

# 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

**Procedure**

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | switch# **show ospf**<br>**Example:**<br>`switch# show ospf`<br>`                    ^`<br>`% invalid command detected at '^' marker.` | Verifies that the routing protocol is enabled.<br>If the feature is not enabled, Cisco NX-OS reports that the command is invalid. |
| **Step 2** | switch# **show running-config eigrp all**<br>**Example:**<br>`switch# show running-config eigrp all` | Verifies the configuration for this routing protocol. |
| **Step 3** | switch# **show running-config eigrp**<br>**Example:**<br>`switch# show running-config eigrp`<br>`version 6.1(2)I1(1)`<br>`feature eigrp` | Verifies the VRF configuration for this routing protocol. |

| | Command or Action | Purpose |
|---|---|---|
| | `router eigrp 99`<br>`  address-family ipv4 unicast`<br>`  router-id 192.0.2.1`<br>`  vrf red`<br>`  stub` | |
| **Step 4** | switch# **show processes memory \| include isis**<br>**Example:**<br>`switch# show processes memory \| include isis`<br>` 8913  9293824  bffff1d0/bffff0d0  isis`<br>`32243  8609792  bfffe0c0/bfffdfc0  isis` | Checks the memory utilization for this routing protocol. |
| **Step 5** | switch# **show ip client pim**<br>**Example:**<br>`switch# show ip client pim`<br>`  Client: pim, uuid: 284, pid: 3839, extended pid:`<br>` 3839`<br>`  Protocol: 103, client-index: 10, routing VRF id:`<br>` 255`<br>`  Data MTS-SAP: 1519`<br>`  Data messages, send successful: 2135, failed: 0` | Verifies that the routing protocol is receiving packets. |
| **Step 6** | switch# **show ip interface** *loopback-interface*<br>**Example:**<br>`switch# show ip interface loopback0`<br>`loopback0, Interface status:`<br>`protocol-up/link-up/admin-up, iod: 36,`<br>`Context:"default"`<br>`  IP address: 1.0.0.1, IP subnet: 1.0.0.0/24`<br>`  ...`<br>`  IP multicast groups locally joined:`<br>`  224.0.0.2  224.0.0.1  224.0.0.13`<br>`  ...` | Verifies that the routing protocol is enabled on an interface. |
| **Step 7** | switch# **show vrf interface** *loopback -interface*<br>**Example:**<br>`switch# show vrf interface loopback 99`<br>`Interface  VRF-Name`<br>`  VRF-ID`<br>`loopback99  default`<br>`  1` | Verifies that the interface is in the correct VRF. |
| **Step 8** | switch# **show routing unicast clients**<br>**Example:**<br>`switch# show routing unicast clients` | Verifies that the routing protocol is registered with the RIB. |
| **Step 9** | switch# **show forwarding distribution multicast client**<br>**Example:**<br>`switch# show forwarding distribution multicast`<br>`client`<br>`Number of Clients Registered: 3`<br>`Client-name  Client-id  Shared Memory Name` | Verifies that the RIB is interacting with the forwarding plane. |

| | Command or Action | Purpose |
|---|---|---|
| | igmp 1 N/A<br>mrib 2 /procket/shm/mrib-mfdm | |

### 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).