BGP Route Summarization

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BGP Aggregation Lab

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BGP Aggregation Lab

Objective

Introduce the student with some basic BGP routing commands. You should print out the Blank Network Diagram, and document your work before beginning to configure your router.

Required Equipment

Frame relay switch with 3 ports,
2 routers with one serial interface,
1 router with two serial interfaces.
and 3 sets of DTE & DCE cables or 3 back to back cables.

Scenario

Frame Relay. Using point-to-point subinterfaces, establish a frame relay circuit between the three routers.

IP addressing. Subnet 172.16.1.0 255.255.255.0 (/24) to provide two subnets with 2 hosts for use in the WAN.

On Router 2, assign 172.16.200.1 255.255.255.0 interface loopback 0.

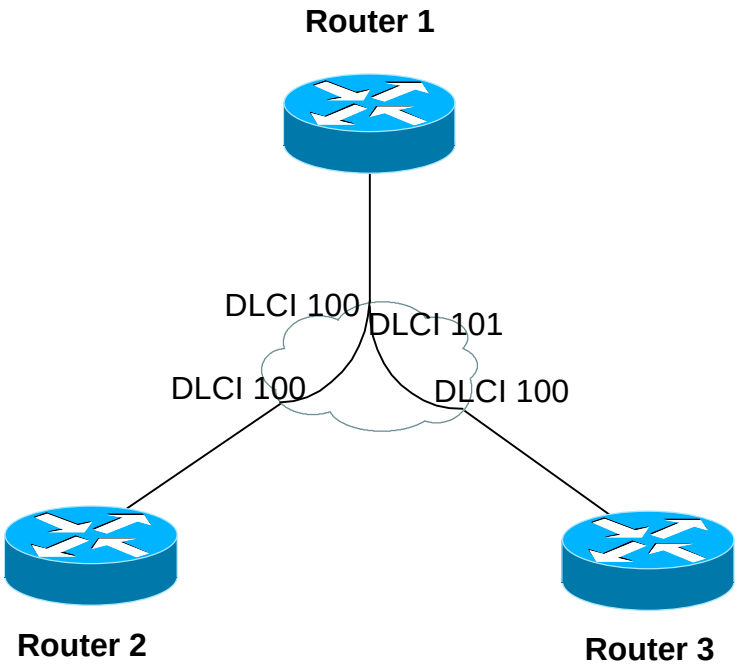
On Router 3, assign 10.1.0.1 255.255.0.0 to interface loopback0, 10.2.0.1 255.255.0.0 to interface loopback 1, and 172.17.1.1/24, 172.17.11.1/24 and 172.17.111.1/24 to loopback interface 2.

BGP Configuration. Enable BGP on all three routers using the router numbers for their autonomous system number. For example Router 1 will be AS 1.

Configure Router 2 and Router 3 so they will announce the networks assigned to the loopback interfaces. Do not summarize.

Router 1 will summarize the class A networks into an 8 bit (255.0.0.0) block, and the class b networks into a 16 bit (255.255.0.0) block before announcing them to Router 2. Router 2 should not see any routes originated from AS 1.

Blank Network Diagram



Solution

- Router 1
  - BGP routing table
- Router 2
  - BGP routing table
- Router 3
  - BGP routing table

```
hostname Router1
!
interface Serial0
 no ip address
  encapsulation frame-relay
 !
interface Serial0.2 point-to-point
 ip address 172.16.1.5 255.255.255.252
 frame-relay interface-dlci 100
!
interface Serial0.3 point-to-point
 ip address 172.16.1.9 255.255.255.252
 frame-relay interface-dlci 101
!
router bgp 1
 aggregate-address 10.0.0.0 255.0.0.0 as-set summary-only
 aggregate-address 172.17.0.0 255.255.0.0 as-set summary-only
 neighbor 172.16.1.6 remote-as 2
 neighbor 172.16.1.10 remote-as 3
!
ip classless
```

Router 1 - BGP Table

BGP table version is 20, local router ID is 192.168.250.100
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 10.0.0.0	0.0.0.0			32768	3 i
s> 10.1.0.0/16	172.16.1.10	0		0	3 i
s> 10.2.0.0/16	172.16.1.10	0		0	3 i
*> 172.16.200.0/24	172.16.1.6	0		0	2 i
*> 172.17.0.0	0.0.0.0			32768	3 i
s> 172.17.1.0/24	172.16.1.10	0		0	3 i
s> 172.17.11.0/24	172.16.1.10	0		0	3 i
s> 172.17.111.0/24	172.16.1.10	0		0	3 i

Router 2

```
version 11.2
!
hostname Router2
!
ip subnet-zero
!
interface Loopback0
 ip address 172.16.200.1 255.255.255.0
!
interface Serial0
 no ip address
 encapsulation frame-relay
 frame-relay lmi-type cisco
!
interface Serial0.1 point-to-point
 ip address 172.16.1.6 255.255.255.252
 frame-relay interface-dlci 100
!
router bgp 2
 network 172.16.200.0 mask 255.255.255.0
 neighbor 172.16.1.5 remote-as 1
!
ip classless
```

Router 2 - BGP Table

```
Router2#show ip bgp
BGP table version is 34, local router ID is 172.16.200.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 10.0.0.0         172.16.1.5               0             1 3 i
*> 172.16.200.0/24  0.0.0.0                  0         32768 i
*> 172.17.0.0       172.16.1.5               0             1 3 i
```

Router 3

```
version 11.2
!
hostname Router3
!
ip subnet-zero
!
interface Loopback0
 ip address 10.1.0.1 255.255.0.0
!
interface Loopback1
 ip address 10.2.0.1 255.255.0.0
!
interface Loopback2
 ip address 172.17.11.1 255.255.255.0 secondary
 ip address 172.17.111.1 255.255.255.0 secondary
 ip address 172.17.1.1 255.255.255.0
!
interface Serial0
 no ip address
 encapsulation frame-relay
 frame-relay lmi-type cisco
!
interface Serial0.1 point-to-point
 ip address 172.16.1.10 255.255.255.252
 frame-relay interface-dlci 100
!
router bgp 3
 network 10.1.0.0 mask 255.255.0.0
 network 10.2.0.0 mask 255.255.0.0
 network 172.17.1.0 mask 255.255.255.0
 network 172.17.11.0 mask 255.255.255.0
 network 172.17.111.0 mask 255.255.255.0
```

```
 neighbor 172.16.1.9 remote-as 1
!
ip classless
```

Router 3 - BGP Table

```
Router3#sh ip bgp
BGP table version is 23, local router ID is 172.16.34.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 10.1.0.0/16      0.0.0.0                  0         32768 i
*> 10.2.0.0/16      0.0.0.0                  0         32768 i
*> 172.16.200.0/24  172.16.1.9               0               1 2 i
*> 172.17.1.0/24    0.0.0.0                  0         32768 i
*> 172.17.11.0/24   0.0.0.0                  0         32768 i
*> 172.17.111.0/24  0.0.0.0                  0         32768 i
```

References

Cisco web pages

BGP Technical Tips. This is a 5 part tutorial on BGP.

Books

Internet Routing Architectures by Bassam Halabi. Very good book. Click here to buy now.

Contact information

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