



## Path Preference Hierarchy

The Path Preference Hierarchy feature allows you to configure service providers per VRF for traffic classes.

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## Feature Information for Path Preference Hierarchy

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 Path Preference Hierarchy**

Feature Name	Releases	Feature Information
Path Preference Hierarchy	Cisco IOS XE Denali 16.3.1	The Path Preference Hierarchy feature allows you to configure service providers per VRF for traffic classes.  The following command was introduced or modified: <b>path-preference.</b>

## Information About Path Preference Hierarchy

### Overview of Path Preference Hierarchy

In an enterprise network, you would need to configure service providers to interconnect the hub and branches. The Path Preference Hierarchy feature allows you to configure three service providers per VRF for traffic classes. The service providers could be primary service provider, fallback service provider, and next-fallback service provider respectively. As the name suggests, the primary service provider is the first preference in the network, followed by fallback and next-fallback, respectively. You cannot have the same service provider for

primary and fallback as this results in a “fallback backhole.” In other words, each service provider must be unique.

Use the **path-preference** command to specify the service provider order. Use the **blackhole** or **routing** keywords for a next-fallback service provider to drop the packet if fallback is unavailable or to specify there is no next-fallback service provider, respectively. When a packet reaches “blackhole,” the packet is discarded.

## How to Configure Path Preference Hierarchy

### Configuring Path Preference Hierarchy

Perform this task to configure Path Preference Hierarchy feature on a hub.

```
domain default
vrf green
  master hub
  source-interface Loopback1
  site-prefixes prefix-list HUBPFX
  class HEIRARCHICAL sequence 100
  match dscp ef policy custom
  priority 1 loss threshold 10
  path-preference ISP1 ISP2 fallback ISP3 next-fallback blackhole
```

The following is a sample output on a device that displays the route change reason and history. In this example, the traffic class jumps from next-fallback service provider to primary service provider, when the fallback is unavailable.

```
Dst-Site-Prefix: 100.30.0.0/16      DSCP: ef [46] Traffic class id:2
Clock Time:                        12:57:15 (PST) 03/30/2015
TC Learned:                         00:22:14 ago
Present State:                       CONTROLLED
Current Performance Status: in-policy
Current Service Provider:  ISP2 path-id:2 since 00:03:28
Previous Service Provider:  ISP3 pfr-label: 0:0 | 0:7 [0x7] for 180 sec
(A fallback/next-fallback provider. Primary provider will be re-evaluated 00:02:34 later)

BW Used:                             3 Kbps
Present WAN interface:               Tunnel20 in Border 100.10.2.1
Present Channel (primary):           46 ISP2 pfr-label:0:0 | 0:2 [0x2]
Backup Channel:                      42 ISP3 pfr-label:0:0 | 0:7 [0x7]
Destination Site ID bitmap:         0
Destination Site ID:                 100.30.1.1
Class-Sequence in use:               10
Class Name:                          BUSINESS using policy User-defined
  priority 2 packet-loss-rate threshold 10.0 percent
  priority 2 byte-loss-rate threshold 10.0 percent
BW Updated:                          00:00:14 ago
Reason for Latest Route Change:      next-fallback to Higher Path Preference
Route Change History:
  Date and Time                       Previous Exit                       Current
Exit                                  Reason
1: 12:53:47 (PST) 03/30/2015         ISP3/100.10.1.1/Tu30 (Ch:42)
ISP2/100.10.2.1/Tu20 (Ch:46)          next-fallback to Higher Path Preference
2: 12:50:47 (PST) 03/30/2015         None/0.0.0.0/None (Ch:0)
ISP3/100.10.1.1/Tu30 (Ch:42)         Uncontrolled to Controlled Transition
3: 12:50:15 (PST) 03/30/2015         ISP3/100.10.1.1/Tu30 (Ch:42)          None/0.0.0.0/None
(Ch:0)                               No Channels Available
4: 12:48:14 (PST) 03/30/2015         ISP2/100.10.4.1/Tu20 (Ch:43)
```

```
ISP3/100.10.1.1/Tu30 (Ch:42)          Exit down
5: 12:47:57 (PST) 03/30/2015  ISP2/100.10.2.1/Tu20 (Ch:46)
ISP2/100.10.4.1/Tu20 (Ch:43)          Exit down
```

In the following example, continuation of the above example, the traffic class is now controlled by primary service provider.

```
Route Change History:
      Date and Time          Previous Exit          Current
Exit      Reason
1: 12:59:49 (PST) 03/30/2015  ISP2/100.10.2.1/Tu20 (Ch:46)
ISP1/100.10.1.1/Tu10 (Ch:41)      Backup to Primary path preference transition
2: 12:53:47 (PST) 03/30/2015  ISP3/100.10.1.1/Tu30 (Ch:42)
ISP2/100.10.2.1/Tu20 (Ch:46)      next-fallback to Higher Path Preference
3: 12:50:47 (PST) 03/30/2015  None/0.0.0.0/None (Ch:0)
ISP3/100.10.1.1/Tu30 (Ch:42)      Uncontrolled to Controlled Transition
4: 12:50:15 (PST) 03/30/2015  ISP3/100.10.1.1/Tu30 (Ch:42)      None/0.0.0.0/None
(Ch:0)      No Channels Available
5: 12:48:14 (PST) 03/30/2015  ISP2/100.10.4.1/Tu20 (Ch:43)
ISP3/100.10.1.1/Tu30 (Ch:42)      Exit down
```

In the following example, continuation of the above example, the traffic class is discarded since the packet has reached a blackhole.

```
Route Change History:
      Date and Time          Previous Exit          Current
Exit      Reason
1: 12:50:15 (PST) 03/30/2015  ISP3/100.10.1.1/Tu30 (Ch:42)      None/0.0.0.0/None
(Ch:0)      No Channels Available
2: 12:48:14 (PST) 03/30/2015  ISP2/100.10.4.1/Tu20 (Ch:43)
ISP3/100.10.1.1/Tu30 (Ch:42)      Exit down
3: 12:47:57 (PST) 03/30/2015  ISP2/100.10.2.1/Tu20 (Ch:46)
ISP2/100.10.4.1/Tu20 (Ch:43)      Exit down
4: 12:44:42 (PST) 03/30/2015  ISP1/100.10.1.1/Tu10 (Ch:41)
ISP2/100.10.2.1/Tu20 (Ch:46)      Exit down
5: 12:44:13 (PST) 03/30/2015  ISP1/100.10.3.1/Tu10 (Ch:44)
ISP1/100.10.1.1/Tu10 (Ch:41)      Exit down
```

## Additional References for Path Preference Hierarchy

### Related Documents

Related Topic	Document Title
Performance Routing Version 3 commands	<a href="#">Cisco IOS Performance Routing Version 3 Command Reference</a>

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Description	Link
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