BGP · PART 1

packetlife.net

Attributes

Name	Description
Well-known Mandatory · Must be supported and propagated	
1 **Origin**	Origin type (IGP, EGP, or unknown)
2 **AS Path**	List of autonomous systems which the advertisement has traversed
3 **Next Hop**	External peer in neighboring AS
Well-known Discretionary · Must be supported; propagation optional	
5 **Local Preference**	Metric for internal neighbors to reach external destinations (default 100)
6 **Atomic Aggregate**	Includes ASes which have been dropped due to route aggregation
Optional Transitive · Marked as partial if unsupported by neighbor	
7 **Aggregator**	ID and AS of summarizing router
8 **Community**	Route tag
Optional Nontransitive · Deleted if unsupported by neighbor	
4 **Multiple Exit Discriminator (MED)**	Metric for external neighbors to reach the local AS (default 0)
9 **Originator ID**	The originator of a reflected route
10 **Cluster List**	List of cluster IDs
13 **Cluster ID**	Originating cluster
-- **Weight**	Cisco proprietary, not communicated to peers (default 0)

Path Selection

	Attribute	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 metric	Lowest
9	**eBGP Peering**	Favor more stable routes	Oldest
10	**Router ID**	Tie breaker	Lowest

About BGP

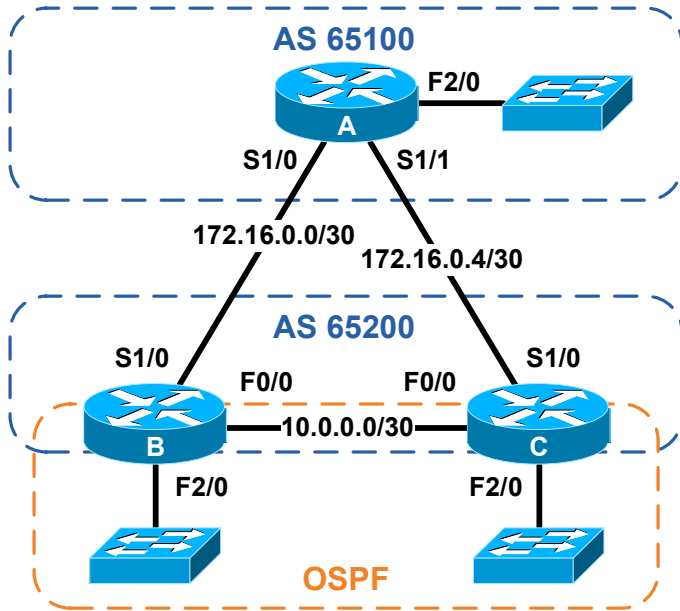|	
Type	Path Vector
eBGP AD	20
iBGP AD	200
Standard	RFC 4271
Protocols	IP
Transport	TCP/179
Authentication	MD5

Terminology

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

External BGP (eBGP)
BGP adjacencies which span autonomous system boundaries

Internal BGP (iBGP)
BGP adjacencies formed within a single AS

Synchronization Requirement
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

Active · Attempting to connect

Connect · TCP session established

Open Sent · Open message sent

Open Confirm · Response received

Established · Adjacency established

Troubleshooting

```
show ip bgp [summary]
```
```
show ip bgp neighbors
```
```
show ip route [bgp]
```
```
clear ip bgp * [soft]
```
```
debug ip bgp […]
```

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`
Ignore AS Path	`bgp bestpath as-path ignore`	**Ignore Cost Communities**	`bgp bestpath cost-community ignore`

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 Backbone 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 192.168.2.1 0.0.0.0 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 Backbone 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 192.168.3.1 0.0.0.0 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
```