

Attribute Types

Well-known Mandatory · Must be supported and propagated

Well-known Discretionary · Must be supported; propagation optional

Optional Transitive · Marked as partial if unsupported by neighbor

Optional Nontransitive · Deleted if unsupported by neighbor

Attributes

Name	Type	Description
Aggregator	OT	ID and AS of router which performed summarization
AS Path	WM	List of autonomous systems the advertisement has traversed
Atomic Aggregate	WD	Includes AS which have been dropped due to route aggregation
Cluster ID	ON	Originating cluster
Community	OT	Route tag
Local Preference	WD	Metric for internal neighbors to reach external paths; default 100
Multiple Exit Discriminator (MED)	ON	Metric for external neighbors to reach the AS; default 0
Next Hop	WM	External peer in neighboring AS
Origin	WM	Origin type (IGP, EGP, or unknown)
Originator ID	ON	Identifies route reflector
Weight	O	Cisco proprietary, not communicated to peers; default 0

Path Selection

Order	Description	Preference
1 Weight	Administrative preference	Highest
2 Local Preference	Communicated between peers within an AS	Highest
3 Self-Originated	Prefer paths originated locally	True
4 AS Path	Minimize AS hops	Shortest
5 Origin	Prefer IGP-learned routes over EGP, and EGP over unknown	IGP
6 MED	Used externally to enter an AS	Lowest
7 External	Prefer eBGP routes over iBGP	eBGP
8 IGP Cost	Consider IGP attributes	Lowest
9 eBGP Peering	Favor more stable routes	Oldest
10 Router ID	Tie breaker	Lowest

Influencing Path Selection

Weight neighbor 172.16.0.1 weight 200 **Local Preference** bgp default local-preference 100
MED default-metric 400 **Route Map** neighbor 172.16.0.1 route-map Foo

About BGP

Type Path Vector

Algorithm Path Selection

eBGP AD 20

iBGP AD 200

Standard RFC 4271

Protocols IP

Transport TCP 179

Authentication MD5

Terminology

Autonomous System (AS) · A logical domain under the control of a single entity

External BGP (eBGP) · BGP neighborships formed between autonomous systems

Internal BGP (iBGP) · BGP between peers within a single autonomous system

Synchronization requirement · Asserts that a route must be known by an IGP before it may be advertised to BGP peers

Packet Types

Open

Update

Keepalive

Notification

Neighbor States

Idle · Neighbor is not responding

Connect · TCP session established

Open Sent · Open message sent

Open Confirm · Response received

Established · Neighborhood established

Troubleshooting

show ip bgp

show ip bgp summary

show ip bgp neighbors

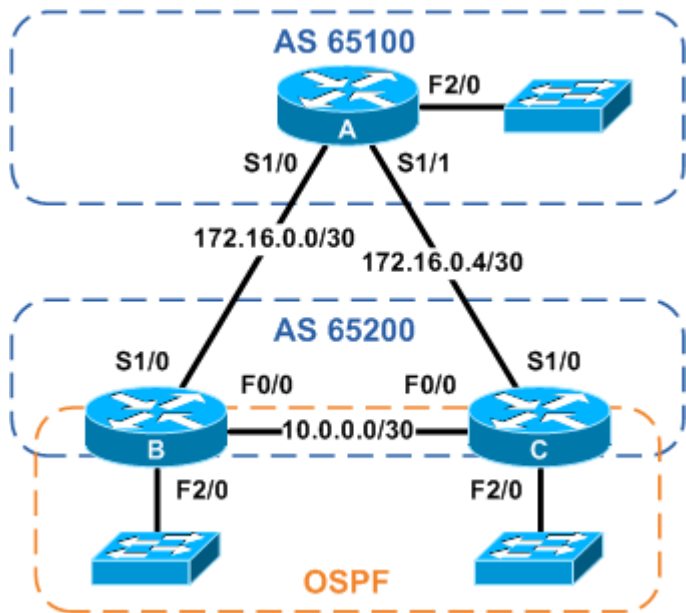
show ip route [bgp]

clear ip bgp * [soft]

debug ip bgp events

debug ip bgp updates

Configuration Example



Router A

```
interface Serial1/0
  description Backbone to B
  ip address 172.16.0.1 255.255.255.252
!
interface Serial1/1
  description Backbone to C
  ip address 172.16.0.5 255.255.255.252
!
interface FastEthernet2/0
  description LAN
  ip address 192.168.1.1 255.255.255.0
!
router bgp 65100
  no synchronization
  network 172.16.0.0 mask 255.255.255.252
  network 172.16.0.4 mask 255.255.255.252
  network 192.168.1.0
  neighbor South peer-group
  neighbor South remote-as 65200
  neighbor 172.16.0.2 peer-group South
  neighbor 172.16.0.6 peer-group South
  no auto-summary
```

Router B

```
interface FastEthernet0/0
  description Local to C
  ip address 10.0.0.1 255.255.255.252
!
interface Serial1/0
  description Backbone to A
  ip address 172.16.0.2 255.255.255.252
!
interface FastEthernet2/0
  description LAN
  ip address 192.168.2.1 255.255.255.0
!
router ospf 100
  network 10.0.0.1 0.0.0.0 area 0
  network 192.168.2.0 0.0.0.255 area 1
!
router bgp 65200
  no synchronization
  redistribute ospf 100 route-map LAN_Subnets
  neighbor 10.0.0.2 remote-as 65200
  neighbor 172.16.0.1 remote-as 65100
  no auto-summary
!
access-list 10 permit 192.168.0.0 0.0.255.255
!
route-map LAN_Subnets permit 10
  match ip address 10
  set metric 100
```

Router C

```
interface FastEthernet0/0
  description Local to B
  ip address 10.0.0.2 255.255.255.252
!
interface Serial1/0
  description Backbone to A
  ip address 172.16.0.6 255.255.255.252
!
interface FastEthernet2/0
  description LAN
  ip address 192.168.3.1 255.255.255.0
!
router ospf 100
  network 10.0.0.2 0.0.0.0 area 0
  network 192.168.3.0 0.0.0.255 area 2
!
router bgp 65200
  no synchronization
  redistribute ospf 100 route-map LAN_Subnets
  neighbor 10.0.0.1 remote-as 65200
  neighbor 172.16.0.5 remote-as 65100
  no auto-summary
!
access-list 10 permit 192.168.0.0 0.0.255.255
!
route-map LAN_Subnets permit 10
  match ip address 10
  set metric 100
```

Router A Routing Table

```
172.16.0.0/30 is subnetted, 2 subnets
C    172.16.0.4 is directly connected, S1/1
C    172.16.0.0 is directly connected, S1/0
C    192.168.1.0/24 is directly connected, F2/0
B    192.168.2.0/24 [20/100] via 172.16.0.2
B    192.168.3.0/24 [20/100] via 172.16.0.2
```

Router B Routing Table

```
172.16.0.0/30 is subnetted, 2 subnets
B    172.16.0.4 [20/0] via 172.16.0.1
C    172.16.0.0 is directly connected, S1/0
10.0.0.0/30 is subnetted, 1 subnets
C    10.0.0.0 is directly connected, F0/0
B    192.168.1.0/24 [20/0] via 172.16.0.1
C    192.168.2.0/24 is directly connected, F2/0
O IA 192.168.3.0/24 [110/2] via 10.0.0.2, F0/0
```