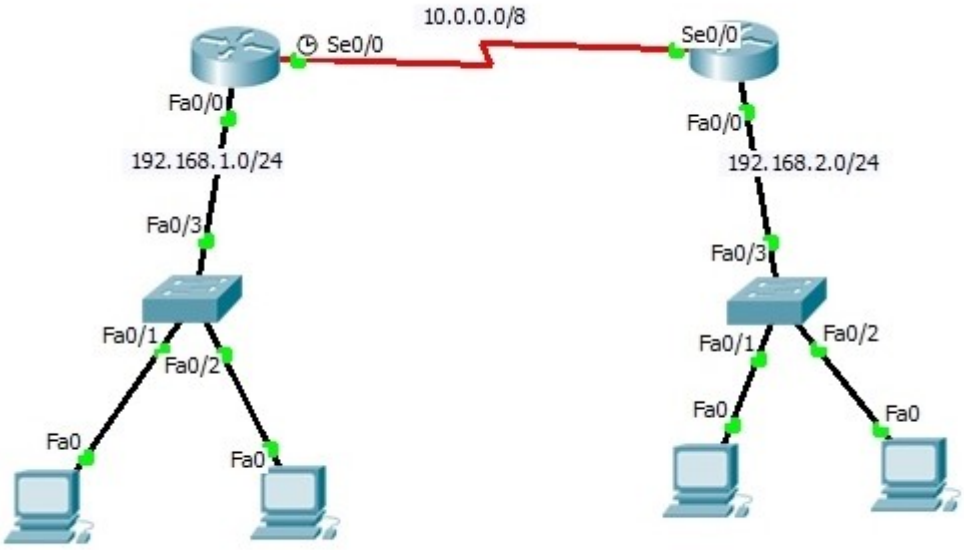
Basic router configuration with Static routing



Objective

Configure static routing

Tasks

1. Change the routers default hostname to specific hostnames, refer the topology for hostname.
2. Configure the R1 serial interface ip address with the given network address 10.0.0.0/8.
3. Configure the R1 fast Ethernet ip address with the given network address 192.168.1.0/24.
4. Configure the R2 serial interface ip address with the given network address 10.0.0.0/8.
5. Configure the R2 fast Ethernet ip address with the given network address 192.168.1.0/24.
6. Configure the PC's with the valid ip addresses.
7. Configure the static routing on the R1 and R2 router so that there is a full connectivity between R1 and R2 networks.
8. After configure them cross verify the network connectivity by pinging from PC's of R1 to the PC's of R2.
9. Configure a telnet to the above topology so that it can be accessed remotely.
10. Save the Routers configuration to a startup configuration file for a future reference.

Configuration

R1 Configuration

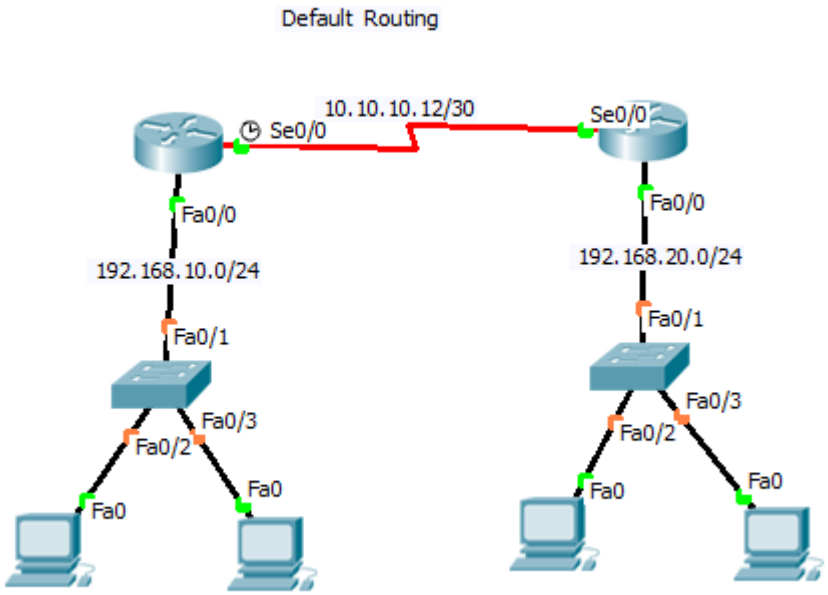
```
R1>enable
R1#configure terminal
R1(config)#ip route 192.168.2.0 255.255.255.0 10.0.0.2

R1#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    10.0.0.0/8 is directly connected, Serial0/0
C    192.168.1.0/24 is directly connected, FastEthernet0/0
S    192.168.2.0/24 [1/0] via 10.0.0.2
```

R2 Configuration

```
R2>enable
R2#configure terminal
R2(config)#ip route 192.168.1.0 255.255.255.0 10.0.0.1

R2#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    10.0.0.0/8 is directly connected, Serial0/0
C    192.168.2.0/24 is directly connected, FastEthernet0/0
S    192.168.1.0/24 [1/0] via 10.0.0.1
```

LAB 2

DEFAULT ROUTING



Objective

Configure Default routing

Tasks

1. Change the routers default hostname to specific hostnames, refer the topology for hostname.
2. Configure the R1 serial interface ip address with the given network address 10.10.10.12/30.
3. Configure the R1 fast Ethernet ip address with the given network address 192.168.10.0/24.
4. Configure the R2 serial interface ip address with the given network address 10.10.10.12/30.
5. Configure the R2 fast Ethernet ip address with the given network address 192.168.20.0/24.
6. Configure the PC's with the valid ip addresses.
7. Configure the Default routing on the R1 and R2 router so that there is a full connectivity between R1 and R2 networks.
8. After configure them cross verify the network connectivity by pinging from PC's of R1 to the PC's of R2.
9. Save the Routers configuration to a startup configuration file for a future reference.

Configuration

R1 Configuration

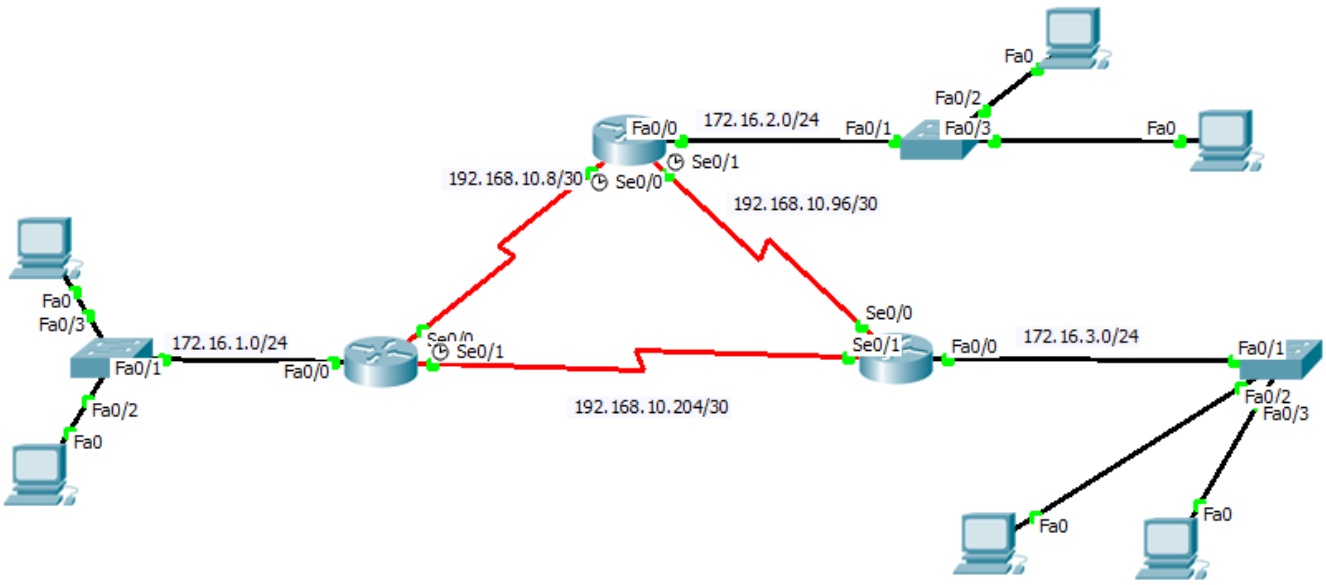
```
R1>enable
R1#configure terminal
R1(config)#ip route 0.0.0.0 0.0.0.0 10.10.10.14

R1#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/30 is subnetted, 1 subnets
C    10.10.10.12/30 is directly connected, Serial0/0
C    192.168.10.0/24 is directly connected, FastEthernet0/0
S*    0.0.0.0/0 [1/0] via 10.10.10.14
```

R2 Configuration

```
R2>enable
R2#configure terminal
R2(config)#ip route 0.0.0.0 0.0.0.0  10.10.10.13

R2#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/30 is subnetted, 1 subnets
C    10.10.10.12/30 is directly connected, Serial0/0
C    192.168.20.0/24 is directly connected, FastEthernet0/0
S*    0.0.0.0/0 [1/0] via 10.10.10.13
```

LAB 3

EIGRP



Objective

Configure EIGRP routing with AS 1

Tasks

1. Change the routers default hostname to specific hostnames, refer the topology for hostname.
2. Configure the R1 serial interface ip address with the given network address 192.168.10.8/30 and 192.168.10.96/30.
3. Configure the R1 fast Ethernet ip address with the given network address 172.16.2.0.0/24.
4. Configure the R2 serial interface ip address with the given network address 192.168.10.8/30 and 192.168.10.204/30.
5. Configure the R2 fast Ethernet ip address with the given network address 172.16.1.0/24.
6. Configure the R3 serial interface ip address with the given network address 192.168.10.8/30 and 192.168.10.204/30.
7. Configure the R2 fast Ethernet ip address with the given network address 172.16.3.0/24.
8. Configure the PC's with the valid ip addresses.
9. Configure the EIGRP 1 on the R1, R2 and R3 router so that there is a full connectivity between R1, R2 and R3 networks.

10. After configure them cross verify the network connectivity by pinging from PC's of R1 to the PC's of R2, PC's from R3 to R1.
11. Save the Routers configuration to a startup configuration file for a future reference.

Configuration

R1 Configuration

```
R1>enable
R1#configure terminal
R1(config)#router eigrp 1
R1(config-router)#network 192.168.10.8 0.0.0.3
R1(config-router)#network 192.168.10.96 0.0.0.3
R1(config-router)#network 172.16.2.0 0.0.0.255
R1(config-router)#exit
R1(config)#exit
R1#
R1#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/24 is subnetted, 3 subnets
D       172.16.1.0 [90/2172416] via 192.168.10.10, 00:00:11, Serial0/0
C       172.16.2.0 is directly connected, FastEthernet0/0
D       172.16.3.0 [90/2172416] via 192.168.10.98, 00:00:07, Serial0/1
     192.168.10.0/30 is subnetted, 3 subnets
C       192.168.10.8 is directly connected, Serial0/0
C       192.168.10.96 is directly connected, Serial0/1
D       192.168.10.204 [90/2681856] via 192.168.10.10, 00:00:11, Serial0/0
                       [90/2681856] via 192.168.10.98, 00:00:07, Serial0/1
```

R2 Configuration

```
R2>enable
R2#configure terminal
R2(config)#router eigrp 1
R2(config-router)# network 192.168.10.8 0.0.0.3
R2(config-router)# network 172.16.1.0 0.0.0.255
R2(config-router)# network 192.168.10.204 0.0.0.3
R2(config-router)#exit
R2(config)#exit
R2#
```

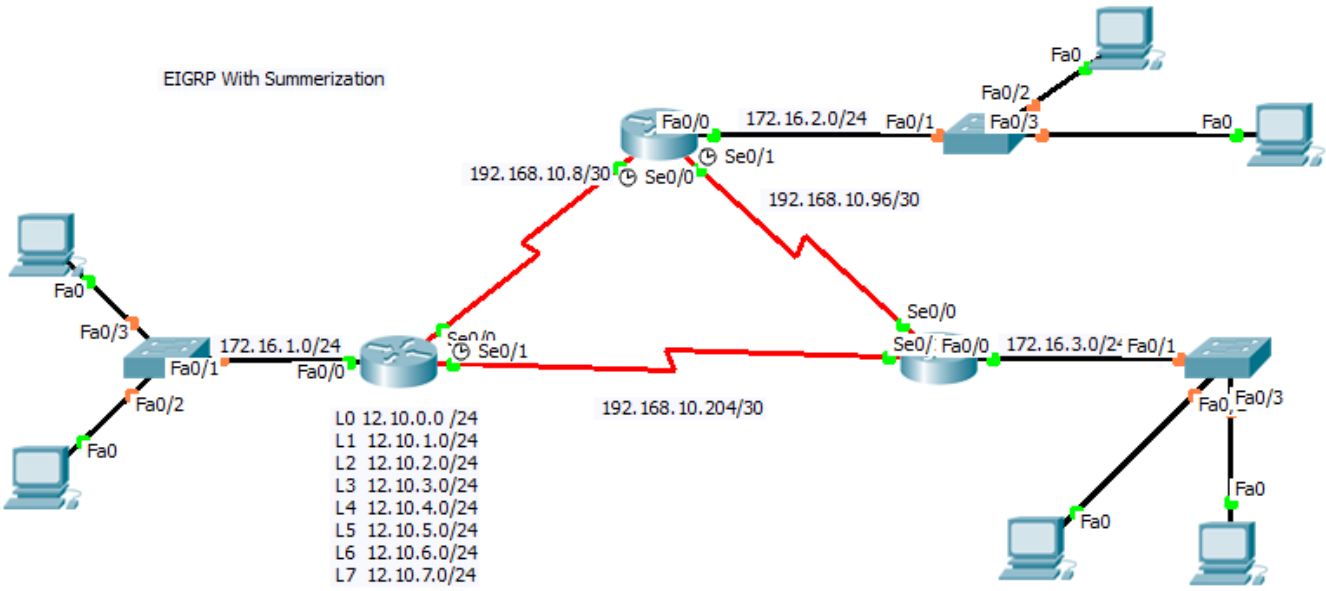
```
R2#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/24 is subnetted, 3 subnets
C       172.16.1.0 is directly connected, FastEthernet0/0
D       172.16.2.0 [90/2172416] via 192.168.10.9, 00:01:36, Serial0/0
D       172.16.3.0 [90/2172416] via 192.168.10.206, 00:01:33, Serial0/1
     192.168.10.0/30 is subnetted, 3 subnets
C       192.168.10.8 is directly connected, Serial0/0
D       192.168.10.96 [90/2681856] via 192.168.10.9, 00:01:36, Serial0/0
                      [90/2681856] via 192.168.10.206, 00:01:33, Serial0/1
C       192.168.10.204 is directly connected, Serial0/1
R2#
```

R3 Configuration

```
R3>enable
R3#configure terminal
R3(config)#router eigrp 1
R3(config-router)# network 192.168.10.96 0.0.0.3
R3(config-router)# network 172.16.3.0 0.0.0.255
R3(config-router)# network 192.168.10.204 0.0.0.3
R3(config-router)#exit
R3(config)#exit
R3#

R3#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set
```

172.16.0.0/24 is subnetted, 3 subnets
D 172.16.1.0 [90/2172416] via 192.168.10.205, 00:03:20, Serial0/1
D 172.16.2.0 [90/2172416] via 192.168.10.97, 00:03:20, Serial0/0
C 172.16.3.0 is directly connected, FastEthernet0/0
192.168.10.0/30 is subnetted, 3 subnets
D 192.168.10.8 [90/2681856] via 192.168.10.97, 00:03:20, Serial0/0
[90/2681856] via 192.168.10.205, 00:03:20, Serial0/1
C 192.168.10.96 is directly connected, Serial0/0
C 192.168.10.204 is directly connected, Serial0/1
R3#

LAB 4
EIGRP with Summarization



Objective

Configure EIGRP routing using AS 1 with manual summarization

Tasks

1. Change the routers default hostname to specific hostnames, refer the topology for hostname.
2. Configure the R1 serial interface ip address with the given network address 192.168.10.8/30 and 192.168.10.96/30.
3. Configure the R1 fast Ethernet ip address with the given network address 172.16.2.0.0/24.
4. Configure the R2 serial interface ip address with the given network address 192.168.10.8/30 and 192.168.10.204/30.
5. Configure the R2 fast Ethernet ip address with the given network address 172.16.1.0/24.

6. Configure Loopback interfaces on R2 with network address as 12.10.0.0/24 to 12.10.7.0/24
7. Configure the R3 serial interface ip address with the given network address 192.168.10.8/30 and 192.168.10.204/30.
8. Configure the R2 fast Ethernet ip address with the given network address 172.16.3.0/24.
9. Configure the PC's with the valid ip addresses.
10. Configure the EIGRP 1 on the R1, R2 and R3 router so that there is a full connectivity between R1, R2 and R3 networks.
11. After configure them cross verify the network connectivity by pinging from PC's of R1 to the PC's of R2, PC's from R3 to R1.
12. Configure manual summarization on R2 for 12.10.0.0/24 network.
13. Save the Routers configuration to a startup configuration file for a future reference.

Configuration

R1 Configuration

```
R1>enable
R1#configure terminal
R1(config)#router eigrp 1
R1(config-router)#network 192.168.10.8 0.0.0.3
R1(config-router)#network 192.168.10.96 0.0.0.3
R1(config-router)#network 172.16.2.0 0.0.0.255
R1(config-router)#exit
R1(config)#exit
R1#
R1#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/24 is subnetted, 3 subnets
D       172.16.1.0 [90/2172416] via 192.168.10.10, 00:00:11, Serial0/0
C       172.16.2.0 is directly connected, FastEthernet0/0
D       172.16.3.0 [90/2172416] via 192.168.10.98, 00:00:07, Serial0/1
     192.168.10.0/30 is subnetted, 3 subnets
C       192.168.10.8 is directly connected, Serial0/0
C       192.168.10.96 is directly connected, Serial0/1
D       192.168.10.204 [90/2681856] via 192.168.10.10, 00:00:11, Serial0/0
                       [90/2681856] via 192.168.10.98, 00:00:07, Serial0/1
```

R2 Configuration

```
R2>enable
R2#configure terminal
R2(config)#router eigrp 1
R2(config-router)# network 192.168.10.8 0.0.0.3
R2(config-router)# network 172.16.1.0 0.0.0.255
R2(config-router)# network 192.168.10.204 0.0.0.3
R2(config-router)#exit
R2(config)#exit
R2#

R2#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/24 is subnetted, 3 subnets
C       172.16.1.0 is directly connected, FastEthernet0/0
D       172.16.2.0 [90/2172416] via 192.168.10.9, 00:01:36, Serial0/0
D       172.16.3.0 [90/2172416] via 192.168.10.206, 00:01:33, Serial0/1
     192.168.10.0/30 is subnetted, 3 subnets
C       192.168.10.8 is directly connected, Serial0/0
D       192.168.10.96 [90/2681856] via 192.168.10.9, 00:01:36, Serial0/0
                      [90/2681856] via 192.168.10.206, 00:01:33, Serial0/1
C       192.168.10.204 is directly connected, Serial0/1
R2#
```

R3 Configuration

```
R3>enable
R3#configure terminal
R3(config)#router eigrp 1
R3(config-router)# network 192.168.10.96 0.0.0.3
R3(config-router)# network 172.16.3.0 0.0.0.255
R3(config-router)# network 192.168.10.204 0.0.0.3
R3(config-router)#exit
R3(config)#exit
R3#

R3#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

172.16.0.0/24 is subnetted, 3 subnets
D 172.16.1.0 [90/2172416] via 192.168.10.205, 00:03:20, Serial0/1
D 172.16.2.0 [90/2172416] via 192.168.10.97, 00:03:20, Serial0/0
C 172.16.3.0 is directly connected, FastEthernet0/0
192.168.10.0/30 is subnetted, 3 subnets
D 192.168.10.8 [90/2681856] via 192.168.10.97, 00:03:20, Serial0/0
[90/2681856] via 192.168.10.205, 00:03:20, Serial0/1
C 192.168.10.96 is directly connected, Serial0/0
C 192.168.10.204 is directly connected, Serial0/1

Manual Summarization configuration
Note: auto summarization has to be disabled on all routers before configuring manual summarization.

```
R2>enable
R2#configure terminal
R2(config)#router eigrp 1
R2(config-router)# network 192.168.10.8 0.0.0.3
R2(config-router)# network 172.16.1.0 0.0.0.255
R2(config-router)# network 192.168.10.204 0.0.0.3
R2(config-router)# network 12.10.0.0 0.0.0.255
R2(config-router)#no auto-summary
R2(config)# interface loopback 0
R2(config-if)#ip address 12.10.0.1 255.255.255.0
```
Note: similarly configure ip address to loopback 1 to loopback 7
```
R2(config-if)#exit
R2(config)#exit
R2#show ip interface brief
Interface IP-Address OK? Method Status Protocol

FastEthernet0/0 172.16.1.100 YES manual up up

FastEthernet0/1 unassigned YES unset administratively down down

Serial0/0 192.168.10.10 YES manual up up

Serial0/1 192.168.10.205 YES manual up up
```

Serial0/2	unassigned	YES	unset	administratively down	down
Serial0/3	unassigned	YES	unset	administratively down	down
FastEthernet1/0	unassigned	YES	unset	administratively down	down
FastEthernet1/1	unassigned	YES	unset	administratively down	down
Loopback0	12.10.0.1	YES	manual	up	up
Loopback1	12.10.1.1	YES	manual	up	up
Loopback2	12.10.2.1	YES	manual	up	up
Loopback3	12.10.3.1	YES	manual	up	up
Loopback4	12.10.4.1	YES	manual	up	up
Loopback5	12.10.5.1	YES	manual	up	up
Loopback6	12.10.6.1	YES	manual	up	up
Loopback7	12.10.7.1	YES	manual	up	up

```
R2#configure terminal
R2(config)# interface Serial0/0
R2 (config-if)# ip summary-address eigrp 1 12.10.0.0 255.255.248.0
R2 (config-if)#exit
R2(config)# interface Serial0/1
R2(config-if)# ip summary-address eigrp 1 12.10.0.0 255.255.248.0
R2 (config-if)#exit
R2(config)#exit
R2#
R1#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

12.0.0.0/21 is subnetted, 1 subnets
```

D 12.10.0.0 [90/2297856] via 192.168.10.10, 00:26:40, Serial0/0
172.16.0.0/24 is subnetted, 3 subnets
D 172.16.1.0 [90/2172416] via 192.168.10.10, 00:26:40, Serial0/0
C 172.16.2.0 is directly connected, FastEthernet0/0
D 172.16.3.0 [90/2172416] via 192.168.10.98, 00:26:40, Serial0/1
192.168.10.0/30 is subnetted, 3 subnets
C 192.168.10.8 is directly connected, Serial0/0
C 192.168.10.96 is directly connected, Serial0/1
D 192.168.10.204 [90/2681856] via 192.168.10.98, 00:26:40, Serial0/1
[90/2681856] via 192.168.10.10, 00:26:40, Serial0/0

R3#show ip route
Codes: C - connected, S - static, I - IGRP, 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, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

12.0.0.0/21 is subnetted, 1 subnets
D 12.10.0.0 [90/2297856] via 192.168.10.205, 00:29:20, Serial0/1
172.16.0.0/24 is subnetted, 3 subnets
D 172.16.1.0 [90/2172416] via 192.168.10.205, 00:29:20, Serial0/1
D 172.16.2.0 [90/2172416] via 192.168.10.97, 00:29:20, Serial0/0
C 172.16.3.0 is directly connected, FastEthernet0/0
192.168.10.0/30 is subnetted, 3 subnets
D 192.168.10.8 [90/2681856] via 192.168.10.97, 00:29:20, Serial0/0
[90/2681856] via 192.168.10.205, 00:29:20, Serial0/1
C 192.168.10.96 is directly connected, Serial0/0
C 192.168.10.204 is directly connected, Serial0/1