



# NetFlow Policy Routing

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NetFlow policy routing (NPR) integrates policy routing, which enables traffic engineering and traffic classification, with NetFlow services, which provide billing, capacity planning, and information monitoring on real-time traffic flows. IP policy routing works with Cisco Express Forwarding (formerly known as CEF), distributed Cisco Express Forwarding (formerly known as dCEF), and NetFlow.

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Prerequisites for NetFlow Policy Routing

For NetFlow policy routing to work, the following features must already be configured:

- Cisco Express Forwarding, distributed Cisco Express Forwarding, or NetFlow
- Policy routing

## Restrictions for NetFlow Policy Routing

- NetFlow Policy Routing (NPR) is available only on Cisco platforms that support Cisco Express Forwarding.

- Distributed Forwarding Information Base (FIB)-based policy routing is available only on platforms that support distributed Cisco Express Forwarding.
- The **set ip next-hop verify-availability** command is not supported in distributed Cisco Express Forwarding because distributed Cisco Express Forwarding does not support the Cisco Discovery Protocol (formerly known as CDP) database.

## Information About NetFlow Policy Routing

### NetFlow Policy Routing

NetFlow policy routing (NPR) integrates policy routing, which enables traffic engineering and traffic classification, with NetFlow services, which provide billing, capacity planning, and information monitoring on real-time traffic flows. IP policy routing works with Cisco Express Forwarding (formerly known as CEF), distributed Cisco Express Forwarding (formerly known as dCEF), and NetFlow.

NetFlow policy routing leverages the following technologies:

- Cisco Express Forwarding, which looks at a Forwarding Information Base (FIB) instead of a routing table when switching packets, to address maintenance problems of a demand caching scheme.
- Distributed Cisco Express Forwarding, which addresses the scalability and maintenance problems of a demand caching scheme.
- NetFlow, which provides accounting, capacity planning, and traffic monitoring capabilities.

The following are the benefits of NPR:

- NPR takes advantage of new switching services. Cisco Express Forwarding, distributed Cisco Express Forwarding, and NetFlow can now use policy routing.
- Policy routing can be deployed on a wide scale and on high-speed interfaces.

NPR is the default policy routing mode. No additional configuration tasks are required to enable policy routing with Cisco Express Forwarding, distributed Cisco Express Forwarding, or NetFlow. As soon as one of these features is turned on, packets are automatically subjected to policy routing in the appropriate switching path.

The following example shows how to configure policy routing with Cisco Express Forwarding. The route is configured to verify that the next hop 10.0.0.8 of the route map named test is a Cisco Discovery Protocol neighbor before the device tries to policy-route to it.

```
Device(config)# ip cef
Device(config)# interface GigabitEthernet 0/0/1
Device(config-if)# ip route-cache flow
Device(config-if)# ip policy route-map test
Device(config-if)# exit
Device(config)# route-map test permit 10
Device(config-route-map)# match ip address 1
Device(config-route-map)# set ip precedence priority
Device(config-route-map)# set ip next-hop 10.0.0.8
Device(config-route-map)# set ip next-hop verify-availability
Device(config-route-map)# exit
Device(config)# route-map test permit 20
Device(config-route-map)# match ip address 101
```

```
Device(config-route-map) # set interface Ethernet 0/0/3
Device(config-route-map) # set ip tos max-throughput
Device(config-route-map) # exit
```

## Next-Hop Reachability

You can use the **set ip next-hop verify-availability** command to configure policy routing to verify the reachability of the next hop of a route map before the device performs policy routing to that next hop. This command has the following restrictions:

- It can cause performance degradation.
- Cisco Discovery Protocol must be enabled on the interface.
- The directly connected next hop must be a Cisco Discovery Protocol-enabled Cisco device.
- It does not work with distributed Cisco Express Forwarding configurations.

If a device is policy routing packets to the next hop and the next hop happens to be down, the device tries unsuccessfully to use the Address Resolution Protocol (ARP). This behavior can continue indefinitely. You can prevent this behavior by configuring the **set ip next-hop verify availability** command on the device. This command first verifies (using a route map) whether the next hop is a Cisco Discovery Protocol neighbor of the device before routing packets to that next hop. However, if you configure this command on a device whose next hop is not a Cisco Discovery Protocol neighbor, the device looks at the subsequent next hop, if there is one. If there is no available next hop, packets are not policy-routed. This configuration is optional because some media or encapsulations do not support Cisco Discovery Protocol.

If the **set ip next-hop verify availability** command is not configured, packets are either policy-routed or remain forever unrouted.

If you want to verify the availability of only some next hops, you can configure different route-map entries (under the same route-map name) with different criteria (using access-list matching or packet-size matching), and use the **set ip next-hop verify availability** configuration command selectively.

## Additional References

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>
IP routing protocol-independent commands	<a href="#">Cisco IOS IP Routing: Protocol-Independent Command Reference</a>

**Technical Assistance**

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for NetFlow Policy Routing

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1: Feature Information for NetFlow Policy Routing**

Feature Name	Releases	Feature Information
NetFlow Policy Routing		NetFlow policy routing (NPR) integrates policy routing, which enables traffic engineering and traffic classification, with NetFlow services, which provide billing, capacity planning, and monitoring information on real-time traffic flows. IP policy routing works with Cisco Express Forwarding, distributed Cisco Express Forwarding, and NetFlow.
Policy Routing Infrastructure		The Policy Routing Infrastructure feature provides full support of IP policy-based routing with Cisco Express Forwarding and NetFlow. When both policy routing and NetFlow are enabled, redundant processing is avoided.