PfRv3 Path of Last Resort

The PfRv3 path of last resort feature allows the traffic to be routed to the path of last resort.

Feature Information for PfRv3 Path of Last Resort

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. An account on Cisco.com is not required.

Table 1: Feature Information for PfRv3 Path of Last Resort

Feature Name	Releases	Feature Information
PfRv3 Path of Last Resort	15.5(3)M	The PfRv3 Path of Last Resort is a route used by the device when a service provider cannot be reached or the exits are out of bandwidth. The following commands were modified or added by this feature: **domain path isp-name**, **show domain default vrf border**, **show domain default vrf master**.

Restrictions for PfRv3 Path of Last Resort

- Path of last resort supports probing per interface and not per channel.
- Path of last resort is not supported on multi next hop interfaces.

Information About PfRv3 Path of Last Resort

PfRv3 Path of Last Resort

The PfRv3 Path of Last Resort feature provides the ability to designate a service provider as a path of last resort such that when the primary and fallback service providers become unavailable due to unreadability or out of bandwidth situations, traffic is routed over the path of last resort service provider. This feature is used for metered links where data is charged on a per-usage basis and is used when no other service providers are available.

The following are the different supported modes:

- Standby mode—No traffic classes are currently routed over the path of last resort service provider.
- Active mode—Traffic classes are currently routed over the path of last resort service provider.
- Disabled mode—The path of last resort is not enabled.

The channels of the path of last resort are inactive when it is in standby mode. Once the path of last resort is active, smart probes are sent only on DSCP 0 (Zero SLA) to conserve bandwidth. In addition, smart probe frequency is reduced to 1 packet every 10 seconds from 20 packets per seconds, unreachable detection are extended to 60 seconds.

How to Configure PfRv3 Path of Last Resort

Configuring Policy for Path of Last Resort

To configure policy for path of last resort, perform the steps below.

SUMMARY STEPS

1. **domain default**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**domain default**
	Example:
	`domain default`
	`  vrf default`
	`  master hub`
	`  class foo seq 1`
	`  match dscp ef policy voice`
	`  path-preference ISP1 fallback ISP2`
	`  path-last-resort ISP4`
		The keyword specifics that the traffic for this policy is routed over the path of last resort when the primary and fallback service providers are unavailable.

Configuring Path of Last Resort

To configure path of last resort, perform the steps below.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface tunnel** *tunnel-number*
4. **domain path** *isp-name* [**internet-bound** | **path-id** | **path-last-resort** | **zero-sla**]

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**interface tunnel** *tunnel-number* **Example:** `Device(config)# interface tunnel 100`	Enters interface configuration mode.
Step 4	**domain path** *isp-name* [**internet-bound** | **path-id** | **path-last-resort** | **zero-sla**] **Example:** `Device(config-if)# domain path ISP1 path-last-resort`	Specifies a service provider for the interface. • **internet-bound**—Configures an internet bound interface. • **path-id**—Configures service provider's path-id for the interface. • **path-last-resort**—Configures the interface to be a path of a last resort. • **zero-sla**—Configures Zero SLA for the interface. **Note** You can configure multiple Internet Service Providers (ISPs). If you are defining a specific domain name for an ISP (for example, domain_abc), you must specify the same domain name while configuring the ISP paths.

Verifying PfRv3 Path of Last Resort

The **show** commands can be entered in any order.

SUMMARY STEPS

1. **show domain default vrf** *vrf-name* **master status**
2. **show domain default vrf** *vrf-name* **border status**
3. **show domain default vrf** *vrf-name* **master channels**
4. **show domain default vrf** *vrf-name* **border channels**
5. **show domain default vrf** *vrf-name* **master policy**

DETAILED STEPS

Procedure

Step 1 **show domain default vrf** *vrf-name* **master status**

Displays the master status of the hub border routers.

Example:

```
Device# show domain default vrf vrf1 master status

Borders:
  IP address: 10.204.1.4
  Version: 2
  Connection status: CONNECTED (Last Updated 00:59:16 ago )
  Interfaces configured:
   Name: Tunnel20 | type: external | Service Provider: ISP2 | Status: UP | Zero-SLA: NO | Path of
Last Resort: Disabled
    Number of default Channels: 0
  Tunnel if: Tunnel1
  IP address: 10.203.1.3
  Version: 2
  Connection status: CONNECTED (Last Updated 00:59:16 ago )
  Interfaces configured:
    Name: Tunnel10 | type: external | Service Provider: ISP1 | Status: UP | Zero-SLA: YES | Path of
Last Resort: Standby
      Number of default Channels: 0
  Tunnel if: Tunnel1
```

Step 2 **show domain default vrf** *vrf-name* **border status**

Displays the master status of the hub border routers.

Example:

```
Device# show domain default vrf vrf1 border status

------------------------------------------------------------------
**** Border Status ****
Instance Status: UP
Present status last updated: 01:01:42 ago
Loopback: Configured Loopback1 UP (30.209.1.9)
Master: 30.209.1.9
Master version: 2
Connection Status with Master: UP
```

```
MC connection info: CONNECTION SUCCESSFUL
Connected for: 01:01:42
Route-Control: Enabled
Asymmetric Routing: Disabled
Minimum Mask length: 28
Sampling: off
Minimum Requirement: Met
External Wan interfaces:
    Name: Tunnel10 Interface Index: 16 SNMP Index: 13 SP: ISP1 path-id: 0 Status: UP Zero-SLA: YES
Path of Last Resort: Standby Path-id List: 0:0
  Name: Tunnel20 Interface Index: 18 SNMP Index: 15 SP: ISP2 Status: UP Zero-SLA: NO Path of Last
Resort: Disabled Path-id List: 0:0


Auto Tunnel information:


   Name:Tunnel1 if_index: 21
   Borders reachable via this tunnel:
---------------------------------------------------------------------
```

Step 3 **show domain default vrf** *vrf-name* **master channels**

Displays the master status of the hub master controller.

Example:

```
Device# show domain default vrf vrf1 master channels

Channel Id: 9 Dst Site-Id: 30.209.1.9 Link Name: ISP1 DSCP: af41 [34] pfr-label: 0:0 | 0:0 [0x0]
TCs: 0
  Channel Created: 00:57:15 ago
  Provisional State: Initiated and open
  Operational state: Available
  Channel to hub: FALSE
  Interface Id: 16
  Supports Zero-SLA: Yes
  Muted by Zero-SLA: Yes
  Muted by Path of Last Resort: Yes
  Estimated Channel Egress Bandwidth: 0 Kbps
  Immitigable Events Summary:
    Total Performance Count: 0, Total BW Count: 0
  ODE Stats Bucket Number: 1
    Last Updated : 00:56:15 ago
     Packet Count : 505
     Byte Count : 42420
     One Way Delay : 229 msec*
     Loss Rate Pkts: 0.0 %
     Loss Rate Byte: 0.0 %
     Jitter Mean : 535 usec
     Unreachable : FALSE
    TCA Statistics:
     Received:1 ; Processed:1 ; Unreach_rcvd:0
  Latest TCA Bucket
    Last Updated : 00:56:15 ago
     One Way Delay : 229 msec*
     Loss Rate Pkts: NA
     Loss Rate Byte: NA
     Jitter Mean : NA
     Unreachability: FALSE
```

Step 4 **show domain default vrf** *vrf-name* **border channels**

Displays the information of border router channels at the hub site.

Example:

```
Device# show domain default vrf vrf1 border channels

Channel id: 2
 Channel create time: 00:46:02 ago
 Site id : 255.255.255.255
 DSCP : default[0]
 Service provider : ISP1
 Pfr-Label : 0:0 | 0:0 [0x0]
 exit path-id: 0
 Exit path-id sent on wire: 0
 Number of Probes sent : 0
 Number of Probes received : 0
 Last Probe sent : 00:46:02 ago
 Last Probe received : - ago
 Channel state : Initiated and open
 Channel next_hop : 0.0.0.0
 RX Reachability : Initial State
 TX Reachability : Reachable
 Channel is sampling 0 flows
 Channel remote end point: 0.0.0.0
 Channel to hub: FALSE
 Version: 0
 Supports Zero-SLA: No
 Muted by Zero-SLA: No
 Muted by Path of Last Resort: Yes
 Probe freq with traffic : 1 in 10000 ms
```

Step 5 **show domain default vrf** *vrf-name* **master policy**

Displays the status of the master policy.

Example:

```
Device# show domain default vrf vrf1 master policy

class VOICE sequence 10
  path-last-resort ISP1
  class type: Dscp Based
    match dscp ef policy custom
      priority 1 one-way-delay threshold 200 msec
      Number of Traffic classes using this policy: 2
```