



# Troubleshooting Routing

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## About Troubleshooting Routing Issues

Layer 3 routing involves determining optimal routing paths and packet switching. You can use routing algorithms to calculate the optimal path from the router to a destination. This calculation depends on the algorithm selected, route metrics, and other considerations such as load balancing and alternate path discovery.

Cisco NX-OS supports multiple virtual routing and forwarding (VRF) instances and multiple routing information bases (RIBs) to support multiple address domains. Each VRF is associated with a RIB, and this information is collected by the Forwarding Information Base (FIB).

See the following documents for more information on routing:

- *Cisco Nexus 9000 Series NX-OS Unicast Routing Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS Multicast Routing Configuration Guide*

## Initial Troubleshooting Routing Checklist

You can troubleshoot routing issues by checking these items first:

Checklist	Done
Verify that the routing protocol is enabled.	
Verify that the address family is configured if necessary.	
Verify that you have configured the correct VRF for your routing protocol.	

Use the following commands to display routing information:

- **show ip arp**
- **show ip traffic**

- **show ip static-route**
- **show ip client**
- **show ip fib**
- **show ip process**
- **show ip route**
- **show vrf**
- **show vrf interface**

# Troubleshooting Routing

## SUMMARY STEPS

1. switch# **show ospf**
2. switch# **show running-config eigrp all**
3. switch# **show running-config eigrp**
4. switch# **show processes memory | include isis**
5. switch# **show ip client pim**
6. switch# **show ip interface loopback-interface**
7. switch# **show vrf interface loopback -interface**
8. switch# **show routing unicast clients**
9. switch# **show forwarding distribution multicast client**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<p>switch# <b>show ospf</b></p> <p><b>Example:</b></p> <pre>switch# show ospf                 ^ % invalid command detected at '^' marker.</pre>	<p>Verifies that the routing protocol is enabled.</p> <p>If the feature is not enabled, Cisco NX-OS reports that the command is invalid.</p>
<b>Step 2</b>	<p>switch# <b>show running-config eigrp all</b></p> <p><b>Example:</b></p> <pre>switch# show running-config eigrp all</pre>	<p>Verifies the configuration for this routing protocol.</p>
<b>Step 3</b>	<p>switch# <b>show running-config eigrp</b></p> <p><b>Example:</b></p> <pre>switch# show running-config eigrp version 6.1(2)I1(1) feature eigrp router eigrp 99   address-family ipv4 unicast     router-id 192.0.2.1</pre>	<p>Verifies the VRF configuration for this routing protocol.</p>

	Command or Action	Purpose
	<pre>vrf red stub</pre>	
<b>Step 4</b>	<p>switch# <b>show processes memory   include isis</b></p> <p><b>Example:</b></p> <pre>switch# show processes memory   include isis 8913 9293824 bffff1d0/bffff0d0 isis 32243 8609792 bfffe0c0/bfffd0c0 isis</pre>	Checks the memory utilization for this routing protocol.
<b>Step 5</b>	<p>switch# <b>show ip client pim</b></p> <p><b>Example:</b></p> <pre>switch# show ip client pim Client: pim, uuid: 284, pid: 3839, extended pid: 3839 Protocol: 103, client-index: 10, routing VRF id: 255 Data MTS-SAP: 1519 Data messages, send successful: 2135, failed: 0</pre>	Verifies that the routing protocol is receiving packets.
<b>Step 6</b>	<p>switch# <b>show ip interface loopback-interface</b></p> <p><b>Example:</b></p> <pre>switch# show ip interface loopback0 loopback0, Interface status: protocol-up/link-up/admin-up, iod: 36, Context:"default" IP address: 1.0.0.1, IP subnet: 1.0.0.0/24 ... IP multicast groups locally joined: 224.0.0.2 224.0.0.1 224.0.0.13 ...</pre>	Verifies that the routing protocol is enabled on an interface.
<b>Step 7</b>	<p>switch# <b>show vrf interface loopback -interface</b></p> <p><b>Example:</b></p> <pre>switch# show vrf interface loopback 99 Interface          VRF-Name VRF-ID loopback99         default 1</pre>	Verifies that the interface is in the correct VRF.
<b>Step 8</b>	<p>switch# <b>show routing unicast clients</b></p> <p><b>Example:</b></p> <pre>switch# show routing unicast clients</pre>	Verifies that the routing protocol is registered with the RIB.
<b>Step 9</b>	<p>switch# <b>show forwarding distribution multicast client</b></p> <p><b>Example:</b></p> <pre>switch# show forwarding distribution multicast client Number of Clients Registered: 3 Client-name  Client-id  Shared Memory Name igmp        1          N/A mrib        2          /procket/shm/mrib-mfdm</pre>	Verifies that the RIB is interacting with the forwarding plane.

### Example

This example shows how to display the EIGRP routing protocol configuration:

```
switch# show running-config eigrp all
version 6.1(2)I1(1)
feature eigrp
router eigrp 99
log-neighbor-warnings
  log-neighbor-changes
  log-adjacency-changes
  graceful-restart
  nsf
  timers nsf signal 20
  distance 90 170
  metric weights 0 1 0 1 0 0
  metric maximum-hops 100
  default-metric 100000 100 255 1 1500
  maximum-paths 16
address-family ipv4 unicast
  log-neighbor-warnings
  log-neighbor-changes
  log-adjacency-changes
  graceful-restart
  router-id 192.0.2.1
  nsf
  timers nsf signal 20
  distance 90 170
  metric weights 0 1 0 1 0 0
  metric maximum-hops 100
  default-metric 100000 100 255 1 1500
  maximum-paths 16
```

This example shows how to display that the unicast routing protocol is registered with the RIB:

```
switch# show routing unicast clients
CLIENT: am
index mask: 0x00000002
epid: 3908      MTS SAP: 252      MRU cache hits/misses:      2/1
Routing Instances:
  VRF: management      table: base
Messages received:
  Register      : 1      Add-route      : 2      Delete-route      : 1
Messages sent:
  Add-route-ack  : 2      Delete-route-ack : 1
CLIENT: rpm
index mask: 0x00000004
epid: 4132      MTS SAP: 348      MRU cache hits/misses:      0/0
Messages received:
  Register      : 1
Messages sent:
...
CLIENT: eigrp-99
index mask: 0x00002000
epid: 3148      MTS SAP: 63775    MRU cache hits/misses:      0/1
Routing Instances:
  VRF: default      table: base      notifiers: self
Messages received:
```

```
Register          : 1      Delete-all-routes : 1
Messages sent:
...
```

## Troubleshooting Policy-Based Routing

- Make sure the ACLs match the incoming traffic.
- Make sure the route is available:
  - For IP network routes, use the **show ip route** command to make sure the IP network route is available for the next hop specified in the **set ip next-hop** command.
  - For IP host routes, use the **show ip arp** command to make sure the IP host route is available for the next hop specified in the **set ip next-hop** command.
  - For IPv6 network routes, use the **show ipv6 route** command to make sure the IPv6 network route is available for the next hop specified in the **set ipv6 next-hop** command.
  - For IPv6 host routes, use the **show ipv6 neighbor** command to make sure the IPv6 host route is available for the next hop specified in the **set ipv6 next-hop** command.
- Make sure the policy is active in the system (using the **show ip policy** command).
- Check the statistics for the entry (using the **show route-map map-name pbr-statistics** command).

