

Policy–Based Routing through IPv6 Configuration Example

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Introduction

Policy–based routing provides a mechanism for expressing and implementing forwarding/routing of data packets based on the policies defined by the network administrators. Policy–based routing is applied to incoming packets and uses route maps to define the policies. Based on the criteria defined in the route maps, packets are forwarded/routed to the appropriate next hop. This document provides a sample configuration for policy–based routing through IPv6.

Prerequisites

Requirements

There are no specific requirements for this document.

Note: Refer to Restrictions for IPv6 PBR for more information on restrictions.

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

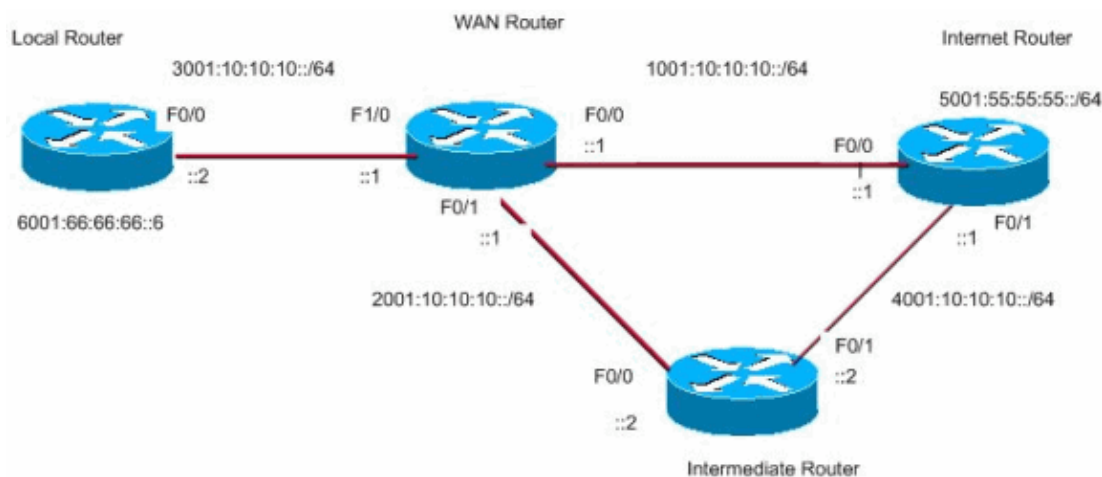
Configure

In this configuration scenario, policy-based routing (PBR) is configured on a WAN router and policy routing is applied on the fa1/0 interface. As per the configuration traffic from the network, 6001:66:66:66::6 is redirected to the Intermediate router. This is achieved through the policy-based routing. This configuration example sets the next-hop to 2001:10:10:10::2. If the traffic source is 6001:66:66:66::6, then traffic is redirected to the Intermediate router where it then reaches the Internet router.

Note: Use the Command Lookup Tool (registered customers only) to find more information on the commands used in this document.

Network Diagram

This document uses this network setup:



Configurations

This document uses these configurations:

- WAN Router Configuration
- Intermediate Router Configuration
- Internet Router Configuration
- Local Router Configuration

WAN Router Configuration

```
WAN_Router#
!
ipv6 unicast-routing
ipv6 cef
!
interface FastEthernet0/0
 no ip address
 duplex auto
 speed 100
 ipv6 address 1001:10:10:10::1/64
 ipv6 enable
 ipv6 eigrp 55
!
interface FastEthernet0/1
 no ip address
 duplex auto
```

```

speed 100
ipv6 address 2001:10:10:10::1/64
ipv6 enable
ipv6 eigrp 55
!
interface FastEthernet1/0
no ip address
speed 100
full-duplex
ipv6 address 3001:10:10:10::1/64
ipv6 enable
ipv6 eigrp 55
ipv6 policy route-map ipv6
!
ipv6 router eigrp 55
router-id 3.3.3.3
no shutdown
!
route-map ipv6 permit 10
match ipv6 address ALLOW_INTERNAL_NETWORK
set ipv6 next-hop 2001:10:10:10::2
!
ipv6 access-list ALLOW_INTERNAL_NETWORK
permit ipv6 6001:66:66:66::/64 any

!--- Creates IPv6 access-list ALLOW_INTERNAL_NETWORK
!--- and permits any ipv6 address in the network 6001:66:66:66::/64

!

```

Intermediate Router Configuration

```

Intermediate_Router#
!
ip cef
!
ipv6 unicast-routing
ipv6 cef
!
interface FastEthernet0/0
no ip address
duplex auto
speed 100
ipv6 address 2001:10:10:10::2/64
ipv6 enable
ipv6 eigrp 55
!
interface FastEthernet0/1
no ip address
duplex auto
speed 100
ipv6 address 4001:10:10:10::2/64
ipv6 enable
ipv6 eigrp 55
!
ipv6 router eigrp 55
router-id 2.2.2.2
no shutdown
!

```

Internet Router Configuration

```

Internet_Router#
!
ip cef

```

```

!
ipv6 unicast-routing
ipv6 cef
!
!
interface Loopback10
no ip address
ipv6 address 5001:55:55:55::5/64
ipv6 enable
!
interface FastEthernet0/0
no ip address
duplex auto
speed 100
ipv6 address 1001:10:10:10::2/64
ipv6 enable
ipv6 eigrp 55
!
interface FastEthernet0/1
no ip address
duplex auto
speed 100
ipv6 address 4001:10:10:10::1/64
ipv6 enable
ipv6 eigrp 55
!

ipv6 route ::/64 Loopback10
ipv6 router eigrp 55
router-id 1.1.1.1
no shutdown
redistribute connected
!

```

Local Router Configuration

```

Local_Router#
!
ip cef
!
ipv6 unicast-routing
ipv6 cef
!
!
interface Loopback10
no ip address
ipv6 address 6001:66:66:66::6/64
ipv6 enable
!
interface FastEthernet0/0
no ip address
speed 100
full-duplex
ipv6 address 3001:10:10:10::2/64
ipv6 enable
!
!
ipv6 route ::/64 FastEthernet0/0

!--- Static route is configured in the local router.

!

```

Verify

Issue the **ping** command from Local_Router in order to check the policy-based routing:

```
Local_Router#ping ipv6 5001:55:55:55::5

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 5001:55:55:55::5, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/40/76 ms
```

Enable this **debug** command on WAN_Router in order to see if the policy-based routing is functioning properly or not:

```
Wan_Router#
debug ipv6 policy

IPv6 policy-based routing debugging is on

Wan_Router#
*Mar  1 04:10:43.846: IPv6 PBR (CEF): FastEthernet1/0,
      matched src 6001:66:66:66::6 dst 5001:55:55:55::5 protocol 17
*Mar  1 04:10:43.846: IPv6 PBR (CEF): FIB policy route via FastEthernet0/1
*Mar  1 04:10:46.826: IPv6 PBR (CEF): FastEthernet1/0,
      matched src 6001:66:66:66::6 dst 5001:55:55:55::5 protocol 17
*Mar  1 04:10:46.826: IPv6 PBR (CEF): FIB policy route via FastEthernet0/1
*Mar  1 04:10:49.834: IPv6 PBR (CEF): FastEthernet1/0,
      matched src 6001:66:66:66::6 dst 5001:55:55:55::5 protocol 17
*Mar  1 04:10:49.834: IPv6 PBR (CEF): FIB policy route via FastEthernet0/1
*Mar  1 04:10:52.838: IPv6 PBR (CEF): FastEthernet1/0,
      matched src 6001:66:66:66::6 dst 5001:55:55:55::5 protocol 17
*Mar  1 04:10:52.838: IPv6 PBR (CEF): FIB policy route via FastEthernet0/1
```

Troubleshoot

Example of an Incorrect Configuration

IPv4 and IPv6 PBR cannot coexist on an interface as this example output shows:

```
route-map BGP-NLGP-MSP-I2RandE-ALLOW permit 10
  description For allowing BGP sessions and setting next hops
  match ipv6 address BGP-NLGP-MSP-I2RandE-IPV6-ALLOW
!
route-map BGP-NLGP-MSP-I2RandE-ALLOW permit 20
  match ip address BGP-NLGP-MSP-I2RandE-IPV4-ALLOW
!
route-map BGP-NLGP-MSP-I2RandE-ALLOW permit 30
  set ip next-hop 192.168.48.41
  set ipv6 next-hop 2620:32:0:1000::2
!
```

Example of a Correct Configuration

In order to apply IPv4 and IPv6, you have to use two separate route-maps for IPv4 and IPv6 and then apply them on an interface. This sample output provides an example:

```
route-map IPv6 permit 10
  match ipv6 address BGP-NLGP-MSP-I2RandE-IPV6-ALLOW
  set ipv6 next-hop 2620:32:0:1000::2
route-map IPV4 permit 10
```

```
match ip address BGP-NLGP-MSP-I2RandE-IPV4-ALLOW
set ip next-hop 192.168.48.41
```

```
Router#show run interface e0/0
Building configuration...
```

```
Current configuration : 163 bytes
!
interface Ethernet0/0
 ip address 10.57.253.109 255.255.255.252
 ip policy route-map IPV4
 ipv6 address 2001:468:1900:70::1/64
 ipv6 policy route-map IPv6
end
```

Related Information

- [Policy-Based Routing](#)
- [IP Version 6 \(IPv6\) Support Page](#)
- [Cisco IOS IPv6 Configuration Guide, Release 12.4](#)
- [IP Routed Protocols Support Page](#)
- [IP Routing Support Page](#)
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