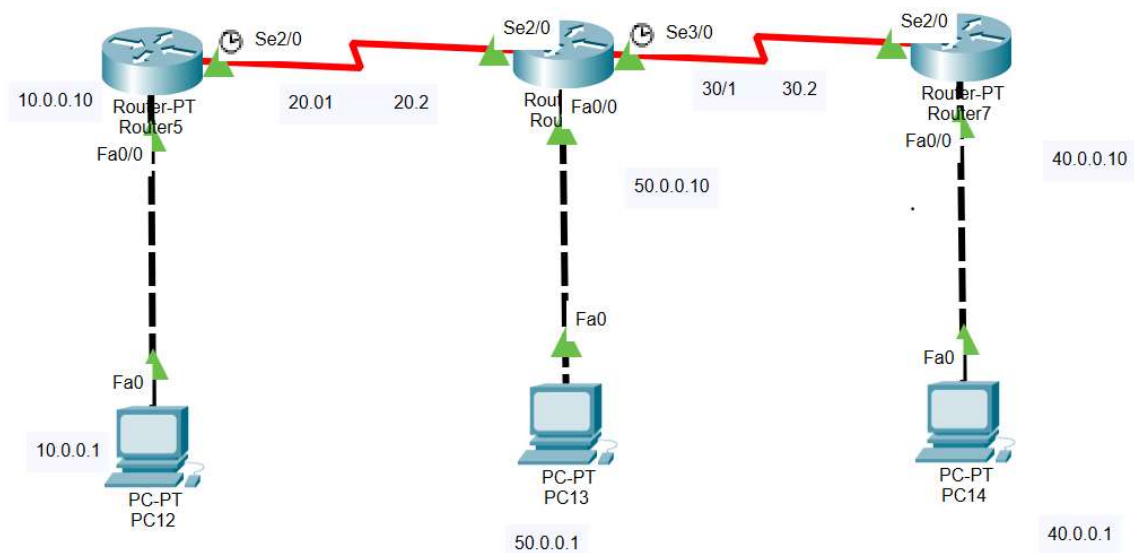## EIGRP

Default commands for Topology .

R1 , R2 , R3 -

R1
Conf ter
interface fastEthernet 0/0
no sh
ip address 10.0.0.10 255.0.0.0
exi
hostname R1
interface serial 2/0
ip address 20.0.0.1 255.0.0.0
no sh
exi

R2

Conf ter
hostname R2
interface serial 2/0
no sh

```
ip address 20.0.0.2 255.0.0.0
no sh
exi
interface serial 3/0
ip address 30.0.0.2 255.0.0.0
no sh
exi
interface fastEthernet 0/0
ip address 50.0.0.10 255.0.0.0
no sh
exi
```

R3

```
Conf ter
hostname R3
interface serial 2/0
ip address 30.0.0.3 255.0.0.0
no sh
exi
interface fastEthernet 0/0
no sh
ip address 40.0.0.10 255.0.0.0
no sh
exi
```

R1
```
router eigrp 100
network 20.0.0.0 0.255.255.255
network 10.0.0.0 0.255.255.255
No auto
exi
```
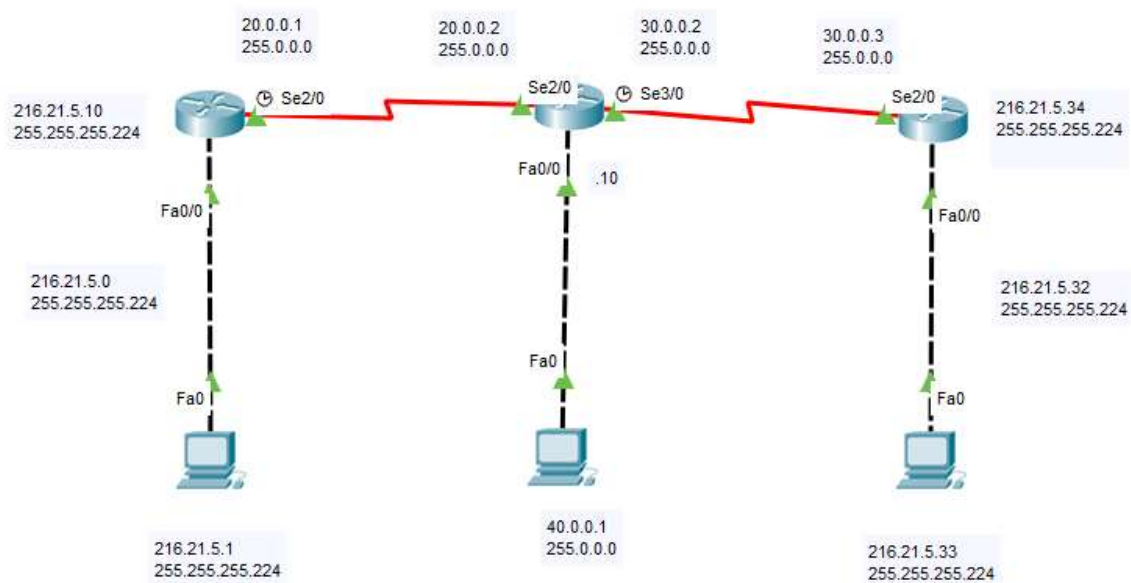
R2

```
router eigrp 100
```

```
network 20.0.0.0 0.255.255.255
network 30.0.0.0 0.255.255.255
network 40.0.0.0 0.255.255.255
No auto
exi
```

R3
```
router eigrp 100
network 30.0.0.0 0.255.255.255
network 40.0.0.0 0.255.255.255
NO auto
exi
```

No auto summary – LAB EIGRP

216.21.5.0 – 5 networks.

R1

hostname R1

```
interface fastEthernet 0/0
ip address 216.21.5.10 255.255.255.224
no sh
exi
interface serial 2/0
ip address 20.0.0.1 255.0.0.0
no sh
exi


router eigrp 100
network 20.0.0.0
network 216.21.5.0 0.0.0.31
exi



R2
hostname R2
interface fastEthernet 0/0
ip address 40.0.0.10 255.0.0.0
no sh
exi
interface serial 2/0
ip address 20.0.0.2 255.0.0.0
no sh
exi
interface serial 3/0
no sh
ip address 30.0.0.2 255.0.0.0
no sh
exi

router eigrp 100
network 20.0.0.0 0.255.255.255
network 30.0.0.0 0.255.255.255
network 40.0.0.0 0.255.255.255
```
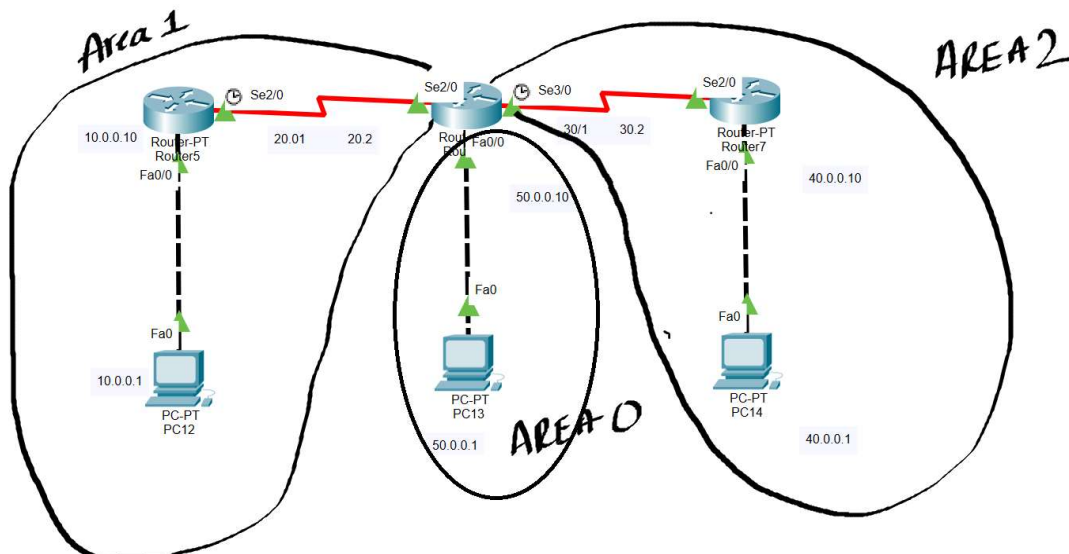
```
exi

R3

interface fastEthernet 0/0
ip address 216.21.5.34 255.255.255.224
no sh
exi
interface serial 2/0
ip address 30.0.0.3 255.0.0.0
no sh
exi

router eigrp 100
network 30.0.0.0 0.255.255.255
network 216.21.5.32 0.0.0.31
exi
```

OSPF LAB


```
R1
router ospf 10
```

```
network 10.0.0.0 0.255.255.255 area 1
network 20.0.0.0 0.255.255.255 area 1
Exit

R2
router ospf 10
network 20.0.0.0 0.255.255.255 area 1
network 30.0.0.0 0.255.255.255 area 2
network 50.0.0.0 0.255.255.255 area 0
Exit

R3
router ospf 10
network 30.0.0.0 0.255.255.255 area 2
network 40.0.0.0 0.255.255.255 area 2
Exit
```
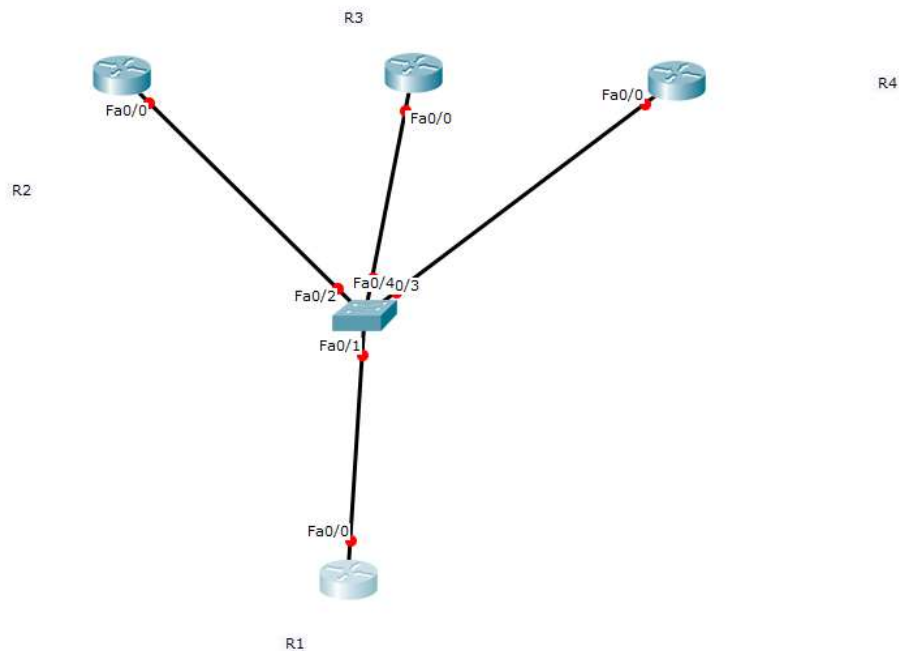
DR and BDR LAB

```
hostname R1
interface fastEthernet 0/0
no shutdown
ip address 10.0.0.1 255.0.0.0
exi

hostname R2
interface fastEthernet 0/0
ip address 10.0.0.2 255.0.0.0
no sh
exi

hostname R3
interface fastEthernet 0/0
no shutdown
ip address 10.0.0.3 255.0.0.0
exi

hostname R4
interface fastEthernet 0/0
ip address 10.0.0.4 255.0.0.0
no sh
exi

router ospf 10
network 10.0.0.0 0.255.255.255 area 0
end
In all routers
```

Show ip ospf Neighbours

```
R1(config)#interface fastEthernet 0/0

R1(config-if)#ip ospf priority 200
```

You change the priority if you like by using the **ip ospf priority** command:

- The default priority is 1.
- A priority of 0 means you will never be elected as DR or BDR.

You need to use **clear ip ospf process** before this change takes effect.
we need to reset the OSPF neighbor adjacencies so that we'll elect the new DR and BDR.
#**clear ip ospf process**
Reset ALL OSPF processes? [no]: yes
#**clear ip ospf process**
Reset ALL OSPF processes? [no]: yes
I'll reset all the OPSF neighbor adjacencies.

R1#show ip ospf interface fastEthernet 0/0

Acl
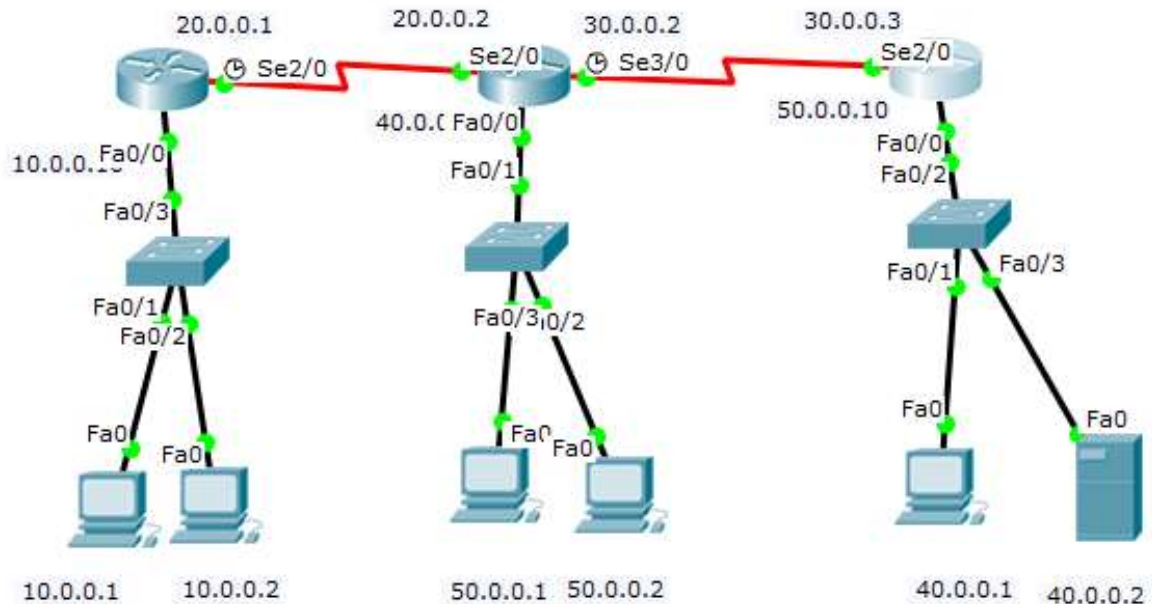
TASK

1. Deny host 10.0.0.1 from communicating with
   50.0.0.0 – Numbered and named both.
2. Deny host 50.0.0.2 from communicating with
   50.0.0.0

```
hostname R1
interface fastEthernet 0/0
ip address 10.0.0.10 255.0.0.0
no shutdown
exi
interface serial 2/0
ip address 20.0.0.1 255.0.0.0
no shutdown
exi
router eigrp 100
```

```
network 10.0.0.0
network 20.0.0.0
no auto-summary
exi


hostname R2
interface fastEthernet 0/0
ip address 50.0.0.10 255.0.0.0
no sh
exi
interface serial 2/0
ip address 20.0.0.02 255.0.0.0
no sh
exi
interface serial 3/0
ip address 30.0.0.2 255.0.0.0
no sh
exi
router eigrp 100
network 20.0.0.0
network 30.0.0.0
network 50.0.0.0
no auto-summary
exi



hostname R3
interface fastEthernet 0/0
ip address 40.0.0.10 255.0.0.0
no sh
exi
interface serial 2/0
ip address 30.0.0.3 255.0.0.0
no sh
```

```
exi
router eigrp 100
no auto-summary
network 30.0.0.0
network 40.0.0.0
exi
```

R2 - Numbered

```
conf t
access-list 10 deny 10.0.0.1
access-list 10 deny 50.0.0.2
access-list 10 permit any

interface fastEthernet 0/0
ip access-group 10 out
exi
```

After configuring remove seq number 20 by giving
"no access-list 10 deny 40.0.0.2"

R2-Named – Without permit any.

```
ip access-list standard cisco
deny host 10.0.0.1
deny host 50.0.0.2
exi
interface fastEthernet 0/0
ip access-group cisco out
exi
```

After configuring remove seq number 20 by giving
"no deny host 40.0.0.2"

Task

1.Deny the user 10.0.0.1 should not access 40.0.0.2 http service

2.Deny the user 10.0.0.2 should not be able to use ICMP to 40.0.0.2 ping service .

R1

```
access-list 100 deny tcp 10.0.0.1 0.0.0.0 host
40.0.0.2 eq www
access-list 100 deny icmp 10.0.0.2 0.0.0.0 host
40.0.0.2 echo
access-list 100 permit ip any any
interface fastEthernet 0/0
ip access-group 100 in
exi
```

R2

```
ip access-list extended cisco
deny tcp host 10.0.0.1 host 40.0.0.2 eq www
deny icmp host 10.0.0.2 host 40.0.0.2 echo
permit ip any any
exi
interface FastEthernet0/0
ip address 10.0.0.10 255.0.0.0
ip access-group cisco in
exit
```

NATTING
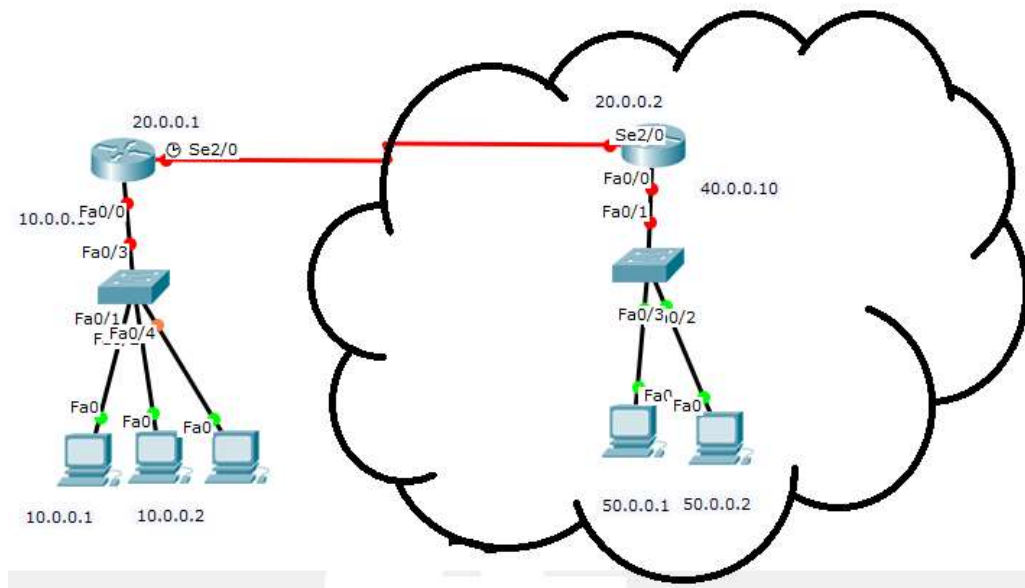
Network topology diagram showing router R1 (20.0.0.1, Se2/0) connected via serial link to router R2 (20.0.0.2, Se2/0). R1 has Fa0/0 (10.0.0.10) connecting to a switch (Fa0/3) linking PCs (10.0.0.1, 10.0.0.2). R2 has Fa0/0, Fa0/1 (40.0.0.10) connecting to a switch (Fa0/3, 0/2) linking PCs (50.0.0.1, 50.0.0.2) inside a cloud.

```
hostname R1
interface fastEthernet 0/0
ip address 10.0.0.10 255.0.0.0
no shutdown
exi
interface serial 2/0
ip address 20.0.0.1 255.0.0.0
no shutdown
exi


hostname R2
interface fastEthernet 0/0
ip address 50.0.0.10 255.0.0.0
no sh
exi
interface serial 2/0
ip address 20.0.0.02 255.0.0.0
no sh
exi
interface serial 3/0
```

```
ip address 30.0.0.2 255.0.0.0
no sh
exi
```

R1
```
ip route 0.0.0.0 0.0.0.0 20.0.0.2
```

R2
```
ip route 70.0.0.0 255.0.0.0 20.0.0.1
```

R1 – Static nat
```
ip nat inside source static 10.0.0.1 70.0.0.1
ip nat inside source static 10.0.0.2 70.0.0.2
exi
interface fastEthernet 0/0
ip nat inside
exi
interface serial 2/0
ip nat outside
exi
```

R1 – Dynamic nat

```
access-list 55 permit 10.0.0.0 0.255.255.255
ip nat pool ccna 70.0.0.1 70.0.0.10 netmask
255.0.0.0
ip nat inside source list 55 pool ccna
```

R1 – Overload nat / PAT

```
access-list 55 permit 10.0.0.0 0.255.255.255
ip nat pool ccna 70.0.0.1 70.0.0.1 netmask
255.255.255.255
ip nat inside source list 55 pool ccna overload
```
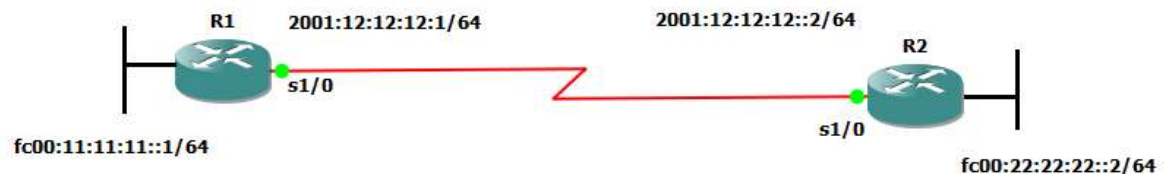
....

IPV6

Static routing

R-1(config)#**ipv6 route** fc00:22:22:22::/64 2001:12:12:12::2
R-2(config)#**ipv6 route** fc00:11:11:11::/64   2001:12:12:12::1

R1   2001:12:12:12:1/64   2001:12:12:12::2/64
                                                      R2
s1/0

                                              s1/0

fc00:11:11:11::1/64

fc00:22:22:22::2/64

```
interface serial 1/0
  ipv6 address 2001:12:12:12::1/64
  no sh
  exi

  interface serial 1/1
  ipv6 address fc00:11:11:11::1/64
  no sh
  no keepalive
  exi

  ipv6 route FC00:22:22:22::/64 2001:12:12:12::2
  exi
```
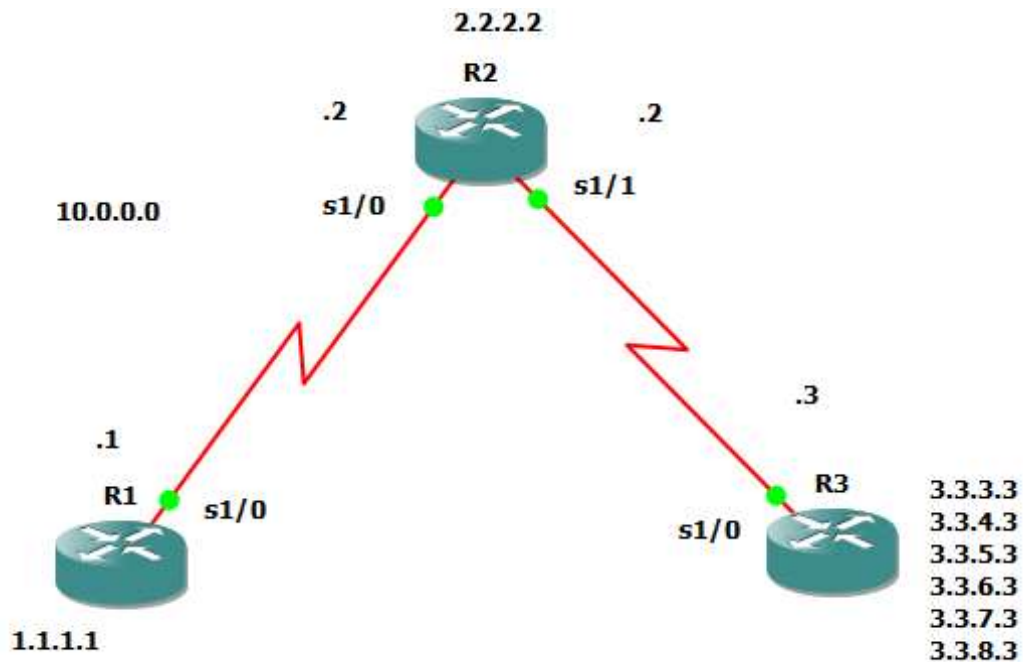
R2

```
interface serial 1/0
   ipv6 address 2001:12:12:12::2/64
  no sh
  exi
```

```
interface serial 1/1
ipv6 address fc00:22:22:22::2/64
no sh
no keepalive
exi

ipv6 route FC00:11:11:11::/64 2001:12:12:12::1
exi
```

Summarization with EIGRP

```
3.3.00000011.00000011
3.3.00000100.00000011          3.3.0000 1000.00000011 /20
3.3.00000101.00000011          255.255.240.0
3.3.00000110.00000011
3.3.00000111.00000011
3.3.00001000.00000011
```

R1

```
interface loopback 1
ip address 1.1.1.1 255.255.255.255
exi
interface fa 0/0
ip address 10.0.0.1 255.255.255.0
no sh
exi
```

R2
```
interface fa 0/0
ip address 10.0.0.2 255.255.255.0
no shutdown
exi
interface fa 0/1
ip address 20.0.0.2 255.255.255.0
no shutdown
exi
interface loopback 2
ip address 2.2.2.2 255.255.255.255
exi
```

R3
```
interface fa 0/0
no sh
ip address 20.0.0.3 255.255.255.0
```

```
exi
interface loopback 1
ip address 3.3.3.3 255.255.255.0
exi
interface loopback 2
  ip address 3.3.4.3 255.255.255.0
  exi
  interface loopback 3
  ip address 3.3.5.3 255.255.255.0
  exi
  interface loopback 4
  ip address 3.3.6.3 255.255.255.0
  exi
  interface loopback 5
  ip address 3.3.7.3 255.255.255.0
  exi
  interface loopback 6
  ip address 3.3.7.3 255.255.255.0
  exi
  interface loopback 6
  ip address 3.3.8.3 255.255.255.0
  exi
```

R1
```
router eigrp 100
  network 1.0.0.0
  network 10.0.0.0
no auto
  exi
```

R2
```
router eigrp 100
  network 10.0.0.0
  network 20.0.0.0
  network 2.0.0.0
no auto
```

```
     exi
```

R3
```
router eigrp 100
  network 20.0.0.0
  network 3.0.0.0
no auto

  exi
```

In **R2** show ip route before giving No autosummary
```
D    1.0.0.0/8 [90/2297856] via 10.0.0.1, 00:00:55,
Serial1/0
     2.0.0.0/8 is variably subnetted, 2 subnets, 2
masks
C       2.2.2.2/32 is directly connected, Loopback2
D       2.0.0.0/8 is a summary, 00:00:45, Null0
D    3.0.0.0/8 [90/2297856] via 20.0.0.3, 00:00:18,
Serial1/1
     20.0.0.0/8 is variably subnetted, 2 subnets, 2
masks
C       20.0.0.0/24 is directly connected,
Serial1/1
D       20.0.0.0/8 is a summary, 00:00:52, Null0
     10.0.0.0/8 is variably subnetted, 2 subnets, 2
masks
C       10.0.0.0/24 is directly connected,
Serial1/0
D       10.0.0.0/8 is a summary, 00:00:52, Null0
```


In **R2** show ip route after giving No autosummary

```
D    1.0.0.0/8 [90/2297856] via 10.0.0.1, 00:01:55,
Serial1/0
     2.0.0.0/32 is subnetted, 1 subnets
C       2.2.2.2 is directly connected, Loopback2
```

```
        3.0.0.0/24 is subnetted, 6 subnets
D       3.3.3.0 [90/2297856] via 20.0.0.3,
00:00:33, Serial1/1
D       3.3.4.0 [90/2297856] via 20.0.0.3,
00:00:33, Serial1/1
D       3.3.5.0 [90/2297856] via 20.0.0.3,
00:00:33, Serial1/1
D       3.3.6.0 [90/2297856] via 20.0.0.3,
00:00:33, Serial1/1
D       3.3.7.0 [90/2297856] via 20.0.0.3,
00:00:33, Serial1/1
D       3.3.8.0 [90/2297856] via 20.0.0.3,
00:00:33, Serial1/1
        20.0.0.0/24 is subnetted, 1 subnets
C       20.0.0.0 is directly connected, Serial1/1
        10.0.0.0/24 is subnetted, 1 subnets
```

R3

```
interface fa 0/0
  ip summary-address eigrp 100 3.3.0.0
255.255.240.0
  exit
After this command
```

R2

Show ip route
```
Gateway of last resort is not set

D    1.0.0.0/8 [90/2297856] via 10.0.0.1, 00:14:46,
Serial1/0
        2.0.0.0/32 is subnetted, 1 subnets
C       2.2.2.2 is directly connected, Loopback2
        3.0.0.0/20 is subnetted, 1 subnets
D       3.3.0.0 [90/2297856] via 20.0.0.3,
00:00:24, Serial1/1
        20.0.0.0/24 is subnetted, 1 subnets
```

```
C        20.0.0.0 is directly connected, Serial1/1
      10.0.0.0/24 is subnetted, 1 subnets
C        10.0.0.0 is directly connected, Serial1/0
R2#
```

....

Authentication - EIGRP
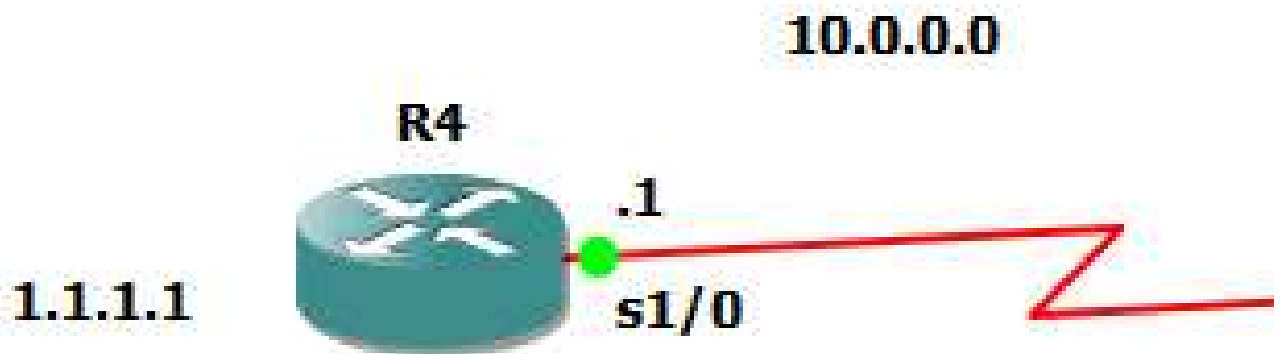
R4
```
interface loopback 1
  ip address 1.1.1.1 255.255.255.255
  no sh
  exi
  interface fa 0/0
  ip address 10.0.0.1 255.0.0.0
  no sh
  exi
  router eigrp 100
  network 1.0.0.0
  network 10.0.0.0
  no auto-summary
  exi
```

R5

```
interface loopback 2
  ip address 2.2.2.2 255.255.255.255
  exi
  interface fa 0/0
  ip address 10.0.0.2 255.0.0.0
  no sh
  exi
  router eigrp 100
  network 2.0.0.0
  network 10.0.0.0
  no auto-summary
exit
```

First we need to create the Key chain - Using the Key-string and Key Number it will create a hash value which has match on both sides. Key chain has to be same on both the routers .
R4
```
key chain R1
  key 20
  key-string cisco
  exi
  interface fa 0/0
  ip authentication mode eigrp 100 md5
  ip authentication key-chain eigrp 100 R1
  exi
```

Show ip route
R5
```
key chain R1
  key 20
  key-string cisco
  exi
  interface fa 0/0
  ip authentication mode eigrp 100 md5
  ip authentication key-chain eigrp 100 R1
  exi
```

Show ip route

Routing information protocol – Authentication
R4
```
key chain R2
   key 20
   key-string cisco
   exi
   interface fa 0/0
   ip rip authentication mode md5
   ip rip authentication key-chain R2
   exi
```
R5
```
key chain R2
   key 20
   key-string cisco
   exi
   interface fa 0/0
   ip rip authentication mode md5
   ip rip authentication key-chain R2
   exi
```

OSPF Authentication

r1

```
router ospf 10
    network 10.0.0.0 0.255.255.255 area 0
    network 1.1.1.1 0.0.0.0 area 0
    exi
```

r2

```
 router ospf 10
  network 2.0.0.0 0.0.0.0 area 0
  network 10.0.0.0 0.255.255.255 area 0
 exi
```
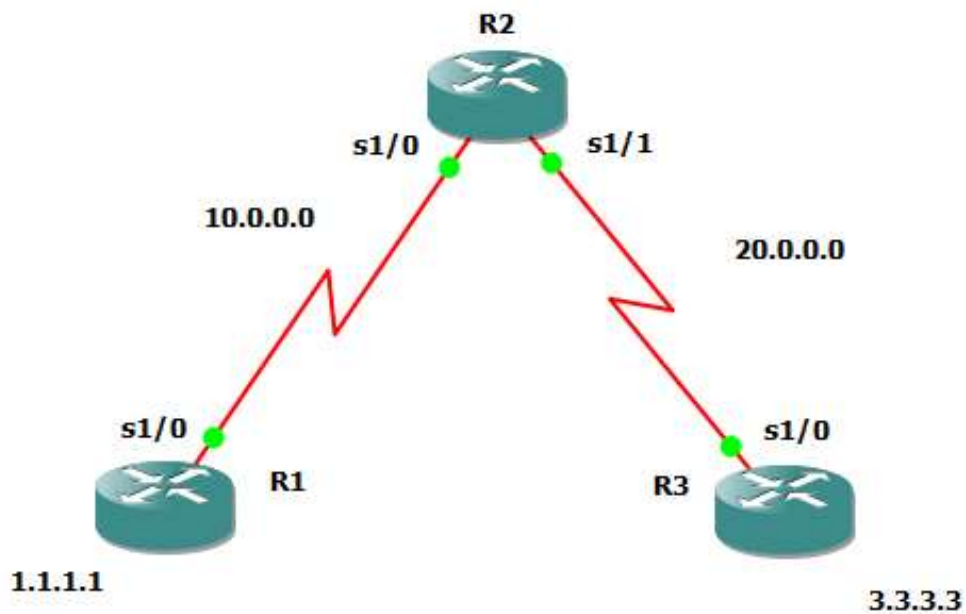
r1

```
interface fa 0/0
  ip ospf authentication message-digest
  ip ospf message-digest-key 5 md5 cisco
   exi
```

r2

```
 interface fa 0/0
  ip ospf authentication message-digest
  ip ospf message-digest-key 2 md5 cisco
  end
```

....

Redistribution

R1

```
interface loopback 1
  ip address 1.1.1.1 255.255.255.255
  no sh
  exi

  interface serial 1/0
  no sh
  ip address 10.0.0.1 255.0.0.0
  exi

  router rip
  version 2
  network 1.0.0.0
  no auto-summary
  network 10.0.0.0
  exi
```

R2

```
interface serial 1/0
ip address 10.0.0.2 255.0.0.0
  no sh
  exi

  interface serial 1/1
  ip address 20.0.0.2 255.0.0.0
  no sh
  exi

  router rip
  version 2
  no auto
  network 10.0.0.0

  router eigrp 100
  network 20.0.0.0
  no auto-summary
  exi
```

R3

```
interface serial 1/0
  no sh
  ip address 20.0.0.3 255.0.0.0
  exi

  interface loopback 3
  ip address 3.3.3.3 255.255.255.255
  exi

  router eigrp 100
  network 3.0.0.0
  no auto-summary
  network 20.0.0.0
  exi
```

Show ip route

R2
```
router rip
  redistribute eigrp 100 metric 3
  exi

  router eigrp 100
  redistribute rip metric 1000 2000 255 1 1500
  exi
```

Show ip route

....

R3
```
router ospf 100
```

```
   network 20.0.0.0 0.255.255.255 area 0
   network 3.3.3.3 0.0.0.0 area 0
exit
```

R2
```
router ospf 10
   network 20.0.0.0 0.255.255.255 area 0
   exi

   router rip
   redistribute ospf 10 metric 5
   exi

   router ospf 10
   redistribute rip subnets metric 100 metric-type 1
   exi
```
NOTE: If I say " redistribute rip - enter" it will take classfull , Metric and Metric type are optional Baceuse by default ospf takes all external routes metric as 20 . In R3 show ip route ospf . If we don't give " SUBNETS " command by default OSPF will only redistribute classfull networks ,

Show ip route

....