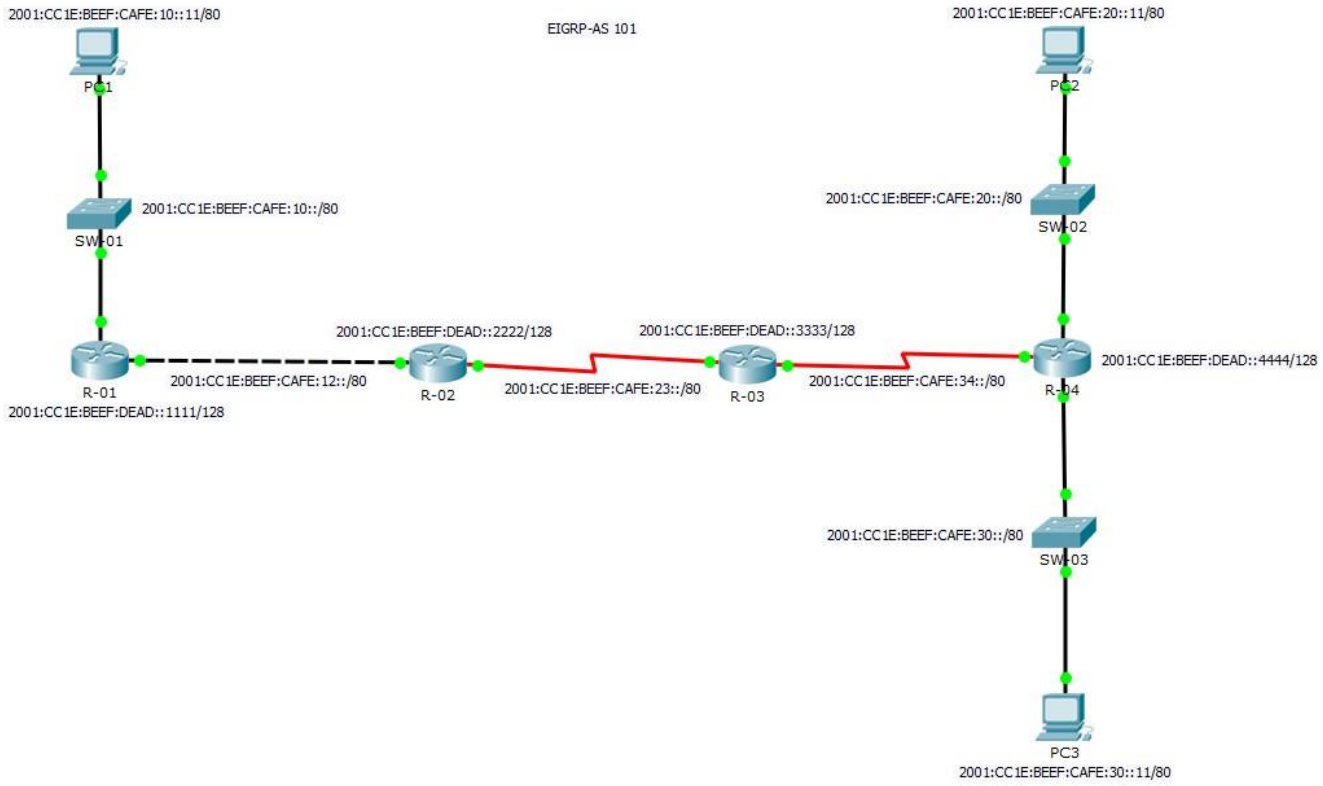
LAB-222



Hedef

Router'larda EIGRP Ipv6 konfigurasyonu gerçekleştirerek farklı Ipv6 networklerinin haberleşmesini sağlamak.

PC'lerin IP konfigurasyonları

PC1	VLAN 10	2001:CC1E:BEEF:CAFE:10::11/80	Default GateWay 2001:CC1E:BEEF:CAFE:10::1
PC2	VLAN 10	2001:CC1E:BEEF:CAFE:20::11/80	Default GateWay 2001:CC1E:BEEF:CAFE:20::1
PC3	VLAN 10	2001:CC1E:BEEF:CAFE:20::11/80	Default GateWay 2001:CC1E:BEEF:CAFE:30::1

Çalışma-01

Bu çalışmamızda IPv6 taşımacılığı yapmak üzere EIGRP konfigurasyonu gerçekleştireceğiz.

EIGRP IPv6 konfigurasyonu yaparken dikkat edeceğimiz hususlar şunlar olacaktır: Cisco router'lar default ayarlarında IPv6 rouiting özelliği kapalı gelir. İlk olarak bu özelliği açacak olan **ipv6 unicast-routing** komutunu aktive edeceğiz. IPv6 routing yapılandırmalarında **network** komutu kullanılmamaktadır. Direk olarak dahil etmek istediğimiz interface'e gidip interface altında gerekli olan komutu girerek, ilgili interface'in EIGRP'ye dahil olmasını sağlıyacağız. Stub networkleri **passive-interface** olarak tanımlayarak bu interfacelerden EIGRP *Hello* paketlerinin gitmesini engelleyeceğiz. Bunun hem gereksiz trafiği engellediğini hemde ilgi networklerden yapılabilecek EIGRP ataklarına karşı bir güvenlik tedbiri olduğunu belirtmek isterim. EIGRP IPv6 yapılandırmasında bir diğer önemli husus ise mevcut interface'lerde 32 bitlik bir adres olmadığı için, ihtiyaç duyulan **Router-ID** değerini manuel olarak vermemizin bizden bekleniyor olduğudur.

EIGRP IPv6 konfigurasyonu sayesinde routerlar üzerlerindeki ve öğrendikleri IPv6 networklerin bilgilerini, birbirleriyle paylaşacaklardır. Bu paylaşım neticesinde PC'lerin birbirleri ile IPv6 haberleşmesi de sağlanmış olacaktır.

```
R-01#configure terminal
R-01(config)#ipv6 unicast-routing
R-01(config)#
R-01(config)#ipv6 router eigrp 101
R-01(config-rtr)#eigrp router-id 1.1.1.1
R-01(config-rtr)#no shutdown
R-01(config-rtr)#passive-interface gigabitEthernet 0/0
R-01(config-rtr)#exit
R-01(config)#interface loopback 0 R-01(config-if)#ipv6
eigrp 101
R-01(config-if)#
R-01(config-if)#interface GigabitEthernet0/1
R-01(config-if)#ipv6 eigrp 101
R-01(config-if)#
R-01(config-if)#interface GigabitEthernet0/0
R-01(config-if)#ipv6 eigrp 101
R-01(config-if)#end
R-02#configure terminal
R-02(config)#ipv6 unicast-routing
R-02(config)#
R-02(config)#ipv6 router eigrp 101
R-02(config-rtr)#eigrp router-id 2.2.2.2
R-02(config-rtr)#no shutdown
R-02(config-rtr)#exit
R-02(config)#
R-02(config)#interface loopback 0 R-02(config-if)#ipv6
eigrp 101
```

```
R-02(config-if)#
R-02(config-if)#interface GigabitEthernet0/1
R-02(config-if)#ipv6 eigrp 101
R-02(config-if)#
R-02(config-if)#interface Serial0/0/0
R-02(config-if)#ipv6 eigrp 101
R-02(config-if)#end
R-02#

R-03#configure terminal
R-03(config)#ipv6 unicast-routing
R-03(config)#
R-03(config)#ipv6 router eigrp 101
R-03(config-rtr)#eigrp router-id 3.3.3.3
R-03(config-rtr)#no shutdown
R-03(config-rtr)#exit
R-03(config)#
R-03(config)#interface loopback 0
R-03(config-if)#ipv6 eigrp 101
R-03(config-if)#
R-03(config-if)#interface Serial0/0/0
R-03(config-if)#ipv6 eigrp 101
R-03(config-if)#
R-03(config-if)#interface Serial0/0/1
R-03(config-if)#ipv6 eigrp 101
R-03(config-if)#end
R-03#

R-04#configure terminal
R-04(config)#ipv6 unicast-routing
R-04(config)#
R-04(config)#ipv6 router eigrp 101
R-04(config-rtr)#eigrp router-id 4.4.4.4
R-04(config-rtr)#no shutdown
R-04(config-rtr)#exit
R-04(config)#
R-04(config)#interface loopback 0
R-04(config-if)#ipv6 eigrp 101
R-04(config-if)#
R-04(config-if)#interface GigabitEthernet 0/0
R-04(config-if)#ipv6 eigrp 101
R-04(config-if)#
R-04(config-if)#interface GigabitEthernet 0/1
R-04(config-if)#ipv6 eigrp 101
```

```
R-04(config-if)#
R-04(config-if)#interface Serial0/0/0
R-04(config-if)#ipv6 eigrp 101
R-04(config-if)#end
R-04#
```

Router R-02'de IPV6 Routing tablosuna bakalım.

```
R-02#sh ipv6 route
IPv6 Routing Table - 13 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external D
2001:CC1E:BEEF:CAFE:10::/80 [90/3072]      via
FE80::2E0:A3FF:FE46:7B02, GigabitEthernet0/1 C
2001:CC1E:BEEF:CAFE:12::/80 [0/0]
     via GigabitEthernet0/1, directly connected
L   2001:CC1E:BEEF:CAFE:12::2/128 [0/0]
via GigabitEthernet0/1, receive D
2001:CC1E:BEEF:CAFE:20::/80 [90/2682112]
via FE80::210:11FF:FE0E:9D01, Serial0/0/0 C
2001:CC1E:BEEF:CAFE:23::/80 [0/0]      via
Serial0/0/0, directly connected L
2001:CC1E:BEEF:CAFE:23::2/128 [0/0]      via
Serial0/0/0, receive
D   2001:CC1E:BEEF:CAFE:30::/80 [90/2682112]      via
FE80::210:11FF:FE0E:9D01,        Serial0/0/0        D
2001:CC1E:BEEF:CAFE:34::/80  [90/2681856]          via
FE80::210:11FF:FE0E:9D01,        Serial0/0/0        D
2001:CC1E:BEEF:DEAD::1111/128  [90/130816]         via
FE80::2E0:A3FF:FE46:7B02,     GigabitEthernet0/1     C
2001:CC1E:BEEF:DEAD::2222/128   [0/0]              via
Loopback0,         directly         connected        D
2001:CC1E:BEEF:DEAD::3333/128 [90/2297856]         via
FE80::210:11FF:FE0E:9D01,        Serial0/0/0        D
2001:CC1E:BEEF:DEAD::4444/128 [90/2809856]         via
FE80::210:11FF:FE0E:9D01, Serial0/0/0  L     FF00::/8
[0/0]      via Null0, receive
R-02#
R-02#
```

Bu tablo bize bütün loopback IP'lerinin, bütün router'lar arasındaki bağlantı IP'lerinin ve en arkadaki PC networklerinin başarılı bir şekilde routerlar arasında taşındığını göstermektedir. Tabloya göre R-02 2001:CC1E:BEEF:DEAD::4444/128 networküne **2809856** metric uzaklıktaymış.

```
R-02#show ipv6 eigrp interfaces
IPv6-EIGRP interfaces for process 101

                        Xmit Queue   Mean   Pacing Time   Multicast
Pending
Interface         Peers  Un/Reliable  SRTT   Un/Reliable   Flow Timer   Routes
Lo0                 0        0/0      1236       0/10           0           0
Gig0/1              1        0/0      1236       0/10           0           0
Se0/0/0             1        0/0      1236       0/10           0           0
R-02#

R-02#show ipv6 eigrp neighbors
IPv6-EIGRP neighbors for process 101
H   Address                 Interface     Hold   Uptime   SRTT   RTO  Q  Seq
                                          (sec)           (ms)       Cnt Num
0     Link-local address:       Gig0/1       12   00:11:03  40     1000  0
15      FE80::2E0:A3FF:FE46:7B02
1     Link-local address:       Se0/0/0      14   00:08:33  40     1000  0
15      FE80::210:11FF:FE0E:9D01

R-02#

R-02#show ipv6 eigrp topology
IPv6-EIGRP Topology Table for AS 101/ID(2.2.2.2)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - Reply status

P 2001:CC1E:BEEF:CAFE:10::/80, 1 successors, FD is 3072
         via FE80::2E0:A3FF:FE46:7B02 (3072/2816), GigabitEthernet0/1
P 2001:CC1E:BEEF:CAFE:12::/80, 1 successors, FD is 2816
via Connected, GigabitEthernet0/1
P 2001:CC1E:BEEF:CAFE:20::/80, 1 successors, FD is 2682112
         via FE80::210:11FF:FE0E:9D01 (2682112/2170112), Serial0/0/0
P 2001:CC1E:BEEF:CAFE:23::/80, 1 successors, FD is 2169856
via Connected, Serial0/0/0
P 2001:CC1E:BEEF:CAFE:30::/80, 1 successors, FD is 2682112
```

```
         via FE80::210:11FF:FE0E:9D01 (2682112/2170112), Serial0/0/0 P
2001:CC1E:BEEF:CAFE:34::/80, 1 successors, FD is 2681856
         via FE80::210:11FF:FE0E:9D01 (2681856/2169856), Serial0/0/0 P
2001:CC1E:BEEF:DEAD::1111/128, 1 successors, FD is 130816
         via FE80::2E0:A3FF:FE46:7B02 (130816/128256), GigabitEthernet0/1
P 2001:CC1E:BEEF:DEAD::2222/128, 1 successors, FD is 128256
via Connected, Loopback0
P 2001:CC1E:BEEF:DEAD::3333/128, 1 successors, FD is 2297856
via FE80::210:11FF:FE0E:9D01 (2297856/128256), Serial0/0/0 P
2001:CC1E:BEEF:DEAD::4444/128, 1 successors, FD is 2809856
via FE80::210:11FF:FE0E:9D01 (2809856/2297856), Serial0/0/0 R-02#
```

```
R-02#show ipv6 eigrp topology all-links
IPv6-EIGRP Topology Table for AS 101/ID(2.2.2.2)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - Reply status

P 2001:CC1E:BEEF:CAFE:10::/80, 1 successors, FD is 3072
         via FE80::2E0:A3FF:FE46:7B02 (3072/2816), GigabitEthernet0/1
P 2001:CC1E:BEEF:CAFE:12::/80, 1 successors, FD is 2816
via Connected, GigabitEthernet0/1
P 2001:CC1E:BEEF:CAFE:20::/80, 1 successors, FD is 2682112
         via FE80::210:11FF:FE0E:9D01 (2682112/2170112), Serial0/0/0
P 2001:CC1E:BEEF:CAFE:23::/80, 1 successors, FD is 2169856
via Connected, Serial0/0/0
P 2001:CC1E:BEEF:CAFE:30::/80, 1 successors, FD is 2682112
         via FE80::210:11FF:FE0E:9D01 (2682112/2170112), Serial0/0/0 P
2001:CC1E:BEEF:CAFE:34::/80, 1 successors, FD is 2681856
         via FE80::210:11FF:FE0E:9D01 (2681856/2169856), Serial0/0/0 P
2001:CC1E:BEEF:DEAD::1111/128, 1 successors, FD is 130816
         via FE80::2E0:A3FF:FE46:7B02 (130816/128256), GigabitEthernet0/1
P 2001:CC1E:BEEF:DEAD::2222/128, 1 successors, FD is 128256
via Connected, Loopback0
P 2001:CC1E:BEEF:DEAD::3333/128, 1 successors, FD is 2297856
via FE80::210:11FF:FE0E:9D01 (2297856/128256), Serial0/0/0 P
2001:CC1E:BEEF:DEAD::4444/128, 1 successors, FD is 2809856
via FE80::210:11FF:FE0E:9D01 (2809856/2297856), Serial0/0/0
R-02#
```

Bu yapıda yedekli bir yol olmadığı için üstteki tablo ile bir önceki arasında bir fark göremiyoruz.

```
R-02#show ipv6 protocols
IPv6 Routing Protocol is "connected"
IPv6 Routing Protocol is "ND"
```

```
IPv6 Routing Protocol is "eigrp 101"
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
EIGRP maximum metric variance 1
  Interfaces:
    Loopback0
    GigabitEthernet0/1
    Serial0/0/0
Redistributing: eigrp 101
  Maximum path: 16
  Distance: internal 90 external 170
 R-02#
R-
01#sho
w ipv6
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ols
IPv6 Routing Protocol is "connected" IPv6
Routing Protocol is "ND"
IPv6 Routing Protocol is "eigrp 101"
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
EIGRP maximum metric variance 1
  Interfaces:
    Loopback0
    GigabitEthernet0/1
    GigabitEthernet0/0 (passive)
Redistributing: eigrp 101
  Maximum path: 16
  Distance: internal 90 external 170
 R-01#
```

Bu arada PC'lerin haberleşmelerine bir bakalım. PC1'den diğerlerine ping atalım.

```
PC>ping 2001:CC1E:BEEF:CAFE:20::11

Pinging 2001:CC1E:BEEF:CAFE:20::11 with 32 bytes of data:

Reply from 2001:CC1E:BEEF:CAFE:20::11: bytes=32 time=2ms TTL=124
Reply from 2001:CC1E:BEEF:CAFE:20::11: bytes=32 time=2ms TTL=124
Reply from 2001:CC1E:BEEF:CAFE:20::11: bytes=32 time=2ms TTL=124 Reply
from 2001:CC1E:BEEF:CAFE:20::11: bytes=32 time=13ms TTL=124

Ping statistics for 2001:CC1E:BEEF:CAFE:20::11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 13ms, Average = 4ms

PC>
PC>ping 2001:CC1E:BEEF:CAFE:30::11

Pinging 2001:CC1E:BEEF:CAFE:30::11 with 32 bytes of data:

Reply from 2001:CC1E:BEEF:CAFE:30::11: bytes=32 time=2ms TTL=124
Reply from 2001:CC1E:BEEF:CAFE:30::11: bytes=32 time=12ms TTL=124
Reply from 2001:CC1E:BEEF:CAFE:30::11: bytes=32 time=2ms TTL=124 Reply
from 2001:CC1E:BEEF:CAFE:30::11: bytes=32 time=2ms TTL=124
```

```
Ping statistics for 2001:CC1E:BEEF:CAFE:30::11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 12ms, Average = 4ms

PC>
```

Router'ların son config`leri

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

Current configuration : 1124 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 ipv6
unicast-routing
!
no ipv6 cef
!
license udi pid CISCO2901/K9 sn FTX1524ALVY
!
no ip domain-lookup
!
spanning-tree mode pvst
```

```
!
interface Loopback0
no ip address
 ipv6 address 2001:CC1E:BEEF:DEAD::1111/128
ipv6 eigrp 101
! interface
GigabitEthernet0/0  no ip
address  duplex auto  speed
auto
 ipv6 address 2001:CC1E:BEEF:CAFE:10::1/80
ipv6 eigrp 101
! interface
GigabitEthernet0/1  no ip
address  duplex auto  speed
auto
 ipv6 address 2001:CC1E:BEEF:CAFE:12::1/80
ipv6 eigrp 101
!
```

```
interface Serial0/0/0
no ip address  clock
rate 2000000
shutdown
!
interface Serial0/0/1
no ip address  clock
rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
ipv6 router eigrp 101
eigrp router-id 1.1.1.1  no
shutdown
 passive-interface GigabitEthernet0/0
!
ip classless
!
ip flow-export version 9
!
line con 0  exec-
timeout 0 0  logging
synchronous
!
line aux 0
! line vty 0
4  login
!
end
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Current configuration : 1086 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 ipv6
unicast-routing
!
no ipv6 cef
!
license udi pid CISCO2901/K9 sn FTX15240R13
!
no ip domain-lookup
!
spanning-tree mode pvst
!
interface Loopback0
no ip address
 ipv6 address 2001:CC1E:BEEF:DEAD::2222/128
ipv6 eigrp 101
! interface
GigabitEthernet0/0  no ip
address  duplex auto  speed
auto  shutdown
! interface
GigabitEthernet0/1  no ip
address  duplex auto  speed
auto
 ipv6 address 2001:CC1E:BEEF:CAFE:12::2/80
ipv6 eigrp 101
```

```
! interface
Serial0/0/0  no ip
address
 ipv6 address 2001:CC1E:BEEF:CAFE:23::2/80
ipv6 eigrp 101  clock rate 2000000 !
 clock rate 2000000 shutdown
!
interface Vlan1
no ip address
shutdown
!
ipv6 router eigrp 101
eigrp router-id 2.2.2.2  no
shutdown
!
ip classless
!
ip flow-export version 9
! line con 0  exec-
timeout 0 0  logging
synchronous
! line aux
0
! line vty 0
4  login
!
end
R-
03#s
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Current configuration : 1066 bytes
!
```

```
version 15.1
no service timestamps log datetime msec no
service timestamps debug datetime msec no
service password-encryption
!
hostname R-03
!
no ip cef ipv6
unicast-routing
!
no ipv6 cef
!
license udi pid CISCO2901/K9 sn FTX1524073W
!
no ip domain-lookup
!
spanning-tree mode pvst
!
interface Loopback0
no ip address
 ipv6 address 2001:CC1E:BEEF:DEAD::3333/128
ipv6 eigrp 101
! interface
GigabitEthernet0/0  no ip
address  duplex auto  speed
auto  shutdown
! interface
GigabitEthernet0/1  no ip
address  duplex auto  speed
auto  shutdown
! interface
Serial0/0/0  no ip
address
 ipv6 address 2001:CC1E:BEEF:CAFE:23::3/80
ipv6 eigrp 101
!
 ipv6 address 2001:CC1E:BEEF:CAFE:34::3/80
 ipv6 eigrp 101
 clock rate 2000000
!
```

```
interface Vlan1
no ip address
shutdown
!
ipv6 router eigrp 101
eigrp router-id 3.3.3.3  no
shutdown
!
ip classless
!
ip flow-export version 9
!
line con 0  exec-
timeout 0 0  logging
synchronous
!
line aux 0
! line vty 0
4  login
!
end
R-
04#s
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Current configuration : 1112 bytes
!
version 15.1
no service timestamps log datetime msec no
service timestamps debug datetime msec no
service password-encryption
!
hostname R-04
```

```
! ip cef ipv6
unicast-routing
!
no ipv6 cef
!
license udi pid CISCO2901/K9 sn FTX1524UDPU
!
no ip domain-lookup
!
spanning-tree mode pvst
!
interface Loopback0
no ip address
 ipv6 address 2001:CC1E:BEEF:DEAD::4444/128
ipv6 eigrp 101
! interface
GigabitEthernet0/0  no ip
address  duplex auto  speed
auto
 ipv6 address 2001:CC1E:BEEF:CAFE:20::1/80
ipv6 eigrp 101
! interface
GigabitEthernet0/1  no ip
address  duplex auto  speed
auto
 ipv6 address 2001:CC1E:BEEF:CAFE:30::1/80
ipv6 eigrp 101
! interface
Serial0/0/0  no ip
address
 ipv6 address 2001:CC1E:BEEF:CAFE:34::4/80
ipv6 eigrp 101
!
 clock rate 2000000 shutdown
!
interface Vlan1
no ip address
shutdown
!
```

```
ipv6 router eigrp 101
eigrp router-id 4.4.4.4  no
shutdown
!
ip classless
!
ip flow-export version 9
! line con 0  exec-
timeout 0 0  logging
synchronous
! line aux
0
! line vty 0
4  login
! end
```

Umarım faydalı bir LAB çalışması olmuştur.
Soru ve yorumlarınız için,

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