on router exists with neighbor.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

No Valid Next-Hop Entry

No valid entry can be found for the next-hop from the current device. See the "IOS XR Support" section on page 63-27.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes

Routing Loop In Forwarding Path

A routing loop is present in the forwarding path.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

All MPLS enabled core facing interfaces are down

LSP connectivity problem, control plane issue. No MPLS enabled interface is operationally up.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Label Advertising Not Enabled

Label advertisement is disabled on router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Label Advertising Possibly Denied by ACL

Label advertisement has been globally disabled, but selectively enabled for one or more access lists. The ACL(s) might be denying the advertising of labels to the destination prefix.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TTL Propagation Disabled

Could not troubleshoot or detect failure point because the device is not propagating the Time To Live (TTL).

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Check tunnel traffic admission policy

No traffic admission policy (such as via autoroute announce, or Policy Based Tunnel Selection (PBTS) or a static route) configured on the TE Tunnel.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NA	Yes	Yes	Yes

Check if MPLS is enabled on the tunnel interface

Incomplete configuration detected for the MPLS TE Tunnel interface.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	NA	Yes	NS	Yes	Yes	Yes

Check that the primary and backup tunnel's interfaces are up

The tunnel interface on the router is administratively down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Tunnel config not present at headend

The TE Tunnel configuration is not present at the headend router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Check that the tunnels outgoing interface is operational

The outgoing interface of FRR primary tunnel configured on the router is operationally down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

TE not enabled globally on router

MPLS Traffic Engineering is not enabled globally on the router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

TE not enabled globally on the interface

MPLS Traffic Engineering is not enabled on the interface of the router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

No IP Address assigned for tunnel

MPLS Traffic Engineering Tunnel has no IP address assigned.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Tunnel destination invalid

The destination address configured for the tunnel is unreachable.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Tunnel is administratively shut down

Tunnel has been admin shut down on the router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Missing OSPF configuration for TE

Router has not configured OSPF for MPLS TE.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Node is not advertising MPLS TE links

Router is not advertising itself through OSPF as an MPLS TE link.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

No targeted LDP session exists between peer PE's

Remote Site PE router is not accepting targeted LDP session requests.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	NA	Yes	NS	Yes	Yes	Yes

Blocking ACL causing targeted LDP session setup problem

Router has an access control list which is blocking LDP messages (on TCP port 646).

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Targeted LDP not established/operational between PE's

LDP has been unable to establish a targeted session between the devices due to peer PE router being unreachable.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Tunnel Connectivity Failure No Targeted LDP Configuration

LDP discovery failure for the neighbor devices. The tunnel tail end device is not accepting LDP targeted hellos.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

For link protection, check that the backup tunnel does not pass through the protected interface

There is a FRR backup tunnel configured on the router. It is configured to protect a link on router (as NHOP), which is on the path the primary tunnel takes. However the configured backup tunnel is configured to traverse this link.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Check the primary tunnel has FRR enabled with 'fast-reroute'

A tunnel has been detected on router. It appears that this tunnel is intended to be a primary tunnel, but it does not have the fast-reroute configuration as required.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	NA	Yes	NS	Yes	Yes	Yes

Node protection - Check if backup tunnel path is explicit and does not contain the protected node interface in path

There is a FRR backup tunnel configured on router. It is configured to protect a router (as NNHOP), which is on the path the primary tunnel takes. However the configured backup tunnel is configured to traverse a link on this router.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

Check if the primary & backup tunnel merge point is reachable

The merge point router for FRR primary tunnel and FRR backup tunnel is unreachable.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NS	Yes	Yes	Yes

TE ping failure

The *ping mpls traffic-eng tunnel* command returned failure.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	NA	Yes	NS	Yes	Yes	Yes

Tunnel operationally down

The *show mpls traffic-eng tunnels* command has indicated that the TE Tunnel is down.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	NA	Yes	NS	Yes	Yes	Yes

Tunnel Connectivity Failure

Unknown MPLS TE connectivity problem.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	NA	Yes	Yes	Yes

Unable to Troubleshoot MPLS TE Connectivity Problem

Router is running a non-OAM Cisco IOS version. The connectivity of the tunnel cannot be tested.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Unknown LSP Connectivity Problem

LSP connectivity problem, data plane issue, or unknown cause.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Unsupported IOS Version

Core router running an unsupported IOS version. This version of IOS does not support the required OAM functionality.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	NS

VPN Connectivity Tests have been Exercised and No Failures Found (However as Pings are Blocked to the CE, it is Not Possible to Verify VPN Connectivity)

Unable to verify VPN connectivity in VRF from PE to destination.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Customer Site

Possible Customer Routing Issue

The PE has some routes from the CE, but the CE is unable to respond to pings.

CE to CE	PE to Attached CE	CE to PE Across Core	PE to PE (in VRF)	PE to PE Core	IOS	IOS XR	IPv4	IPv6
Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes

IOS XR Support

This section details the IOS XR support caveats:

1. MPLS Not Enabled On Interface, page 63-21

   IOS XR has the concept of packages. One of the packages relevant to Diagnostics is the MPLS package. When Diagnostics troubleshooting focuses on an IOS XR router in the core, various preparation checks are carried out to ensure that the router is configured sufficiently; that is, that the MPLS package is installed and active, and then to check for the required features being enabled (MPLS OAM and MPLS LDP). If any of these checks fail, a failure scenario is reported. MPLS Not Enabled On Interface, page 63-21 remains valid for IOS devices, or when MPLS is disabled on an interface on an IOS XR device.

2. CEF Not Enabled On Router, page 63-19

It is still possible for Diagnostics to determine cases where CEF is disabled on IOS routers in the core, for example, CEF could be disabled via CLI configuration, or when the router is overloaded and shuts itself down. In such cases, the IOS CLI command **show cef state** reports that CEF is either *enabled/running* or *disabled/not running*, and Diagnostics can determine that CEF is disabled.

CEF cannot be disabled on an IOS XR router. When the CEF switching feature on an IOS XR router becomes overloaded, it does not shut down. Instead, it applies back pressure to the queue of outstanding requests in an effort to reduce the load on the CEF switching process. Therefore, in an IOS XR router, the relevant CLI **show** command does not report that CEF is non-operational, and thus this failure scenario is not valid on an IOS XR router.

3. LDP/TDP Mismatch, page 63-20

   This is not a valid scenario where directly connected IOS XR routers are present, because IOS XR only supports a single label distribution protocol – that is LDP. It is possible for the application to find LDP-TDP mismatch if it is configured in IOS-IOS XR, IOS XR-IOS, or IOS-IOS configurations.

4. Broken LDP Neighbor Session, page 63-18

   Label Inconsistency, page 63-19

   LDP Label Mismatch, page 63-19

   LDP Neighbors Not Discovered, page 63-20

   LSP Reply Path Problem, page 63-20

Missing LFIB Entry, page 63-20

Missing or Untagged Return Path, page 63-21

No Entry for Label, page 63-21

No Valid Next-Hop Entry, page 63-22

These failure scenarios are due to specific bugs in IOS versions, and are not applicable to IOS XR.

5. ATM Interface Is Protocol Down, page 63-2

   ATM Sub-interface is Protocol Down, page 63-2

   Intermittent ATM Failure (to the ATM Next Hop), page 63-6

   Intermittent ATM Failure (to the Destination), page 63-6

   Static IP address on ATM Point-to-Point Interface, page 63-11

   Undiagnosed ATM Failure (ATM Pings Failed but the ATM Segment Ping Succeeded), page 63-12

   Undiagnosed ATM Failure (End to End and Segment ATM Pings Failed), page 63-12

   These failures are not supported in case of ATM interfaces on the CRS-1 platform. However, they continue to be applicable on IOS devices and for IOS XR on the Cisco 12000 XR Series.

IPv6 Support

This section details the IPv6 support caveats:

- In addition to IPv4 troubleshooting for both IOS and IOS XR devices, troubleshooting is extended for the IOS XR devices where IPv6 addressing is used on the PE-CE link. IPv6 is not supported on IOS devices.
- Ethernet is the only Access Circuit interface technology on which Diagnostics can troubleshoot, when IPv6 addressing is used on IOS XR devices.
- IPv6 support is extended only to support eBGP as the PE-CE routing protocol.
- Since the scope of the IPv6 address is only between the attachment circuit links, it is assumed that both ends of the LSP to have either IPv6 or IPv4 and not IPv6 at one end and IPv4 at the other and vice-versa.
- IPv6 support can troubleshoot PE-CE links configuration with Global Unicast IPv6 address alone.
- For IPv6 support, IPv4 router-id will be used for identification of Peer Routers, for protocols including BGP and LDP.
- Unlike in case of IPv4, the CE Access Circuit Interface IP address (for applicable test types) will not be auto populated as IPv6 unnumbered is not supported on IOS XR devices and there is no concept of /30 and /31 address in IPv6.
- The below failure scenarios although applicable on IOS XR, not applicable in IPv6 context as these validations are performed during initial data validations. The failure scenario to report that the CE access circuit interface IP address is a network address is performed during initial data validations. There is no concept of Broadcast address in IPv6.
  - Broadcast Address
  - Network Address

Observations

Observations are conditions that could lead to connectivity problems. Because Diagnostics cannot categorically conclude the cause of the connectivity problem, these conditions are reported as observations.

For more information, e-mail: mpls-diagnostics-expert@cisco.com

ACL Configured on PE

There is an access control list (ACL) configured on the provider edge (PE) router. It might be causing failure of the VPN routing/forwarding instance (VRF) ping from this PE to the remote PE, however we have not analyzed the ACL to confirm its usage. This is not causing the connectivity failure from the PE to the local customer edge (CE) router, or customer device.

BGP Neighbor Session Problem

Possible border gateway protocol (BGP) neighbor session problem detected. Displays table with columns BGP Neighbor (Neighbor IP Address) and BGP State (BGP Neighbor State).

BGP Router ID is Not a Loopback Interface

The local BGP router ID on the PE is not assigned to a loopback interface. It is recommended that the router ID is taken from a loopback interface to both reduce the chance of duplication and enhance stability.

Connected Routes Not Redistributed into MP-BGP

Directly connected routes might not be redistributed into MP-BGP.

Core Troubleshooting Could Not be Performed. The VPN Route is External.

Core troubleshooting could not be performed. Diagnostics is unable to determine the label-switched path (LSP) to test, because the PE <*PE Name*> has no valid VPN route to the remote prefix <*IP address*> within the VRF <*VRF name*>. The route is not learned through an internal Border Gateway Protocol (BGP) VPNv4 neighbor. It is known through the <*Routing Protocol Name*>. The next-hop for this external route is <*IP address*>. Traffic does not flow through the MPLS core, as expected. This might be an intentional back door link, however, it is often a symptom of PE - CE misrouting. To test LSP connectivity, you might want to run a PE to PE Core test that allows you to specify the LSP endpoints manually.

Core Troubleshooting Could Not be Performed. The VPN Route is External and the Next-Hop Is Inaccessible.

Core troubleshooting could not be performed. Diagnostics is unable to determine the LSP to test, because the PE <*PE Name*> has no valid virtual private network (VPN) route to the remote prefix <*IP address*> within the VRF <*IP address*>. The route is not learned through an internal BGP VPNv4 neighbor. It is known through the <*Routing Protocol Name*>. The next-hop for this external route is inaccessible. This might be an intentional back door link, however, it is often a symptom of PE - CE misrouting. To test LSP connectivity, you might want to run a PE to PE Core test that allows you to specify the LSP endpoints manually.

Core Troubleshooting Could Note be Performed. The VPN Route Next-Hop is Inaccessible.

Core troubleshooting could not be performed. Diagnostics is unable to determine the LSP to test, because the PE <*PE Name*> has no valid VPN route to the remote prefix <*IP address*> within the VRF <*VRF name*>. The next-hop is inaccessible. This might be due to a problem within the Core Interior Gateway Protocol (IGP) or IP connectivity failure. To test LSP connectivity, you might want to run a PE to PE Core test that allows you to specify the LSP endpoints manually.

Duplicate BGP Router ID

BGP Router Identifier on the PE is found to be duplicated on one or more interfaces of the listed devices.

eBGP Maximum Prefixes

The exterior border gateway protocol (eBGP) session between the PE and an eBGP neighbor has a maximum prefix count configured on the PE. There are currently *X* prefixes in the VRF from this neighbor.

eBGP Neighbor Not Established

It appears that you are running eBGP as your PE-CE routing protocol. The PE and CE interfaces are on different subnets and there is no route to the CE on the PE. Until there is a route to the CE, this eBGP session is not established.

eBGP Neighbors Not Established

eBGP neighbors have been specified in a VRF but are not established and are unreachable.

EIGRP Peer Relationship Not Established

The PE interface is configured with IP unnumbered. The CE interface must either also be using IP unnumbered or be on the same subnet in order for the enhanced interior gateway routing protocol (EIGRP) to establish a peer relationship.

Full-Mesh VPN Topology

These routers appear to be connected via a fully meshed VPN configuration. If this is not correct, there is an issue with the route target configuration.

Hub and Spoke VPN Topology

These routers appear to be connected via a hub and spoke VPN configuration. If this is not correct, there is an issue with the route target configuration.

Hub To Hub, Hub and Spoke VPN Topology

These routers appear to be connected via a hub to hub, hub and spoke VPN configuration. If this is not correct, there is an issue with the route target configuration.

Incomplete CEF Adjacencies

Incomplete Cisco express forwarding (CEF) adjacencies on the access circuit interface.

Incorrect Multilink Virtual-Access Interface Specified

If you are specifying a multilink access circuit interface for the PE ensure that the virtual access interface specified is an active multilink bundle interface and that it has active bundle links.

Interface Not In VLAN

Warning: Ethernet access circuit interface is not associated with a virtual LAN (VLAN).

Intermittent Ping Success

The ping showed only intermittent connectivity.

Inverse ARP Disabled on FR Interface

The Frame Relay interface is dynamically configured but has inverse address resolution protocol (ARP) explicitly disabled.

Inverse ARP Implicitly Disabled on FR Interface

There is a Frame Relay static map on the interface. This interface is configured dynamically but the presence of the static map will, as a side effect, disable inverse ARP.

LMI Disabled on Frame Relay Interface

Warning: Frame Relay permanent virtual circuit (PVC) status cannot be checked on interface because the local management interface (LMI) is disabled.

LSP Endpoint is Not a Loopback Interface

The VPNv4 route is being sent to IBGP neighbor(s). However, the next hop address is one of the directly connected physical interfaces. It is recommended to use loopback interfaces as the next hops for VPNv4 IBGP neighbors. If the address is not available at the correct hop via the IGP, it could break connectivity between VPN sites because no forwarding label information is available.

MPLS OAM Package is not enabled on IOS XR Router

MPLS OAM package is not enabled on the IOS XR router.

MPLS TE Package is not Enabled on IOS XR Router

MPLS TE package is not enabled on the IOS XR router.

Multiple Equal Cost Paths

Equal cost multiple paths (ECMP) were found.

Non-compliant IOS Version on PE Router

Core troubleshooting could not be performed because the provider edge (PE) router is running a non MPLS OAM compliant Cisco IOS version.

No Routes Received from eBGP

It appears that you are running eBGP as your PE-CE routing protocol. However, no routes have been received from the neighbor.

No Route to Remote Prefix Received from eBGP

It appears that you are running eBGP as your PE-CE routing protocol. However, the route to a remote prefix has not been received from the neighbor. Check PE and customer edge (CE) BGP configuration.

No VPN Label in VRF for Prefix

No virtual private network (VPN) label was found for the address in the VPN routing/forwarding (VRF) on the device.

OSPF Peer Relationship Not Established

The PE interface is configured with IP unnumbered. The CE interface must either also be using IP unnumbered or be on the same subnet in order for open shortest path first (OSPF) to establish a peer relationship.

PE-PE Core Only Test Performed and the Optional Loopback IP Address Parameters Have Not Been Supplied

The LSP under test was selected based on the BGP router-id of the remote site PE. If the network has multiple LSPs between the two PEs, the reported result might not accurately reflect the state of the LSP used for customer traffic. To ensure the correct LSP is tested, you can supply the LSP endpoints on the test input window.

Possible Backup Link

The ping from the PE to the destination prefix succeeded, however the route from the PE to the destination prefix has not been learned via the expected PE interface. There might be a backup link in operation, or you might have input the incorrect parameters.

Possible Blocking Route Map

A route map is configured on the PE which might be causing route traffic to be lost. If this is an intranet/extranet VPN configuration, then there might be a route map configuration error.

Possible Core IP Failure

The internet control message protocol (ICMP) ping issued from the local PE to the remote PE failed. There is no route to the remote PE in the Interior Gateway Protocol (IGP) route table of the local PE. Try troubleshooting IP connectivity between these devices.

Possible Ethernet Duplex Mismatch

Warning: Access circuit interface has late collisions. This might be caused by an Ethernet duplex mismatch.

Route Limit Reached

The route count on the device has reached the route limit.

Traceroute Not Transmitted

The MPLS traceroute was not transmitted.

This chapter provides details of all IOS and IOS XR commands executed by the troubleshooting workflow in the Cisco Prime Diagnostics application for the Cisco Prime Fulfillment 6.1 release.

IOS Commands

This section lists the IOS commands used by Diagnostics. If TACACS+ (or another authentication/authorization system) is used, ensure that these are all allowed for Diagnostics.

Note This list might be updated when Diagnostics releases or patches are made available, e-mail: mpls-diagnostics-expert@cisco.com for the latest list.

1. attach <*slot*> show version
2. execute-on slot <*slot*> 'show mpls forwarding-table <*destinationPrefix*> <*subnetMask*>'
3. execute-on slot <*slot*> 'show mpls forwarding-table <*destinationPrefix*>'
4. execute-on slot <*slot*> 'show mpls forwarding-table vrf <*vrfName*> <*destinationPrefix*> <*subnetMask*>'
5. execute-on slot <*slot*> 'show mpls forwarding-table vrf <*vrfName*> <*destinationPrefix*>'
6. execute-on slot <*slot*> 'show mpls forwarding-table vrf <*vrfName*>'
7. execute-on slot <*slot*> 'show mpls forwarding-table'
8. execute-on slot <*slot*> show ip cef vrf <*vrfName*> <*networkPrefix*>
9. execute-on slot <*slot*> show ip cef vrf <*vrfName*> <*networkPrefix*> <*subnetMask*>

10. execute-on slot <*slot*> show version
11. ping (interactive)
12. ping <*targetIp*>
13. ping mpls ipv4 <*targetIp*>/<*targetIpSubnetMask*> source <*source*> sweep <*minSweepSize*> <*maxSweepSize*> <*sweepInterval*> <*repeatCount*> timeout <*timeout*> replyMode <*replyMode*>
14. ping mpls traffic-eng Tunnel <*tunnelNumber*>
15. ping vrf <*vrfName*> (interactive)
16. show access-lists <*listName*>
17. show atm map
18. show atm pvc <*interface*>
19. show cef drop
20. show cef drop | include ^<*slot*>
21. show frame-relay lmi
22. show frame-relay lmi interface <*interface*>
23. show frame-relay map
24. show frame-relay pvc <*interface*> dlci <*dlci*>
25. show interfaces <*interface*>
26. show ip bgp summary
27. show ip bgp vpnv4 <*vrfName*> rib-failure
28. show ip bgp vpnv4 all neighbors
29. show ip bgp vpnv4 all neighbors <*destIp*>
30. show ip bgp vpnv4 all | include local router
31. show ip bgp vpnv4 vrf <*vrfName*> <*networkPrefix*>
32. show ip bgp vpnv4 vrf <*vrfName*> neighbors <*destIp*>
33. show ip bgp vpnv4 vrf <*vrfName*> <*prefix*> <*subnetMask*>
34. show ip bgp vpnv4 vrf <*vrfName*> labels | include <*networkPrefix*>/<*subnetMask*> | [0-9]+\.[0-9]+\.[0-9]+\.[0-9]+
35. show ip bgp vpnv4 vrf <*vrfName*> labels | include <*classfulPrefix*>
36. show ip bgp vpnv4 vrf <*vrfName*> labels | include <*networkPrefix*>/<*subnetMask*>
37. show ip cef <*destinationPrefix*>
38. show ip cef summary
39. show ip cef vrf <*vrfName*> <*networkPrefix*> <*subnetMask*> detail
40. show ip cef vrf <*vrfName*> <*networkPrefix*> detail
41. show ip cef vrf <*vrfName*> adjacency <*interface*> <*destip*> detail
42. show ip eigrp <*vrfName*> interfaces <*vrfInterface*>
43. show ip interface <*interface*>
44. show ip interface <*interface*> | include access list is
45. show ip interface brief <*interface*>

46. show ip interface brief | include <*ip-address*>
47. show ip ospf <*processId*> <*area*> interface <*intName*>
48. show ip ospf mpls traffic-eng link
49. show ip protocols <*vrfName*>
50. show ip route <*targetIp*>
51. show ip route vrf <*vrfName*> <*targetIp*>
52. show ip traffic
53. show ip vrf detail <*vrfName*>
54. show ip vrf interfaces <*vrfName*>
55. show mpls forwarding-table <*destinationPrefix*>
56. show mpls forwarding-table <*destinationPrefix*> <*subnetMask*>
57. show mpls forwarding-table <*destinationPrefix*> detail
58. show mpls forwarding-table labels <*label*>
59. show mpls forwarding-table labels <*label*> detail
60. show mpls forwarding-table vrf <*vrfName*>
61. show mpls forwarding-table vrf <*vrfName*> <*destinationPrefix*>
62. show mpls forwarding-table
63. show mpls interfaces <*interface*>
64. show mpls interfaces all
65. show mpls ip binding <*destinationPrefix*> <*destinationMask*>
66. show mpls ip binding local
67. show mpls ip binding summary
68. show mpls label range
69. show mpls ldp bindings <*ip*> <*subnetMask*>
70. show mpls ldp bindings neighbor <*neighbor ip*> <*subnetMask*>
71. show mpls ldp discovery
72. show mpls ldp neighbor
73. show mpls ldp neighbor <*interface*>
74. show mpls traffic-eng tunnels
75. show mpls traffic-eng tunnels <*status*>
76. show mpls traffic-eng tunnels <*tunnelId*>
77. show mpls traffic-eng tunnels destination <*destination*> <*status*>
78. show mpls traffic-eng tunnels destination <*destination*>
79. show mpls traffic-eng tunnels role <*role*>
80. show mpls traffic-eng tunnels role <*role*> <*status*>
81. show mpls traffic-eng tunnels role <*role*> destination <*destination*> <*status*>
82. show mpls traffic-eng tunnels role <*role*> destination <*destination*> up
83. show mpls traffic-eng tunnels role head brief

84. show ppp multilink interface <*interface*>
85. show route-map <*mapName*>
86. show running-config
87. show running-config interface <*interface*>
88. show running-config interface <*interface*> | include frame-relay interface-dlci
89. show running-config interface <*interface*> | include map-group
90. show running-config interface <*interface*> | include no frame-relay inverse-arp
91. show running-config | begin router bgp
92. show running-config | include advertise-
93. show running-config | include ldp password
94. show running-config | include mpls label protocol
95. show running-config | include no
96. show version
97. show vlans
98. traceroute mpls ipv4 <*ipAddress*>/<*subnetMask*> source <*source*> destination <*destination*> ttl 15
99. traceroute mpls traffic-eng Tunnel <*tunnelNumber*>
100. traceroute vrf <*vrfName*> (interactive)

IOS XR Commands

This section lists the IOS XR commands used by Diagnostics. If TACACS+ (or another authentication/authorization system) is used, ensure that these are all allowed for Diagnostics.

Note This list might be updated when Diagnostics releases or patches are made available, e-mail: mpls-diagnostics-expert@cisco.com for the latest list.

1. ping <*targetIp*>
2. ping atm interface <*interface*> <*vpi*>/<*vci*>
3. ping atm interface <*interface*> <*vpi*>/<*vci*> end-loopback
4. ping atm interface <*interface*> <*vpi*>/<*vci*> seg-loopback
5. ping mpls ipv4 <*destination*>/<*subnetMask*>
6. ping mpls ipv4 <*destination*>/<*subnetMask*> reply mode router-alert
7. ping mpls ipv4 <*destination*>/<*subnetMask*> source <*source*>
8. ping mpls traffic-eng Tunnel <*tunnelId*>
9. ping vrf <*vrfName*>
10. ping vrf <*vrfName*> <*targetIp*> <*sourceInterface*> <*minSweepSize*> <*maxSweepSize*> <*sweepInterval*>
11. show access-lists ipv4 <*listName*>

12. show bgp ipv4 all summary
13. show bgp vpnv4 unicast neighbors
14. show bgp vpnv4 unicast summary
15. 14.show bgp vpnv4 unicast vrf <*vrfName*> <*networkPrefix*>
16. show bgp vpnv4 unicast vrf <*vrfName*> <*prefix*> <*mask*>
17. show bgp vpnv4 unicast vrf <*vrfName*> labels
18. show bgp vrf <*vrfName*> advertised neighbor <*neighboreId*> summary | include <*ceDeviceIpAddr*>
19. show bgp vrf <*vrfName*> ipv4 unicast
20. show bgp vrf <*vrfName*> neighbors
21. show bgp vrf <*vrfName*> vpnv4 unicast neighbors
22. show cef ipv4 <*destinationPrefix*>
23. show cef ipv4 drops
24. show cef ipv4 drops location <*slot*>
25. show cef ipv4 summary
26. show cef vrf <*vrfName*> ipv4 <*networkPrefix*> detail
27. show cef vrf <*vrfName*> ipv4 <*networkPrefix*> <*subnetMask*> detail
28. show cef vrf <*vrfName*> <*networkPrefix*> <*subnetMask*> location <*location*>
29. show eigrp <*vrfName*> interfaces <*vrfInterface*>
30. show frame-relay lmi
31. show frame-relay lmi interface <*interface*>
32. show install active summary
33. show install inactive summary
34. show install location <*slot*>
35. show interfaces <*interface*>
36. show ip cef vrf <*vrfName*> adjacency <*interface*> <*destip*> detail
37. show ip ospf <*processId*> <*area*> interface <*intName*>
38. show ipv4 interface <*interface*>
39. show ipv4 interface brief <*interface*>
40. show ipv4 interface brief | include <*ip-address*>
41. show ipv4 traffic
42. show ipv4 vrf <*vrfName*> interface brief
43. show ipv4 vrf <*vrfName*> interface <*interface*>
44. show ipv4 vrf all interface brief
45. show mpls forwarding
46. show mpls forwarding labels <*label*>
47. show mpls forwarding prefix <*destinationPrefix*>/<*subnetMask*>
48. show mpls forwarding prefix <*destinationPrefix*>/<*subnetMask*> detail

49. show mpls forwarding vrf <*vrf*>
50. show mpls forwarding vrf <*vrf*> prefix <*destinationPrefix*>/<*subnetMask*>
51. show mpls forwarding vrf <*vrfName*> prefix <*destinationPrefix*>/<*subnetMask*> labels <*label*> location <*location*>
52. show mpls forwarding vrf <*vrfName*> prefix <*destinationPrefix*>/<*subnetMask*> location <*location*>
53. show mpls interfaces
54. show mpls interfaces <*interface*>
55. show mpls label range
56. show mpls label table summary
57. show mpls ldp bindings <*ip*> <*mask*>
58. show mpls ldp bindings neighbor <*neighbor*> <*ip*> <*mask*>
59. show mpls ldp discovery
60. show mpls ldp neighbor
61. show mpls ldp neighbor <*interface*>
62. show mpls traffic-eng tunnels
63. show mpls traffic-eng tunnels backup <*tunnelId*>
64. show mpls traffic-eng tunnels brief role head
65. show mpls traffic-eng tunnels <*status*> detail
66. show mpls traffic-eng tunnels <*tunnel-id*>
67. show mpls traffic-eng tunnels <*tunnelNumber*> detail
68. show mpls traffic-eng tunnels destination <*destination*>
69. show mpls traffic-eng tunnels name <*name*>
70. show mpls traffic-eng tunnels destination <*destination*> <*status*> detail
71. show mpls traffic-eng tunnels destination <*destination*> detail
72. show mpls traffic-eng tunnels detail
73. show mpls traffic-eng tunnels role <*role*> <*status*> detail
74. show mpls traffic-eng tunnels role <*role*> destination <*destination*> <*status*> detail
75. show mpls traffic-eng tunnels role <*role*> destination <*destination*> up detail
76. show mpls traffic-eng tunnels role <*role*> detail
77. show ospf
78. show ospf vrf <*vrf*>
79. show ospf border-routers | include ABR
80. show ospf | include ID
81. show ospf mpls traffic-eng link
82. show ospf vrf <*vrfName*> interface brief
83. show ospf vrf <*vrfName*> interface <*interfaceName*>
84. show protocols | include OSPF

85. show rib ipv4 tables
86. show rib vrf <*vrf*> ipv4 unicast statistics <*protocolName*>
87. show rib vrf <*vrf*> protocols
88. show rip vrf <*vrf*>
89. show route ipv4 <*targetIp*>
90. show route vrf <*vrfName*> ipv4 <*targetIp*>
91. show rpl route-policy <*mapName*>
92. show rsvp neighbors
93. show running-config
94. show running-config explicit-path name <*explicitPathName*>
95. show running-config interface <*interface*>
96. show running-config mpls ldp
97. show running-config mpls ldp label advertise
98. show running-config mpls traffic-eng
99. show running-config router bgp
100. show running-config router bgp <*asNumber*> vrf <*vrfName*> neighbor <*neighborIpAddr*>
101. show running-config router bgp <*asNumber*> neighbor-group <*neighborGroupName*>
102. show running-config router bgp | include redistribute <*protocol*>
103. show running-config router ospf
104. show running-config router <*protocol ID*> vrf <*vrf*>
105. show running-config rsvp interface <*interface-name*>
106. show vlan interface
107. show version
108. show vrf <*vrfName*> ipv4 detail
109. traceroute mpls ipv4 <*destination*>/<*subnetMask*>
110. traceroute mpls traffic-eng Tunnel <*tunnelId*>
111. traceroute vrf <*vrf*>
112. ping vrf <*vrfName*> <*targetIpv6Address*> <*sourceInterface*> <*minSweepSize*> <*maxSweepSize*> <*sweepInterval*>
113. show bgp vpnv6 unicast neighbors
114. show bgp vpnv6 unicast neighbors <*destIp*>
115. show bgp vpnv6 unicast vrf <*vrfName*> <*networkPrefix*>
116. show bgp vpnv6 unicast vrf <*vrfName*> <*networkPrefix*>/<*subnetMask*>
117. show bgp vpnv6 unicast vrf <*vrfName*> labels | include <*networkPrefix*>/<*subnetMask*>| [0-9A-Fa-f:]+[0-9A-Fa-f]*
118. show bgp vpnv6 unicast summary | include BGP router identifier
119. show bgp vrf <*vrfName*> ipv6 unicast

120. show bgp vrf <*vrfName*> ipv6 unicast advertised neighbor <*neighborId*> summary | include <*ceDeviceIpAddr*>
121. show cef ipv6 summary
122. show cef vrf <*vrfName*> ipv6 <*networkPrefix*> detail
123. show cef vrf <*vrfName*> ipv6 <*networkPrefix*>/<*subnetMask*> detail
124. show cef vrf <*vrfName*> ipv6 <*networkPrefix*> location <*location*>
125. show cef vrf <*vrfName*> ipv6 <*networkPrefix*>/<*subnetMask*> location <*location*>
126. show ipv6 interface <*interface*>
127. show ipv6 interface brief <*interface*>
128. show ipv6 vrf all interface brief
129. show ipv6 vrf <*vrfName*> interface brief
130. show ipv6 vrf <*vrfName*> interface <*interface*>
131. show rib ipv6 tables
132. show route ipv6 <*targetIp*>
133. show route vrf <*vrfName*> ipv6 <*targetIp*>
134. show vrf <*vrfName*> ipv6 detail

Unrecognized VPN Topology

These routers do not appear to be connected via any VPN configuration. If running a hub and spoke VPN architecture, ensure the test is being run from hub to spoke, not from spoke to spoke.

Tunnel configured with OSPF Affinity Values

The TE tunnel configuration for an OSPF process has affinity values configured, which could lead to tunnel head-end problems. The affinity values have been detected on the link interface.

Check for configured Tunnel metrics

A custom TE metric has been detected for tunnel on a link with custom TE weight. This may override the default IGP weight and may lead to tunnel problems if configured incorrectly.

Check Primary and Backup Tunnel Setup Priority Value

The backup tunnel has been configured with a higher setup priority value than the primary tunnel that it is protecting. This may lead to primary tunnel preemption in cases where the requested bandwidth for the tunnels is restricted.

Check Primary and Backup Tunnel Hold Priority Value

The backup tunnel has been configured with a higher hold priority value than the primary tunnel that it is protecting.

The backup tunnel is configured with a bandwidth request

The backup tunnel configured on head-end has been configured with a bandwidth request. However, tunnel interface has been allocated with lesser bandwidth.

The backup tunnel is configured with a dynamic path-option

The backup tunnel configured on the router has been configured with a dynamic path. The suggested configuration is to have explicit-paths for backup tunnels.

Explicit path contains loose or exclude entries

The explicit path configured for tunnel contains loose or exclude entries. These entries may prevent a tunnel being formed across the correct route.

LDP Router-Id is not a loopback interface

Device has configured LDP router ID with a non-loopback interface IP. This is not a suggested practice.

RSVP is not configured on Interface

An interface on device is not configured for RSVP.

PE Core Facing Interface Down

MPLS enabled core facing interfaces on PE <*PE Name*> are currently operationally down.