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Layer 2 Traceroute Utility

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**Note**

- For complete syntax and usage information for the commands used in this chapter, see these publications:
http://www.cisco.com/en/US/products/ps11846/prod_command_reference_list.html
 - Cisco IOS Release 15.4SY supports only Ethernet interfaces. Cisco IOS Release 15.4SY does not support any WAN features or commands.
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**Tip**

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html

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Prerequisites for the Layer 2 Traceroute Utility

None.

Restrictions for the Layer 2 Traceroute Utility

- Cisco Discovery Protocol (CDP) must be enabled on all the devices in the network. For the Layer 2 traceroute utility to function properly, do not disable CDP. If any devices in the Layer 2 path are transparent to CDP, the Layer 2 traceroute utility cannot identify these devices on the path.
- A switch is defined as reachable from another switch when you can test connectivity by using the **ping** privileged EXEC command. All devices in the Layer 2 path must be mutually reachable. To verify the ping connectivity you need to use the IP address that the CDP advertises on its Layer 2 interfaces.
- The maximum number of hops identified in the path is ten.

- You can enter the **traceroute mac** or the **traceroute mac ip** privileged EXEC command on a switch that is not in the Layer 2 path from the source device to the destination device. All devices in the path must be reachable from this switch.
- The **traceroute mac** command output shows the Layer 2 path only when the specified source and destination MAC addresses belong to the same VLAN. If you specify source and destination MAC addresses that belong to different VLANs, the Layer 2 path is not identified, and an error message appears.
- If you specify a multicast source or destination MAC address, the path is not identified, and an error message appears.
- If the source or destination MAC address belongs to multiple VLANs, you must specify the VLAN to which both the source and destination MAC addresses belong. If the VLAN is not specified, the path is not identified, and an error message appears.
- The **traceroute mac ip** command output shows the Layer 2 path when the specified source and destination IP addresses belong to the same subnet. When you specify the IP addresses, the Layer 2 traceroute utility uses the Address Resolution Protocol (ARP) to associate the IP addresses with the corresponding MAC addresses and the VLAN IDs.
 - If an ARP entry exists for the specified IP address, the Layer 2 traceroute utility uses the associated MAC address and identifies the Layer 2 path.
 - If an ARP entry does not exist, the Layer 2 traceroute utility sends an ARP query and tries to resolve the IP address. If the IP address is not resolved, the path is not identified, and an error message appears.
- When multiple devices are attached to one port through hubs (for example, multiple CDP neighbors are detected on a port), the Layer 2 traceroute utility terminates at that hop and displays an error message.
- The Layer 2 traceroute utility is not supported in Token Ring VLANs.
- Layer 2 traceroute opens a listening socket on the User Datagram Protocol (UDP) port 2228 that can be accessed remotely with any IPv4 address, and does not require any authentication. This UDP socket allows to read VLAN information, links, presence of particular MAC addresses, and CDP neighbor information, from the device. This information can be used to eventually build a complete picture of the Layer 2 network topology.
- Layer 2 traceroute is enabled by default and can be disabled by running the **no l2 traceroute** command in global configuration mode. To re-enable Layer 2 traceroute, use the **l2 traceroute** command in global configuration mode.

Information About the Layer 2 Traceroute Utility

The Layer 2 traceroute utility identifies the Layer 2 path that a packet takes from a source device to a destination device. Layer 2 traceroute supports only unicast source and destination MAC addresses. The utility determines the path by using the MAC address tables of the switches in the path. When the Layer 2 traceroute utility detects a device in the path that does not support Layer 2 traceroute, it continues to send Layer 2 trace queries and allows them to time out.

The Layer 2 traceroute utility can only identify the path from the source device to the destination device. The utility cannot identify the path that a packet takes from the source host to the source device or from the destination device to the destination host.

How to Use the Layer 2 Traceroute Utility

To display the Layer 2 path that a packet takes from a source device to a destination device, perform one of these tasks in privileged EXEC mode:

Command	Purpose
<pre>Router# traceroute mac [interface type interface_number] <i>source_mac_address</i> [interface type interface_number] <i>destination_mac_address</i> [vlan vlan_id] [detail]</pre>	Uses MAC addresses to trace the path that packets take through the network.
<pre>Router# traceroute mac ip {<i>source_ip_address</i> <i>source_hostname</i>} {<i>destination_ip_address</i> <i>destination_hostname</i>} [detail]</pre>	Uses IP addresses to trace the path that packets take through the network.

These examples show how to use the **traceroute mac** and **traceroute mac ip** commands to display the physical path a packet takes through the network to reach its destination:

```
Router# traceroute mac 0000.0201.0601 0000.0201.0201
```

```
Source 0000.0201.0601 found on con6[WS-C2950G-24-EI] (2.2.6.6)
con6 (2.2.6.6) :Fa0/1 => Fa0/3
con5          (2.2.5.5      ) : Fa0/3 => Gi0/1
con1          (2.2.1.1      ) : Gi0/1 => Gi0/2
con2          (2.2.2.2      ) : Gi0/2 => Fa0/1
Destination 0000.0201.0201 found on con2[WS-C3550-24] (2.2.2.2)
Layer 2 trace completed
```

```
Router#
```

```
Router# traceroute mac 0001.0000.0204 0001.0000.0304 detail
```

```
Source 0001.0000.0204 found on VAYU[WS-C6509] (2.1.1.10)
1 VAYU / WS-C6509 / 2.1.1.10 :
    Gi6/1 [full, 1000M] => Po100 [auto, auto]
2 PANI / WS-C6509 / 2.1.1.12 :
    Po100 [auto, auto] => Po110 [auto, auto]
3 BUMI / WS-C6509 / 2.1.1.13 :
    Po110 [auto, auto] => Po120 [auto, auto]
4 AGNI / WS-C6509 / 2.1.1.11 :
    Po120 [auto, auto] => Gi8/12 [full, 1000M] Destination 0001.0000.0304
found on AGNI[WS-C6509] (2.1.1.11) Layer 2 trace completed.
Router#
```



Tip

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