JUNIPER NETWORKS

Technology Overview

Retrieving Virtual Private Network Information Using SNMP

Release
12.3

Published: 2012-11-14

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YEAR 2000 NOTICE

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Introduction

This document describes how to retrieve and interpret Layer 3 VPN routing and forwarding information by using SNMP.

SNMP Overview

SNMP enables users to monitor network devices from a central location. Many network management systems (NMS) are based on SNMP, and support for this protocol is a key feature of most network devices.

The Juniper Networks® Junos® operating system supports SNMP on many different Juniper Networks platforms. The Junos OS includes an onboard SNMP agent that provides remote management applications with access to detailed information about the devices on the network.

A typical SNMP implementation contains three components:

- Managed devices – Such as routers and switches.
- SNMP agent – Process that resides on a managed device and communicates with the NMS.
- NMS – A combination of hardware and software used to monitor and administer the network; network device that runs SNMP manager software. Also referred to as an SNMP manager.

The SNMP agent exchanges network management information with the SNMP manager (NMS). The agent responds to requests for information and actions from the manager. The SNMP manager collects information about network connectivity, activity, and events by polling managed devices.

SNMP implementation in the Junos OS uses a master SNMP agent (known as the SNMP process or snmpd) that resides on the managed device. Various subagents reside on different modules of the Junos OS as well (such as the Routing Engine), and these subagents are managed by the snmpd.

Related Documentation

- Understanding SNMP Implementation in Junos OS
- Example: Retrieving VRF VPN Information Using SNMP on page 1
- Configuring SNMP on Devices Running Junos OS

Example: Retrieving VRF VPN Information Using SNMP

This example describes how to retrieve and interpret Layer 3 VPN routing and forwarding information by using SNMP and includes the following sections:

Requirements

The routers used in this example are Juniper Networks M Series Multiservice Edge Routers, T Series Core Routers, and MX Series 3D Universal Edge Routers. The network management system (NMS) is a workstation running the UNIX operating system with the standard SNMP application available in UNIX.

SNMP applications are preinstalled on Linux and Solaris OS versions of UNIX. SNMP applications are available in open source code and can be installed on any operating system, including Windows systems. Network management applications, such as IBM Tivoli, provide their own SNMP tools.

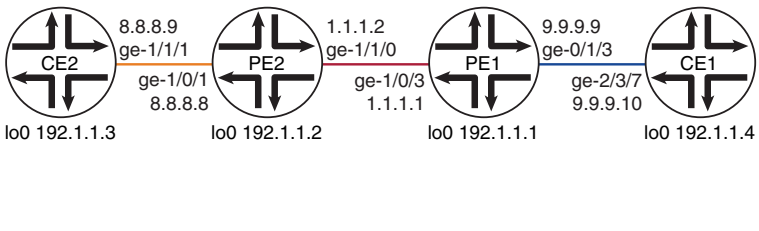
Overview

This example shows how to retrieve virtual private network (VPN) routing and forwarding (VRF) information using SNMP to display management information base (MIB) objects.

In Figure 1 on page 2:

- Provider edge (PE) routers PE1 and PE2 are configured with a VRF routing instance named **jnprl3vpn**.
- Customer edge (CE) routers CE1 and CE2 communicate across the VPN service using subnetwork 192.1.1.0.

Figure 1: VRF VPN Example Topology



Configuration

The network is preconfigured with a VRF VPN named **jnprl3vpn** and uses the interfaces and IP addresses shown in Figure 1 on page 2. This example describes how to retrieve the VPN configuration and status information by using SNMP.

Verifying VRF VPN Information by Using SNMP

To confirm the configuration of the VRF VPN, perform these tasks:

- Display the Interface Name for an Interface Index on page 12
- Display the Interface Index for Interfaces Configured for a VRF Routing Instance on page 12

Display the MPLS VPN MIB

Purpose Retrieve and display a table of information describing the VRF routing instance and the associated attributes on a PE router.

Action To display the VRF routing instance information, use the **snmpwalk** command on a network management station. Specify the SNMP read community string, the router IP address, and the MIB object identifier (OID) to identify which portion of the object identifier space is searched using SNMP GET NEXT requests. In the following example, the SNMP read community string is **petblr**, the IP address is **116.197.178.2**, and the MIB OID is **mplsVpnMIB**. For more information about the **snmpwalk** command, see the man pages on your workstation.

NOTE: The IP address specified in the **snmpwalk** command can be the **fxp0** Ethernet console port, the **lo0.0** loopback interface, or any transit interface that is configured to respond to SNMP requests. By default, all interfaces are configured to respond to SNMP requests.

```
user@host_shell>snmpwalk -v1 -c petblr 116.197.178.2 mplsVpnMIB

MPLS-VPN-MIB::mplsVpnConfiguredVrfs.0 = Gauge32: 1
MPLS-VPN-MIB::mplsVpnActiveVrfs.0 = Gauge32: 1
MPLS-VPN-MIB::mplsVpnConnectedInterfaces.0 = Gauge32: 2
MPLS-VPN-MIB::mplsVpnNotificationEnable.0 = INTEGER: false(2)
MPLS-VPN-MIB::mplsVpnVrfConfMaxPossibleRoutes.0 = Gauge32: 0
MPLS-VPN-MIB::mplsVpnVrfConfRouteMaxThreshTime.0 = Gauge32: 0 seconds
MPLS-VPN-MIB::mplsVpnVrfVpnId."jnprl3vpn" = ""
MPLS-VPN-MIB::mplsVpnVrfDescription."jnprl3vpn" = STRING: jnprl3vpn
MPLS-VPN-MIB::mplsVpnVrfRouteDistinguisher."jnprl3vpn" = STRING: "1234:1"
MPLS-VPN-MIB::mplsVpnVrfCreationTime."jnprl3vpn" = Timeticks: (114092600) 13 days, 4:55:26.00
MPLS-VPN-MIB::mplsVpnVrfOperStatus."jnprl3vpn" = INTEGER: up(1)
MPLS-VPN-MIB::mplsVpnVrfActiveInterfaces."jnprl3vpn" = Gauge32: 2
MPLS-VPN-MIB::mplsVpnVrfAssociatedInterfaces."jnprl3vpn" = Gauge32: 2
MPLS-VPN-MIB::mplsVpnVrfConfMidRouteThreshold."jnprl3vpn" = Gauge32: 0
MPLS-VPN-MIB::mplsVpnVrfConfHighRouteThreshold."jnprl3vpn" = Gauge32: 0
MPLS-VPN-MIB::mplsVpnVrfConfMaxRoutes."jnprl3vpn" = Gauge32: 0
MPLS-VPN-MIB::mplsVpnVrfConfLastChanged."jnprl3vpn" = Timeticks: (114095300) 13 days, 4:55:53.00
MPLS-VPN-MIB::mplsVpnVrfConfRowStatus."jnprl3vpn" = INTEGER: active(1)
MPLS-VPN-MIB::mplsVpnVrfConfStorageType."jnprl3vpn" = INTEGER: readOnly(5)
MPLS-VPN-MIB::mplsVpnVrfRouteTarget."jnprl3vpn".0.both = STRING: "1234:1"
MPLS-VPN-MIB::mplsVpnVrfRouteTargetDescr."jnprl3vpn".0.both = STRING:
MPLS-VPN-MIB::mplsVpnVrfRouteTargetRowStatus."jnprl3vpn".0.both = INTEGER: active(1)
MPLS-VPN-MIB::mplsVpnVrfPerfRoutesAdded."jnprl3vpn" = Counter32: 19
MPLS-VPN-MIB::mplsVpnVrfPerfRoutesDeleted."jnprl3vpn" = Counter32: 0
MPLS-VPN-MIB::mplsVpnVrfPerfCurrNumRoutes."jnprl3vpn" = Gauge32: 19
```

Meaning In the sample output:

- The **mplsVpnVrfDescription** MIB object shows **jnprl3vpn** as the description of the VRF routing instance configured on the router. If the description is not configured, the MIB object displays the VRF name by default.
- The **mplsVpnVrfRouteDistinguisher** MIB object shows **1234:1** as the route distinguisher for this VPN.
- The **mplsVpnVrfOperStatus** MIB object shows **(up)1** as the operational status of the VRF routing instance.
- The **mplsVpnVrfRouteTarget** MIB object shows **1234:1** as the route target for this VPN.

Another way to display the VRF routing instance information is to use the **show snmp mib** command and specify the MPLS VPN MIB table (**mplsVpnMIB**).

For more information about the MIB objects shown in this sample output, see *draft-ietf-ppvpn-mpls-vpn-mib-05.txt*, *MPLS/BGP Virtual Private Network Management Information Base Using SMIv2*.

Display the VPN Interface Index Information

Purpose Retrieve and display a table of VRF routing instance interface information on a PE router.

Action To display the VRF routing instance interface information, use the **show snmp mib** command. Specify the **walk** option, specify the **jnxVpnMIB** VPN interface MIB table, and to display the information in a more user-friendly format, specify the **ascii** option.

```
user@PE1> show snmp mib walk jnxVpnMIB ascii

jnxVpnConfiguredVpns.0 = 1
jnxVpnActiveVpns.0 = 1
jnxVpnNextIfIndex.0 = 0
jnxVpnNextPwIndex.0 = 0
jnxVpnNextRTIndex.0 = 0
jnxVpnRowStatus.2."jnprl3vpn" = 1
jnxVpnStorageType.2."jnprl3vpn" = 5
jnxVpnDescription.2."jnprl3vpn" = jnprl3vpn
jnxVpnIdentifierType.2."jnprl3vpn" = 5
jnxVpnIdentifier.2."jnprl3vpn" =  5-1234:1
jnxVpnConfiguredSites.2."jnprl3vpn" = 0
jnxVpnActiveSites.2."jnprl3vpn" = 0
jnxVpnLocalAddresses.2."jnprl3vpn" = 0
jnxVpnTotalAddresses.2."jnprl3vpn" = 0
jnxVpnAge.2."jnprl3vpn" = 31000
jnxVpnIfRowStatus.2."jnprl3vpn".518 = 1
jnxVpnIfRowStatus.2."jnprl3vpn".536 = 1
jnxVpnIfStorageType.2."jnprl3vpn".518 = 5
jnxVpnIfStorageType.2."jnprl3vpn".536 = 5
jnxVpnIfAssociatedPw.2."jnprl3vpn".518 = 0
jnxVpnIfAssociatedPw.2."jnprl3vpn".536 = 0
jnxVpnIfProtocol.2."jnprl3vpn".518 = 0
jnxVpnIfProtocol.2."jnprl3vpn".536 = 0
jnxVpnIfInBandwidth.2."jnprl3vpn".518 = 0
jnxVpnIfInBandwidth.2."jnprl3vpn".536 = 0
jnxVpnIfOutBandwidth.2."jnprl3vpn".518 = 0
```



```
jnxVpnIfOutBandwidth.2."jnprl3vpn".536 = 0
jnxVpnIfStatus.2."jnprl3vpn".518 = 5
jnxVpnIfStatus.2."jnprl3vpn".536 = 5
jnxVpnRTRowStatus.2."jnprl3vpn".1 = 1
jnxVpnRTStorageType.2."jnprl3vpn".1 = 5
jnxVpnRTType.2."jnprl3vpn".1 = 6
jnxVpnRT.2."jnprl3vpn".1 = 1234:1
jnxVpnRTFunction.2."jnprl3vpn".1 = 3
```

Meaning In the sample output:

- The **jnxVpnDescription** MIB object shows the description of the VRF routing instance. In this example, the description is the name of the VRF routing instance.
- The **jnxVpnIfRowStatus** MIB object shows the operational status of the VRF routing instance interfaces. The last index in the table identifies the interface index (ifIndex) of the interface. In this example, the highlighted interface indexes are **518** and **536**.

The following MIB object definitions are from the enterprise-specific MIB files supplied by Juniper Networks. The MIB object description can be useful in understanding the meaning and purpose of a MIB object. The following sample definitions are provided for your reference.

```
jnxVpnIfEntry OBJECT-TYPE
    SYNTAX     JnxVpnIfEntry
    MAX-ACCESS not-accessible
    STATUS     current
    DESCRIPTION
        "Entry containing information about a particular VPN
         interface."
    INDEX { jnxVpnIfVpnType, jnxVpnIfVpnName, jnxVpnIfIndex }
    ::= { jnxVpnIfTable 1 }

jnxVpnIfIndex OBJECT-TYPE
    SYNTAX     Unsigned32
    MAX-ACCESS accessible-for-notify
    STATUS     current
    DESCRIPTION
        "The index of this interface in the VPN.  Each interface
         in the VPN is given a unique index.  The RowStatus says
         whether a given interface (i.e., a row in this table)
         is valid or not. Note: this index MUST NOT be zero."
    ::= { jnxVpnIfEntry 3 }
```

Supported MIBs are described in the *Junos OS SNMP MIBs and Traps Reference*. Juniper Networks enterprise-specific MIBs can be downloaded from http://www.juniper.net/techpubs/en_US/release-independent/junos/mibs/mibs.html.

For more information about the **show snmp mib** command, see the *Junos OS System Basics and Services Command Reference*.

Display the VRF Route Table Information

Purpose Retrieve and display a table of information describing the VRF routing table on a PE router.

Action To display the VRF routing table information, use the **snmpwalk** command on a network management station. Specify the name of the VRF routing instance and the SNMP read community string in the format ***vrfname*@*communitystring***. Also specify the router IP address and the MIB OID. In the following example, the routing instance is **jnprl3vpn**, the SNMP read community string is **petblr**, the IP address is **116.197.178.2**, and the OID is **1.3.6.1.2.1.4**.

```
user@host_shell>snmpwalk -v1 -c jnprl3vpn@petblr 116.197.178.2 1.3.6.1.2.1.4

IP-MIB::ipForwarding.0 = INTEGER: forwarding(1)
IP-MIB::ipDefaultTTL.0 = INTEGER: 64
IP-MIB::ipInReceives.0 = Counter32: 2786616
IP-MIB::ipInHdrErrors.0 = Counter32: 0
IP-MIB::ipInAddrErrors.0 = Counter32: 0
IP-MIB::ipForwDatagrams.0 = Counter32: 9600
IP-MIB::ipInUnknownProtos.0 = Counter32: 12
IP-MIB::ipInDiscards.0 = Counter32: 0
IP-MIB::ipInDelivers.0 = Counter32: 2778416
IP-MIB::ipOutRequests.0 = Counter32: 2835725
IP-MIB::ipOutDiscards.0 = Counter32: 0
IP-MIB::ipOutNoRoutes.0 = Counter32: 0
IP-MIB::ipReasmTimeout.0 = INTEGER: 60
IP-MIB::ipReasmReqds.0 = Counter32: 0
IP-MIB::ipReasmOKs.0 = Counter32: 0
IP-MIB::ipReasmFails.0 = Counter32: 0
IP-MIB::ipFragOKs.0 = Counter32: 0
IP-MIB::ipFragFails.0 = Counter32: 0
IP-MIB::ipFragCreates.0 = Counter32: 0
IP-MIB::ipAdEntAddr.8.8.8.8 = IpAddress: 8.8.8.8
IP-MIB::ipAdEntIfIndex.8.8.8.8 = INTEGER: 518
IP-MIB::ipAdEntNetMask.8.8.8.8 = IpAddress: 255.255.255.0
IP-MIB::ipAdEntBcastAddr.8.8.8.8 = INTEGER: 1
IP-MIB::ipAdEntReasmMaxSize.8.8.8.8 = INTEGER: 65535
IP-MIB::ipNetToMediaIfIndex.518.8.8.8.8 = INTEGER: 518
IP-MIB::ipNetToMediaIfIndex.518.8.8.8.9 = INTEGER: 518
IP-MIB::ipNetToMediaPhysAddress.518.8.8.8.8 = STRING: 0:22:83:15:bc:7f
IP-MIB::ipNetToMediaPhysAddress.518.8.8.8.9 = STRING: 0:21:59:ad:53:3b
IP-MIB::ipNetToMediaNetAddress.518.8.8.8.8 = IpAddress: 8.8.8.8
IP-MIB::ipNetToMediaNetAddress.518.8.8.8.9 = IpAddress: 8.8.8.9
IP-MIB::ipNetToMediaType.518.8.8.8.8 = INTEGER: static(4)
IP-MIB::ipNetToMediaType.518.8.8.8.9 = INTEGER: dynamic(3)
IP-MIB::ipRoutingDiscards.0 = Counter32: 0
IP-FORWARD-MIB::ipCidrRouteNumber.0 = Gauge32: 19
IP-FORWARD-MIB::ipCidrRouteDest.1.1.1.0.255.255.255.0.0.8.8.8.9 = IpAddress: 1.1.1.0
IP-FORWARD-MIB::ipCidrRouteDest.6.6.6.1.255.255.255.255.0.8.8.8.9 = IpAddress: 6.6.6.1
IP-FORWARD-MIB::ipCidrRouteDest.7.7.7.0.255.255.255.0.0.8.8.8.9 = IpAddress: 7.7.7.0
IP-FORWARD-MIB::ipCidrRouteDest.8.8.8.0.255.255.255.0.0.0.0.0.0 = IpAddress: 8.8.8.0
IP-FORWARD-MIB::ipCidrRouteDest.8.8.8.8.255.255.255.255.0.0.0.0.0 = IpAddress: 8.8.8.8
IP-FORWARD-MIB::ipCidrRouteDest.9.9.9.0.255.255.255.0.0.8.8.8.9 = IpAddress: 9.9.9.0
IP-FORWARD-MIB::ipCidrRouteDest.10.250.1.0.255.255.255.252.0.8.8.8.9 = IpAddress: 10.250.1.0
IP-FORWARD-MIB::ipCidrRouteDest.10.250.1.4.255.255.255.252.0.8.8.8.9 = IpAddress: 10.250.1.4
IP-FORWARD-MIB::ipCidrRouteDest.10.250.1.8.255.255.255.252.0.8.8.8.9 = IpAddress: 10.250.1.8
IP-FORWARD-MIB::ipCidrRouteDest.10.250.1.16.255.255.255.252.0.8.8.8.9 = IpAddress: 10.250.1.16
IP-FORWARD-MIB::ipCidrRouteDest.10.250.1.20.255.255.255.252.0.8.8.8.9 = IpAddress: 10.250.1.20
IP-FORWARD-MIB::ipCidrRouteDest.10.250.1.24.255.255.255.252.0.8.8.8.9 = IpAddress: 10.250.1.24
IP-FORWARD-MIB::ipCidrRouteDest.10.250.1.28.255.255.255.252.0.8.8.8.9 = IpAddress: 10.250.1.28
IP-FORWARD-MIB::ipCidrRouteDest.192.1.1.1.255.255.255.255.0.8.8.8.9 = IpAddress: 192.1.1.1
IP-FORWARD-MIB::ipCidrRouteDest.192.1.1.2.255.255.255.255.0.8.8.8.9 = IpAddress: 192.1.1.2
IP-FORWARD-MIB::ipCidrRouteDest.192.1.1.3.255.255.255.255.0.8.8.8.9 = IpAddress: 192.1.1.3
IP-FORWARD-MIB::ipCidrRouteDest.192.1.1.4.255.255.255.255.0.8.8.8.9 = IpAddress: 192.1.1.4
```



```
IP-FORWARD-MIB::ipCidrRouteDest.192.1.1.6.255.255.255.255.0.8.8.8.9 = IpAddress: 192.1.1.6
IP-FORWARD-MIB::ipCidrRouteDest.224.0.0.5.255.255.255.255.0.0.0.0.0 = IpAddress: 224.0.0.5
IP-FORWARD-MIB::ipCidrRouteMask.1.1.1.0.255.255.255.0.0.8.8.8.9 = IpAddress: 255.255.255.0
IP-FORWARD-MIB::ipCidrRouteMask.6.6.6.1.255.255.255.255.0.8.8.8.9 = IpAddress: 255.255.255.255
IP-FORWARD-MIB::ipCidrRouteMask.7.7.7.0.255.255.255.0.0.8.8.8.9 = IpAddress: 255.255.255.0
IP-FORWARD-MIB::ipCidrRouteMask.8.8.8.0.255.255.255.0.0.0.0.0.0 = IpAddress: 255.255.255.0
IP-FORWARD-MIB::ipCidrRouteMask.8.8.8.8.255.255.255.255.0.0.0.0.0 = IpAddress: 255.255.255.255
IP-FORWARD-MIB::ipCidrRouteMask.9.9.9.0.255.255.255.0.0.8.8.8.9 = IpAddress: 255.255.255.0
IP-FORWARD-MIB::ipCidrRouteMask.10.250.1.0.255.255.255.252.0.8.8.8.9 = IpAddress: 255.255.255.252
IP-FORWARD-MIB::ipCidrRouteMask.10.250.1.4.255.255.255.252.0.8.8.8.9 = IpAddress: 255.255.255.252
IP-FORWARD-MIB::ipCidrRouteMask.10.250.1.8.255.255.255.252.0.8.8.8.9 = IpAddress: 255.255.255.252
IP-FORWARD-MIB::ipCidrRouteMask.10.250.1.16.255.255.255.252.0.8.8.8.9 = IpAddress: 255.255.255.252
IP-FORWARD-MIB::ipCidrRouteMask.10.250.1.20.255.255.255.252.0.8.8.8.9 = IpAddress: 255.255.255.252
IP-FORWARD-MIB::ipCidrRouteMask.10.250.1.24.255.255.255.252.0.8.8.8.9 = IpAddress: 255.255.255.252
IP-FORWARD-MIB::ipCidrRouteMask.10.250.1.28.255.255.255.252.0.8.8.8.9 = IpAddress: 255.255.255.252
IP-FORWARD-MIB::ipCidrRouteMask.192.1.1.1.255.255.255.255.0.8.8.8.9 = IpAddress: 255.255.255.255
IP-FORWARD-MIB::ipCidrRouteMask.192.1.1.2.255.255.255.255.0.8.8.8.9 = IpAddress: 255.255.255.255
IP-FORWARD-MIB::ipCidrRouteMask.192.1.1.3.255.255.255.255.0.8.8.8.9 = IpAddress: 255.255.255.255
IP-FORWARD-MIB::ipCidrRouteMask.192.1.1.4.255.255.255.255.0.8.8.8.9 = IpAddress: 255.255.255.255
IP-FORWARD-MIB::ipCidrRouteMask.192.1.1.6.255.255.255.255.0.8.8.8.9 = IpAddress: 255.255.255.255
IP-FORWARD-MIB::ipCidrRouteMask.224.0.0.5.255.255.255.255.0.0.0.0.0 = IpAddress: 255.255.255.255
IP-FORWARD-MIB::ipCidrRouteTos.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteTos.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHop.1.1.1.0.255.255.255.0.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.6.6.6.1.255.255.255.255.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.7.7.7.0.255.255.255.0.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.8.8.8.0.255.255.255.0.0.0.0.0.0 = IpAddress: 0.0.0.0
IP-FORWARD-MIB::ipCidrRouteNextHop.8.8.8.8.255.255.255.255.0.0.0.0.0 = IpAddress: 0.0.0.0
IP-FORWARD-MIB::ipCidrRouteNextHop.9.9.9.0.255.255.255.0.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.10.250.1.0.255.255.255.252.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.10.250.1.4.255.255.255.252.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.10.250.1.8.255.255.255.252.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.10.250.1.16.255.255.255.252.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.10.250.1.20.255.255.255.252.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.10.250.1.24.255.255.255.252.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.10.250.1.28.255.255.255.252.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.192.1.1.1.255.255.255.255.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.192.1.1.2.255.255.255.255.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.192.1.1.3.255.255.255.255.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.192.1.1.4.255.255.255.255.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.192.1.1.6.255.255.255.255.0.8.8.8.9 = IpAddress: 8.8.8.9
IP-FORWARD-MIB::ipCidrRouteNextHop.224.0.0.5.255.255.255.255.0.0.0.0.0 = IpAddress: 0.0.0.0
IP-FORWARD-MIB::ipCidrRouteIfIndex.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: 518
```

```
IP-FORWARD-MIB::ipCidrRouteIfIndex.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteIfIndex.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: 518
IP-FORWARD-MIB::ipCidrRouteIfIndex.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteType.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: local(3)
IP-FORWARD-MIB::ipCidrRouteType.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: local(3)
IP-FORWARD-MIB::ipCidrRouteType.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: remote(4)
IP-FORWARD-MIB::ipCidrRouteType.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: other(1)
IP-FORWARD-MIB::ipCidrRouteProto.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: netmgmt(3)
IP-FORWARD-MIB::ipCidrRouteProto.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: local(2)
IP-FORWARD-MIB::ipCidrRouteProto.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteProto.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: ospf(13)
IP-FORWARD-MIB::ipCidrRouteAge.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: 72989
IP-FORWARD-MIB::ipCidrRouteAge.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: 72989
IP-FORWARD-MIB::ipCidrRouteAge.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: 72989
IP-FORWARD-MIB::ipCidrRouteAge.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: 73031
IP-FORWARD-MIB::ipCidrRouteAge.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: 73031
IP-FORWARD-MIB::ipCidrRouteAge.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: 72989
```



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IP-FORWARD-MIB::ipCidrRouteAge.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: 72989
IP-FORWARD-MIB::ipCidrRouteAge.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: 72990
IP-FORWARD-MIB::ipCidrRouteAge.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: 73032
IP-FORWARD-MIB::ipCidrRouteInfo.1.1.1.0.255.255.255.0.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.6.6.6.1.255.255.255.255.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.7.7.7.0.255.255.255.0.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.8.8.8.0.255.255.255.0.0.0.0.0.0 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.8.8.8.8.255.255.255.255.0.0.0.0.0 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.9.9.9.0.255.255.255.0.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.10.250.1.0.255.255.255.252.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.10.250.1.4.255.255.255.252.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.10.250.1.8.255.255.255.252.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.10.250.1.16.255.255.255.252.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.10.250.1.20.255.255.255.252.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.10.250.1.24.255.255.255.252.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.10.250.1.28.255.255.255.252.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.192.1.1.1.255.255.255.255.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.192.1.1.2.255.255.255.255.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.192.1.1.3.255.255.255.255.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.192.1.1.4.255.255.255.255.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.192.1.1.6.255.255.255.255.0.8.8.8.9 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteInfo.224.0.0.5.255.255.255.255.0.0.0.0.0 = OID: SNMPv2-SMI::zeroDotZero
IP-FORWARD-MIB::ipCidrRouteNextHopAS.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteNextHopAS.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: 0
IP-FORWARD-MIB::ipCidrRouteMetric1.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: 3
IP-FORWARD-MIB::ipCidrRouteMetric1.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: 52
IP-FORWARD-MIB::ipCidrRouteMetric1.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: 53
IP-FORWARD-MIB::ipCidrRouteMetric1.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric1.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric1.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: 103
IP-FORWARD-MIB::ipCidrRouteMetric1.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: 52
IP-FORWARD-MIB::ipCidrRouteMetric1.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: 53
IP-FORWARD-MIB::ipCidrRouteMetric1.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: 102
IP-FORWARD-MIB::ipCidrRouteMetric1.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: 53
```

```
IP-FORWARD-MIB::ipCidrRouteMetric1.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: 552
IP-FORWARD-MIB::ipCidrRouteMetric1.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: 2
IP-FORWARD-MIB::ipCidrRouteMetric1.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: 25052
IP-FORWARD-MIB::ipCidrRouteMetric1.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: 52
IP-FORWARD-MIB::ipCidrRouteMetric1.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: 2
IP-FORWARD-MIB::ipCidrRouteMetric1.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: 65535
IP-FORWARD-MIB::ipCidrRouteMetric1.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: 102
IP-FORWARD-MIB::ipCidrRouteMetric1.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: 25052
IP-FORWARD-MIB::ipCidrRouteMetric1.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: 1
IP-FORWARD-MIB::ipCidrRouteMetric2.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric2.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric3.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: -1
```



```
IP-FORWARD-MIB::ipCidrRouteMetric4.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric4.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteMetric5.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: -1
IP-FORWARD-MIB::ipCidrRouteStatus.1.1.1.0.255.255.255.0.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.6.6.6.1.255.255.255.255.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.7.7.7.0.255.255.255.0.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.8.8.8.0.255.255.255.0.0.0.0.0.0 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.8.8.8.8.255.255.255.255.0.0.0.0.0 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.9.9.9.0.255.255.255.0.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.10.250.1.0.255.255.255.252.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.10.250.1.4.255.255.255.252.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.10.250.1.8.255.255.255.252.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.10.250.1.16.255.255.255.252.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.10.250.1.20.255.255.255.252.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.10.250.1.24.255.255.255.252.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.10.250.1.28.255.255.255.252.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.192.1.1.1.255.255.255.255.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.192.1.1.2.255.255.255.255.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.192.1.1.3.255.255.255.255.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.192.1.1.4.255.255.255.255.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.192.1.1.6.255.255.255.255.0.8.8.8.9 = INTEGER: active(1)
IP-FORWARD-MIB::ipCidrRouteStatus.224.0.0.5.255.255.255.255.0.0.0.0.0 = INTEGER: active(1)
```

Meaning In the sample output:

- The **IP-MIB::ipNetToMediaPhysAddress.518.8.8.8.9** MIB object shows the Ethernet MAC address of the interface that has IP address **8.8.8.9**, and is directly connected to the interface with interface index **518**.
- The **IP-MIB::ipNetToMediaNetAddress.518.8.8.8.9** MIB object shows the IP address of the interface directly connected to the interface with interface index **518**.
- The **IP-FORWARD-MIB::ipCidrRouteDest.192.1.1.3.255.255.255.255.0.8.8.8.9** MIB object shows there is a route to reach IP address **192.1.1.3**, which is the address configured on the loopback interface (**lo0**) of Router CE1.

- The **IP-FORWARD-MIB::ipCidrRouteNextHop.192.1.1.3.255.255.255.255.0.8.8.8.9** MIB object shows the next hop for reaching IP address **192.1.1.3** through the interface with interface index **518**.
- The **IP-FORWARD-MIB::ipCidrRouteIfIndex.1.1.1.0.255.255.255.0.0.8.8.8.9** MIB object shows the interface index for the interface used to reach IP subnetwork 1.1.1.0.
- The **IP-FORWARD-MIB::ipCidrRouteIfIndex.8.8.8.0.255.255.255.0.0.0.0.0.0** MIB object shows the interface index for the interface used to reach IP subnetwork 8.8.8.0.
- The **IP-FORWARD-MIB::ipCidrRouteIfIndex.192.1.1.3.255.255.255.255.0.8.8.8.9** MIB object shows the interface index for the interface used to reach IP address 192.1.1.3.

Display the Interface Name for an Interface Index

Purpose Retrieve and display the interface name for a given interface index.

Action To display the interface name for a given interface index, use the **show snmp mib** command and specify the interface index number:

```
user@PE2> show snmp mib get ifName.518
ifName.518     = ge-1/0/1.0
```

Meaning In the sample output, interface index **518** is identified as the **ge-1/0/1.0** interface.

Display the Interface Index for Interfaces Configured for a VRF Routing Instance

Purpose Retrieve and display the interface index for a given VRF routing instance.

Action To display the interface index for a given VRF routing instance, use the **snmpwalk** command on a network management station. Specify the name of the VRF routing instance and the SNMP read community string in the format ***vrfname*@*communitystring***. Also specify the IP address of the router and the MIB object identifier (OID). In the following example, the routing instance name is **jnprl3vpn**, the SNMP read community string is **petblr**, the IP address is **116.197.178.2**, and the MIB OID is **1.3.6.1.2.1.2**.

```
user@host_shell>snmpwalk -v1 -c jnprl3vpn@petblr 116.197.178.2 1.3.6.1.2.1.2
Did not find 'ifIndex' in module RFC1213-MIB (D:\usr\share\snmp\mibs/rfc1215.mib)
Did not find 'egpNeighAddr' in module RFC1213-MIB
(D:\usr\share\snmp\mibs/rfc1215.mib)
Did not find 'sysName' in module RFC1213-MIB
(D:\usr\share\snmp\mibs/mib-ex2500-priv.txt)
Did not find 'sysLocation' in module RFC1213-MIB
(D:\usr\share\snmp\mibs/mib-ex2500-priv.txt)
Did not find 'sysContact' in module RFC1213-MIB
(D:\usr\share\snmp\mibs/mib-ex2500-priv.txt)
Did not find 'ifIndex' in module RFC1213-MIB
(D:\usr\share\snmp\mibs/mib-ex2500-priv.txt)
IF-MIB::ifNumber.0 = INTEGER: 59
IF-MIB::ifIndex.4 = INTEGER: 4
IF-MIB::ifIndex.516 = INTEGER: 516
IF-MIB::ifIndex.518 = INTEGER: 518
IF-MIB::ifIndex.536 = INTEGER: 536
IF-MIB::ifDescr.4 = STRING: lsi
IF-MIB::ifDescr.516 = STRING: ge-1/0/1
```

```
IF-MIB::ifDescr.518 = STRING: ge-1/0/1.0
IF-MIB::ifDescr.536 = STRING: lsi.512
IF-MIB::ifType.4 = INTEGER: mplsTunnel(150)
IF-MIB::ifType.516 = INTEGER: ethernetCsmacd(6)
IF-MIB::ifType.518 = INTEGER: propVirtual(53)
IF-MIB::ifType.536 = INTEGER: propVirtual(53)
IF-MIB::ifMtu.4 = INTEGER: 1496
IF-MIB::ifMtu.516 = INTEGER: 1514
IF-MIB::ifMtu.518 = INTEGER: 1500
IF-MIB::ifMtu.536 = INTEGER: 1496
IF-MIB::ifSpeed.4 = Gauge32: 0
IF-MIB::ifSpeed.516 = Gauge32: 1000000000
IF-MIB::ifSpeed.518 = Gauge32: 1000000000
IF-MIB::ifSpeed.536 = Gauge32: 4294967295
IF-MIB::ifPhysAddress.4 = STRING:
IF-MIB::ifPhysAddress.516 = STRING: 0:22:83:15:bc:7f
IF-MIB::ifPhysAddress.518 = STRING: 0:22:83:15:bc:7f
IF-MIB::ifPhysAddress.536 = STRING:
IF-MIB::ifAdminStatus.4 = INTEGER: up(1)
IF-MIB::ifAdminStatus.516 = INTEGER: up(1)
IF-MIB::ifAdminStatus.518 = INTEGER: up(1)
IF-MIB::ifAdminStatus.536 = INTEGER: up(1)
IF-MIB::ifOperStatus.4 = INTEGER: up(1)
IF-MIB::ifOperStatus.516 = INTEGER: up(1)
IF-MIB::ifOperStatus.518 = INTEGER: up(1)
IF-MIB::ifOperStatus.536 = INTEGER: up(1)
IF-MIB::ifLastChange.4 = Timeticks: (572) 0:00:05.72
IF-MIB::ifLastChange.516 = Timeticks: (105781905) 12 days, 5:50:19.05
IF-MIB::ifLastChange.518 = Timeticks: (114092494) 13 days, 4:55:24.94
IF-MIB::ifLastChange.536 = Timeticks: (114095045) 13 days, 4:55:50.45
IF-MIB::ifInOctets.4 = Counter32: 0
IF-MIB::ifInOctets.516 = Counter32: 1324274
IF-MIB::ifInOctets.518 = Counter32: 1277110
IF-MIB::ifInOctets.536 = Counter32: 0
IF-MIB::ifInUcastPkts.4 = Counter32: 0
IF-MIB::ifInUcastPkts.516 = Counter32: 49
IF-MIB::ifInUcastPkts.518 = Counter32: 11583
IF-MIB::ifInUcastPkts.536 = Counter32: 0
IF-MIB::ifInNUcastPkts.4 = Counter32: 0
IF-MIB::ifInNUcastPkts.516 = Counter32: 11632
IF-MIB::ifInNUcastPkts.518 = Counter32: 0
IF-MIB::ifInNUcastPkts.536 = Counter32: 0
IF-MIB::ifInDiscards.4 = Counter32: 0
IF-MIB::ifInDiscards.516 = Counter32: 0
IF-MIB::ifInDiscards.518 = Counter32: 0
IF-MIB::ifInDiscards.536 = Counter32: 0
IF-MIB::ifInErrors.4 = Counter32: 0
IF-MIB::ifInErrors.516 = Counter32: 6
IF-MIB::ifInErrors.518 = Counter32: 0
IF-MIB::ifInErrors.536 = Counter32: 0
IF-MIB::ifInUnknownProtos.4 = Counter32: 0
IF-MIB::ifInUnknownProtos.516 = Counter32: 0
IF-MIB::ifInUnknownProtos.518 = Counter32: 0
IF-MIB::ifInUnknownProtos.536 = Counter32: 0
IF-MIB::ifOutOctets.4 = Counter32: 0
IF-MIB::ifOutOctets.516 = Counter32: 787040
IF-MIB::ifOutOctets.518 = Counter32: 745362
IF-MIB::ifOutOctets.536 = Counter32: 0
IF-MIB::ifOutUcastPkts.4 = Counter32: 0
IF-MIB::ifOutUcastPkts.516 = Counter32: 52
IF-MIB::ifOutUcastPkts.518 = Counter32: 9145
```

```
IF-MIB::ifOutUcastPkts.536 = Counter32: 0
IF-MIB::ifOutNUcastPkts.4 = Counter32: 0
IF-MIB::ifOutNUcastPkts.516 = Counter32: 9132
IF-MIB::ifOutNUcastPkts.518 = Counter32: 0
IF-MIB::ifOutNUcastPkts.536 = Counter32: 0
IF-MIB::ifOutDiscards.4 = Counter32: 0
IF-MIB::ifOutDiscards.516 = Counter32: 0
IF-MIB::ifOutDiscards.518 = Counter32: 0
IF-MIB::ifOutDiscards.536 = Counter32: 0
IF-MIB::ifOutErrors.4 = Counter32: 0
IF-MIB::ifOutErrors.516 = Counter32: 0
IF-MIB::ifOutErrors.518 = Counter32: 0
IF-MIB::ifOutErrors.536 = Counter32: 0
IF-MIB::ifOutQLen.4 = Gauge32: 0
IF-MIB::ifOutQLen.516 = Gauge32: 0
IF-MIB::ifOutQLen.518 = Gauge32: 0
IF-MIB::ifOutQLen.536 = Gauge32: 0
IF-MIB::ifSpecific.4 = OID: SNMPv2-SMI::zeroDotZero
IF-MIB::ifSpecific.516 = OID: SNMPv2-SMI::zeroDotZero
IF-MIB::ifSpecific.518 = OID: SNMPv2-SMI::zeroDotZero
IF-MIB::ifSpecific.536 = OID: SNMPv2-SMI::zeroDotZero
```

Meaning In the sample output:

- Interface index **516** is physical interface **ge-1/0/1**.
- Interface index **518** is logical interface **ge-1/0/1.0**.
- Interface index **536** is label-switched interface **lsi.512**

Related Documentation

- SNMP Overview on page 1
- Understanding SNMP Implementation in Junos OS
- Configuring SNMP on Devices Running Junos OS

