

## OSPF单区域的配置

### OSPF的基本配置和验证

Router-ID为环回口接口地址，区域0，通告相关网段。

Route A的配置

[Route A]ospf 1 router-id 10.0.1.1

[Route A-ospf-1]area 0

[Route A-ospf-1-area-0.0.0.0]network 10.0.1.1 0.0.0.0

[Route A-ospf-1-area-0.0.0.0]network 10.0.12.0 0.0.0.255

[Route A-ospf-1-area-0.0.0.0]network 10.0.23.0 0.0.0.255

Route A上的路由表

<Route A>display ip routing-table

Route Flags: R - relay, D - download to fib

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Routing Tables: Public

Destinations : 13 Routes : 13

Destination/Mask Proto Pre Cost Flags NextHop Interface

0.0.0.0/0 O\_ASE 150 1 D 10.0.12.2 GigabitEthernet 0/0/0

10.0.1.1/32 Direct 0 0 D 127.0.0.1 LoopBack0

10.0.2.2/32 OSPF 10 1 D 10.0.12.2 GigabitEthernet 0/0/0

10.0.3.3/32 OSPF 10 2 D 10.0.12.2 GigabitEthernet 0/0/0

10.0.12.0/24 Direct 0 0 D 10.0.12.1 GigabitEthernet 0/0/0

10.0.12.1/32 Direct 0 0 D 127.0.0.1 GigabitEthernet 0/0/0

10.0.12.255/32 Direct 0 0 D 127.0.0.1 GigabitEthernet 0/0/0

10.0.23.0/24 OSPF 10 2 D 10.0.12.2 GigabitEthernet 0/0/0

127.0.0.0/8 Direct 0 0 D 127.0.0.1 InLoopBack0

127.0.0.1/32 Direct 0 0 D 127.0.0.1 InLoopBack0

127.255.255.255/32 Direct 0 0 D 127.0.0.1 InLoopBack0

172.16.0.1/32 OSPF 10 2 D 10.0.12.2 GigabitEthernet 0/0/0

255.255.255.255/32 Direct 0 0 D 127.0.0.1 InLoopBack0

查看邻居状态

<Route A>display ospf peer

OSPF Process 1 with Router ID 10.0.1.1

Neighbors

Area 0.0.0.0 interface 10.0.12.1(GigabitEthernet0/0/0)'s neighbors

Router ID: 10.0.2.2 Address: 10.0.12.2

State: Full Mode:Nbr is Master Priority: 200

DR: 10.0.12.2 BDR: 10.0.12.1 MTU: 0

Dead timer due in 33 sec

Retrans timer interval: 5

Neighbor is up for 00:11:49

Authentication Sequence: [ 0 ]

### 修改OSPF的Hell0和Dead时间

OSPF默认的Hello间隔是10s，Dead间隔是Hello间隔的4倍

<Route A>display ospf interface GigabitEthernet 0/0/0

OSPF Process 1 with Router ID 10.0.1.1

Interfaces

Interface: 10.0.12.1 (GigabitEthernet0/0/0)

Cost: 1 State: BDR Type: Broadcast MTU: 1500

Priority: 1

Designated Router: 10.0.12.2

Backup Designated Router: 10.0.12.1

Timers: Hello 10 , Dead 40 , Poll 120 , Retransmit 5 , Transmit Delay 1

端口下修改Hello时间

[Route A]interface GigabitEthernet 0/0/0

[Route A-GigabitEthernet0/0/0]ospf timer hello 15

查看

<Route A>display ospf interface GigabitEthernet 0/0/0

OSPF Process 1 with Router ID 10.0.1.1

Interfaces

Interface: 10.0.12.1 (GigabitEthernet0/0/0)

Cost: 1 State: DR Type: Broadcast MTU: 1500

Priority: 1

Designated Router: 10.0.12.1

Backup Designated Router: 0.0.0.0

Timers: Hello 15 , Dead 60 , Poll 120 , Retransmit 5 , Transmit Delay 1

### OSPF缺省路由的发布和验证

[Route C]ip route-static 0.0.0.0 0.0.0.0 LoopBack1

在Route A上查看会有OSPF的外部路由

<Route A>display ip routing-table

Route Flags: R - relay, D - download to fib

------------------------------------------------------------------------------

Routing Tables: Public

Destinations : 13 Routes : 13

Destination/Mask Proto Pre Cost Flags NextHop Interface

0.0.0.0/0 O\_ASE 150 1 D 10.0.12.2 GigabitEthernet 0/0/0

10.0.1.1/32 Direct 0 0 D 127.0.0.1 LoopBack0

10.0.2.2/32 OSPF 10 1 D 10.0.12.2 GigabitEthernet 0/0/0

10.0.3.3/32 OSPF 10 2 D 10.0.12.2 GigabitEthernet 0/0/0

10.0.12.0/24 Direct 0 0 D 10.0.12.1 GigabitEthernet 0/0/0

10.0.12.1/32 Direct 0 0 D 127.0.0.1 GigabitEthernet 0/0/0

10.0.12.255/32 Direct 0 0 D 127.0.0.1 GigabitEthernet 0/0/0

10.0.23.0/24 OSPF 10 2 D 10.0.12.2 GigabitEthernet 0/0/0

127.0.0.0/8 Direct 0 0 D 127.0.0.1 InLoopBack0

127.0.0.1/32 Direct 0 0 D 127.0.0.1 InLoopBack0

127.255.255.255/32 Direct 0 0 D 127.0.0.1 InLoopBack0

172.16.0.1/32 OSPF 10 2 D 10.0.12.2 GigabitEthernet 0/0/0

255.255.255.255/32 Direct 0 0 D 127.0.0.1 InLoopBack0

### 控制DR/BDR的选举

Route B上查看邻居信息

<Route B>display ospf peer 10.0.3.3

OSPF Process 1 with Router ID 10.0.2.2

Neighbors

Area 0.0.0.0 interface 10.0.23.1(GigabitEthernet0/0/1)'s neighbors

Router ID: 10.0.3.3 Address: 10.0.23.2

State: Full Mode:Nbr is Master Priority: 1 DR: 10.0.23.2 BDR: 10.0.23.1 MTU: 0

Dead timer due in 40 sec

Retrans timer interval: 5

Neighbor is up for 00:36:16

Authentication Sequence: [ 0 ]

Route C上查看邻居信息

<Route C>display ospf peer 10.0.2.2

OSPF Process 1 with Router ID 10.0.3.3

Neighbors

Area 0.0.0.0 interface 10.0.23.2(GigabitEthernet0/0/1)'s neighbors

Router ID: 10.0.2.2 Address: 10.0.23.1

State: Full Mode:Nbr is Slave Priority: 1

DR: 10.0.23.2 BDR: 10.0.23.1 MTU: 0

Dead timer due in 29 sec

Retrans timer interval: 5

Neighbor is up for 00:37:58

Authentication Sequence: [ 0 ]

在R2查看，两边的默认路由优先级相同，但是R3的路由器ID大，所以R3是DR，R2是BDR

修改路由器的优先级

[Route B]interface GigabitEthernet 0/0/1

[Route B-GigabitEthernet0/0/1]ospf dr-priority 200

[Route C]interface GigabitEthernet 0/0/1

[Route C-GigabitEthernet0/0/1]ospf dr-priority 100

配置完成会发现DR/BDR并没有改变，因为 DR/BDR的选举是非抢占模式。关闭重启端口后会选举DR/BDR

<Route B>dis ospf peer 10.0.3.3

OSPF Process 1 with Router ID 10.0.2.2

Neighbors

Area 0.0.0.0 interface 10.0.23.1(GigabitEthernet0/0/1)'s neighbors

Router ID: 10.0.3.3 Address: 10.0.23.2

State: Full Mode:Nbr is Master Priority: 100

DR: 10.0.23.1 BDR: 10.0.23.2 MTU: 0

Dead timer due in 38 sec

Retrans timer interval: 5

Neighbor is up for 00:47:11

Authentication Sequence: [ 0 ]