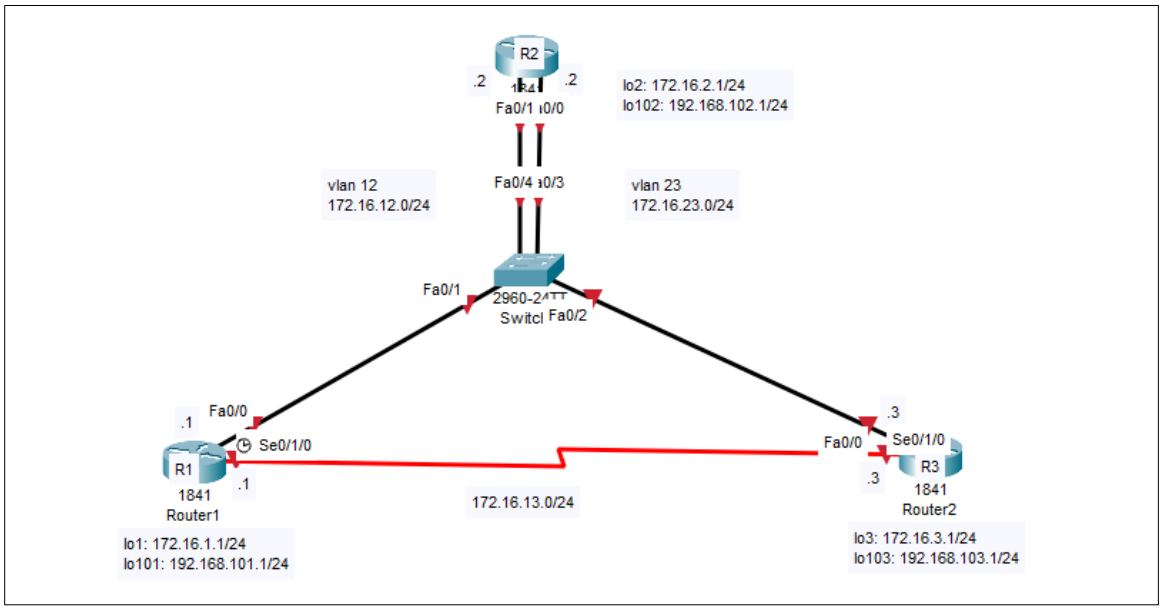
Practical 4 → Manipulating Administrative Distance




Step 1→ Configuring router loopbacks and addressing.

```
Router(config)#hostname R1
R1(config)#
R1(config)#int lo1

R1(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

R1(config-if)#ip add 172.16.1.1 255.255.255.0
R1(config-if)#int lo101

R1(config-if)#
%LINK-5-CHANGED: Interface Loopback101, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback101, changed state to up

R1(config-if)#ip add 192.168.101.1 255.255.255.0
R1(config-if)#int fa0/0
R1(config-if)#ip add 172.16.12.1 255.255.255.0
R1(config-if)#no shut

R1(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

R1(config-if)#int se0/1/0
R1(config-if)#ip add 172.16.13.1 255.255.255.0
R1(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
R1(config-if)#
```

```
Router(config)#hostname R2
R2(config)#
R2(config)#int lo2

R2(config-if)#
%LINK-5-CHANGED: Interface Loopback2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2, changed state to up

R2(config-if)#ip add 172.16.2.1 255.255.255.0
R2(config-if)#int lo102

R2(config-if)#
%LINK-5-CHANGED: Interface Loopback102, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback102, changed state to up

R2(config-if)#ip add 192.168.102.1 255.255.255.0
R2(config-if)#int fa 0/0
R2(config-if)#ip add 172.16.12.2 255.255.255.0
R2(config-if)#no shut

R2(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

R2(config-if)#int fa0/1
R2(config-if)#ip add 172.16.23.2 255.255.255.0
R2(config-if)#no shut
```

Step 2→ Configure switch VLANs.

```
Switch#en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 12
Switch(config-vlan)#name R1-R2
Switch(config-vlan)#vlan 23
Switch(config-vlan)#name R2-R3
Switch(config-vlan)#exit
Switch(config)#int fa0/1
Switch(config-if)#description to R1 fa0/0
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 12
Switch(config-if)#int fa0/3
Switch(config-if)#description to R2 fa0/0
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 12
```

```
Switch(config-if)#int fa0/4
Switch(config-if)#description to R2 fa0/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 23
Switch(config-if)#int fa0/2
Switch(config-if)#description to R3 fa0/0
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 23
Switch(config-if)#
```

Step 3→ Configure RIP

```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#no auto-summary
R1(config-router)#network 172.16.0.0
R1(config-router)#network 192.168.101.0
R1(config-router)#
```

```
R2>en
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#no auto-summary
R2(config-router)#network 172.16.0.0
R2(config-router)#network 192.168.102.0
R2(config-router)#
```

```
R3>en
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#no auto-summary
R3(config-router)#network 172.16.0.0
R3(config-router)#network 192.168.103.0
R3(config-router)#
```

```
R1#sh ip route rip
     172.16.0.0/24 is subnetted, 6 subnets
R       172.16.2.0 [120/1] via 172.16.12.2, 00:00:23, FastEthernet0/0
R       172.16.3.0 [120/1] via 172.16.13.2, 00:00:05, Serial0/1/0
R       172.16.23.0 [120/1] via 172.16.12.2, 00:00:23, FastEthernet0/0
                    [120/1] via 172.16.13.2, 00:00:05, Serial0/1/0
R    192.168.102.0/24 [120/1] via 172.16.12.2, 00:00:23, FastEthernet0/0
R    192.168.103.0/24 [120/1] via 172.16.13.2, 00:00:05, Serial0/1/0

R1#
```

```
R1#sh ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 18 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface              Send  Recv  Triggered RIP  Key-chain
  FastEthernet0/0        22
  Serial0/1/0            22
  Loopback1              22
  Loopback101            22
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
           172.16.0.0
           192.168.101.0
Passive Interface(s):
Routing Information Sources:
           Gateway         Distance      Last Update
           172.16.12.2          120      00:00:11
           172.16.13.2          120      00:00:24
Distance: (default is 120)
```

Step 4→ Configure OSPF

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int lo1
R1(config-if)#ip ospf network point-to-point
R1(config-if)#int lo101
R1(config-if)#ip ospf network point-to-point
R1(config-if)#router ospf 1
R1(config-router)#network 172.16.0.0 0.0.255.255 area 0
R1(config-router)#network 192.168.101.0 0.0.255.255 area 0
R1(config-router)#
```

```
R1(config-router)#network 192.168.101.0 0.0.0.255 area 0
R1(config-router)#
```

```
R2>en
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#int lo2
R2(config-if)#ip ospf network point-to-point
R2(config-if)#int lo102
R2(config-if)#ip ospf network point-to-point
R2(config-if)#router ospf 1
R2(config-router)#network 172.16.0.0 0.0.255.255 area 0
R2(config-router)#
01:11:04: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.101.1 on FastEthernet0/0 from LOADING to
FULL, Loading Done
```

```
R2(config-router)#network 172.16.0.0 0.0.0.255 area 0
R2(config-router)#
```

```
R3>en
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#int lo3
R3(config-if)#ip ospf network point-to-point
R3(config-if)#int lo103
R3(config-if)#ip ospf network point-to-point
R3(config-if)#router ospf 1
R3(config-router)#network 172.16.0.0 0.0.255.255 area 0
R3(config-router)#
01:13:57: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.102.1 on FastEthernet0/0 from LOADING to
FULL, Loading Done

R3(config-router)#network
01:14:02: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.101.1 on Serial0/1/0 from LOADING to
FULL, Loading Done

% Incomplete command.
R3(config-router)#network 192.168.103.0 0.0.0.255 area 0
R3(config-router)#
```

Step 5→ Modify the routing administrative distance

```
R1#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, 6 subnets
C       172.16.1.0 is directly connected, Loopback1
O       172.16.2.0 [110/2] via 172.16.12.2, 00:10:11, FastEthernet0/0
O       172.16.3.0 [110/3] via 172.16.12.2, 00:06:31, FastEthernet0/0
C       172.16.12.0 is directly connected, FastEthernet0/0
C       172.16.13.0 is directly connected, Serial0/1/0
O       172.16.23.0 [110/2] via 172.16.12.2, 00:06:31, FastEthernet0/0
C    192.168.101.0/24 is directly connected, Loopback101
O    192.168.102.0/24 [110/2] via 172.16.12.2, 00:09:44, FastEthernet0/0
O    192.168.103.0/24 [110/3] via 172.16.12.2, 00:05:22, FastEthernet0/0
```

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router rip
R1(config-router)#distance 100
```

```
R1#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, 6 subnets
C       172.16.1.0 is directly connected, Loopback1
R       172.16.2.0 [100/1] via 172.16.12.2, 00:00:18, FastEthernet0/0
R       172.16.3.0 [100/1] via 172.16.13.2, 00:00:08, Serial0/1/0
C       172.16.12.0 is directly connected, FastEthernet0/0
C       172.16.13.0 is directly connected, Serial0/1/0
R       172.16.23.0 [100/1] via 172.16.12.2, 00:00:18, FastEthernet0/0
                    [100/1] via 172.16.13.2, 00:00:08, Serial0/1/0
C    192.168.101.0/24 is directly connected, Loopback101
R    192.168.102.0/24 [100/1] via 172.16.12.2, 00:00:18, FastEthernet0/0
R    192.168.103.0/24 [100/1] via 172.16.13.2, 00:00:08, Serial0/1/0
```

```
R2#en
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router rip
R2(config-router)#distance 100
R2(config-router)#
```

```
R3#en
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router rip
R3(config-router)#distance 100
```

Step 6→ Modify the distance based on route source

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router ospf
% Incomplete command.
R1(config)#router ospf 1
R1(config-router)#network 172.16.0.0 0.0.255.255 area 0
R1(config-router)#network 192.168.101.0 0.0.0.255 area 0
R1(config-router)#distance 85 192.168.100.0 0.0.3.255
R1(config-router)#
```

#R1

```
R2>en
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#network 172.16.0.0 0.0.255.255 area 0
R2(config-router)#ntwork 192.168.102.0 0.0.0.255 area 0
                     ^
% Invalid input detected at '^' marker.

R2(config-router)#network 192.168.102.0 0.0.0.255 area 0
R2(config-router)#distance 85 192.168.100.0 0.0.3.255
R2(config-router)#
```

#R2

```
R3>en
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 172.16.0.0 0.0.255.255 area 0
R3(config-router)#network 192.168.103.0 0.0.0.255 area 0
R3(config-router)#distance 85 192.168.100.0 0.0.3.255
R3(config-router)#
```

#R3

```
R2#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, 6 subnets
R       172.16.1.0 [65/1] via 172.16.12.1, 00:00:01, FastEthernet0/0
C       172.16.2.0 is directly connected, Loopback2
R       172.16.3.0 [65/1] via 172.16.23.3, 00:00:19, FastEthernet0/1
C       172.16.12.0 is directly connected, FastEthernet0/0
O       172.16.13.0 [85/65] via 172.16.12.1, 00:40:10, FastEthernet0/0
                    [85/65] via 172.16.23.3, 00:40:10, FastEthernet0/1
C       172.16.23.0 is directly connected, FastEthernet0/1
R    192.168.101.0/24 [65/1] via 172.16.12.1, 00:00:01, FastEthernet0/0
C    192.168.102.0/24 is directly connected, Loopback102
R    192.168.103.0/24 [65/1] via 172.16.23.3, 00:00:19, FastEthernet0/1
```

Step 7→ Modify the distance based on access list

```
R1(config)#access-list 1 permit 172.16.0.0 0.0.255.255
R1(config)#distance 65 0.0.0.0 255.255.255.255
          |  ^
% Invalid input detected at '^' marker.

R1(config)#router rip
R1(config-router)#distance 65 0.0.0.0 255.255.255.255
R1(config-router)#
```

#Same for R2 and R3

```
R1#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, 6 subnets
C       172.16.1.0 is directly connected, Loopback1
R       172.16.2.0 [65/1] via 172.16.12.2, 00:00:06, FastEthernet0/0
R       172.16.3.0 [65/1] via 172.16.13.2, 00:00:23, Serial0/1/0
C       172.16.12.0 is directly connected, FastEthernet0/0
C       172.16.13.0 is directly connected, Serial0/1/0
O       172.16.23.0 [85/2] via 172.16.12.2, 00:21:56, FastEthernet0/0
C    192.168.101.0/24 is directly connected, Loopback101
R    192.168.102.0/24 [65/1] via 172.16.12.2, 00:00:06, FastEthernet0/0
R    192.168.103.0/24 [65/1] via 172.16.13.2, 00:00:23, Serial0/1/0

R1#
```

```
R1#sh ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 9 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface              Send  Recv  Triggered RIP  Key-chain
  Loopback1              22
  Loopback101            22
  FastEthernet0/0        22
  Serial0/1/0            22
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
           172.16.0.0
           192.168.101.0
Passive Interface(s):
Routing Information Sources:
           Gateway         Distance      Last Update
           172.16.12.2           65      00:00:07
           172.16.13.2           65      00:00:02
Distance: 100 (default is 120)
```