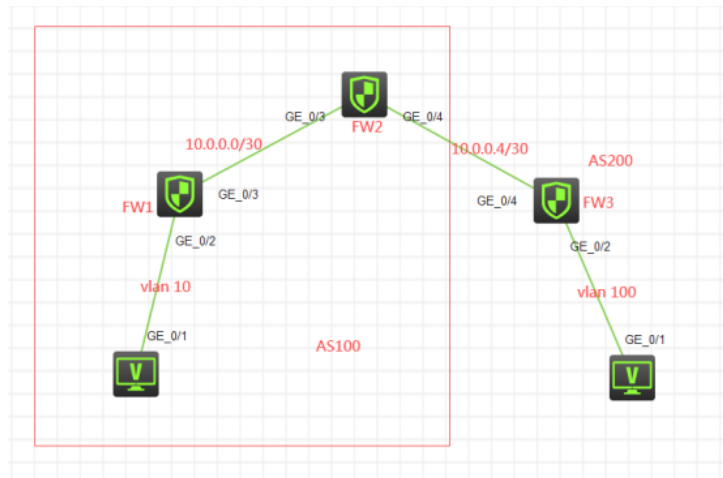


知 F1060 BGP RR一级路由反射器典型组网配置案例

设备部署方式 H3C模拟器 韦家宁 2020-04-11 发表

组网及说明



组网说明:

本案例使用H3C HCL模拟器的F1060防火墙来模拟BGP一级RR路由反射器的典型组网配置。FW1、FW2属于AS100，FW3属于AS200。由于FW1与FW3没有互联，又想实现PC的互通，因此需要采用RR路由反射器技术，FW2为FW1的RR路由反射器，FW1为FW2的RR路由反射器的客户端。为了使得FW1与FW2之间能够建立IBGP邻居关系及达到路由反射的效果，因此FW1与FW2之间同时运行OSPF路由协议，为IBGP邻居的建立及路由反射提供承载。最后FW2与FW3之间建立IBGP邻居关系。

IP地址规划如下:

设备名称	接口/VLAN	IP地址	子网掩码位数	备注
FW1	Gi 1/0/3	10.0.0.1	30	
	VLAN 10	192.168.10.1	24	
	Loopback 0	1.1.1.1	32	Router-id
FW2	Gi 1/0/3	10.0.0.2	30	
	Gi 1/0/4	10.0.0.5	30	
	Loopback 0	3.3.3.3	32	Router-id
FW3	Gi 1/0/4	10.0.0.6	30	
	VLAN 100	172.16.10.1	24	
	Loopback 0	2.2.2.2	32	Router-id

配置步骤

FW1:

```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname FW1
[FW1]int loopback 0
[FW1-LoopBack0]ip address 1.1.1.1 32
[FW1-LoopBack0]quit
[FW1]acl basic 2000
[FW1-acl-ipv4-basic-2000]rule 0 permit source any
[FW1-acl-ipv4-basic-2000]quit
[FW1]zone-pair security source trust destination untrust
[FW1-zone-pair-security-Trust-Untrust]packet-filter 2000
[FW1-zone-pair-security-Trust-Untrust]quit
[FW1]zone-pair security source untrust destination trust
[FW1-zone-pair-security-Untrust-Trust]packet-filter 2000
[FW1-zone-pair-security-Untrust-Trust]quit
[FW1]zone-pair security source trust destination local
[FW1-zone-pair-security-Trust-Local]packet-filter 2000
[FW1-zone-pair-security-Trust-Local]quit
[FW1]zone-pair security source local destination trust
[FW1-zone-pair-security-Local-Trust]packet-filter 2000
[FW1-zone-pair-security-Local-Trust]quit
[FW1]zone-pair security source untrust destination local
```

```
[FW1-zone-pair-security-Untrust-Local]packet-filter 2000
[FW1-zone-pair-security-Untrust-Local]quit
[FW1]zone-pair security source local destination untrust
[FW1-zone-pair-security-Local-Untrust]packet-filter 2000
[FW1-zone-pair-security-Local-Untrust]quit
[FW1]zone-pair security source trust destination trust
[FW1-zone-pair-security-Trust-Trust]packet-filter 2000
[FW1-zone-pair-security-Trust-Trust]quit
[FW1]zone-pair security source untrust destination untrust
[FW1-zone-pair-security-Untrust-Untrust]packet-filter 2000
[FW1-zone-pair-security-Untrust-Untrust]quit
[FW1]vlan 10
[FW1-vlan10]quit
[FW1]int vlan 10
[FW1-Vlan-interface10]ip address 192.168.10.1 24
[FW1-Vlan-interface10]quit
[FW1]int gi 1/0/2
[FW1-GigabitEthernet1/0/2]port link-mode bridge
[FW1-GigabitEthernet1/0/2]port link-type access
[FW1-GigabitEthernet1/0/2]port access vlan 10
[FW1-GigabitEthernet1/0/2]quit
[FW1]int gi 1/0/3
[FW1-GigabitEthernet1/0/3]des <connect to FW2>
[FW1-GigabitEthernet1/0/3]ip address 10.0.0.1 30
[FW1-GigabitEthernet1/0/3]quit
[FW1]ospf 1 router-id 1.1.1.1
[FW1-ospf-1]area 0.0.0.0
[FW1-ospf-1-area-0.0.0.0]network 10.0.0.1 0.0.0.0
[FW1-ospf-1-area-0.0.0.0]network 1.1.1.1 0.0.0.0
[FW1-ospf-1-area-0.0.0.0]quit
[FW1-ospf-1]quit
[FW1]bgp 100
[FW1-bgp-default]router-id 1.1.1.1
[FW1-bgp-default]peer 3.3.3.3 as-number 100
[FW1-bgp-default]peer 3.3.3.3 connect-interface LoopBack 0
[FW1-bgp-default]address-family ipv4 unicast
[FW1-bgp-default-ipv4]peer 3.3.3.3 enable
[FW1-bgp-default-ipv4]network 192.168.10.0 255.255.255.0
[FW1-bgp-default-ipv4]network 192.168.20.0 255.255.255.0
[FW1-bgp-default-ipv4]quit
[FW1-bgp-default]quit
[FW1]security-zone name Untrust
[FW1-security-zone-Untrust]import interface GigabitEthernet 1/0/3
[FW1-security-zone-Untrust]import interface LoopBack 0
[FW1-security-zone-Untrust]quit
[FW1]security-zone name Trust
[FW1-security-zone-Trust]import interface vlan 10
[FW1-security-zone-Trust]import interface GigabitEthernet 1/0/2 vlan 10
[FW1-security-zone-Trust]quit
```

FW2 :

```
[H3C]sysname FW2
[FW2]acl basic 2000
[FW2-acl-ipv4-basic-2000]rule 0 permit source any
[FW2-acl-ipv4-basic-2000]quit
[FW2]zone-pair security source trust destination untrust
[FW2-zone-pair-security-Trust-Untrust]packet-filter 2000
[FW2-zone-pair-security-Trust-Untrust]quit
[FW2]zone-pair security source untrust destination trust
[FW2-zone-pair-security-Untrust-Trust]packet-filter 2000
[FW2-zone-pair-security-Untrust-Trust]quit
[FW2]zone-pair security source trust destination local
[FW2-zone-pair-security-Trust-Local]packet-filter 2000
[FW2-zone-pair-security-Trust-Local]quit
```

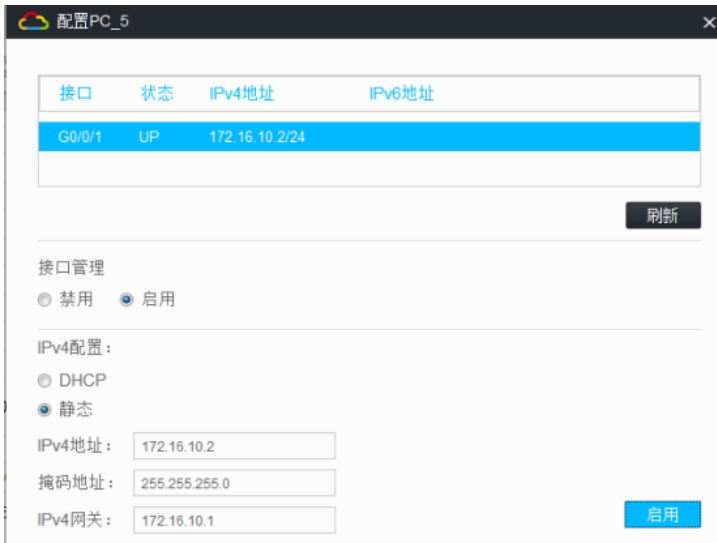
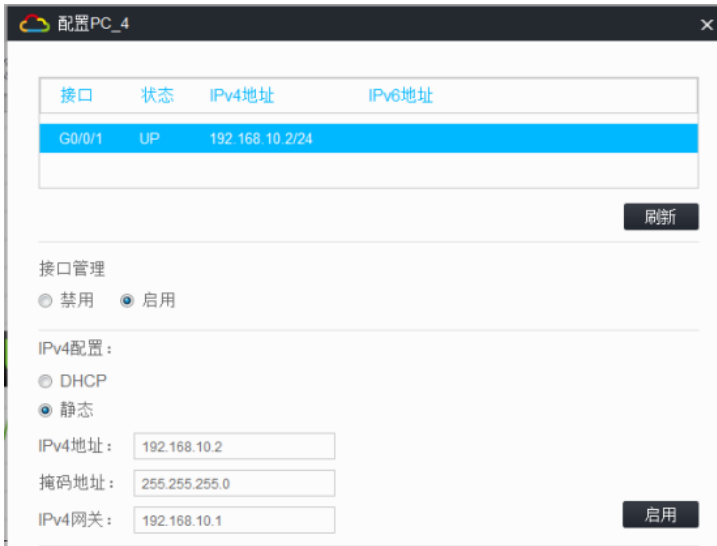
```
[FW2]zone-pair security source local destination trust
[FW2-zone-pair-security-Local-Trust]packet-filter 2000
[FW2-zone-pair-security-Local-Trust]quit
[FW2]zone-pair security source untrust destination local
[FW2-zone-pair-security-Untrust-Local]packet-filter 2000
[FW2-zone-pair-security-Untrust-Local]quit
[FW2]zone-pair security source local destination untrust
[FW2-zone-pair-security-Local-Untrust]packet-filter 2000
[FW2-zone-pair-security-Local-Untrust]quit
[FW2]zone-pair security source trust destination trust
[FW2-zone-pair-security-Trust-Trust]packet-filter 2000
[FW2-zone-pair-security-Trust-Trust]quit
[FW2]zone-pair security source untrust destination untrust
[FW2-zone-pair-security-Untrust-Untrust]packet-filter 2000
[FW2-zone-pair-security-Untrust-Untrust]quit
[FW2]int loopback 0
[FW2-LoopBack0]ip address 3.3.3.3 32
[FW2-LoopBack0]quit
[FW2]int gi 1/0/3
[FW2-GigabitEthernet1/0/3]port link-mode route
[FW2-GigabitEthernet1/0/3]des <connect to FW1>
[FW2-GigabitEthernet1/0/3]ip address 10.0.0.2 30
[FW2-GigabitEthernet1/0/3]quit
[FW2]int gi 1/0/4
[FW2-GigabitEthernet1/0/4]ip address 10.0.0.5 30
[FW2-GigabitEthernet1/0/4]des <connect to FW3>
[FW2-GigabitEthernet1/0/4]quit
[FW2]ospf 1 router-id 3.3.3.3
[FW2-ospf-1]area 0.0.0.0
[FW2-ospf-1-area-0.0.0.0]network 10.0.0.2 0.0.0.0
[FW2-ospf-1-area-0.0.0.0]network 3.3.3.3 0.0.0.0
[FW2-ospf-1-area-0.0.0.0]quit
[FW2-ospf-1]quit
[FW2]bgp 100
[FW2-bgp-default]router-id 3.3.3.3
[FW2-bgp-default]peer 1.1.1.1 as-number 100
[FW2-bgp-default]peer 1.1.1.1 connect-interface LoopBack 0
[FW2-bgp-default]peer 10.0.0.6 as-number 200
[FW2-bgp-default]address-family ipv4 unicast
[FW2-bgp-default-ipv4]import-route direct
[FW2-bgp-default-ipv4]peer 1.1.1.1 enable
[FW2-bgp-default-ipv4]peer 1.1.1.1 reflect-client //指定1.1.1.1为RR反射器的客户端
[FW2-bgp-default-ipv4]peer 10.0.0.6 enable
[FW2-bgp-default-ipv4]quit
[FW2-bgp-default]quit
[FW2]security-zone name Untrust
[FW2-security-zone-Untrust]import interface GigabitEthernet 1/0/4
[FW2-security-zone-Untrust]quit
[FW2]security-zone name Trust
[FW2-security-zone-Trust]import interface GigabitEthernet 1/0/3
[FW2-security-zone-Trust]import interface LoopBack 0
[FW2-security-zone-Trust]quit
```

FW3 :

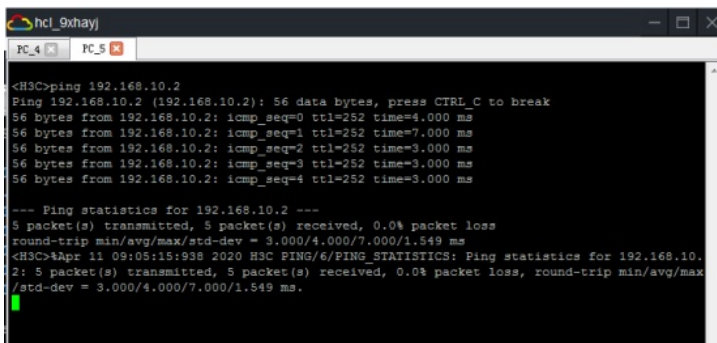
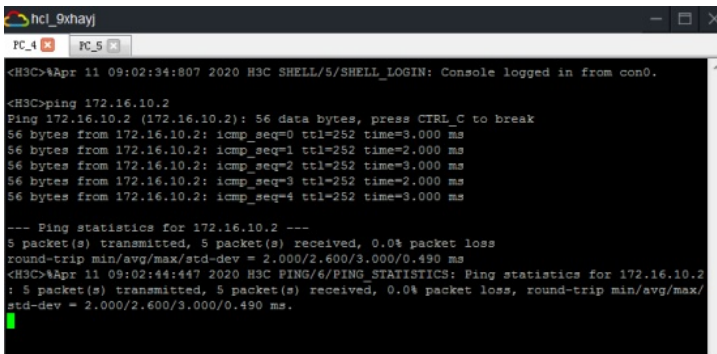
```
<H3C>sys
System View: return to User View with Ctrl+Z.
[H3C]sysname FW3
[FW3]acl basic 2000
[FW3-acl-ipv4-basic-2000]rule 0 permit source any
[FW3-acl-ipv4-basic-2000]quit
[FW3]zone-pair security source trust destination untrust
[FW3-zone-pair-security-Trust-Untrust]packet-filter 2000
[FW3-zone-pair-security-Trust-Untrust]quit
[FW3]zone-pair security source untrust destination trust
```

```
[FW3-zone-pair-security-Untrust-Trust]packet-filter 2000
[FW3-zone-pair-security-Untrust-Trust]quit
[FW3]zone-pair security source trust destination local
[FW3-zone-pair-security-Trust-Local]packet-filter 2000
[FW3-zone-pair-security-Trust-Local]quit
[FW3]zone-pair security source local destination trust
[FW3-zone-pair-security-Local-Trust]packet-filter 2000
[FW3-zone-pair-security-Local-Trust]quit
[FW3]zone-pair security source untrust destination local
[FW3-zone-pair-security-Untrust-Local]packet-filter 2000
[FW3-zone-pair-security-Untrust-Local]quit
[FW3]zone-pair security source local destination untrust
[FW3-zone-pair-security-Local-Untrust]packet-filter 2000
[FW3-zone-pair-security-Local-Untrust]quit
[FW3]zone-pair security source trust destination trust
[FW3-zone-pair-security-Trust-Trust]packet-filter 2000
[FW3-zone-pair-security-Trust-Trust]quit
[FW3]zone-pair security source untrust destination untrust
[FW3-zone-pair-security-Untrust-Untrust]packet-filter 2000
[FW3-zone-pair-security-Untrust-Untrust]quit
[FW3]int loopback 0
[FW3-LoopBack0]ip address 2.2.2.2 32
[FW3-LoopBack0]quit
[FW3]vlan 100
[FW3-vlan100]quit
[FW3]int vlan 100
[FW3-Vlan-interface100]ip address 172.16.10.1 24
[FW3-Vlan-interface100]quit
[FW3]int gi 1/0/2
[FW3-GigabitEthernet1/0/2]port link-mode bridge
[FW3-GigabitEthernet1/0/2]port link-type access
[FW3-GigabitEthernet1/0/2]port access vlan 100
[FW3-GigabitEthernet1/0/2]quit
[FW3]int gi 1/0/4
[FW3-GigabitEthernet1/0/4]des <connect to FW2>
[FW3-GigabitEthernet1/0/4]ip address 10.0.0.6 30
[FW3-GigabitEthernet1/0/4]quit
[FW3]bgp 200
[FW3-bgp-default]router-id 2.2.2.2
[FW3-bgp-default]peer 10.0.0.5 as-number 100
[FW3-bgp-default]address-family ipv4 unicast
[FW3-bgp-default-ipv4]peer 10.0.0.5 enable
[FW3-bgp-default-ipv4]import-route direct
[FW3-bgp-default-ipv4]network 172.16.10.0 255.255.255.0
[FW3-bgp-default-ipv4]network 172.16.20.0 255.255.255.0
[FW3-bgp-default-ipv4]quit
[FW3-bgp-default]quit
[FW3]security-zone name Untrust
[FW3-security-zone-Untrust]import interface GigabitEthernet 1/0/4
[FW3-security-zone-Untrust]quit
[FW3]security-zone name Trust
[FW3-security-zone-Trust]import interface vlan 100
[FW3-security-zone-Trust]import interface GigabitEthernet 1/0/2 vlan 100
[FW3-security-zone-Trust]import interface LoopBack 0
[FW3-security-zone-Trust]quit
```

PC都填写IP地址:



PC之间可以相互PING通:



分别查看FW1、FW2、FW3的BGP邻居信息:

```
[FW1]dis bgp peer ipv4
BGP local router ID: 1.1.1.1
Local AS number: 100
Total number of peers: 1          Peers in established state: 1
* - Dynamically created peer
Peer      AS   MsgRcvd  MsgSent  OutQ  PrefRcv  Up/Down  State
3.3.3.3   100    18      14      0     5 00:07:53 Established
[FW1]
```

```
[FW2]dis bgp peer ipv4
BGP local router ID: 3.3.3.3
Local AS number: 100
Total number of peers: 2          Peers in established state: 2
* - Dynamically created peer
Peer      AS   MsgRcvd  MsgSent  OutQ  PrefRcv  Up/Down  State
1.1.1.1   100    14      18      0     1 00:09:52 Established
10.0.0.6  200    10      11      0     3 00:04:34 Established
[FW2]
```

```
[FW3]dis bgp peer ipv4
BGP local router ID: 2.2.2.2
Local AS number: 200
Total number of peers: 1          Peers in established state: 1
* - Dynamically created peer
Peer      AS   MsgRcvd  MsgSent  OutQ  PrefRcv  Up/Down  State
10.0.0.5  100    12      11      0     4 00:04:48 Established
[FW3]
```

分别查看FW1、FW2的OSPF邻居信息:

```
[FW1]dis ospf peer
OSPF Process 1 with Router ID 1.1.1.1
Neighbor Brief Information
Area: 0.0.0.0
Router ID   Address      Pri Dead-Time  State      Interface
3.3.3.3     10.0.0.2    1 37          Full/BDR   GE1/0/3
[FW1]
```

```
[FW2]dis ospf peer
OSPF Process 1 with Router ID 3.3.3.3
Neighbor Brief Information
Area: 0.0.0.0
Router ID   Address      Pri Dead-Time  State      Interface
1.1.1.1     10.0.0.1    1 34          Full/DR    GE1/0/3
[FW2]
```

分别查看FW1、FW2、FW3的路由表:

```
[FW1]dis ip routing-table
Destinations : 21          Routes : 21

Destination/Mask  Proto  Pre Cost      NextHop      Interface
0.0.0.0/32        Direct 0 0            127.0.0.1    InLoop0
1.1.1.1/32        Direct 0 0            127.0.0.1    InLoop0
2.2.2.2/32        BGP    255 0            10.0.0.6     GE1/0/3
3.3.3.3/32        O_INTRA 10 1            10.0.0.2     GE1/0/3
10.0.0.0/30       Direct 0 0            10.0.0.1     GE1/0/3
10.0.0.0/32       Direct 0 0            10.0.0.1     GE1/0/3
10.0.0.1/32       Direct 0 0            127.0.0.1    InLoop0
10.0.0.3/32       Direct 0 0            10.0.0.1     GE1/0/3
10.0.0.4/30       BGP    255 0            3.3.3.3      GE1/0/3
127.0.0.0/8       Direct 0 0            127.0.0.1    InLoop0
127.0.0.0/32      Direct 0 0            127.0.0.1    InLoop0
127.0.0.1/32      Direct 0 0            127.0.0.1    InLoop0
127.255.255.255/32 Direct 0 0            127.0.0.1    InLoop0
172.16.10.0/24    BGP    255 0            10.0.0.6     GE1/0/3
192.168.10.0/24   Direct 0 0            192.168.10.1 Vlan10
192.168.10.0/32   Direct 0 0            192.168.10.1 Vlan10
192.168.10.1/32   Direct 0 0            127.0.0.1    InLoop0
192.168.10.255/32 Direct 0 0            192.168.10.1 Vlan10
224.0.0.0/4       Direct 0 0            0.0.0.0      NULL0
224.0.0.0/24      Direct 0 0            0.0.0.0      NULL0
255.255.255.255/32 Direct 0 0            127.0.0.1    InLoop0
[FW1]
```

```
[FW2]dis ip routing-table

Destinations : 21          Routes : 21

Destination/Mask    Proto  Pre Cost           NextHop             Interface
0.0.0.0/32          Direct 0  0                127.0.0.1           InLoop0
1.1.1.1/32          O_INTRA 10 1                10.0.0.1            GE1/0/3
2.2.2.2/32          BGP    255 0                10.0.0.6            GE1/0/4
3.3.3.3/32          Direct 0  0                127.0.0.1           InLoop0
10.0.0.0/30         Direct 0  0                10.0.0.2            GE1/0/3
10.0.0.0/32         Direct 0  0                10.0.0.2            GE1/0/3
10.0.0.2/32         Direct 0  0                127.0.0.1           InLoop0
10.0.0.3/32         Direct 0  0                10.0.0.2            GE1/0/3
10.0.0.4/30         Direct 0  0                10.0.0.5            GE1/0/4
10.0.0.4/32         Direct 0  0                10.0.0.5            GE1/0/4
10.0.0.5/32         Direct 0  0                127.0.0.1           InLoop0
10.0.0.7/32         Direct 0  0                10.0.0.5            GE1/0/4
127.0.0.0/8         Direct 0  0                127.0.0.1           InLoop0
127.0.0.0/32        Direct 0  0                127.0.0.1           InLoop0
127.0.0.1/32        Direct 0  0                127.0.0.1           InLoop0
127.255.255.255/32 Direct 0  0                127.0.0.1           InLoop0
172.16.10.0/24      BGP    255 0                10.0.0.6            GE1/0/4
192.168.10.0/24     BGP    255 0                1.1.1.1             GE1/0/3
224.0.0.0/4         Direct 0  0                0.0.0.0             NULL0
224.0.0.0/24        Direct 0  0                0.0.0.0             NULL0
255.255.255.255/32 Direct 0  0                127.0.0.1           InLoop0
[FW2]
```

```
[FW3]dis ip routing-table

Destinations : 20          Routes : 20

Destination/Mask    Proto  Pre Cost           NextHop             Interface
0.0.0.0/32          Direct 0  0                127.0.0.1           InLoop0
2.2.2.2/32          Direct 0  0                127.0.0.1           InLoop0
3.3.3.3/32          BGP    255 0                10.0.0.5            GE1/0/4
10.0.0.0/30         BGP    255 0                10.0.0.5            GE1/0/4
10.0.0.4/30         Direct 0  0                10.0.0.6            GE1/0/4
10.0.0.4/32         Direct 0  0                10.0.0.6            GE1/0/4
10.0.0.6/32         Direct 0  0                127.0.0.1           InLoop0
10.0.0.7/32         Direct 0  0                10.0.0.6            GE1/0/4
127.0.0.0/8         Direct 0  0                127.0.0.1           InLoop0
127.0.0.0/32        Direct 0  0                127.0.0.1           InLoop0
127.0.0.1/32        Direct 0  0                127.0.0.1           InLoop0
127.255.255.255/32 Direct 0  0                127.0.0.1           InLoop0
172.16.10.0/24      Direct 0  0                172.16.10.1         Vlan100
172.16.10.0/32      Direct 0  0                172.16.10.1         Vlan100
172.16.10.1/32      Direct 0  0                127.0.0.1           InLoop0
172.16.10.255/32    Direct 0  0                172.16.10.1         Vlan100
192.168.10.0/24     BGP    255 0                10.0.0.5            GE1/0/4
224.0.0.0/4         Direct 0  0                0.0.0.0             NULL0
224.0.0.0/24        Direct 0  0                0.0.0.0             NULL0
255.255.255.255/32 Direct 0  0                127.0.0.1           InLoop0
[FW3]
```

至此，F1060 BGP RR一级路由反射器典型组网配置案例已完成！

配置关键点