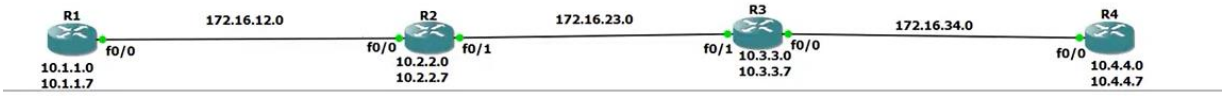
EIGRP Advance

1=Authentication




```
R1(config)#
R1(config)#key chain NH
R1(config-keychain)#key ?
  <0-2147483647>  Key identifier

R1(config-keychain)#key 102
R1(config-keychain-key)#key-string cisco
R1(config-keychain-key)#exit
R1(config-keychain)#exit
R1(config)#int f0/0
R1(config-if)#ip authentication mode eigrp 100 ?
  md5  Keyed message digest

R1(config-if)#ip authentication mode eigrp 100 md5
R1(config-if)#
*Mar  1 00:35:56.223: %DUAL-5-NBRCHANGE: IP-EIGRP(0) 100: Neighbor 172.16.12.2 (FastEthernet0/0) is down: authentic
ation mode changed
R1(config-if)#ip authentication key-chain eigrp 100 NH
R1(config-if)#
```

**apply same on the all routers

**Apply for the interface it is connected

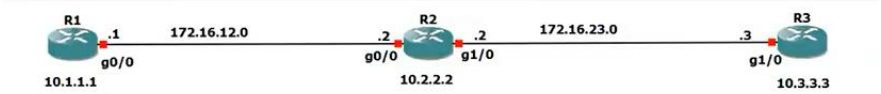
```
R2(config)#do sh run | sec key
key chain NH
 key 102
   key-string cisco
  hidekeys
 ip authentication key-chain eigrp 100 NH
R2(config)#
```

** it is not encrypted (its in plain text form)

```
R2(config)#service password-encryption
R2(config)#do sh run | sec key
key chain NH
 key 102
   key-string 7 01100F175804
  hidekeys
 ip authentication key-chain eigrp 100 NH
```

** service password encryption (CMD)

EIGRP Name Mode



#R1

```
R1(config)#
R1(config)#router eigrp ?
  <1-65535>  Autonomous System
  WORD       EIGRP Virtual-Instance Name

R1(config)#router eigrp A
R1(config-router)#address-family ipv4 unicast autonomous-system 50
R1(config-router-af)#net 172.16.12.0 0.0.0.255
R1(config-router-af)#net 10.1.1.1 0.0.0.0
R1(config-router-af)#^Z
R1#
*Aug 26 20:30:23.999: %SYS-5-CONFIG_I: Configured from console by console
R1#
R1#
R1#sh
```

**On name mode it remains by default

```
 Automatic Summarization: disabled
 Maximum path: 4
 Routing for Networks:
   10.1.1.1/32
   172.16.12.0/24
 Routing Information Sources:
   Gateway         Distance      Last Update
 Distance: internal 90 external 170
```

#R2

```
R2(config)#
R2(config)#router eigrp A2
R2(config-router)#address-family ipv4 unicast autonomous-system 50
R2(config-router-af)#net 172.16.12.0 0.0.0.255
R2(config-router-af)#
*Aug 26 20:32:39.667: %DUAL-5-NBRCHANGE: EIGRP-IPv4 50: Neighbor 172.16.12.1 (GigabitEthernet0/0) is up: new adja
cency
R2(config-router-af)#net 172.16.23.0 0.0.0.255
```

```
P 10.3.3.3/32, 1 successors, FD is 163840
        via Connected, Loopback1
P 10.1.1.1/32, 1 successors, FD is 2048000
        via 172.16.23.2 (2048000/1392640), GigabitEthernet1/0
P 172.16.12.0/24, 1 successors, FD is 1966080
        via 172.16.23.2 (1966080/1310720), GigabitEthernet1/0
P 10.2.2.2/32, 1 successors, FD is 1392640
        via 172.16.23.2 (1392640/163840), GigabitEthernet1/0
P 172.16.23.0/24, 1 successors, FD is 1310720
        via Connected, GigabitEthernet1/0

R3#sh ip rou ei
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
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/32 is subnetted, 3 subnets
D        10.1.1.1 [90/16000] via 172.16.23.2, 00:01:28, GigabitEthernet1/0
D        10.2.2.2 [90/10880] via 172.16.23.2, 00:01:28, GigabitEthernet1/0
      172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
D        172.16.12.0/24
           [90/15360] via 172.16.23.2, 00:01:28, GigabitEthernet1/0
```

** It’s a wide metric in the bottom

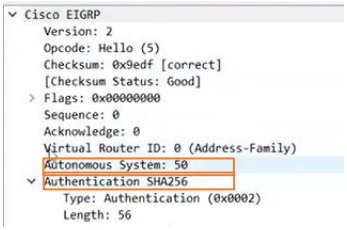
**apply authentication on Named EIGRP

```
R3(config)#router eigrp NH
R3(config-router)# address-family ipv4 unicast autonomous-system 50
R3(config-router-af)#af-int gig1/0
R3(config-router-af-interface)#authentication mode ?
  hmac-sha-256  HMAC-SHA-256 Authentication
  md5           Keyed message digest

R3(config-router-af-interface)#authentication mode  hmac-sha-256 ?
  <0-7>  Encryption type (0 to disable encryption, 7 for proprietary)
  LINE   password

R3(config-router-af-interface)#authentication mode  hmac-sha-256 NH
R3(config-router-af-interface)#
*Aug 26 20:39:20.315: %DUAL-5-NBRCHANGE: EIGRP-IPv4 50: Neighbor 172.16.23.2 (GigabitEthernet1/0) is down: authent
ication HMAC-SHA-256 configured
R3(config-router-af-interface)#authentication key-caain NH
                                                  ^
% Invalid input detected at '^' marker.

R3(config-router-af-interface)#authentication key-cja
```

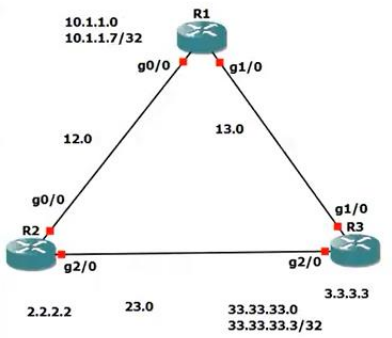
```
R3(config)#do sh run | sec eigrp
router eigrp NH
 !
 address-family ipv4 unicast autonomous-system 50
  !
  af-interface GigabitEthernet1/0
   authentication mode hmac-sha-256 NH
   authentication key-chain NH
  exit-af-interface
  !
  topology base
  exit-af-topology
  network 10.3.3.3 0.0.0.0
  network 172.16.23.0 0.0.0.255
 exit-address-family
```

```
key chain NH
key 230
key-string cisco


af-interface GigabitEthernet1/0
authentication mode hmac-sha-256 NH
authentication key-chain NH
```

**Wireshark



**EIGRP Leak map summary



##configure all ip and loopback address for all router (R1=6L, R2=1L, R3=6L)

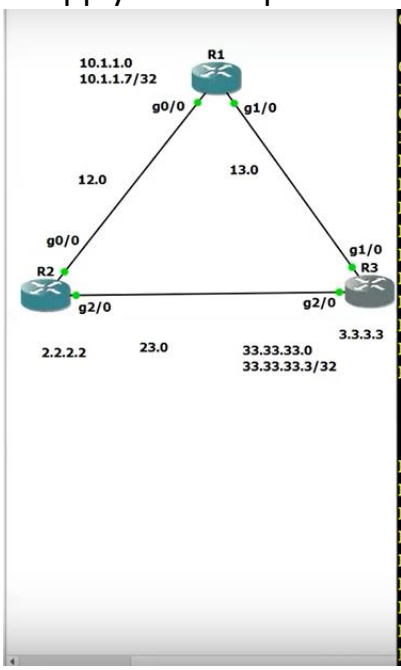
```
R1(config)#
R1(config)#do sh ip rou
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/32 is subnetted, 8 subnets
C        10.1.1.0 is directly connected, Loopback1
C        10.1.1.1 is directly connected, Loopback2
C        10.1.1.2 is directly connected, Loopback4
C        10.1.1.3 is directly connected, Loopback3
C        10.1.1.4 is directly connected, Loopback0
C        10.1.1.5 is directly connected, Loopback5
C        10.1.1.6 is directly connected, Loopback6
C        10.1.1.7 is directly connected, Loopback7
      172.16.0.0/16 is variably subnetted, 4 subnets, 2 masks
C        172.16.12.0/24 is directly connected, GigabitEthernet0/0
L        172.16.12.1/32 is directly connected, GigabitEthernet0/0
C        172.16.13.0/24 is directly connected, GigabitEthernet1/0
L        172.16.13.1/32 is directly connected, GigabitEthernet1/0
```

10.1.1.0 1.7 / 29
R2 & R3
R3 → 10.1.1.3 10.1.1.5

**R3 wants .1 and .5 from R2 individually. (leak map)

**R1 wants 33.33.33.0 from R2 individually not from R3. (leak map)

##Apply Leak-map for R1




```
C        10.1.1.7 is directly connected, Loopback7
      172.16.0.0/16 is variably subnetted, 4 subnets, 2 masks
C        172.16.12.0/24 is directly connected, GigabitEthernet0/0
L        172.16.12.1/32 is directly connected, GigabitEthernet0/0
C        172.16.13.0/24 is directly connected, GigabitEthernet1/0
L        172.16.13.1/32 is directly connected, GigabitEthernet1/0
R1(config)#
R1(config)#access-list 20 permit 10.1.1.3
R1(config)#access-list 20 permit 10.1.1.5
R1(config)#
R1(config)#route-map NH permit 10
R1(config-route-map)#match ip add 20
R1(config-route-map)#exit
R1(config)#
R1(config)#int gig0/0
R1(config-if)#ip summary-address eigrp 100 10.1.1.0 255.255.255.248 ?
  leak-map  Allow dynamic prefixes based on the leak-map
  <cr>

R1(config-if)#$address eigrp 100 10.1.1.0 255.255.255.248 leak-map NH
R1(config-if)#int gig1/0
R1(config-if)#ip summary-address eigrp 100 10.1.1.0 255.255.255.248
R1(config-if)#router eigrp 100
R1(config-router)#no au
R1(config-router)#net 172.16.12.0 0.0.0.255
R1(config-router)#net 172.16.13.0 0.0.0.255
R1(config-router)#net 10.1.1.0 0.0.0.7
R1(config-router)#
```

1=create acl for address

2=create a route-map

3=introduce the ip-summary (for respected routing protocol)

#R2

```
R2(config)#
R2(config)#router eigrp 100
R2(config-router)#no au
R2(config-router)#net 172.16.12.0 0.0.0.255
R2(config-router)#
*Aug 26 20:55:15.883: %DUAL-5-NBRCHANGE: EIGRP-IPv4 100: Neighbor 172.16.12.1 (Gi
abitEthernet0/0) is up: new adjacency
R2(config-router)#net 172.16.23.0 0.0.0.255
R2(config-router)#net 2.2.2.2 0.0.0.0
R2(config-router)#^Z
R2#
```

#R3

```
R3(config)#access-list 25 permit 33.33.33.2
R3(config)#route-map EXP permit 10
R3(config-route-map)#match ip add 25
R3(config-route-map)#int gig1/0
R3(config-if)#ip summary-address eigrp 100 33.33.33.0 255.255.255.252
R3(config-if)#int gig2/0
R3(config-if)#$address eigrp 100 33.33.33.0 255.255.255.252 leak-map EXP
R3(config-if)#router eigrp 100
R3(config-router)#no au
R3(config-router)#net 172.16.13.0 0.0.0.255
R3(config-router)#
*Aug 26 20:56:58.395: %DUAL-5-NBRCHANGE: EIGRP-IPv4 100: Neighbor 172.16.13.1 (Gi
gabitEthernet1/0) is up: new adjacency
R3(config-router)#net 172.16.23.0 0.0.0.255
R3(config-router)#net
*Aug 26 20:57:03.991: %DUAL-5-NBRCHANGE: EIGRP-IPv4 100: Neighbor 172.16.23.2 (Gi
gabitEthernet2/0) is up: new adjacency
R3(config-router)#net 3.3.3.3 0.0.0.0
R3(config-router)#net 33.33.33.0 0.0.0.3
R3(config-router)#^Z
R3#
R3#
```

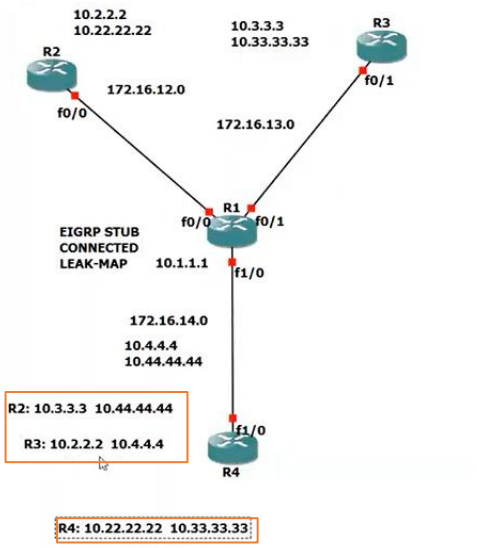
**allow 33.33.33.2 only on R2 for R1

#Result

```
      2.0.0.0/32 is subnetted, 1 subnets
D        2.2.2.2 [90/130816] via 172.16.23.2, 00:01:11, GigabitEthernet2/0
      10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
D        10.1.1.0/29 [90/130816] via 172.16.13.1, 00:01:11, GigabitEthernet1/0
D        10.1.1.3/32 [90/131072] via 172.16.23.2, 00:01:11, GigabitEthernet2/0
D        10.1.1.5/32 [90/131072] via 172.16.23.2, 00:01:11, GigabitEthernet2/0
      33.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
D        33.33.33.0/30 is a summary, 00:00:51, Null0
      172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
D        172.16.12.0/24
```

Individual routes from R2 to R1

EIGRP STUB LEAK_MAP



EIGRP STUB

```
R1(config)#router eigrp 100
R1(config-router)#eigrp stub ?
  connected      Do advertise connected routes
  leak-map       Allow dynamic prefixes based on the leak-map
  receive-only   Set IP-EIGRP as receive only neighbor
  redistributed  Do advertise redistributed routes
  static         Do advertise static routes
  summary        Do advertise summary routes
  <cr>
```

**On R2 before stub and after stub

Before

```
R2#sh ip rou ei
     172.16.0.0/24 is subnetted, 3 subnets
D       172.16.13.0 [90/307200] via 172.16.12.1, 00:01:44, FastEthernet0/0
D       172.16.14.0 [90/284160] via 172.16.12.1, 00:01:44, FastEthernet0/0
     10.0.0.0/32 is subnetted, 7 subnets
D       10.3.3.3 [90/435200] via 172.16.12.1, 00:01:44, FastEthernet0/0
D       10.1.1.1 [90/409600] via 172.16.12.1, 00:01:44, FastEthernet0/0
D       10.4.4.4 [90/412160] via 172.16.12.1, 00:01:44, FastEthernet0/0
D       10.44.44.44 [90/412160] via 172.16.12.1, 00:01:44, FastEthernet0/0
D       10.33.33.33 [90/435200] via 172.16.12.1, 00:01:44, FastEthernet0/0
```

After

```
R2#sh ip rou ei
     172.16.0.0/24 is subnetted, 3 subnets
D       172.16.13.0 [90/307200] via 172.16.12.1, 00:00:34, FastEthernet0/0
D       172.16.14.0 [90/284160] via 172.16.12.1, 00:00:34, FastEthernet0/0
     10.0.0.0/32 is subnetted, 3 subnets
D       10.1.1.1 [90/409600] via 172.16.12.1, 00:00:34, FastEthernet0/0
```

**if we given stub connected it only show connected routes

##Operation

R2: 10.3.3.3 10.44.44.44

R3: 10.2.2.2 10.4.4.4

R4: 10.22.22.22 10.33.33.33

1st ACL

```
R1(config)#access-list 12 permit 10.3.3.3
R1(config)#access-list 12 permit 10.44.44.44
R1(config)#
R1(config)#access-list 13 permit 10.2.2.2
R1(config)#access-list 13 permit 10.4.4.4
R1(config)#
R1(config)#access-list 14 permit 10.22.22.22
R1(config)#access-list 14 permit 10.33.33.33
R1(config)#
```

2nd (router-map)

```
R1(config)#route-map NH permit 10
R1(config-route-map)#match ip add 12
R1(config-route-map)#match int f0/0
R1(config-route-map)#
R1(config-route-map)#route-map NH permit 15
R1(config-route-map)#match ip add 13
R1(config-route-map)#match int f0/1
R1(config-route-map)#
R1(config-route-map)#route-map NH permit 20
R1(config-route-map)#match ip add 14
R1(config-route-map)#match int f1/0
```

3RD (eigrp_stub)

```
R1(config)#router eigrp 100
R1(config-router)#eigrp stub connected leak-map NH
```

**after applying this neighborship will down and comes up