



РУКОВОДСТВО ПОЛЬЗОВАТЕЛЯ

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1. IP-PBR CONFIGURATION

1.1. IP-PBR Configuration

IP-PBR realizes software PBR functions through the hardware of switch chip.

PBR stands for Policy Based Routing. PBR enables users to rely on a certain policy not on routing protocol for routing. Software based PBR supports multiple policies and rules and also load balance. You can designate the next hop's IP address or port for those packets that are in line with policy. PBR supports load balance and applies multiple next-hop IP addresses or ports on those policy-supported packets.

Only when the next-hop egress ARP designated by route map is already learned can IP-PBR regard that this egress is valid and then the corresponding rule is effective. When a packet satisfies IP-PBR policy, the hardware directly forwards this packet to the next-hop egress that the rule specifies. This process is finished by the hardware without the operation of CPU. The packets forwarded by IP-PBR have the highest priority and only those packets unmatched with IP-PBR rule are forwarded to CPU.

The current IP-PBR supports the IP ACL policy and the next-hop IP address policy. When multiple next hops are configured, the first effect next hop is chosen. IP-PBR also supports equivalent routing that is realized by the switch chip. Hardware equivalent routing needs no extra configuration.

IP-PBR supports the following policy routing commands:

```
route-map WORD  
  
match ip address WORD  
  
set ip next-hop X.X.X.X [load-balance]  
  
ip policy route-map WORD
```

IP-PBR is a little different from router's policy routing. IP-PBR chooses an effective next hop as the egress and drops packets if no valid next hop available, while router's policy routing selects an effective next hop but packet loss happens if this next hop has not learned ARP. Once multiple sequences are set, one difference between IP-PBR and software policy routing must be noted. Software policy routing always chooses high-priority sequence routes no matter whether IP address matched by high-priority sequences overlaps with that matched by low-priority sequences and whether these routes are effective, while IP-PBR chooses low-priority sequence routes when high-priority sequence routes invalidate.

1.1.1. Enabling or Disabling IP-PBR Globally

Run the following commands in global configuration mode.

Command	Purpose
<code>ip pbr</code>	The IP-PBR function is disabled by default.
<code>no ip pbr</code>	Resumes the default settings.

IP-PBR is disabled by default.

1.1.2. ISIS Configuration Task List

To configure IP-PBR, do as follows:

Create ACL;

Create a route map;

Apply the route map on a port;

To create an ACL, run the following command globally:

Command	Remarks
<code>ip access-list standard <i>net1</i></code>	Enters the ACL configuration mode and defines ACL.

To create a route map, run the following commands globally:

Command	Remarks
<code>route-map <i>pbr</i></code>	Enters the route map configuration mode.
<code>match ip address <i>access-list</i></code>	Configures the match-up policy.
<code>set ip next-hop <i>A.B.C.D</i></code>	Configures the next-hop address of IP packet.

To apply policy routing on an IP-receiving port, run the following commands:

Command	Remarks
<code>interface interface_name</code>	Enters the interface configuration mode.
<code>ip policy route-map route-map_name</code>	Applies policy routing on the port.

1.1.3. Monitoring and Maintaining MVC

Run the following commands in EXEC mode:

Command	Operation
<code>show ip pbr</code>	It is used to display the information about RIP configuration.
<code>show ip policy</code>	Shows the port on which IP-PBR is applied.
<code>show ip pbr policy</code>	It is used to display the information about IP-PBR equivalent routing.
<code>debug ip pbr</code>	It is used to enable or disable the debugging switch of IP-PBR.

The information that IP-PBR is not running is shown:

```
switch#show ip pbr
IP policy based route state: disabled
No pbr apply item
No equiv exf apply item
```

All data related about IP-PBR running are shown below:

```
switch#show ip pbr
IP policy based route state: enabled
No equiv exf apply item
VLAN3 use route-map ddd, and has 1 entry active.
-----
Entry sequence 10, permit
Match ip access-list:
  acl
Set Outgoing nexthop
```

```
90.0.0.3
```

The IP-PBR policy routing information is shown below:

```
switch#show ip pbr policy
IP policy based route state: enabled

VLAN3 use route-map ddd, and has 1 entry active.
-----
Entry sequence 10, permit
  Match ip access-list:
    acl
  Set Outgoing nexthop
    90.0.0.3
```

The equivalent routing information is shown below:

```
switch#show ip pbr exf
IP policy based route state: enabled

Equiv EXF has 1 entry active.
-----
Entry sequence 1, handle c1f95b0
  Dest ip: 1.1.0.0/16
    90.0.0.3
    192.168.213.161
```

1.1.4. IP-PBR Configuration Example

Switch configuration:

```
!
ip                                     pbr
!
interface                               vlan1
ip                                     address          10.1.1.3          255.255.255.0
no                                     ip                directed-broadcast
ip                                     policy            route-map          pbr
!
ip                                     access-list        standard           ac1
permit                                10.1.1.21         255.255.255.255
!
ip                                     access-list        standard           ac2
permit                                10.1.1.2          255.255.255.255
!
route-map                               pbr                10                permit
match                                  ip                  address            ac1
set                                     ip                  next-hop           13.1.1.99
!
```

```
route-map                pbr                20                permit
match                    ip                address          ac2
set      ip      next-hop    13.1.1.99      14.1.1.99 load-balance
!
```

Configuration Description

The switch is to apply policy routing on the packets that are received from VLAN1. As to the packets whose source IPs are 10.1.1.21, their next hop is 13.1.1.99. As to the packets whose source IPs are 10.1.1.2, they are applied on **route-map pbr 20**; because **set ip next-hop** has the **load-balance** parameter, the switch chip will automatically choose 13.1.1.99 or 14.1.1.99 as the egress according to destination IP address.