

Muhammad Waleed
20b-115-se
SE-B
DCCN Lab#12
Engr Fauzan Saeed

Router0:

```
Router>
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int se2/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#
Router(config-if)#exit
Router(config)#router eigrp 1
Router(config-router)#network 20.0.0.0 255.0.0.0
Router(config-router)#network 30.0.0.0 255.0.0.0
Router(config-router)#network 40.0.0.0 255.0.0.0
Router(config-router)#exit

Router(config)#int se3/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config)#router eigrp 1
Router(config-router)#network 50.0.0.0 255.0.0.0
-
Router(config)#int se3/0
Router(config-if)#clockrate 640000
^
% Invalid input detected at '^' marker.

Router(config-if)#clock rate 640000
Unknown clock rate
Router(config-if)#clock ?
    rate  Configure serial interface clock speed
Router(config-if)#clock rate 64000
Router(config-if)#exit
Router(config)#int se2/0
Router(config-if)#clock rate 64000

Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0 0.255.255.255
Router(config-router)#network 20.0.0.0 0.255.255.255
Router(config-router)#network 30.0.0.0 0.255.255.255
Router(config-router)#network 40.0.0.0 0.255.255.255
Router(config-router)#network 50.0.0.0 0.255.255.255
Router(config-router)#
```

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Router1:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int se2/0
Router(config-if)#ip address 10.0.0.2 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config)#router eigrp
% Incomplete command.
Router(config)#router eigrp 1
Router(config-router)#network 20.0.0.0 255.0.0.0
Router(config-router)#network 30.0.0.0 255.0.0.0
Router(config-router)#network 40.0.0.0 255.0.0.0
-
Router(config)#int se3/0
Router(config-if)#ip address 20.0.0.1 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial3/0, changed state to down

Router(config)#router eigrp 1
Router(config-router)#network 50.0.0.0 255.0.0.0
Router(config-router)#exit
Router(config)#int se3/0
Router(config-if)#clock rate 64000
Router(config-if)#exit
Router(config)#int se2/0
Router(config-if)#clock rate 64000

Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0 255.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 10.0.0.1 (Serial2/0) is up: new adjacency

Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0 0.255.255.255
Router(config-router)#network 20.0.0.0 0.255.255.255
Router(config-router)#network 30.0.0.0 0.255.255.255
Router(config-router)#network 40.0.0.0 0.255.255.255
Router(config-router)#network 50.0.0.0 0.255.255.255
```

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Router2:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#int se2/0
Router(config-if)#ip address 30.0.0.2 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#router eigrp 1
Router(config-router)#network 20.0.0.0 255.0.0.0
Router(config-router)#network 30.0.0.0 255.0.0.0
Router(config-router)#network 40.0.0.0 255.0.0.0

Router(config)#int se3/0
Router(config-if)#ip address 40.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up

Router(config-if)#exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up

%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 40.0.0.2 (Serial3/0) is up: new adjacency

Router(config)#router eigrp 1
Router(config-router)#network 50.0.0.0 255.0.0.0
Router(config-router)#exit
Router(config)#int se3/0
Router(config-if)#clock rate 64000
Router(config-if)#exit
Router(config)#int se2/0
Router(config-if)#clock rate 64000

Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0 255.0.0.0
Router(config-router)#exit

Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0 0.255.255.255
Router(config-router)#network 20.0.0.0 0.255.255.255
Router(config-router)#network 30.0.0.0 0.255.255.255
Router(config-router)#network 40.0.0.0 0.255.255.255
Router(config-router)#network 50.0.0.0 0.255.255.255
```

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Router3:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#int se2/0
Router(config-if)#ip address 20.0.0.2 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config-if)#
Router(config-if)#exit
Router(config)#router eigrp 1
Router(config-router)#network 20.0.0.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 20.0.0.1 (Serial2/0) is up: new adjacency

Router(config-router)#network 30.0.0.0
Router(config-router)#network 40.0.0.0

Router(config)#int se3/0
Router(config-if)#ip address 40.0.0.2 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial3/0, changed state to down

Router(config)#int fa0/0
Router(config-if)#ip address 50.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up



















Router(config-if)#exit
Router(config)#router eigrp 1
Router(config-router)#network 50.0.0.0 255.0.0.0

Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0 255.0.0.0

Router(config)#router eigrp 1
Router(config-router)#network 10.0.0.0 0.255.255.255
Router(config-router)#network 20.0.0.0 0.255.255.255
Router(config-router)#network 30.0.0.0 0.255.255.255
Router(config-router)#network 40.0.0.0 0.255.255.255
Router(config-router)#network 50.0.0.0 0.255.255.255
```

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Connectivity:

PDU List Window					
Fire	Last Status	Source	Destination	Type	Color
	Successful	Router0	Router1	ICMP	
	Successful	Router0	Router3	ICMP	
	Successful	Router0	Router2	ICMP	
	Successful	Router1	Router0	ICMP	
	Successful	Router1	Router3	ICMP	
	Successful	Router1	Router2	ICMP	
	Successful	Router2	Router3	ICMP	
	Successful	Router2	Router0	ICMP	
	Successful	Router2	Router1	ICMP	

IP Routes:

Router0:

```
Router#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, Serial2/0
D    20.0.0.0/8 [90/21024000] via 10.0.0.2, 00:14:05, Serial2/0
C    30.0.0.0/8 is directly connected, Serial3/0
D    40.0.0.0/8 [90/21024000] via 30.0.0.2, 00:28:46, Serial3/0
D    50.0.0.0/8 [90/21026560] via 30.0.0.2, 00:27:50, Serial3/0
        [90/21026560] via 10.0.0.2, 00:14:05, Serial2/0
```

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Router1:

```
Router#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, Serial2/0
C    20.0.0.0/8 is directly connected, Serial3/0
D    30.0.0.0/8 [90/21024000] via 10.0.0.1, 00:14:39, Serial2/0
D    40.0.0.0/8 [90/21024000] via 20.0.0.2, 00:29:24, Serial3/0
D    50.0.0.0/8 [90/20514560] via 20.0.0.2, 00:28:24, Serial3/0
-
```

Router2:

```
Router#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

D    10.0.0.0/8 [90/21024000] via 30.0.0.1, 00:17:40, Serial2/0
D    20.0.0.0/8 [90/21024000] via 40.0.0.2, 00:31:34, Serial3/0
C    30.0.0.0/8 is directly connected, Serial2/0
C    40.0.0.0/8 is directly connected, Serial3/0
D    50.0.0.0/8 [90/20514560] via 40.0.0.2, 00:30:38, Serial3/0
-
```

Router3:

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```
Router#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

```
D    10.0.0.0/8 [90/21024000] via 20.0.0.1, 00:17:20, Serial2/0
C    20.0.0.0/8 is directly connected, Serial2/0
D    30.0.0.0/8 [90/21024000] via 40.0.0.1, 00:32:01, Serial3/0
C    40.0.0.0/8 is directly connected, Serial3/0
C    50.0.0.0/8 is directly connected, FastEthernet0/0
```

Metrics:

Router0:

```
Router#sh ip protocols

Routing Protocol is "eigrp 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
  EIGRP maximum metric variance 1
  Redistributing: eigrp 1
    Automatic network summarization is in effect
    Automatic address summarization:
    Maximum path: 4
  Routing for Networks:
    20.0.0.0
    30.0.0.0
    40.0.0.0
    50.0.0.0
    10.0.0.0
  Routing Information Sources:
    Gateway         Distance      Last Update
    30.0.0.2         90           865269
```

Router1:

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```
Router#sh ip protocols
```

```
Routing Protocol is "eigrp 1 "  
  Outgoing update filter list for all interfaces is not set  
  Incoming update filter list for all interfaces is not set  
  Default networks flagged in outgoing updates  
  Default networks accepted from incoming updates  
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0  
  EIGRP maximum hopcount 100  
  EIGRP maximum metric variance 1  
Redistributing: eigrp 1  
  Automatic network summarization is in effect  
  Automatic address summarization:  
Maximum path: 4  
  Routing for Networks:  
    20.0.0.0  
    30.0.0.0  
    40.0.0.0  
    50.0.0.0  
    10.0.0.0  
  Routing Information Sources:  
    Gateway         Distance      Last Update  
    20.0.0.2         90           1067694
```

Router2:

```
Router#sh ip protocols
```

```
Routing Protocol is "eigrp 1 "  
  Outgoing update filter list for all interfaces is not set  
  Incoming update filter list for all interfaces is not set  
  Default networks flagged in outgoing updates  
  Default networks accepted from incoming updates  
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0  
  EIGRP maximum hopcount 100  
  EIGRP maximum metric variance 1  
Redistributing: eigrp 1  
  Automatic network summarization is in effect  
  Automatic address summarization:  
Maximum path: 4  
  Routing for Networks:  
    20.0.0.0  
    30.0.0.0  
    40.0.0.0  
    50.0.0.0  
    10.0.0.0  
  Routing Information Sources:  
    Gateway         Distance      Last Update  
    30.0.0.1         90           861395  
  -----
```

Router3:

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```
Router#sh ip protocols

Routing Protocol is "eigrp 1 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
  EIGRP maximum metric variance 1
  Redistributing: eigrp 1
    Automatic network summarization is in effect
  Automatic address summarization:
  Maximum path: 4
  Routing for Networks:
    20.0.0.0
    30.0.0.0
    40.0.0.0
    50.0.0.0
    10.0.0.0
  Routing Information Sources:
    Gateway         Distance      Last Update
    20.0.0.1         90            1023936
```

Comparison:

$$\begin{aligned}\text{Default metric} &= [10^7/K1 * \text{Min bandwidth} + K3 * \text{Total Sum of delay(usec)}/10] * 256 \\ &= [10^7/1 * 128 + 1 * 20000/10] * 256 \\ &= 229890560\end{aligned}$$