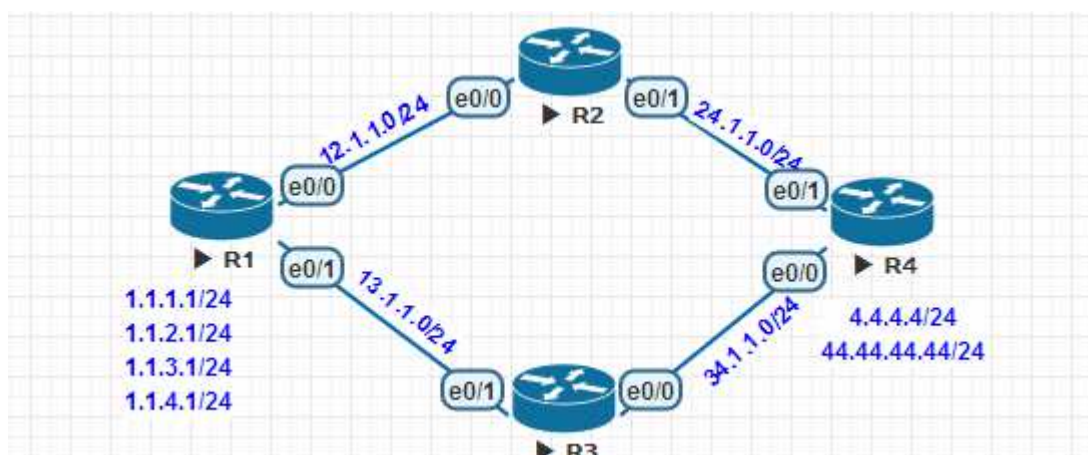


PBR 和扩展 ACL 实现选路

一、拓扑



要求：

- 1.R1、R2、R3、R4 配置 OSPF 路由，使 4 台路由器处于同一 OSPF 域中。
- 2.环回接口(1.1.1.1/24—1.1.4.1/24)访问 4.4.4.4/24 时，经过 R1—R2—R4 路径；访问 44.44.44.44/24 时，经过 R1-R3-R4 路径。

二、配置

- 1.基本 IP 地址配置，省略。
- 2.OSPF 路由配置，采用放大招的方式，省略。
- 3.配置 PBR 之前，测试路径，查看等价负载均衡的现象。

```
R1#tracerout 4.4.4.4 source 1.1.1.1
Type escape sequence to abort.
Tracing the route to 4.4.4.4
VRF info: (vrf in name/id, vrf out name/id)
 1 12.1.1.2 6 msec
   13.1.1.3 5 msec
   12.1.1.2 5 msec
 2 34.1.1.4 3 msec
   24.1.1.4 6 msec *
R1#tracerout 4.4.4.4 source 1.1.4.1
Type escape sequence to abort.
Tracing the route to 4.4.4.4
VRF info: (vrf in name/id, vrf out name/id)
 1 12.1.1.2 5 msec
   13.1.1.3 5 msec
   12.1.1.2 6 msec
 2 34.1.1.4 6 msec
   24.1.1.4 6 msec *
```

```
R1#tracerout 44.44.44.44 source 1.1.2.1
Type escape sequence to abort.
Tracing the route to 44.44.44.44
VRF info: (vrf in name/id, vrf out name/id)
 1 12.1.1.2 6 msec
   13.1.1.3 5 msec
   12.1.1.2 6 msec
 2 34.1.1.4 6 msec
   24.1.1.4 7 msec *
R1#tracerout 44.44.44.44 source 1.1.3.1
Type escape sequence to abort.
Tracing the route to 44.44.44.44
VRF info: (vrf in name/id, vrf out name/id)
 1 12.1.1.2 6 msec
   13.1.1.3 5 msec
   12.1.1.2 5 msec
 2 34.1.1.4 5 msec
   24.1.1.4 5 msec *
```

通过图中，可以明显看出形成了等价负载均衡的现象。

4.R1 上配置扩展 ACL 和 PBR，实现路径控制

(1)配置扩展 ACL

```
R1(config)#access-list 101 permit ip 1.1.1.1 0.0.0.0 4.4.4.4 0.0.0.0
R1(config)#access-list 102 permit ip 1.1.2.1 0.0.0.0 4.4.4.4 0.0.0.0
R1(config)#access-list 103 permit ip 1.1.3.1 0.0.0.0 4.4.4.4 0.0.0.0
R1(config)#access-list 104 permit ip 1.1.4.1 0.0.0.0 4.4.4.4 0.0.0.0
R1(config)#
R1(config)#access-list 111 permit ip host 1.1.1.1 host 44.44.44.44
R1(config)#access-list 112 permit ip host 2.2.2.2 host 44.44.44.44
R1(config)#access-list 113 permit ip host 3.3.3.3 host 44.44.44.44
R1(config)#access-list 114 permit ip host 4.4.4.4 host 44.44.44.44
```

```
R1#show access-list
Extended IP access list 101
  10 permit ip host 1.1.1.1 host 4.4.4.4 (6 matches)
Extended IP access list 102
  10 permit ip host 1.1.2.1 host 4.4.4.4
Extended IP access list 103
  10 permit ip host 1.1.3.1 host 4.4.4.4
Extended IP access list 104
  10 permit ip host 1.1.4.1 host 4.4.4.4 (6 matches)
Extended IP access list 111
  10 permit ip host 1.1.1.1 host 44.44.44.44
Extended IP access list 112
  10 permit ip host 1.1.2.1 host 44.44.44.44 (6 matches)
Extended IP access list 113
  10 permit ip host 1.1.3.1 host 44.44.44.44 (6 matches)
Extended IP access list 114
  10 permit ip host 1.1.4.1 host 44.44.44.44
R1#
```

(2)配置 Route-map

```
R1(config)#route-map ospf1 permit 10
R1(config-route-map)#match ip address 101 102 103 104
R1(config-route-map)#set ip next-hop 13.1.1.3
R1(config-route-map)#exit
R1(config)#
R1(config)#route-map ospf1 permit 20
R1(config-route-map)#match ip address 111 112 113 114
R1(config-route-map)#set ip next-hop 12.1.1.2
R1(config-route-map)#exit
R1(config)#
```

(3)调用 Route-map

```
R1(config)#ip local policy route-map ospf1
R1(config)#
```

三、测试

1.由环回口测试 4.4.4.4

```
R1#tracerout 4.4.4.4 source 1.1.1.1
Type escape sequence to abort.
Tracing the route to 4.4.4.4
VRF info: (vrf in name/id, vrf out name/id)
 1 13.1.1.3 7 msec 6 msec 5 msec
 2 34.1.1.4 6 msec * 2 msec
R1#tracerout 4.4.4.4 source 1.1.4.1
Type escape sequence to abort.
Tracing the route to 4.4.4.4
VRF info: (vrf in name/id, vrf out name/id)
 1 13.1.1.3 5 msec 4 msec 4 msec
 2 34.1.1.4 7 msec * 1 msec
R1#
```

2.由环回口测试 44.44.44.44

```
R1#tracerout 44.44.44.44 source 1.1.2.1
Type escape sequence to abort.
Tracing the route to 44.44.44.44
VRF info: (vrf in name/id, vrf out name/id)
 1 12.1.1.2 6 msec 4 msec 4 msec
 2 24.1.1.4 5 msec * 13 msec
R1#tracerout 44.44.44.44 source 1.1.3.1
Type escape sequence to abort.
Tracing the route to 44.44.44.44
VRF info: (vrf in name/id, vrf out name/id)
 1 12.1.1.2 5 msec 4 msec 5 msec
 2 24.1.1.4 6 msec * 1 msec
R1#
```

扩展,同样可以让 R4 回复 R1 时,由 4.4.4.4/24 回复时,走 R4-R2-R1 的路径;由 44.44.44.44/24 回复时,走 R4-R3-R1 的路径。

1.R4 配置扩展 ACL

```
R4(config)#access-list 101 permit ip host 4.4.4.4 host 1.1.1.1
R4(config)#access-list 102 permit ip host 4.4.4.4 host 1.1.2.1
R4(config)#access-list 103 permit ip host 4.4.4.4 host 1.1.3.1
R4(config)#access-list 104 permit ip host 4.4.4.4 host 1.1.4.1
R4(config)#
R4(config)#access-list 111 permit ip host 44.44.44.44 host 1.1.1.1
R4(config)#access-list 112 permit ip host 44.44.44.44 host 1.1.2.1
R4(config)#access-list 113 permit ip host 44.44.44.44 host 1.1.3.1
R4(config)#access-list 114 permit ip host 44.44.44.44 host 1.1.4.1
R4(config)#
```

2.R4 配置 Route-map

```
R4(config)#route-map ospf1 permit 10
R4(config-route-map)#match ip address 101 102 103 104
R4(config-route-map)#set ip next-hop 24.1.1.2
R4(config-route-map)#exit
R4(config)#
R4(config)#route-map ospf1 permit 20
R4(config-route-map)#match ip address 111 112 113 114
R4(config-route-map)#set ip next-hop 34.1.1.3
R4(config-route-map)#exit
R4(config)#
```

3.调用 Route-map

```
R4(config)#ip local policy route-map ospf1
R4(config)#
```

测试结果:

```
R4#tracerout 1.1.1.1 source 4.4.4.4
Type escape sequence to abort.
Tracing the route to 1.1.1.1
VRF info: (vrf in name/id, vrf out name/id)
 1 24.1.1.2 7 msec 6 msec 5 msec
 2 12.1.1.1 6 msec * 2 msec
R4#traceroute 1.1.4.1 source 4.4.4.4
Type escape sequence to abort.
Tracing the route to 1.1.4.1
VRF info: (vrf in name/id, vrf out name/id)
 1 24.1.1.2 6 msec 15 msec 16 msec
 2 12.1.1.1 15 msec * 1 msec
R4#
```

```
R4#tracerout 1.1.2.1 source 44.44.44.44
Type escape sequence to abort.
Tracing the route to 1.1.2.1
VRF info: (vrf in name/id, vrf out name/id)
 1 34.1.1.3 6 msec 6 msec 5 msec
 2 13.1.1.1 6 msec * 1 msec
R4#traceroute 1.1.3.1 source 44.44.44.44
Type escape sequence to abort.
Tracing the route to 1.1.3.1
VRF info: (vrf in name/id, vrf out name/id)
 1 34.1.1.3 6 msec 3 msec 7 msec
 2 13.1.1.1 8 msec * 1 msec
R4#
```