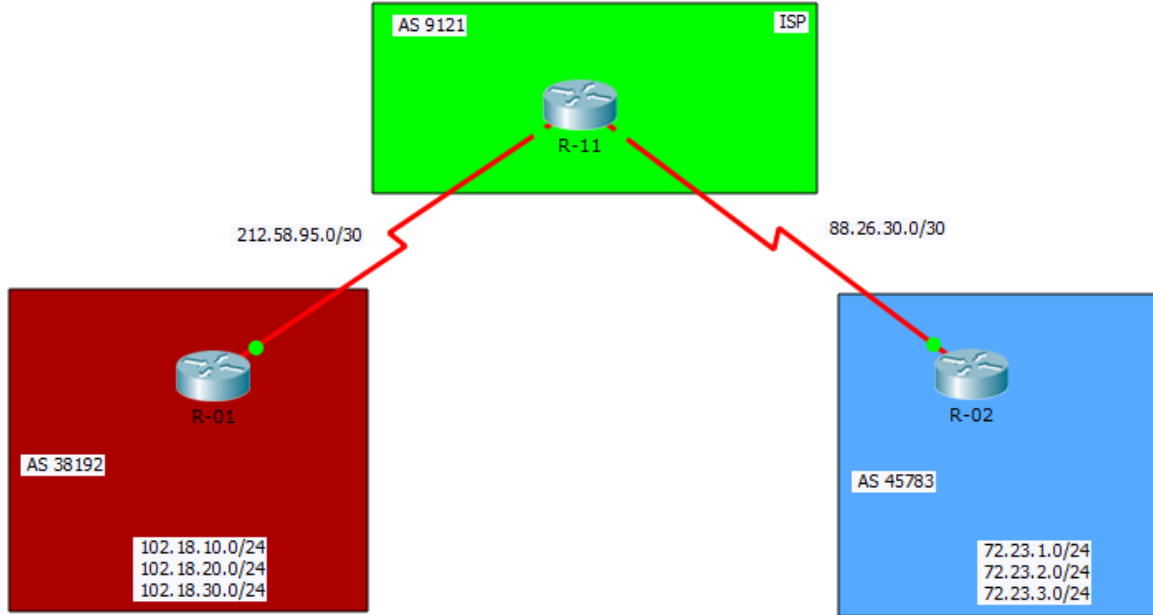


LAB-243



Hedef

Router'larda eBGP konfigürasyonu yaparak farklı Autonomous System'lerden prefix anonsları yapmak.

Çalışma-01

Şekilde de görüldüğü gibi R-01 ve R-02 iki farklı Autonomous System'de bulunmaktadır. Her Autonomous System içerisinde farklı IP blokları IANA üzerinden bu AS'lere atanmıştır.

AS-31192'de bulunan R-01, AS-9121'de bulunan R-11'e sahip olduğu 3 adet /24'lük IP bloklarını anons ederken, AS-45783'de bulunan R-02 ise, AS-9121'de bulunan R-11'e sahip olduğu 3 adet /24'lük IP bloklarını anons edektir. AS-9121'de bulunan R-11 ise diğer iki router'a sadece bir adet **default route** (0.0.0.0) anons edektir. R-11 üzerinde gerekli konfigürasyon çalışmaları yapılmıştır.

Sırasıyla router'larda eBGP komşuluk konfigürasyonlarını gerçekleştirelim.

```
R-01#configure terminal
R-01(config)#
R-01(config)#router bgp 38192
R-01(config-router)#
R-01(config-router)#neighbor 212.58.95.2 remote-as 9121
R-01(config-router)#
%BGP-5-ADJCHANGE: neighbor 212.58.95.2 Up
R-01(config-router)#end
R-01#
```

```
R-02#configure terminal
R-02(config)#
R-02(config)#router bgp 45783
R-02(config-router)#
R-02(config-router)#neighbor 88.26.30.2 remote-as 9121
R-02(config-router)#
%BGP-5-ADJCHANGE: neighbor 88.26.30.2 Up
R-02(config-router)#end
R-02#
```

```
R-01#show ip bgp neighbors
```

```
BGP neighbor is 212.58.95.2, remote AS 9121, external link  
  BGP version 4, remote router ID 212.58.95.2  
  BGP state = Established, up for 00:04:12  
  Last read 00:04:12, last write 00:04:12, hold time is 180, keepalive  
interval is 60 seconds
```

```
Neighbor capabilities:
```

```
  Route refresh: advertised and received(new)
```

```
  Address family IPv4 Unicast: advertised and received
```

```
Message statistics:
```

```
  InQ depth is 0
```

```
  OutQ depth is 0
```

	Sent	Rcvd
Opens:	1	1
Notifications:	0	0
Updates:	0	1
Keepalives:	5	5
Route Refresh:	0	0
Total:	6	7

```
Default minimum time between advertisements runs is 30 seconds
```

```
For address family: IPv4 Unicast
```

```
  BGP table version 2, neighbor version 6/0
```

```
  Output queue size : 0
```

```
  Index 1, Offset 0, Mask 0x2
```

```
  1 update-group member
```

```
(...)
```

```
R-02#show ip bgp neighbors
```

```
BGP neighbor is 88.26.30.2, remote AS 9121, external link  
  BGP version 4, remote router ID 212.58.95.2  
  BGP state = Established, up for 00:05:43  
  Last read 00:05:43, last write 00:05:43, hold time is 180, keepalive  
interval is 60 seconds
```

```
Neighbor capabilities:
```

```
  Route refresh: advertised and received(new)
```

```
  Address family IPv4 Unicast: advertised and received
```

```
Message statistics:
```

```
  InQ depth is 0
```

```
  OutQ depth is 0
```

	Sent	Rcvd
Opens:	1	1
Notifications:	0	0
Updates:	0	1
Keepalives:	6	6
Route Refresh:	0	0
Total:	7	8

```
Default minimum time between advertisements runs is 30 seconds
```

```
For address family: IPv4 Unicast
```

```
  BGP table version 2, neighbor version 6/0
```

```
  Output queue size : 0
```

```
  Index 1, Offset 0, Mask 0x2
```

```
  1 update-group member
```

```
(...)
```

R-01#**show ip bgp summary**

BGP router identifier 212.58.95.1, local AS number 38192
 BGP table version is 2, main routing table version 6
1 network entries using 132 bytes of memory
 1 path entries using 52 bytes of memory
 1/1 BGP path/bestpath attribute entries using 184 bytes of memory
 1 BGP AS-PATH entries using 24 bytes of memory
 0 BGP route-map cache entries using 0 bytes of memory
 0 BGP filter-list cache entries using 0 bytes of memory
 Bitfield cache entries: current 1 (at peak 1) using 32 bytes of memory
 BGP using 424 total bytes of memory
 BGP activity 1/0 prefixes, 1/0 paths, scan interval 60 secs

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
212.58.95.2	4	9121	11	10	2	0	0	00:08:23	4

R-01#

R-02#**show ip bgp summary**

BGP router identifier 88.26.30.1, local AS number 45783
 BGP table version is 2, main routing table version 6
1 network entries using 132 bytes of memory
 1 path entries using 52 bytes of memory
 1/1 BGP path/bestpath attribute entries using 184 bytes of memory
 1 BGP AS-PATH entries using 24 bytes of memory
 0 BGP route-map cache entries using 0 bytes of memory
 0 BGP filter-list cache entries using 0 bytes of memory
 Bitfield cache entries: current 1 (at peak 1) using 32 bytes of memory
 BGP using 424 total bytes of memory
 BGP activity 1/0 prefixes, 1/0 paths, scan interval 60 secs

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
88.26.30.2	4	9121	10	9	2	0	0	00:07:17	4

R-02#

R-01#**show ip bgp**

BGP table version is 2, local router ID is 212.58.95.1
 Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
 r RIB-failure, S Stale
 Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 0.0.0.0/32	212.58.95.2	0	0	0	9121 i

R-01#

R-02#**show ip bgp**

BGP table version is 2, local router ID is 88.26.30.1
 Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
 r RIB-failure, S Stale
 Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 0.0.0.0/32	88.26.30.2	0	0	0	9121 i

R-02#

Çıktılardan da görüldüğü üzere Routerlar R-11 ile eBGP komşuluğu kurmuş ve R-11 den **default route** anonsunu almaktadırlar. Şimdi sıra geldi R-01 ve R-02'nin R-11'e doğru anons geçmesine.

BGP'de bir prefix'in anons edilmesi IGP uygulamalarından çok farklıdır. Her ne kadar bu işi yaparken kullanacağımız komut aynı gibi gözükse de ilgili komut (**network**) BGP'de çok farklı anlamlara ve işleyişe sahiptir. BGP bizden en temelde bir şeyi istemektedir: network komutu ile anons edilecek prefix'in routing tablosunda **aynen** yer alması gerekmektedir. Aynen derken? Yani mesela 192.168.1.0/28 networkünün BGP ile anons edilmesini istiyorsunuz, mutlak suretle routing tablosunda 192.168.1.0/28 kaydının buşunması şarttır. Tablonuzda 192.168.1.0/24 için kayıt olabilir ama bu noktada işimize yaramayacaktır. Neyi ne şekilde anons etmek istiyorsak o bilgi aynen ve aynen routing tablosunda yer almalıdır. Evet 192.168.1.0/24 ün olması bir anlam ifade etmeyeceğinden mutlaka 192.168.1.0/28 için bir route kaydını tablomuza koymak zorundayız.

Bizim örneğimize bakacak olursak R-01 102.18.10.0/24, 102.18.20.0/24, 102.18.30.0/24 networklerine directly connected olmadığı gibi routing tablosunda da bu networklere dair bir bilgiye sahip değildir. Bu durumda BGP konfigürasyonun altına gidip network komutu ile bu blokların anons edilme emrini versek dahi bu isteğimiz geçersiz kalacaktır. Peki ne yapabiliriz? Sorun routing tablosunda bilginin olmaması değil mi? Öyleyse bizde routing tablosuna bu bilgiyi ekleriz. Statik route ile tabiki. Tabiki ama bu statik route'u nereye doğru yazacağız? Cevap bitmez tükenmez, sonu gelmez bir kara delik olan **Null 0** interface'ine doğru. Böylelikle Günün sonunda router'ı kandırıp ihtiyaç duyduğu satırı routing tablosuna eklemiş olacağız.

```

R-01#configure terminal
R-01(config)#
R-01(config)#ip route 102.18.10.0 255.255.255.0 null 0
R-01(config)#ip route 102.18.20.0 255.255.255.0 null 0
R-01(config)#ip route 102.18.30.0 255.255.255.0 null 0
R-01(config)#
R-01(config)#end
R-01#
R-01#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B -
BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

```

Gateway of last resort is 212.58.95.2 to network 0.0.0.0

```

*    0.0.0.0/32 is subnetted, 1 subnets
B*   0.0.0.0/32 [20/0] via 212.58.95.2, 00:31:50
     102.0.0.0/24 is subnetted, 3 subnets
S    102.18.10.0/24 is directly connected, Null0
S    102.18.20.0/24 is directly connected, Null0
S    102.18.30.0/24 is directly connected, Null0
     212.58.95.0/24 is variably subnetted, 2 subnets, 2 masks
C    212.58.95.0/30 is directly connected, Serial0/0/0
L    212.58.95.1/32 is directly connected, Serial0/0/0
R-01#

```

Aynı dertten muzdarip olan R-02'de de benzer işlemleri yapıyoruz.

```

R-02#conf terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R-02(config)#
R-02(config)#ip route 72.23.1.0 255.255.255.0 null 0
R-02(config)#ip route 72.23.2.0 255.255.255.0 null 0
R-02(config)#ip route 72.23.3.0 255.255.255.0 null 0
R-02(config)#
R-02(config)#end
R-02#

```

R-02#**show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is 88.26.30.2 to network 0.0.0.0

```
* 0.0.0.0/32 is subnetted, 1 subnets
B* 0.0.0.0/32 [20/0] via 88.26.30.2, 00:34:55
72.0.0.0/24 is subnetted, 3 subnets
S 72.23.1.0/24 is directly connected, Null0
S 72.23.2.0/24 is directly connected, Null0
S 72.23.3.0/24 is directly connected, Null0
88.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 88.26.30.0/30 is directly connected, Serial0/0/0
L 88.26.30.1/32 is directly connected, Serial0/0/0
R-02#
```

Artık ihtiyaç duyulan routing bilgisini ihtiyaç duydukları şekilde routing tablolarına koyduğumuz router'lar üzerinden anons işlemine başlayabiliriz.

R-01#**configure terminal**

R-01(config)#

R-01(config)#**router bgp 38192**

R-01(config-router)#

R-01(config-router)#**network 102.18.10.0 mask 255.255.255.0**

R-01(config-router)#**network 102.18.20.0 mask 255.255.255.0**

R-01(config-router)#**network 102.18.30.0 mask 255.255.255.0**

R-01(config-router)#**end**

R-01#

R-02#**configure terminal**

R-02(config)#

R-02(config)#**router bgp 45783**

R-02(config-router)#

R-02(config-router)#**network 72.23.1.0 mask 255.255.255.0**

R-02(config-router)#**network 72.23.2.0 mask 255.255.255.0**

R-02(config-router)#**network 72.23.3.0 mask 255.255.255.0**

R-02(config-router)#**end**

R-02#

Bu noktadan sonra router'ların BGP ve IP Routing tablolarına bakarak anonsların gerçekleşmiş olduğunu görebiliriz.

R-01#**show ip bgp**

BGP table version is 8, local router ID is 212.58.95.1
 Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
 r RIB-failure, S Stale
 Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 0.0.0.0/32	212.58.95.2	0	0	0	9121 i
*> 72.23.1.0/24	212.58.95.2	0	0	0	9121 45783 i
*> 72.23.2.0/24	212.58.95.2	0	0	0	9121 45783 i
*> 72.23.3.0/24	212.58.95.2	0	0	0	9121 45783 i
*> 102.18.10.0/24	0.0.0.0	0	0	0	38192 i
*> 102.18.20.0/24	0.0.0.0	0	0	0	38192 i
*> 102.18.30.0/24	0.0.0.0	0	0	0	38192 i

R-01#

R-01#**show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is 212.58.95.2 to network 0.0.0.0

```
* 0.0.0.0/32 is subnetted, 1 subnets
B*   0.0.0.0/32 [20/0] via 212.58.95.2, 00:44:44
    72.0.0.0/24 is subnetted, 3 subnets
B    72.23.1.0/24 [20/0] via 212.58.95.2, 00:44:44
B    72.23.2.0/24 [20/0] via 212.58.95.2, 00:44:44
B    72.23.3.0/24 [20/0] via 212.58.95.2, 00:44:44
    102.0.0.0/24 is subnetted, 3 subnets
S    102.18.10.0/24 is directly connected, Null0
S    102.18.20.0/24 is directly connected, Null0
S    102.18.30.0/24 is directly connected, Null0
    212.58.95.0/24 is variably subnetted, 2 subnets, 2 masks
C    212.58.95.0/30 is directly connected, Serial0/0/0
L    212.58.95.1/32 is directly connected, Serial0/0/0
```

R-01#

R-02#**show ip bgp**

BGP table version is 8, local router ID is 88.26.30.1
 Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
 r RIB-failure, S Stale
 Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 0.0.0.0/32	88.26.30.2	0	0	0	9121 i
*> 72.23.1.0/24	0.0.0.0	0	0	0	45783 i
*> 72.23.2.0/24	0.0.0.0	0	0	0	45783 i
*> 72.23.3.0/24	0.0.0.0	0	0	0	45783 i
*> 102.18.10.0/24	88.26.30.2	0	0	0	9121 38192 i
*> 102.18.20.0/24	88.26.30.2	0	0	0	9121 38192 i
*> 102.18.30.0/24	88.26.30.2	0	0	0	9121 38192 i

R-02#

R-02#**show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is 88.26.30.2 to network 0.0.0.0

```

* 0.0.0.0/32 is subnetted, 1 subnets
B* 0.0.0.0/32 [20/0] via 88.26.30.2, 00:46:37
72.0.0.0/24 is subnetted, 3 subnets
S 72.23.1.0/24 is directly connected, Null0
S 72.23.2.0/24 is directly connected, Null0
S 72.23.3.0/24 is directly connected, Null0
88.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 88.26.30.0/30 is directly connected, Serial0/0/0
L 88.26.30.1/32 is directly connected, Serial0/0/0
102.0.0.0/24 is subnetted, 3 subnets
B 102.18.10.0/24 [20/0] via 88.26.30.2, 00:46:37
B 102.18.20.0/24 [20/0] via 88.26.30.2, 00:46:37
B 102.18.30.0/24 [20/0] via 88.26.30.2, 00:46:37

```

R-02#

Router'ların son config'leri

```
R-01#show running-config
Building configuration...

Current configuration : 1229 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R-01
!
no ip cef
no ipv6 cef
!
license udi pid CISCO2911/K9 sn FTX15247DH9
!
no ip domain-lookup
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface GigabitEthernet0/2
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 212.58.95.1 255.255.255.252
!
```

```
!  
interface Serial0/0/1  
  no ip address  
  clock rate 2000000  
  shutdown  
!  
interface Vlan1  
  no ip address  
  shutdown  
!  
router bgp 38192  
  bgp log-neighbor-changes  
  no synchronization  
  neighbor 212.58.95.2 remote-as 9121  
  network 102.18.10.0 mask 255.255.255.0  
  network 102.18.20.0 mask 255.255.255.0  
  network 102.18.30.0 mask 255.255.255.0  
!  
ip classless  
ip route 102.18.10.0 255.255.255.0 Null0  
ip route 102.18.20.0 255.255.255.0 Null0  
ip route 102.18.30.0 255.255.255.0 Null0  
!  
ip flow-export version 9  
!  
line con 0  
  exec-timeout 0 0  
  logging synchronous  
!  
line aux 0  
!  
line vty 0 4  
  login  
!  
end
```

```
R-02#show running-config
Building configuration...

Current configuration : 1215 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R-02
!
no ip cef
no ipv6 cef
!
license udi pid CISCO2911/K9 sn FTX152498HF
!
no ip domain-lookup
!
spanning-tree mode pvst
!
interface GigabitEthernet0/0
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface GigabitEthernet0/1
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface GigabitEthernet0/2
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface Serial0/0/0
  ip address 88.26.30.1 255.255.255.252
!
interface Serial0/0/1
  no ip address
  clock rate 2000000
  shutdown
!
```

```
!  
interface Vlan1  
  no ip address  
  shutdown  
!  
router bgp 45783  
  bgp log-neighbor-changes  
  no synchronization  
  neighbor 88.26.30.2 remote-as 9121  
  network 72.23.1.0 mask 255.255.255.0  
  network 72.23.2.0 mask 255.255.255.0  
  network 72.23.3.0 mask 255.255.255.0  
!  
ip classless  
ip route 72.23.1.0 255.255.255.0 Null0  
ip route 72.23.2.0 255.255.255.0 Null0  
ip route 72.23.3.0 255.255.255.0 Null0  
!  
ip flow-export version 9  
!  
line con 0  
  exec-timeout 0 0  
  logging synchronous  
!  
line aux 0  
!  
line vty 0 4  
  login  
!  
end
```

<https://goo.gl/XYRJct>

Umarım faydalı bir LAB çalışması olmuştur.
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