**Lesson 11: LAB Exercise**

**Task**

**Step: 1 Connect the Devices with appropriate cable**

**Step: 2 Assign IP address on all Router’s interfaces as per above topology.**

**Step: 3 Run RIPv2 on all router and advertise connected networks.**

**Step: 4 Verify RIPv2 Configuration**

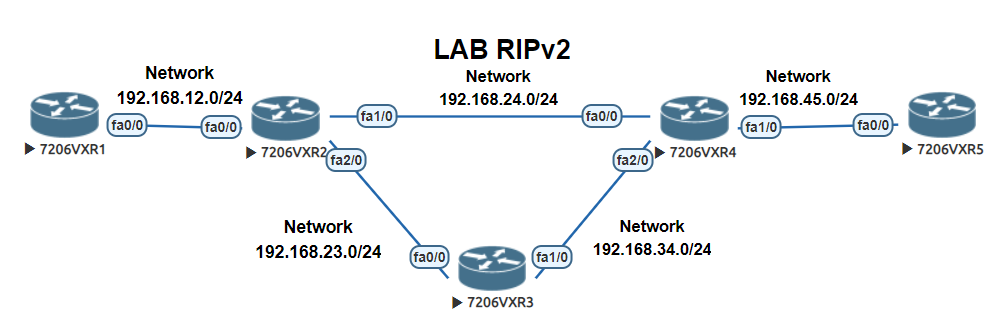
**Hardware and Software Requirements:**

**Cisco routers with IOS software**

**Ethernet cables**

**Terminal emulator software such as PuTTY or SecureCRT**

**Network Topology:**



**Step 1: Connect the Devices**

Connect the routers using Ethernet cables as point to point link.

**Step 2: Assign IP address on all Router’s interfaces as per above topology.**

**Router 1 Configuration**

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R1

R1(config)#interface f0/0

R1(config-if)#no shutdown

R1(config-if)#ip address 192.168.12.1 255.255.255.0

R1(config-if)#exit

**Router 2 Configuration**

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R2

R2(config)#interface f0/0

R2(config-if)#no shutdown

R2(config-if)#ip address 192.168.12.2 255.255.255.0

R2(config-if)#exit

R2(config)#interface f1/0

R2(config-if)#no shutdown

R2(config-if)#ip address 192.168.24.1 255.255.255.0

R2(config-if)#exit

R2(config)#interface f2/0

R2(config-if)#no shutdown

R2(config-if)#ip address 192.168.23.1 255.255.255.0

R2(config-if)#exit

**Router 3 configuration**

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R3

R3(config)#interface f0/0

R3(config-if)#no shutdown

R3(config-if)#ip address 192.168.23.2 255.255.255.0

R3(config-if)#exit

R3(config)#interface f1/0

R3(config-if)#no shutdown

R3(config-if)#ip address 192.168.34.1 255.255.255.0

R3(config-if)#exit

**Router 4 configuration**

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R4

R4(config)#interface f0/0

R4(config-if)#no shutdown

R4(config-if)#ip address 192.168.24.2 255.255.255.0

R4(config-if)#exit

R4(config)#interface f1/0

R4(config-if)#no shutdown

R4(config-if)#ip address 192.168.45.1 255.255.255.0

R4(config-if)#exit

R4(config)#interface f2/0

R4(config-if)#no shutdown

R4(config-if)#ip address 192.168.34.2 255.255.255.0

R4(config-if)#exit

**Router 5 configuration**

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R5

R5(config)#interface f0/0

R5(config-if)#no shutdown

R5(config-if)#ip address 192.168.45.2 255.255.255.0

R5(config-if)#exit

Step: 2 Run RIPv2 On all router and advertise connected networks.

**Router 1 configuration**

R1(config)#router rip

R1(config-router)#version 2

R1(config-router)#no auto-summary

R1(config-router)#network 192.168.12.0

R1(config-router)#end

R1#write

**Router 2 configuration**

R2(config)#router rip

R2(config-router)#version 2

R2(config-router)#no auto-summary

R2(config-router)#network 192.168.12.0

R2(config-router)#network 192.168.24.0

R2(config-router)#network 192.168.23.0

R2(config-router)#end

R2#write

**Router 3 configuration**

R3(config)#router rip

R3(config-router)#version 2

R3(config-router)#no auto-summary

R3(config-router)#network 192.168.23.0

R3(config-router)#network 192.168.34.0

R3(config-router)#end

R3#write

**Router 4 configuration**

R4(config)#router rip

R4(config-router)#version 2

R4(config-router)#no auto-summary

R4(config-router)#network 192.168.24.0

R4(config-router)#network 192.168.34.0

R4(config-router)#network 192.168.45.0

R4(config-router)#end

R4#write

**Router 5 configuration**

R5(config)#router rip

R5(config-router)#version 2

R5(config-router)#no auto-summary

R5(config-router)#network 192.168.45.0

R5(config-router)#end

R5#write

**Step 3: Verify RIPv2 Configuration**

To verify the RIPv2 configuration, enter the following command in global configuration mode on each router:

show ip route

This command will display the routing table for the router, which should include routes for all networks in the topology.

R1#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

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

192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.12.0/24 is directly connected, FastEthernet0/0

L 192.168.12.1/32 is directly connected, FastEthernet0/0

R 192.168.23.0/24 [120/1] via 192.168.12.2, 00:00:09, FastEthernet0/0

R 192.168.24.0/24 [120/1] via 192.168.12.2, 00:00:09, FastEthernet0/0

R 192.168.34.0/24 [120/2] via 192.168.12.2, 00:00:09, FastEthernet0/0

R 192.168.45.0/24 [120/2] via 192.168.12.2, 00:00:09, FastEthernet0/0

R2#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

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

192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.12.0/24 is directly connected, FastEthernet0/0

L 192.168.12.2/32 is directly connected, FastEthernet0/0

192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.23.0/24 is directly connected, FastEthernet2/0

L 192.168.23.1/32 is directly connected, FastEthernet2/0

192.168.24.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.24.0/24 is directly connected, FastEthernet1/0

L 192.168.24.1/32 is directly connected, FastEthernet1/0

R 192.168.34.0/24 [120/1] via 192.168.24.2, 00:00:26, FastEthernet1/0

[120/1] via 192.168.23.2, 00:00:08, FastEthernet2/0

R 192.168.45.0/24 [120/1] via 192.168.24.2, 00:00:26, FastEthernet1/0

R3#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

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

R 192.168.12.0/24 [120/1] via 192.168.23.1, 00:00:27, FastEthernet0/0

192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.23.0/24 is directly connected, FastEthernet0/0

L 192.168.23.2/32 is directly connected, FastEthernet0/0

R 192.168.24.0/24 [120/1] via 192.168.34.2, 00:00:26, FastEthernet1/0

[120/1] via 192.168.23.1, 00:00:27, FastEthernet0/0

192.168.34.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.34.0/24 is directly connected, FastEthernet1/0

L 192.168.34.1/32 is directly connected, FastEthernet1/0

R 192.168.45.0/24 [120/1] via 192.168.34.2, 00:00:26, FastEthernet1/0

R4#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

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

R 192.168.12.0/24 [120/1] via 192.168.24.1, 00:00:28, FastEthernet0/0

R 192.168.23.0/24 [120/1] via 192.168.34.1, 00:00:13, FastEthernet2/0

[120/1] via 192.168.24.1, 00:00:28, FastEthernet0/0

192.168.24.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.24.0/24 is directly connected, FastEthernet0/0

L 192.168.24.2/32 is directly connected, FastEthernet0/0

192.168.34.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.34.0/24 is directly connected, FastEthernet2/0

L 192.168.34.2/32 is directly connected, FastEthernet2/0

192.168.45.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.45.0/24 is directly connected, FastEthernet1/0

L 192.168.45.1/32 is directly connected, FastEthernet1/0

R5#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

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

R 192.168.12.0/24 [120/2] via 192.168.45.1, 00:00:22, FastEthernet0/0

R 192.168.23.0/24 [120/2] via 192.168.45.1, 00:00:22, FastEthernet0/0

R 192.168.24.0/24 [120/1] via 192.168.45.1, 00:00:22, FastEthernet0/0

R 192.168.34.0/24 [120/1] via 192.168.45.1, 00:00:22, FastEthernet0/0

192.168.45.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.45.0/24 is directly connected, FastEthernet0/0

L 192.168.45.2/32 is directly connected, FastEthernet0/0

**Lesson 11: LAB Exercise (EIGRP)**

**Task**

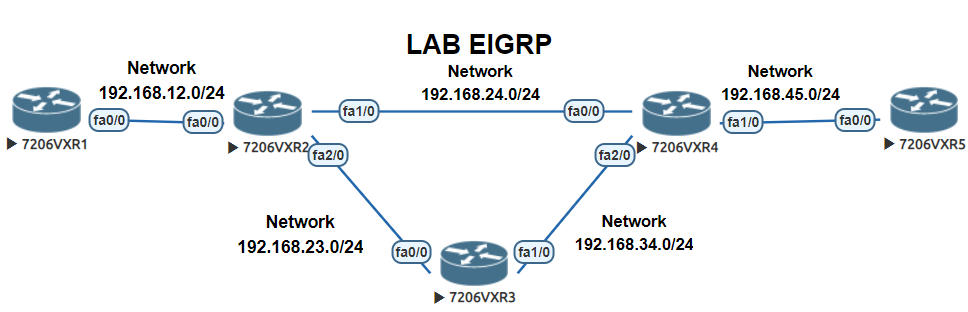
**Step: 1 Connect the Devices with appropriate cable**

**Step: 2 Assign IP address on all Router’s interfaces as per above topology.**

**Step: 3 Run EIGRP on all router and advertise connected networks.**

**Step: 4 Verify EIGRP Configuration**

**TOPOLOGY**



**Step: 1 Connect the Devices**

Connect the routers using Ethernet cables as point to point link.

**Step: 2 Assign IP address on all Router’s interfaces as per above topology.**

**Router 1 Configuration**

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R1

R1(config)#interface f0/0

R1(config-if)#no shutdown

R1(config-if)#ip address 192.168.12.1 255.255.255.0

R1(config-if)#exit

**Router 2 Configuration**

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R2

R2(config)#interface f0/0

R2(config-if)#no shutdown

R2(config-if)#ip address 192.168.12.2 255.255.255.0

R2(config-if)#exit

R2(config)#interface f1/0

R2(config-if)#no shutdown

R2(config-if)#ip address 192.168.24.1 255.255.255.0

R2(config-if)#exit

R2(config)#interface f2/0

R2(config-if)#no shutdown

R2(config-if)#ip address 192.168.23.1 255.255.255.0

R2(config-if)#exit

**Router 3 configuration**

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R3

R3(config)#interface f0/0

R3(config-if)#no shutdown

R3(config-if)#ip address 192.168.23.2 255.255.255.0

R3(config-if)#exit

R3(config)#interface f1/0

R3(config-if)#no shutdown

R3(config-if)#ip address 192.168.34.1 255.255.255.0

R3(config-if)#exit

**Router 4 configuration**

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R4

R4(config)#interface f0/0

R4(config-if)#no shutdown

R4(config-if)#ip address 192.168.24.2 255.255.255.0

R4(config-if)#exit

R4(config)#interface f1/0

R4(config-if)#no shutdown

R4(config-if)#ip address 192.168.45.1 255.255.255.0

R4(config-if)#exit

R4(config)#interface f2/0

R4(config-if)#no shutdown

R4(config-if)#ip address 192.168.34.2 255.255.255.0

R4(config-if)#exit

**Router 5 configuration**

Router>enable

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R5

R5(config)#interface f0/0

R5(config-if)#no shutdown

R5(config-if)#ip address 192.168.45.2 255.255.255.0

R5(config-if)#exit

**Step: 3 Run EIGRP on all router and advertise connected networks**

**Router 1 configuration**

R1(config)#router eigrp

R1(config-router)#no auto-summary

R1(config-router)#network 192.168.12.0

R1(config-router)#end

R1#write

**Router 2 configuration**

R2(config)#router eigrp

R2(config-router)#no auto-summary

R2(config-router)#network 192.168.12.0

R2(config-router)#network 192.168.24.0

R2(config-router)#network 192.168.23.0

R2(config-router)#end

R2#write

**Router 3 configuration**

R3(config)#router eigrp

R3(config-router)#no auto-summary

R3(config-router)#network 192.168.23.0

R3(config-router)#network 192.168.34.0

R3(config-router)#end

R3#write

**Router 4 configuration**

R4(config)#router eigrp

R4(config-router)#no auto-summary

R4(config-router)#network 192.168.24.0

R4(config-router)#network 192.168.34.0

R4(config-router)#network 192.168.45.0

R4(config-router)#end

R4#write

**Router 5 configuration**

R5(config)#router eigrp

R5(config-router)#no auto-summary

R5(config-router)#network 192.168.45.0

R5(config-router)#end

R5#write

**Step: 4 Verify EIGRP Configuration**

To verify the EIGRP configuration, enter the following command in global configuration mode on each router:

**Show ip eigrp neighbor**

This command displays the EIGRP neighbors of the router, their IP addresses, the interface through which the EIGRP neighbor is reachable and the hold time of the neighbor.

R1#show ip eigrp neighbor

EIGRP-IPv4 Neighbors for AS(10)

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 192.168.12.2 Fa0/0 10 00:02:39 283 1698 0 10

R2#show ip eigrp neighbor

EIGRP-IPv4 Neighbors for AS(10)

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

2 192.168.24.2 Fa1/0 11 00:02:21 38 228 0 5

1 192.168.23.2 Fa2/0 13 00:02:54 21 126 0 6

0 192.168.12.1 Fa0/0 11 00:03:27 81 486 0 5

R3#show ip eigrp neighbor

EIGRP-IPv4 Neighbors for AS(10)

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

1 192.168.34.2 Fa1/0 13 00:03:27 32 192 0 6

0 192.168.23.1 Fa0/0 14 00:04:00 28 252 0 9

R4#show ip eigrp neighbor

EIGRP-IPv4 Neighbors for AS(10)

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

2 192.168.45.2 Fa1/0 14 00:03:07 28 252 0 3

1 192.168.34.1 Fa2/0 14 00:03:56 54 324 0 7

0 192.168.24.1 Fa0/0 11 00:03:56 26 156 0 11

R5#show ip eigrp neighbor

EIGRP-IPv4 Neighbors for AS(10)

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 192.168.45.1 Fa0/0 13 00:03:43 31 186 0 8

**show ip eigrp topology**

This command displays the EIGRP topology table, which contains information about the routes learned by EIGRP. It shows the destination IP address, the next-hop IP address, the feasible successor (if available), the metric of the path, and the outgoing interface.

R1#show ip eigrp topology

EIGRP-IPv4 Topology Table for AS(10)/ID(192.168.12.1)

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

r - reply Status, s - sia Status

P 192.168.23.0/24, 1 successors, FD is 30720

via 192.168.12.2 (30720/28160), FastEthernet0/0

P 192.168.24.0/24, 1 successors, FD is 30720

via 192.168.12.2 (30720/28160), FastEthernet0/0

P 192.168.34.0/24, 1 successors, FD is 33280

via 192.168.12.2 (33280/30720), FastEthernet0/0

P 192.168.12.0/24, 1 successors, FD is 28160

via Connected, FastEthernet0/0

P 192.168.45.0/24, 1 successors, FD is 33280

via 192.168.12.2 (33280/30720), FastEthernet0/0

R2#show ip eigrp topology

EIGRP-IPv4 Topology Table for AS(10)/ID(192.168.24.1)

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

r - reply Status, s - sia Status

P 192.168.23.0/24, 1 successors, FD is 28160

via Connected, FastEthernet2/0

P 192.168.24.0/24, 1 successors, FD is 28160

via Connected, FastEthernet1/0

P 192.168.34.0/24, 2 successors, FD is 30720

via 192.168.23.2 (30720/28160), FastEthernet2/0

via 192.168.24.2 (30720/28160), FastEthernet1/0

P 192.168.12.0/24, 1 successors, FD is 28160

via Connected, FastEthernet0/0

P 192.168.45.0/24, 1 successors, FD is 30720

via 192.168.24.2 (30720/28160), FastEthernet1/0

R3#show ip eigrp topology

EIGRP-IPv4 Topology Table for AS(10)/ID(192.168.34.1)

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

r - reply Status, s - sia Status

P 192.168.23.0/24, 1 successors, FD is 28160

via Connected, FastEthernet0/0

P 192.168.24.0/24, 2 successors, FD is 30720

via 192.168.23.1 (30720/28160), FastEthernet0/0

via 192.168.34.2 (30720/28160), FastEthernet1/0

P 192.168.34.0/24, 1 successors, FD is 28160

via Connected, FastEthernet1/0

P 192.168.12.0/24, 1 successors, FD is 30720

via 192.168.23.1 (30720/28160), FastEthernet0/0

P 192.168.45.0/24, 1 successors, FD is 30720

via 192.168.34.2 (30720/28160), FastEthernet1/0

R4#show ip eigrp topology

EIGRP-IPv4 Topology Table for AS(10)/ID(192.168.45.1)

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

r - reply Status, s - sia Status

P 192.168.23.0/24, 2 successors, FD is 30720

via 192.168.24.1 (30720/28160), FastEthernet0/0

via 192.168.34.1 (30720/28160), FastEthernet2/0

P 192.168.24.0/24, 1 successors, FD is 28160

via Connected, FastEthernet0/0

P 192.168.34.0/24, 1 successors, FD is 28160

via Connected, FastEthernet2/0

P 192.168.12.0/24, 1 successors, FD is 30720

via 192.168.24.1 (30720/28160), FastEthernet0/0

P 192.168.45.0/24, 1 successors, FD is 28160

via Connected, FastEthernet1/0

R5#show ip eigrp topology

EIGRP-IPv4 Topology Table for AS(10)/ID(192.168.45.2)

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

r - reply Status, s - sia Status

P 192.168.23.0/24, 1 successors, FD is 33280

via 192.168.45.1 (33280/30720), FastEthernet0/0

P 192.168.24.0/24, 1 successors, FD is 30720

via 192.168.45.1 (30720/28160), FastEthernet0/0

P 192.168.34.0/24, 1 successors, FD is 30720

via 192.168.45.1 (30720/28160), FastEthernet0/0

P 192.168.12.0/24, 1 successors, FD is 33280

via 192.168.45.1 (33280/30720), FastEthernet0/0

P 192.168.45.0/24, 1 successors, FD is 28160

via Connected, FastEthernet0/0

**show ip route**

This command will display the routing table for the router, which should include routes for all networks in the topology.

R1#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

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

192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.12.0/24 is directly connected, FastEthernet0/0

L 192.168.12.1/32 is directly connected, FastEthernet0/0

D 192.168.23.0/24 [90/30720] via 192.168.12.2, 00:02:24, FastEthernet0/0

D 192.168.24.0/24 [90/30720] via 192.168.12.2, 00:02:24, FastEthernet0/0

D 192.168.34.0/24 [90/33280] via 192.168.12.2, 00:01:51, FastEthernet0/0

D 192.168.45.0/24 [90/33280] via 192.168.12.2, 00:01:18, FastEthernet0/0

R2#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

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

192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.12.0/24 is directly connected, FastEthernet0/0

L 192.168.12.2/32 is directly connected, FastEthernet0/0

192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.23.0/24 is directly connected, FastEthernet2/0

L 192.168.23.1/32 is directly connected, FastEthernet2/0

192.168.24.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.24.0/24 is directly connected, FastEthernet1/0

L 192.168.24.1/32 is directly connected, FastEthernet1/0

D 192.168.34.0/24 [90/30720] via 192.168.24.2, 00:02:14, FastEthernet1/0

[90/30720] via 192.168.23.2, 00:02:14, FastEthernet2/0

D 192.168.45.0/24 [90/30720] via 192.168.24.2, 00:02:14, FastEthernet1/0

R2#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

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

192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.12.0/24 is directly connected, FastEthernet0/0

L 192.168.12.2/32 is directly connected, FastEthernet0/0

192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.23.0/24 is directly connected, FastEthernet2/0

L 192.168.23.1/32 is directly connected, FastEthernet2/0

192.168.24.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.24.0/24 is directly connected, FastEthernet1/0

L 192.168.24.1/32 is directly connected, FastEthernet1/0

D 192.168.34.0/24 [90/30720] via 192.168.24.2, 00:02:18, FastEthernet1/0

[90/30720] via 192.168.23.2, 00:02:18, FastEthernet2/0

D 192.168.45.0/24 [90/30720] via 192.168.24.2, 00:02:18, FastEthernet1/0

R3#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

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

D 192.168.12.0/24 [90/30720] via 192.168.23.1, 00:03:12, FastEthernet0/0

192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.23.0/24 is directly connected, FastEthernet0/0

L 192.168.23.2/32 is directly connected, FastEthernet0/0

D 192.168.24.0/24 [90/30720] via 192.168.34.2, 00:03:12, FastEthernet1/0

[90/30720] via 192.168.23.1, 00:03:12, FastEthernet0/0

192.168.34.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.34.0/24 is directly connected, FastEthernet1/0

L 192.168.34.1/32 is directly connected, FastEthernet1/0

D 192.168.45.0/24 [90/30720] via 192.168.34.2, 00:03:12, FastEthernet1/0

R4#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

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

D 192.168.12.0/24 [90/30720] via 192.168.24.1, 00:03:48, FastEthernet0/0

D 192.168.23.0/24 [90/30720] via 192.168.34.1, 00:03:48, FastEthernet2/0

[90/30720] via 192.168.24.1, 00:03:48, FastEthernet0/0

192.168.24.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.24.0/24 is directly connected, FastEthernet0/0

L 192.168.24.2/32 is directly connected, FastEthernet0/0

192.168.34.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.34.0/24 is directly connected, FastEthernet2/0

L 192.168.34.2/32 is directly connected, FastEthernet2/0

192.168.45.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.45.0/24 is directly connected, FastEthernet1/0

L 192.168.45.1/32 is directly connected, FastEthernet1/0

R5#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

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

D 192.168.12.0/24 [90/33280] via 192.168.45.1, 00:03:35, FastEthernet0/0

D 192.168.23.0/24 [90/33280] via 192.168.45.1, 00:03:35, FastEthernet0/0

D 192.168.24.0/24 [90/30720] via 192.168.45.1, 00:03:35, FastEthernet0/0

D 192.168.34.0/24 [90/30720] via 192.168.45.1, 00:03:35, FastEthernet0/0

192.168.45.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.45.0/24 is directly connected, FastEthernet0/0

L 192.168.45.2/32 is directly connected, FastEthernet0/0

**Step 4: Test Network Connectivity**

Test network connectivity between the Routers