

Computer Networks COE 351

Final Project

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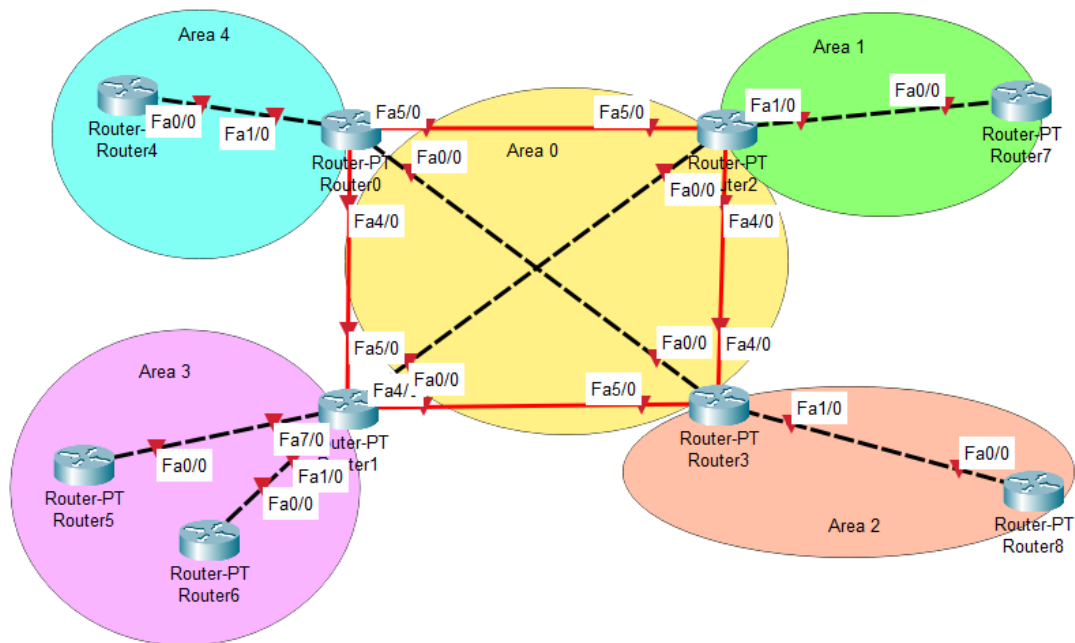


Figure 1 Topology

You need to do the followed:

- 1. Choose the IP's for the routers and use subnet 30, and write why we used that? (write the IP addresses next to the interface).**

1. IP's for the routers

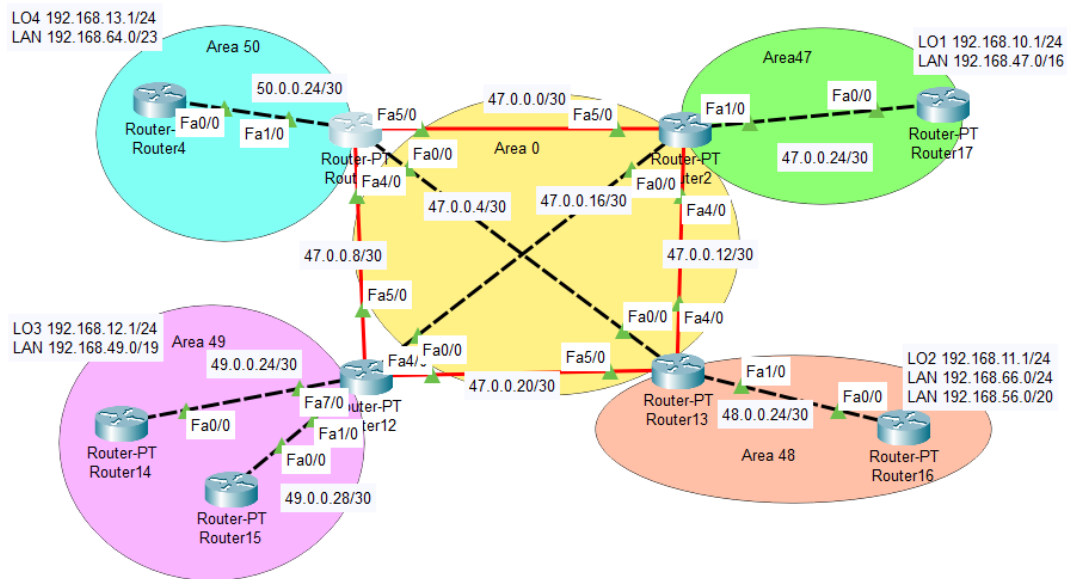


Figure 2 Topology with added addresses

Student id : 391202847

x = 47

Table 1 addressing table

Router 11		
Fa5/0	47.0.0.1	255.255.255.252
Fa0/0	47.0.0.5	255.255.255.252
F4/0	47.0.0.9	255.255.255.252
Router 12		
Fa5/0	47.0.0.10	255.255.255.252
Fa4/0	47.0.0.21	255.255.255.252
Fa0/0	47.0.0.17	255.255.255.252

Router 2		
Fa5/0	47.0.0.2	255.255.255.252
Fa0/0	47.0.0.18	255.255.255.252
Fa4/0	47.0.0.13	255.255.255.252
Fa1/0	47.0.0.26	255.255.255.252
Router 13		
Fa4/0	47.0.0.14	255.255.255.252
Fa0/0	47.0.0.6	255.255.255.252
Fa5/0	47.0.0.22	255.255.255.252

why we used that?

Table 2 area table

47.0.0.0 /30	47.0.0.1	47.0.0.2	255.255.255.252
47.0.0.4/30	47.0.0.5	47.0.0.6	255.255.255.252
47.0.0.8/30	47.0.0.9	47.0.0.10	255.255.255.252
47.0.0.12/30	47.0.0.13	47.0.0.14	255.255.255.252
47.0.0.16/30	47.0.0.17	47.0.0.18	255.255.255.252
47.0.0.20/30	47.0.0.21	47.0.0.22	255.255.255.252

2. Area number should match of X except the one in area 0. EX if IP is 10.10.0.0 area should be area 10. For LANs use 192.168.X.0 change X to be the same as your area ID. on area 2, the second VLAN X will be (area ID + 4).

2. New areas ip addresses

Table 3 address range in each area

Area 0		
Area 1 = > Area 47		
Area Subnet	Start IP	second IP
47.0.0.24/30	47.0.0.25	47.0.0.26
Area 2 = > Area 48		
Area Subnet	Start IP	second IP
48.0.0.24/30	48.0.0.25	48.0.0.26
Area 3 = > Area 49		
Area Subnet	Start IP	second IP
49.0.0.24/30	49.0.0.25	49.0.0.26
49.0.0.28/30	49.0.0.29	49.0.0.30
Area 4 = > Area 50		
Area Subnet	Start IP	second IP
50.0.0.24/30	50.0.0.25	50.0.0.26

Area 47

Table 4 area 47

Area 47		
Router 2		
Fa1/0	47.0.0.26	255.255.255.252
Router 17		
Fa0/0	47.0.0.25	255.255.255.252

Area 48

Table 5 area 48

Area 48		
Router 13		

Fa1/0	48.0.0.25	255.255.255.252
Router 16		
Fa0/0	48.0.0.26	255.255.255.252

Area 49

Table 6 area 49

Area 49		
Router 14		
Fa0/0	49.0.0.26	255.255.255.252
Router 15		
Fa0/0	49.0.0.29	255.255.255.252
Router 12		
Fa1/0	49.0.0.25	255.255.255.252
Fa7/0	49.0.0.30	255.255.255.252

Area 50

Table 7 area 50

Area 50		
Router 11		
Fa1/0	50.0.0.25	255.255.255.252
Router 4	Area 50	
Fa0/0	50.0.0.26	255.255.255.252

3. For the LAN's:

- 1. LAN in area 3 should have around 8000 users.
(chose the closest number to 8000 users but not less than 8000 users).**
- 2. Lan in area 4 should have 500 users.**

3. Area 2 should contain two VLANs:

1. VLAN 1 should be class C

2. VLAN 2 should have 3000 users.

4. LAN in area 1 should have around 60000 users.

4. Each LAN and VLAN should have DHCP service.

For LAN in each area

3.1 LAN in area 1 should have around 60000 users.

LAN : 192.168.47.0/16 = 65536 users

Enable DHCP service

Start 192.168.0.1 End 192.168.255.254

Table 8 lan in area 47

Area 47
Router 17
! ip dhcp pool router17 network 192.168.74.0 255.255.0.0 default-router 192.168.0.1

3.2 Area 2 should contain two VLANs:

1. VLAN 1 should be class C

2. VLAN 2 should have 3000 users.

LAN 192.168.66.0/ 24= class C

Enable DHCP service

Start 192.168.66.1 End 192.168.66.254

LAN 192.168.56.0/ 20= 4094 users

Enable DHCP service

Start 192.168.16.1 End 192.168.31.254

Table 9 lan in area 48

Area 48
Router 16
! ip dhcp pool router16 network 192.168.66.0 255.255.255.0 default-router 192.168.66.1 ! ip dhcp pool router16-2 network 192.168.56.0 255.255.240.0 default-router 192.168.16.1

3.3 LAN in area 3 should have around 8000 users.

(chose the closest number to 8000 users but not less than 8000 users).

LAN 192.168.31.0/24 class C

Enable DHCP service

Start 192.168.31.1 end 192.168.31.254

LAN 192.168.49.0/19 = 8,192 users

Enable DHCP service

Start 192.168.32.1 end 192.168.63.254

Table 10 lan in area 49

Area 49
Router 14
! ip dhcp pool router14 network 192.168.49.0 255.255.224.0 default-router 192.168.32.1 ! ! ip dhcp pool router14-2 network 192.168.31.0 255.255.255.0 default-router 192.168.31.1 !

3.4 Lan in area 4 should have 500 users.

LAN : 192.168.64.0/23= 512 users

Enable DHCP service

End 192.168.65.254

Table 11 lan in area 50

Area 50
Router 4
! ip dhcp pool router4 network 192.168.49.0 255.255.254.0 default-router 192.168.64.1

Table 12 whole lans in each area

Area 47			
LAN : 192.168.47.0/16 = 65536 users			
Start	192.168.0.1	End	192.168.255.254
Area 48			
LAN 192.168.66.0/ 24= class C			
LAN 192.168.56.0/ 20= 4094 users			
Start	192.168.16.1	End	192.168.31.254
Area 49			
LAN 192.168.31.0/24 class C			
LAN 192.168.49.0/19 = 8,192 users			
Start	192.168.32.1	end	192.168.63.254
Area 50			
LAN : 192.168.64.0/23= 512 users			
Start	192.168.64.1	End	192.168.65.254

Address table after add all interfaces

Table 13 whole addressing table

Router 11		
Fa5/0	47.0.0.1	255.255.255.252
Fa0/0	47.0.0.5	255.255.255.252
F4/0	47.0.0.9	255.255.255.252
Fa1/0	50.0.0.25	255.255.255.252
Router 12		
Fa5/0	47.0.0.10	255.255.255.252
Fa4/0	47.0.0.21	255.255.255.252
Fa0/0	47.0.0.17	255.255.255.252
Fa1/0	49.0.0.25	255.255.255.252
Fa7/0	49.0.0.30	255.255.255.252
Router 2		
Fa5/0	47.0.0.2	255.255.255.252
Fa0/0	47.0.0.18	255.255.255.252
Fa4/0	47.0.0.13	255.255.255.252
Fa1/0	47.0.0.26	255.255.255.252
Router 13		
Fa4/0	47.0.0.14	255.255.255.252
Fa0/0	47.0.0.6	255.255.255.252
Fa5/0	47.0.0.22	255.255.255.252
Fa1/0	48.0.0.25	255.255.255.252
Router 4	Area 50	
Fa0/0	50.0.0.26	255.255.255.252
LO4	192.168.13.0	255.255.255.0
LAN	192.168.64.0	255.255.254.0
Router 14	Area 49	
Fa0/0	49.0.0.26	255.255.255.252
LO3	192.168.12.0	255.255.255.0
Router 15	Area 49	
Fa0/0	49.0.0.29	255.255.255.252

LAN	192.168.49.0	255.255.224.0
Router 17	Area 47	
Fa0/0	47.0.0.25	255.255.255.252
LO1	192.168.10.0	255.255.255.0
LAN	192.168.47.0	255.255.0.0
Router 16	Area 48	
Fa0/0	48.0.0.26	255.255.255.252
LO2	192.168.11.0	255.255.255.0
LAN	192.168.66.0	255.255.255.0
LAN	192.168.56.0	255.255.240.0

OSPF routing protocol

4. Use OSPF routing protocol with the areas shown on the figure. (copy the commands on your report)

Table 14 ospf configuration in each router

<p>Router 11</p> <pre> router ospf 1 router-id 11.11.11.11 log-adjacency-changes network 47.0.0.0 0.0.0.3 area 0 network 47.0.0.4 0.0.0.3 area 0 network 47.0.0.8 0.0.0.3 area 0 network 50.0.0.24 0.0.0.3 area 50 !</pre>
<p>Router 2</p> <pre> ! router ospf 1 router-id 2.2.2.2 log-adjacency-changes network 47.0.0.0 0.0.0.3 area 0 network 47.0.0.12 0.0.0.3 area 0 network 47.0.0.16 0.0.0.3 area 0 network 47.0.0.24 0.0.0.3 area 47 !</pre>
<p>Router 12</p> <pre> !</pre>

```
router ospf 1
router-id 12.12.12.12
log-adjacency-changes
network 47.0.0.8 0.0.0.3 area 0
network 47.0.0.16 0.0.0.3 area 0
network 47.0.0.20 0.0.0.3 area 0
network 49.0.0.24 0.0.0.3 area 49
network 49.0.0.28 0.0.0.3 area 49
!
```

Router 13

```
!
router ospf 1
router-id 13.13.13.13
log-adjacency-changes
network 47.0.0.12 0.0.0.3 area 0
network 47.0.0.4 0.0.0.3 area 0
network 47.0.0.20 0.0.0.3 area 0
network 48.0.0.24 0.0.0.3 area 48
!
```

Router 4

```
!
router ospf 1
log-adjacency-changes
network 50.0.0.24 0.0.0.3 area 50
```

Router 17

```
router ospf 1
log-adjacency-changes
network 47.0.0.24 0.0.0.3 area 47
!
```

Router 16

```
!
router ospf 1
log-adjacency-changes
network 48.0.0.24 0.0.0.3 area 48
!
```

Router 14

```
!
router ospf 1
```



```
log-adjacency-changes
network 49.0.0.24 0.0.0.3 area 49
!
```

Router 15

```
!
router ospf 1
log-adjacency-changes
network 49.0.0.28 0.0.0.3 area 49
!
```

6. Use show command to show the next for router 12, router 17, router 14: - neighbors

R12 Show ospf neighbor

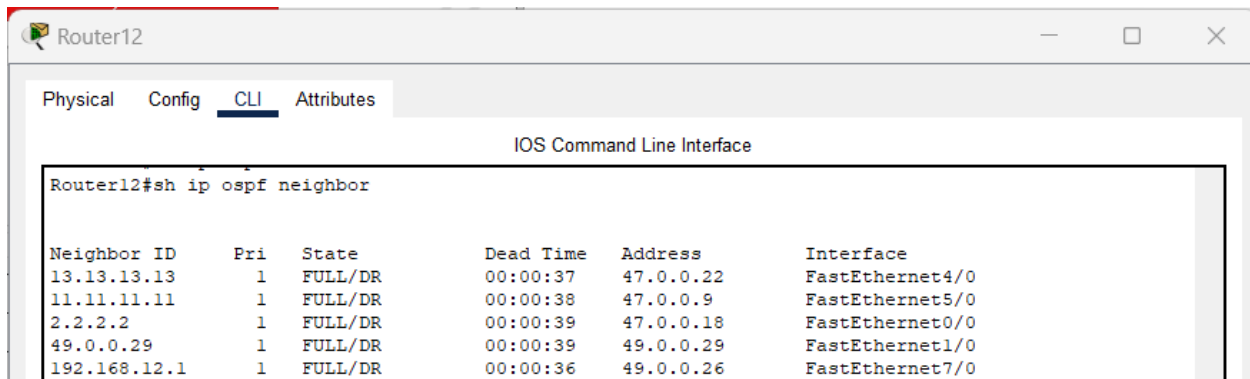


Figure 3 R12 Show ospf neighbor

R17 Show ospf neighbor

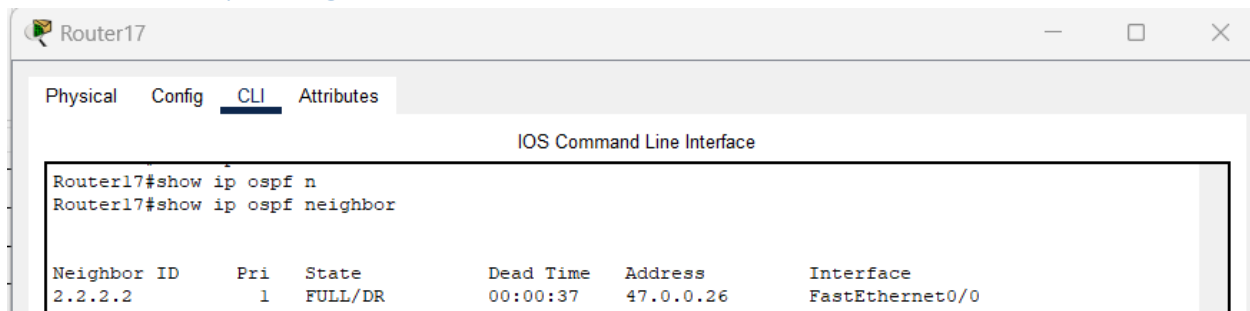


Figure 4 R17 Show ospf neighbor

R14 Show ospf neighbor

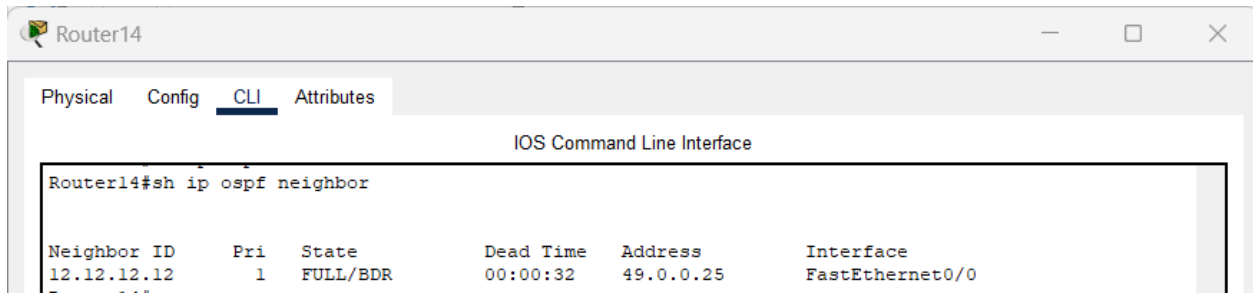


Figure 5 R14 Show ospf neighbor

- database

R12 Show ip ospf database

```

Router12
Physical Config CLI Attributes
IOS Command Line Interface
Router12#sh ip ospf database
      OSPF Router with ID (12.12.12.12) (Process ID 1)

      Router Link States (Area 0)

Link ID        ADV Router    Age      Seq#          Checksum Link count
12.12.12.12    12.12.12.12   883      0x80000008    0x00cf80 3
11.11.11.11    11.11.11.11   924      0x80000007    0x002ed8 3
2.2.2.2        2.2.2.2       913      0x80000009    0x00ed06 3
13.13.13.13    13.13.13.13   904      0x80000007    0x00aae5 3

      Net Link States (Area 0)

Link ID        ADV Router    Age      Seq#          Checksum
47.0.0.13      2.2.2.2       988      0x80000003    0x00511c
47.0.0.9       11.11.11.11   924      0x80000002    0x007ca5
47.0.0.18      2.2.2.2       913      0x80000004    0x00cc95
47.0.0.22      13.13.13.13   904      0x80000002    0x004bb3

      Summary Net Link States (Area 0)

Link ID        ADV Router    Age      Seq#          Checksum
47.0.0.24      2.2.2.2       1071     0x80000002    0x00ec24
50.0.0.24      11.11.11.11   1041     0x80000002    0x00b633
48.0.0.24      13.13.13.13   958      0x80000002    0x00944f
49.0.0.24      12.12.12.12   538      0x80000005    0x009f44
49.0.0.28      12.12.12.12   533      0x80000006    0x007569

      Router Link States (Area 49)

Link ID        ADV Router    Age      Seq#          Checksum Link count
192.168.12.1   192.168.12.1  543      0x80000002    0x002ba5 1
12.12.12.12    12.12.12.12   442      0x80000012    0x002778 2
49.0.0.29      49.0.0.29     442      0x80000002    0x000e0d 1

      Net Link States (Area 49)

Link ID        ADV Router    Age      Seq#          Checksum
49.0.0.26      192.168.12.1  543      0x80000001    0x00fa83
49.0.0.29      49.0.0.29     442      0x80000001    0x005477

      Summary Net Link States (Area 49)

Link ID        ADV Router    Age      Seq#          Checksum
47.0.0.8       12.12.12.12   879      0x8000000a    0x0050a0
47.0.0.16      12.12.12.12   879      0x8000000b    0x00fde9
47.0.0.20      12.12.12.12   879      0x8000000c    0x00d30f
47.0.0.12      12.12.12.12   879      0x8000000d    0x002cbc
47.0.0.0       12.12.12.12   879      0x8000000e    0x00a350
47.0.0.4       12.12.12.12   879      0x8000000f    0x007876
50.0.0.24      12.12.12.12   879      0x80000010    0x008650
47.0.0.24      12.12.12.12   879      0x80000011    0x00ab2d
48.0.0.24      12.12.12.12   879      0x80000012    0x009c3a
Router12#

```

Figure 6 R12 Show ip ospf database

R14 Show ip ospf database

```
Router14#
Router14#sh ip os
Router14#sh ip ospf d
Router14#sh ip ospf database
      OSPF Router with ID (192.168.12.1) (Process ID 1)

      Router Link States (Area 49)

Link ID        ADV Router    Age          Seq#          Checksum Link count
192.168.12.1   192.168.12.1  576          0x80000002   0x002ba5  1
12.12.12.12    12.12.12.12  475          0x80000012   0x002778  2
49.0.0.29      49.0.0.29    475          0x80000002   0x000e0d  1

      Net Link States (Area 49)

Link ID        ADV Router    Age          Seq#          Checksum
49.0.0.26      192.168.12.1  576          0x80000001   0x00fa83
49.0.0.29      49.0.0.29    475          0x80000001   0x005477

      Summary Net Link States (Area 49)

Link ID        ADV Router    Age          Seq#          Checksum
47.0.0.8       12.12.12.12  912          0x8000000a   0x0050a0
47.0.0.16      12.12.12.12  912          0x8000000b   0x00fde9
47.0.0.20      12.12.12.12  912          0x8000000c   0x00d30f
47.0.0.12      12.12.12.12  912          0x8000000d   0x002cbc
47.0.0.0       12.12.12.12  912          0x8000000e   0x00a350
47.0.0.4       12.12.12.12  912          0x8000000f   0x007876
50.0.0.24      12.12.12.12  912          0x80000010   0x008650
47.0.0.24      12.12.12.12  912          0x80000011   0x00ab2d
48.0.0.24      12.12.12.12  912          0x80000012   0x009c3a
Router14#
Router14#
Router14#
```

Figure 7 R14 Show ip ospf database

R17 Show ip ospf database

```

Router17#sh ip ospf d
Router17#sh ip ospf database
      OSPF Router with ID (192.168.10.1) (Process ID 1)

      Router Link States (Area 47)

Link ID        ADV Router    Age         Seq#          Checksum Link count
192.168.10.1   192.168.10.1  1648        0x80000002   0x001dbc 1
2.2.2.2        2.2.2.2       1648        0x80000002   0x001898 1

      Net Link States (Area 47)

Link ID        ADV Router    Age         Seq#          Checksum
47.0.0.26      2.2.2.2       1648        0x80000001   0x008e1d

      Summary Net Link States (Area 47)

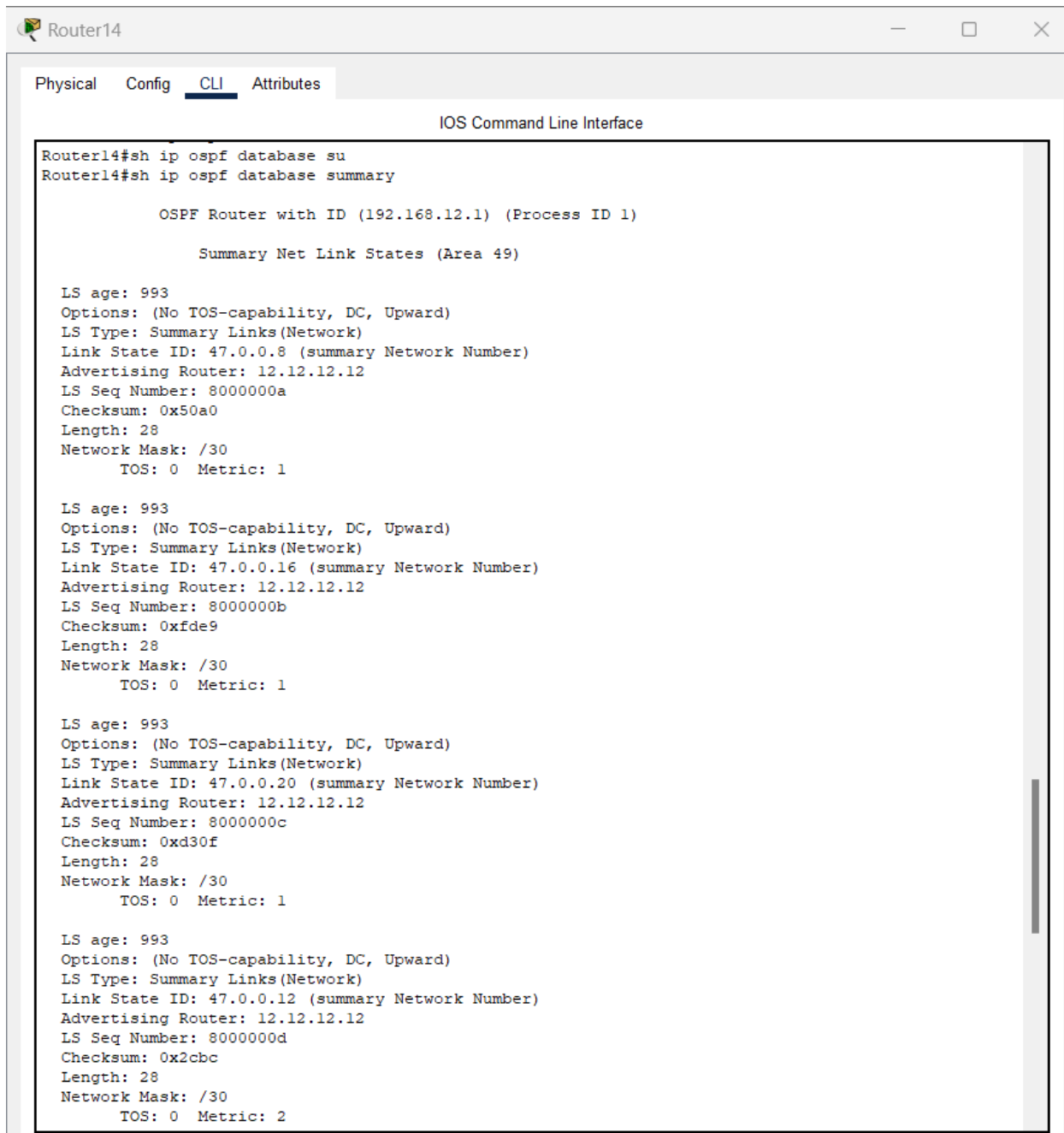
Link ID        ADV Router    Age         Seq#          Checksum
47.0.0.0       2.2.2.2       1134        0x8000000b   0x00cb54
47.0.0.12      2.2.2.2       1134        0x8000000c   0x0051c1
47.0.0.16      2.2.2.2       1134        0x8000000d   0x0027e6
47.0.0.4       2.2.2.2       1030        0x8000000e   0x00a770
47.0.0.20      2.2.2.2       1030        0x8000000f   0x000502
48.0.0.24      2.2.2.2       1010        0x80000010   0x00cd33
47.0.0.8       2.2.2.2       966         0x80000011   0x007997
50.0.0.24      2.2.2.2       966         0x80000012   0x00ba41
49.0.0.28      2.2.2.2       865         0x80000014   0x009166
49.0.0.24      2.2.2.2       586         0x80000015   0x00b743
Router17#
Router17#
Router17#
Router17#

```

Figure 8 R17 Show ip ospf database

- database summary.

R14 Show ip ospf database summary



The screenshot shows a web-based interface for a network device named Router14. The interface has a top bar with the device name and standard window controls. Below this is a tabbed menu with 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The terminal window shows the following commands and output:

```
Router14#sh ip ospf database su
Router14#sh ip ospf database summary

      OSPF Router with ID (192.168.12.1) (Process ID 1)

      Summary Net Link States (Area 49)

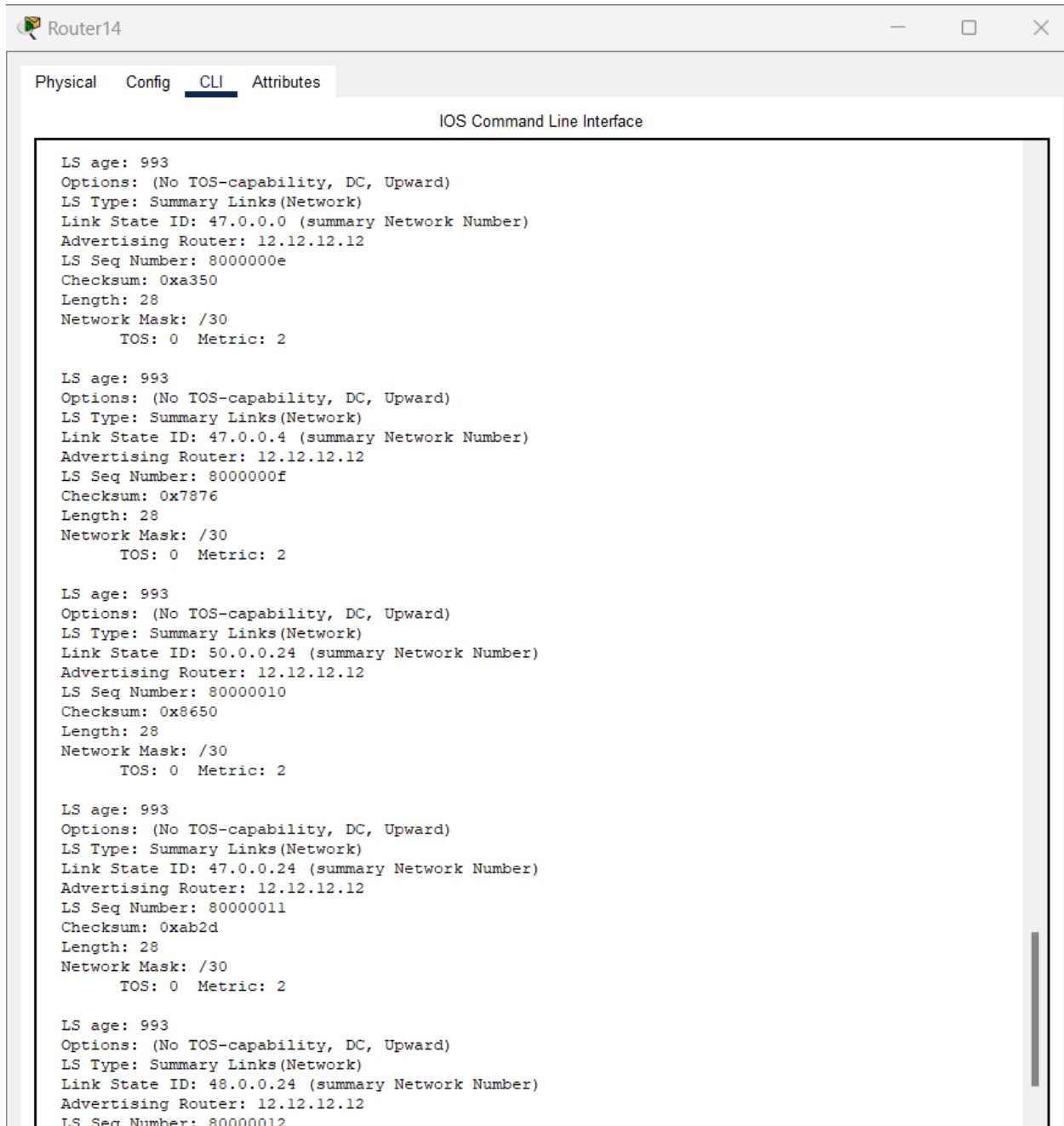
LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.8 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000a
Checksum: 0x50a0
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.16 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000b
Checksum: 0xfde9
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.20 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000c
Checksum: 0xd30f
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.12 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000d
Checksum: 0x2cbc
Length: 28
Network Mask: /30
      TOS: 0  Metric: 2
```

Figure 9 R14 Show ip ospf database summary

The image shows a screenshot of a network router's command-line interface (CLI) window titled "Router14". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" being the active tab. The main area displays the output of the "show ip ospf database summary" command. The output lists five OSPF summary links, each with its age, options, type, link state ID, advertising router, sequence number, checksum, length, network mask, TOS, and metric. The links are for networks 47.0.0.0, 47.0.0.4, 50.0.0.24, 47.0.0.24, and 48.0.0.24, all advertised by router 12.12.12.12 with a metric of 2.

```
Router14
Physical Config CLI Attributes
IOS Command Line Interface

LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.0 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000e
Checksum: 0xa350
Length: 28
Network Mask: /30
TOS: 0 Metric: 2

LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.4 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000f
Checksum: 0x7876
Length: 28
Network Mask: /30
TOS: 0 Metric: 2

LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 50.0.0.24 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 80000010
Checksum: 0x8650
Length: 28
Network Mask: /30
TOS: 0 Metric: 2

LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.24 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 80000011
Checksum: 0xab2d
Length: 28
Network Mask: /30
TOS: 0 Metric: 2

LS age: 993
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 48.0.0.24 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 80000012
```

Figure 10 R14 Show ip ospf database summary

R17 Show ip ospf database summary

Figure 11 R17 Show ip ospf database summary

Router17

Physical Config CLI Attributes

IOS Command Line Interface

```
Router17#sh ip ospf database summary

      OSPF Router with ID (192.168.10.1) (Process ID 1)

      Summary Net Link States (Area 47)

LS age: 1466
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.0 (summary Network Number)
Advertising Router: 2.2.2.2
LS Seq Number: 8000000b
Checksum: 0xcb54
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 1466
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.12 (summary Network Number)
Advertising Router: 2.2.2.2
LS Seq Number: 8000000c
Checksum: 0x51c1
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 1466
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.16 (summary Network Number)
Advertising Router: 2.2.2.2
LS Seq Number: 8000000d
Checksum: 0x27e6
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 1362
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.4 (summary Network Number)
Advertising Router: 2.2.2.2
LS Seq Number: 8000000e
Checksum: 0xa770
Length: 28
Network Mask: /30
      TOS: 0  Metric: 2
```

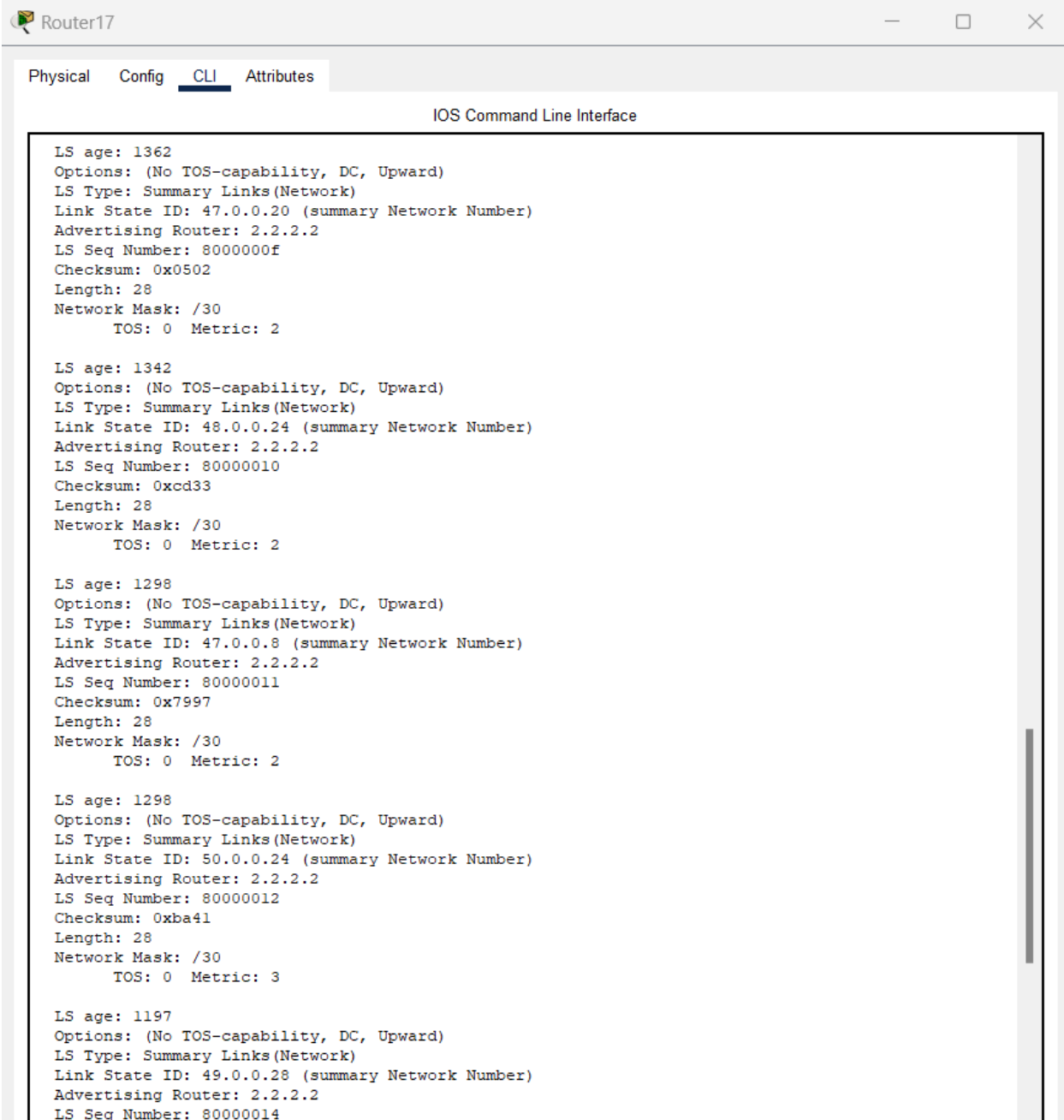



Figure 12 R17 Show ip ospf database summary

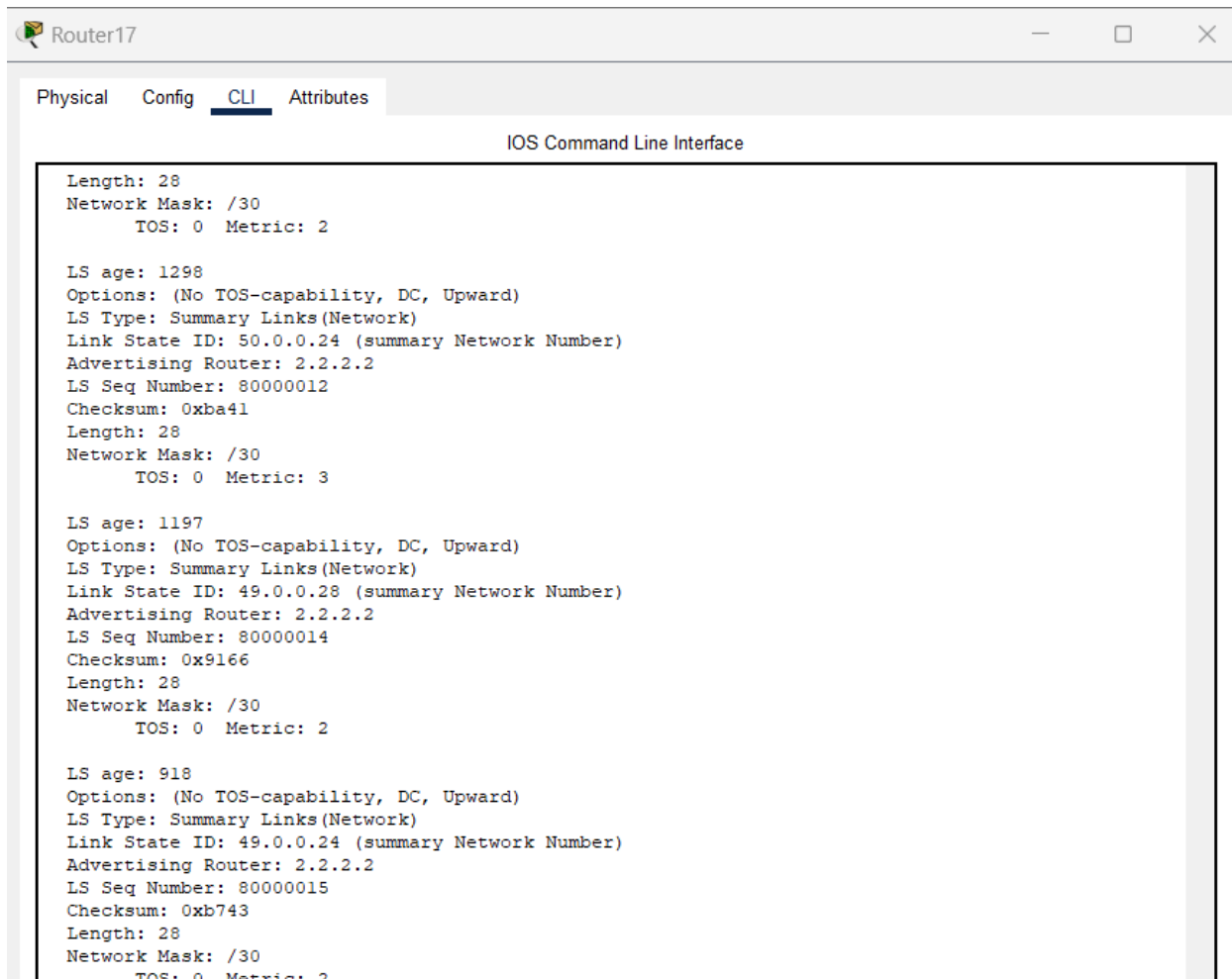
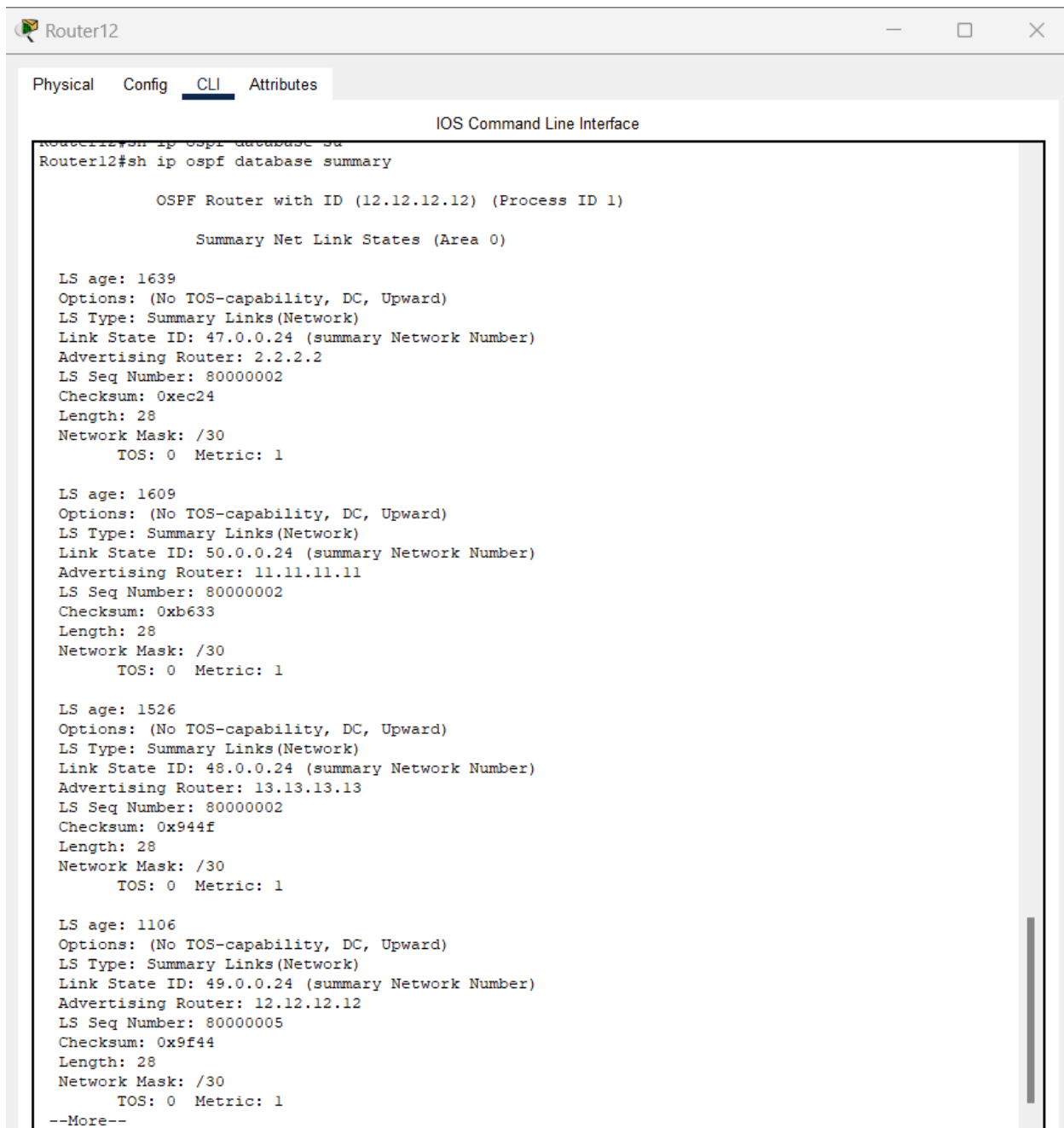


Figure 13 R17 Show ip ospf database summary

R12 Show ip ospf database summary



```
Router12#sh ip ospf database su
Router12#sh ip ospf database summary

      OSPF Router with ID (12.12.12.12) (Process ID 1)

      Summary Net Link States (Area 0)

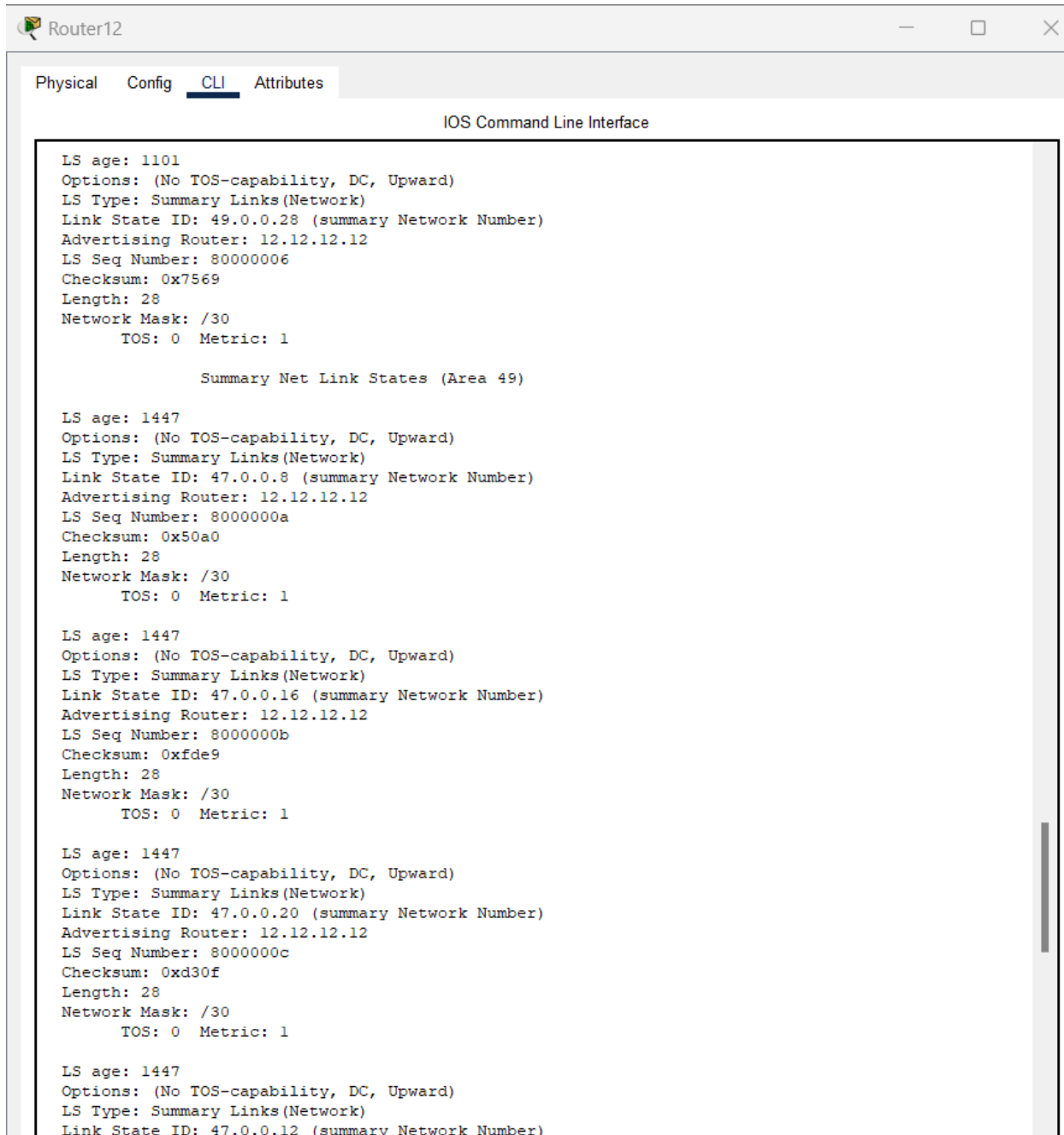
LS age: 1639
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.24 (summary Network Number)
Advertising Router: 2.2.2.2
LS Seq Number: 80000002
Checksum: 0xec24
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 1609
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 50.0.0.24 (summary Network Number)
Advertising Router: 11.11.11.11
LS Seq Number: 80000002
Checksum: 0xb633
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 1526
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 48.0.0.24 (summary Network Number)
Advertising Router: 13.13.13.13
LS Seq Number: 80000002
Checksum: 0x944f
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1

LS age: 1106
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 49.0.0.24 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 80000005
Checksum: 0x9f44
Length: 28
Network Mask: /30
      TOS: 0  Metric: 1
--More--
```

Figure 14 R12 Show ip ospf database summary



The screenshot shows a web-based interface for a router named 'Router12'. At the top, there are tabs for 'Physical', 'Config', 'CLI' (which is selected), and 'Attributes'. Below the tabs, the title 'IOS Command Line Interface' is displayed. The main content area shows the output of the 'show ip ospf database summary' command. The output lists four summary link states for Area 49, each with its own set of details including age, options, type, ID, advertising router, sequence number, checksum, length, network mask, TOS, and metric.

```
LS age: 1101
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 49.0.0.28 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 80000006
Checksum: 0x7569
Length: 28
Network Mask: /30
    TOS: 0  Metric: 1

    Summary Net Link States (Area 49)

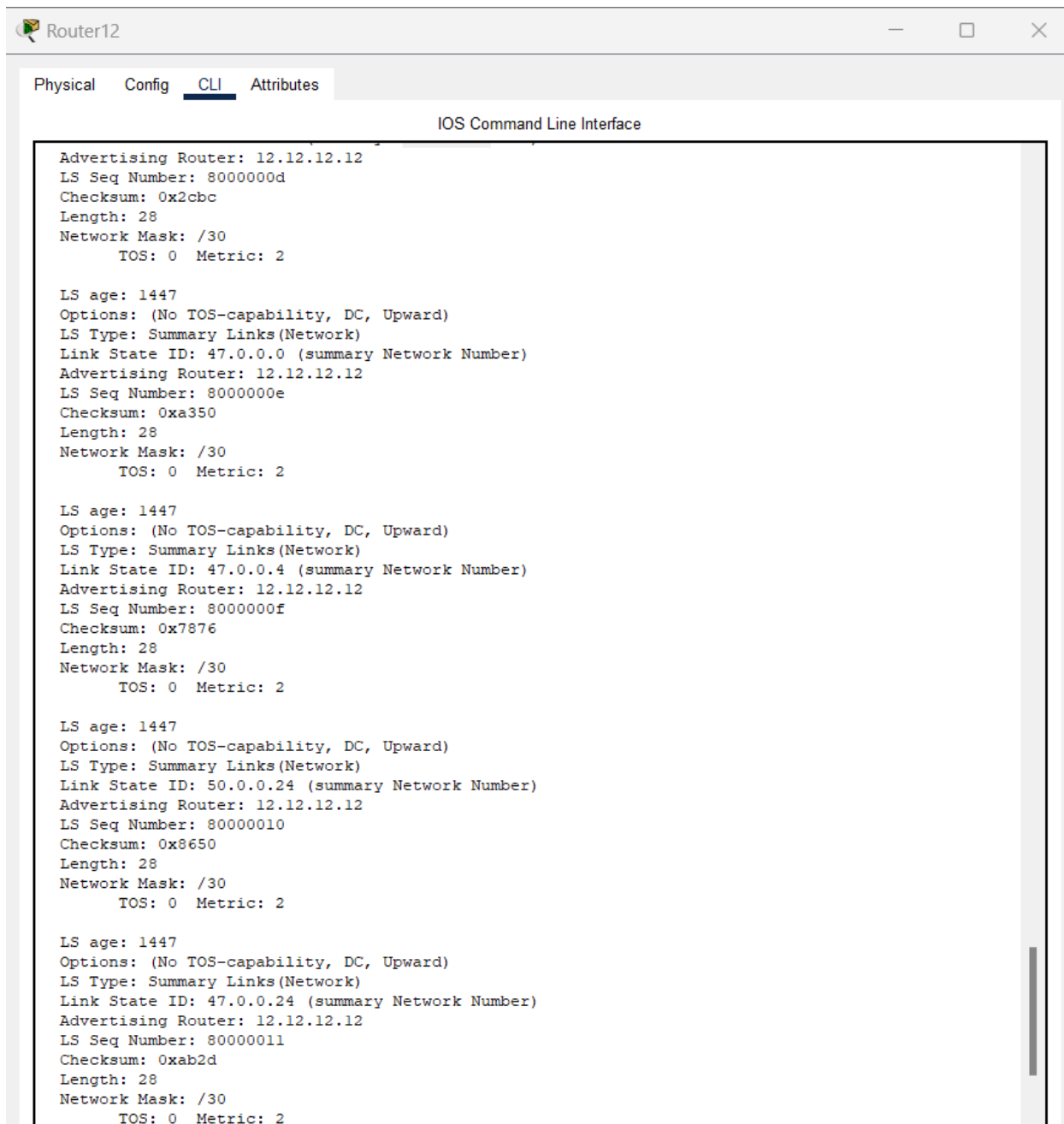
LS age: 1447
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.8 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000a
Checksum: 0x50a0
Length: 28
Network Mask: /30
    TOS: 0  Metric: 1

LS age: 1447
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.16 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000b
Checksum: 0xfde9
Length: 28
Network Mask: /30
    TOS: 0  Metric: 1

LS age: 1447
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.20 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000c
Checksum: 0xd30f
Length: 28
Network Mask: /30
    TOS: 0  Metric: 1

LS age: 1447
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.12 (summary Network Number)
```

Figure 15 R12 Show ip ospf database summary



The screenshot shows a web-based interface for a router named 'Router12'. The 'CLI' tab is selected, displaying the 'IOS Command Line Interface'. The output of the 'show ip ospf database summary' command is shown, listing five OSPF summary links. Each entry includes the advertising router (12.12.12.12), LS sequence number, checksum, length (28), network mask (/30), TOS (0), metric (2), LS age (1447), options (No TOS-capability, DC, Upward), LS type (Summary Links(Network)), and link state ID. The link state IDs are 47.0.0.0, 47.0.0.4, 50.0.0.24, 47.0.0.24, and 47.0.0.24.

```
Advertising Router: 12.12.12.12
LS Seq Number: 8000000d
Checksum: 0x2cbc
Length: 28
Network Mask: /30
  TOS: 0  Metric: 2

LS age: 1447
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.0 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000e
Checksum: 0xa350
Length: 28
Network Mask: /30
  TOS: 0  Metric: 2

LS age: 1447
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.4 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 8000000f
Checksum: 0x7876
Length: 28
Network Mask: /30
  TOS: 0  Metric: 2

LS age: 1447
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 50.0.0.24 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 80000010
Checksum: 0x8650
Length: 28
Network Mask: /30
  TOS: 0  Metric: 2

LS age: 1447
Options: (No TOS-capability, DC, Upward)
LS Type: Summary Links(Network)
Link State ID: 47.0.0.24 (summary Network Number)
Advertising Router: 12.12.12.12
LS Seq Number: 80000011
Checksum: 0xab2d
Length: 28
Network Mask: /30
  TOS: 0  Metric: 2
```

Figure 16 R12 Show ip ospf database summary

7. Chose the area type carefully and write the reason why have chosen it for each area.

Table 15 area names and addresses

Area 0		
Area 1 = Area 47		
47.0.0.24/30	47.0.0.25	47.0.0.26
Area 2 = Area 47+1 = Area 48		
48.0.0.24/30	48.0.0.25	48.0.0.26
Area 3 = Area x+2 = 47+2 = 49		
49.0.0.24/30	49.0.0.25	49.0.0.26
49.0.0.28/30	49.0.0.29	49.0.0.30
Area 4 = Area x+3 = 50		
50.0.0.24/30	50.0.0.25	50.0.0.26

cost from Router 14 to Router 17

8. Show the cost from Router 14 to Router 17 and show all the paths. Define which one is shorter. Do Q.8 with the default reference B/W and see if you have to change it, Explain.

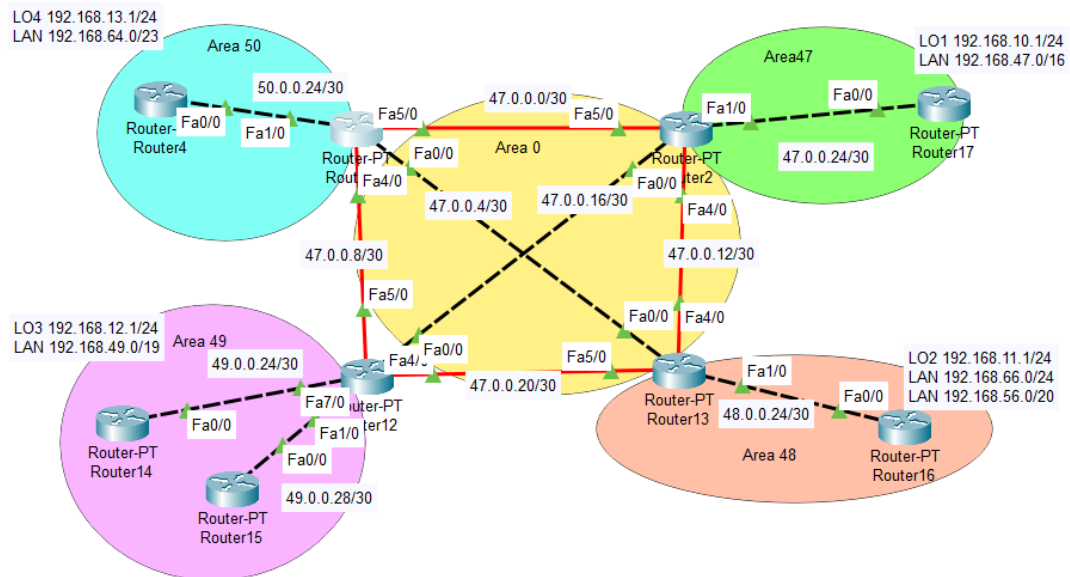


Figure 17 topology

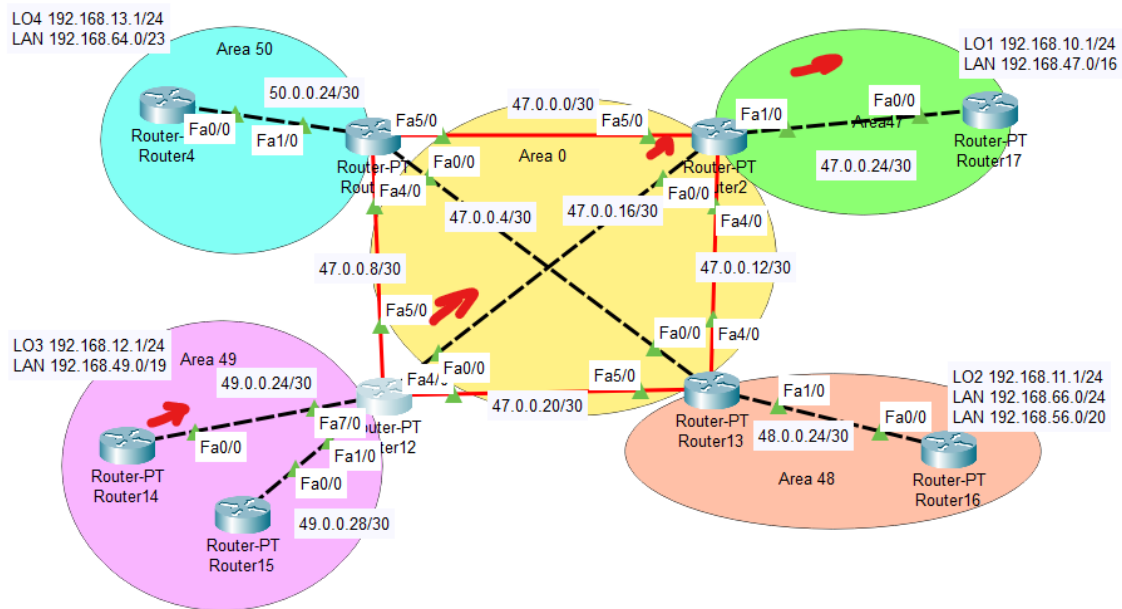


Figure 18 optimal path from R14 to R17

show ip ospf interface brief

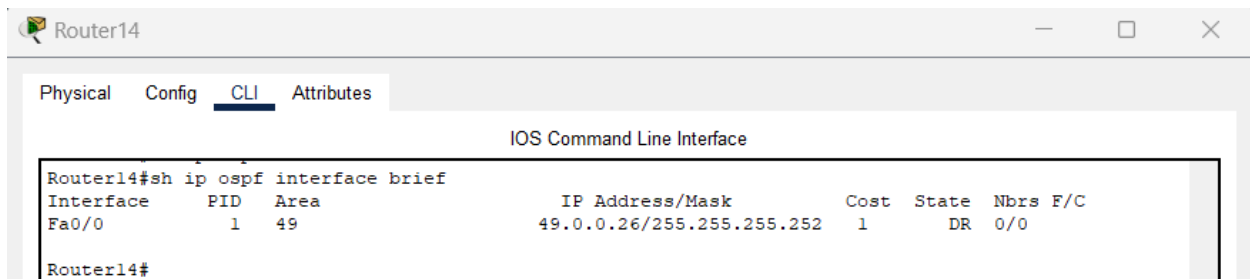


Figure 19 Router 14 show ip ospf interface brief

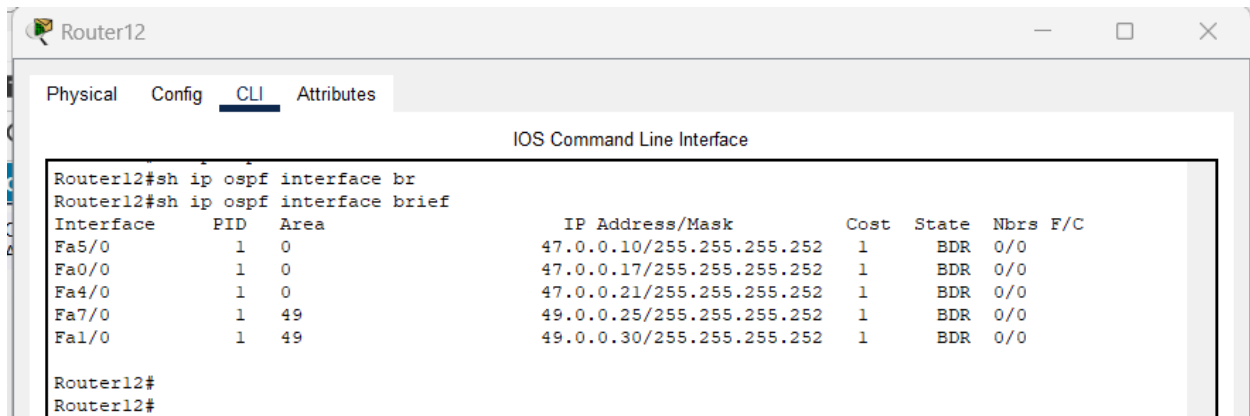


Figure 20 Router 12 show ip ospf interface brief

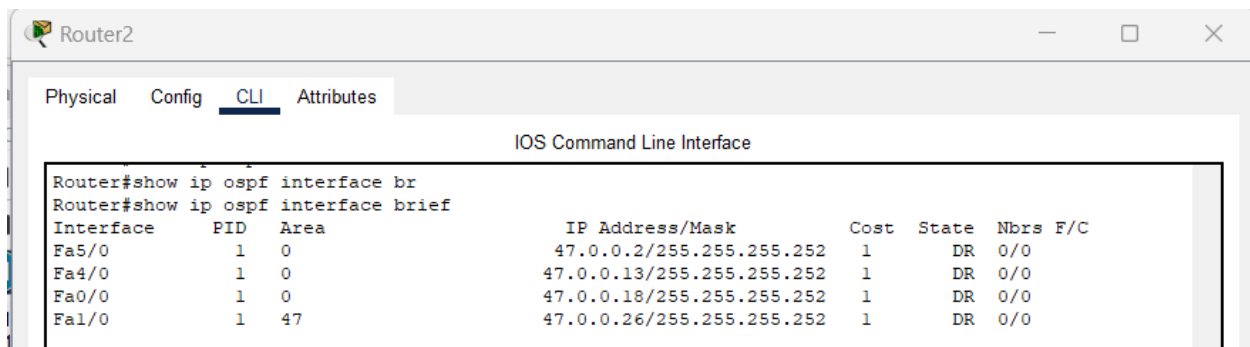


Figure 21 Router 2 show ip ospf interface brief



Figure 22 Router 17 show ip ospf interface brief


```

Router11
Physical Config CLI Attributes
IOS Command Line Interface
Router11#show ip ospf interface brief
Interface      PID Area      IP Address/Mask      Cost  State  Nbrs F/C
Fa0/0          1  0          47.0.0.1/255.255.252  1     DR    0/0
Fa5/0          1  0          47.0.0.5/255.255.252  1     DR    0/0
Fa4/0          1  0          47.0.0.9/255.255.252  1     DR    0/0
Fa1/0          1  50         50.0.0.25/255.255.252  1     DR    0/0
Router11#
Router11#

```

Figure 23 Router 11 show ip ospf interface brief

```

Router13
Physical Config CLI Attributes
IOS Command Line Interface
Router13#sh ip ospf interface brief
Interface      PID Area      IP Address/Mask      Cost  State  Nbrs F/C
Fa4/0          1  0          47.0.0.14/255.255.252  1     BDR   0/0
Fa0/0          1  0          47.0.0.6/255.255.252  1     DR    0/0
Fa5/0          1  0          47.0.0.22/255.255.252  1     DR    0/0
Fa1/0          1  48         48.0.0.25/255.255.252  1     DR    0/0

```

Figure 24 Router 13 show ip ospf interface brief

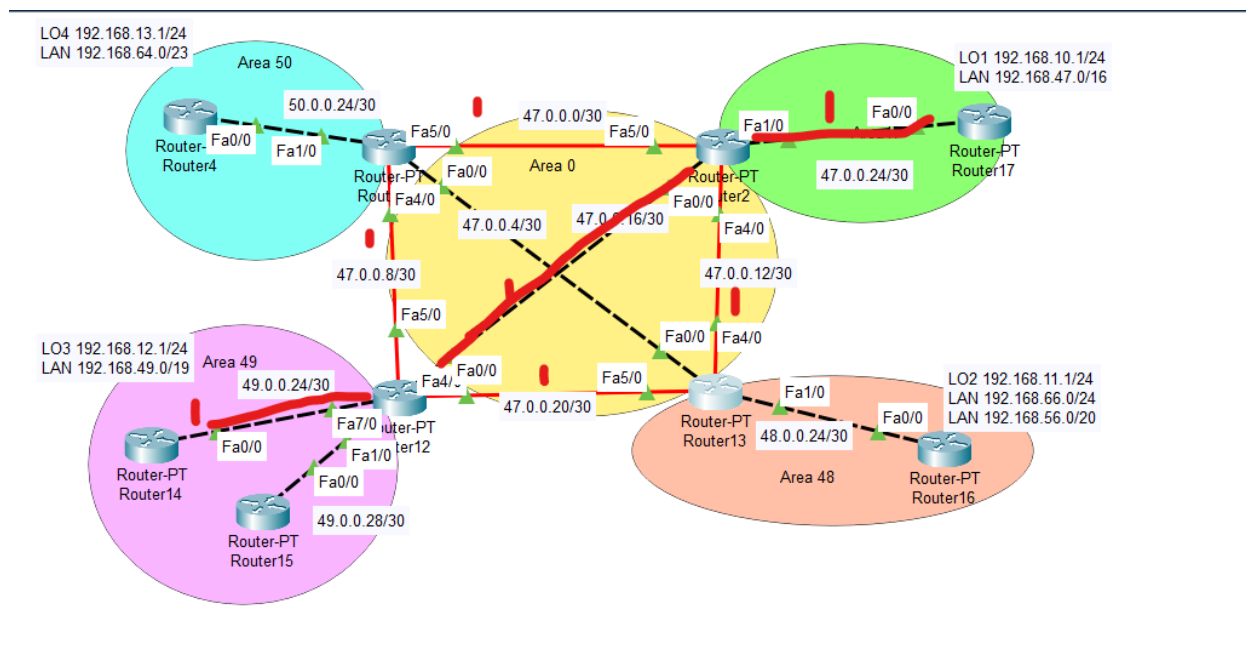
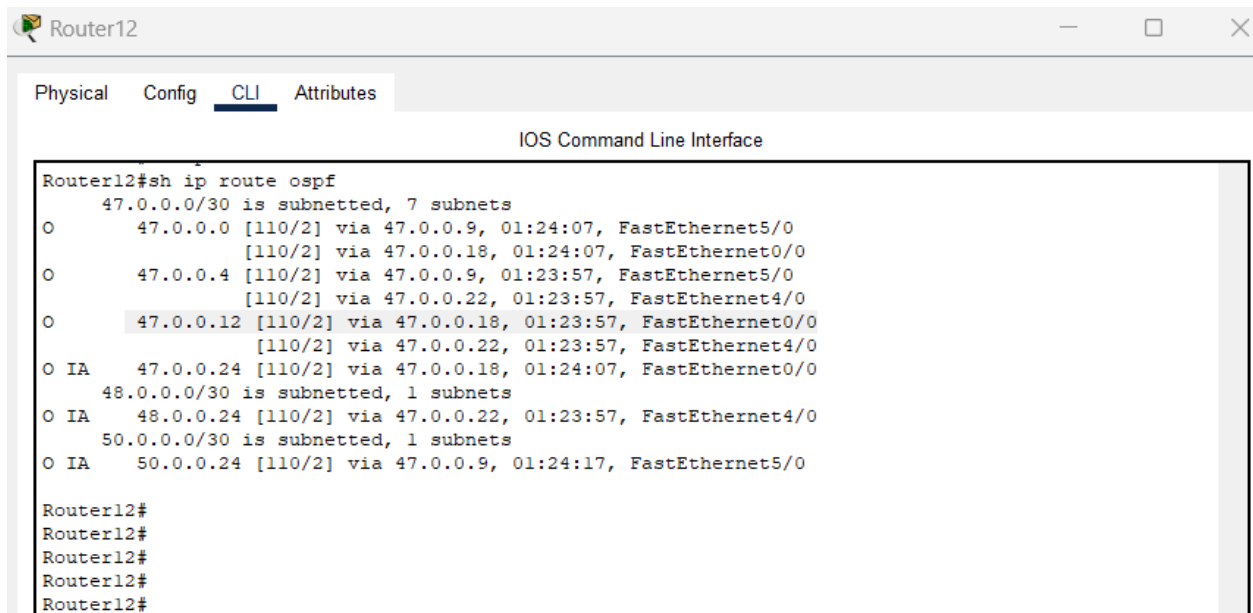


Figure 25 cost at each path

Shortest path from Router 14 to Router 17

R14 > R12 > R2 > R17 is the shortest path

The screenshot shows a web-based interface for Router12. At the top, there are tabs for 'Physical', 'Config', 'CLI', and 'Attributes', with 'CLI' being the active tab. Below the tabs, the text 'IOS Command Line Interface' is displayed. The main area contains the output of the command 'Router12#sh ip route ospf'. The output lists several OSPF routes, including 47.0.0.0/30, 47.0.0.0, 47.0.0.4, 47.0.0.12, 47.0.0.24, 48.0.0.0/30, 48.0.0.24, 50.0.0.0/30, and 50.0.0.24, along with their respective next hops and interface information. The prompt 'Router12#' is repeated at the bottom of the CLI window.

```
Router12#sh ip route ospf
  47.0.0.0/30 is subnetted, 7 subnets
O       47.0.0.0 [110/2] via 47.0.0.9, 01:24:07, FastEthernet5/0
        [110/2] via 47.0.0.18, 01:24:07, FastEthernet0/0
O       47.0.0.4 [110/2] via 47.0.0.9, 01:23:57, FastEthernet5/0
        [110/2] via 47.0.0.22, 01:23:57, FastEthernet4/0
O       47.0.0.12 [110/2] via 47.0.0.18, 01:23:57, FastEthernet0/0
        [110/2] via 47.0.0.22, 01:23:57, FastEthernet4/0
O IA    47.0.0.24 [110/2] via 47.0.0.18, 01:24:07, FastEthernet0/0
  48.0.0.0/30 is subnetted, 1 subnets
O IA    48.0.0.24 [110/2] via 47.0.0.22, 01:23:57, FastEthernet4/0
  50.0.0.0/30 is subnetted, 1 subnets
O IA    50.0.0.24 [110/2] via 47.0.0.9, 01:24:17, FastEthernet5/0

Router12#
Router12#
Router12#
Router12#
Router12#
```

Figure 26 Router 12 show ip route ospf

Cost from Router 14 to Router 17

8. Show the cost from Router 14 to Router 17 with the default reference B/W and see if you have to change it, Explain.

All interfaces are fastEthernet which are equal all over this topology

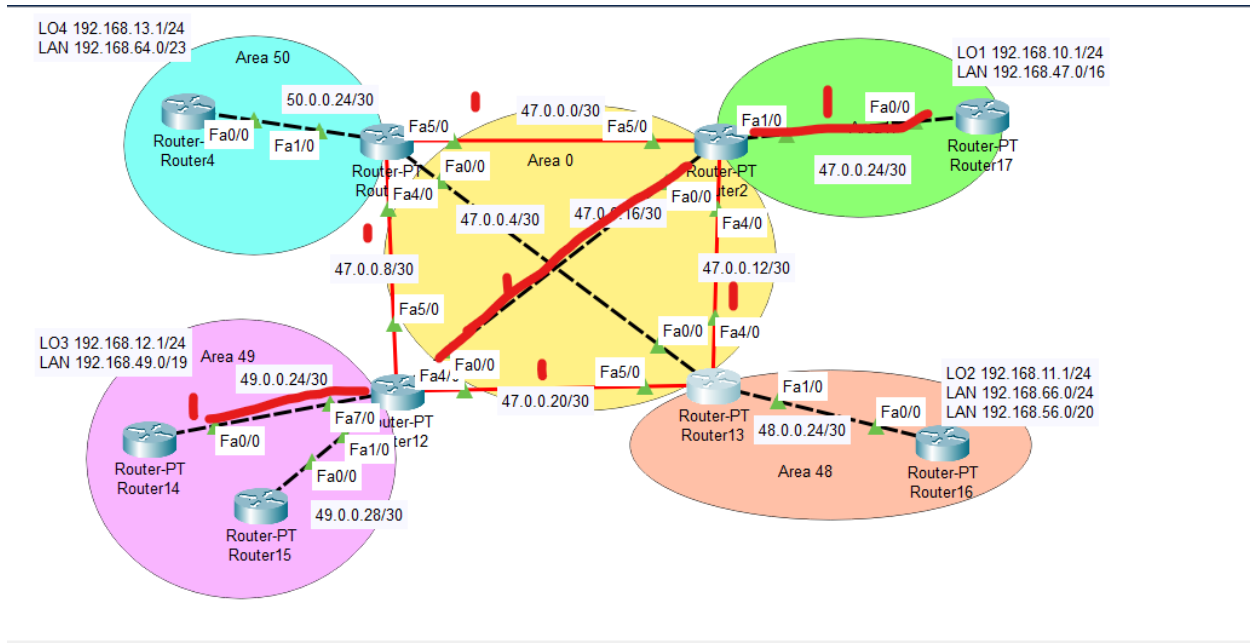
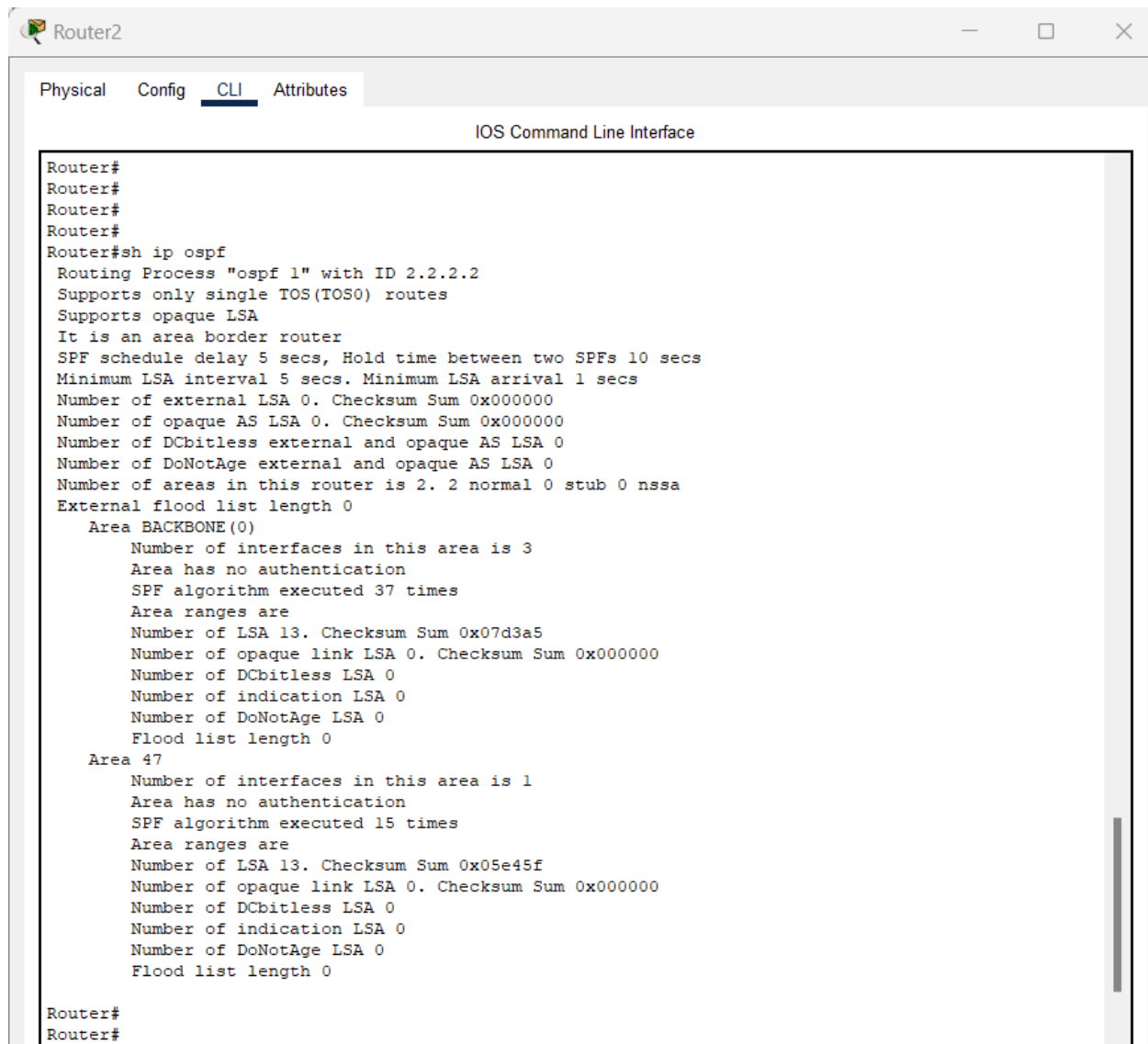


Figure 27 shortest path cost selection

R14 > R12 > R2 > R17 is the shortest path

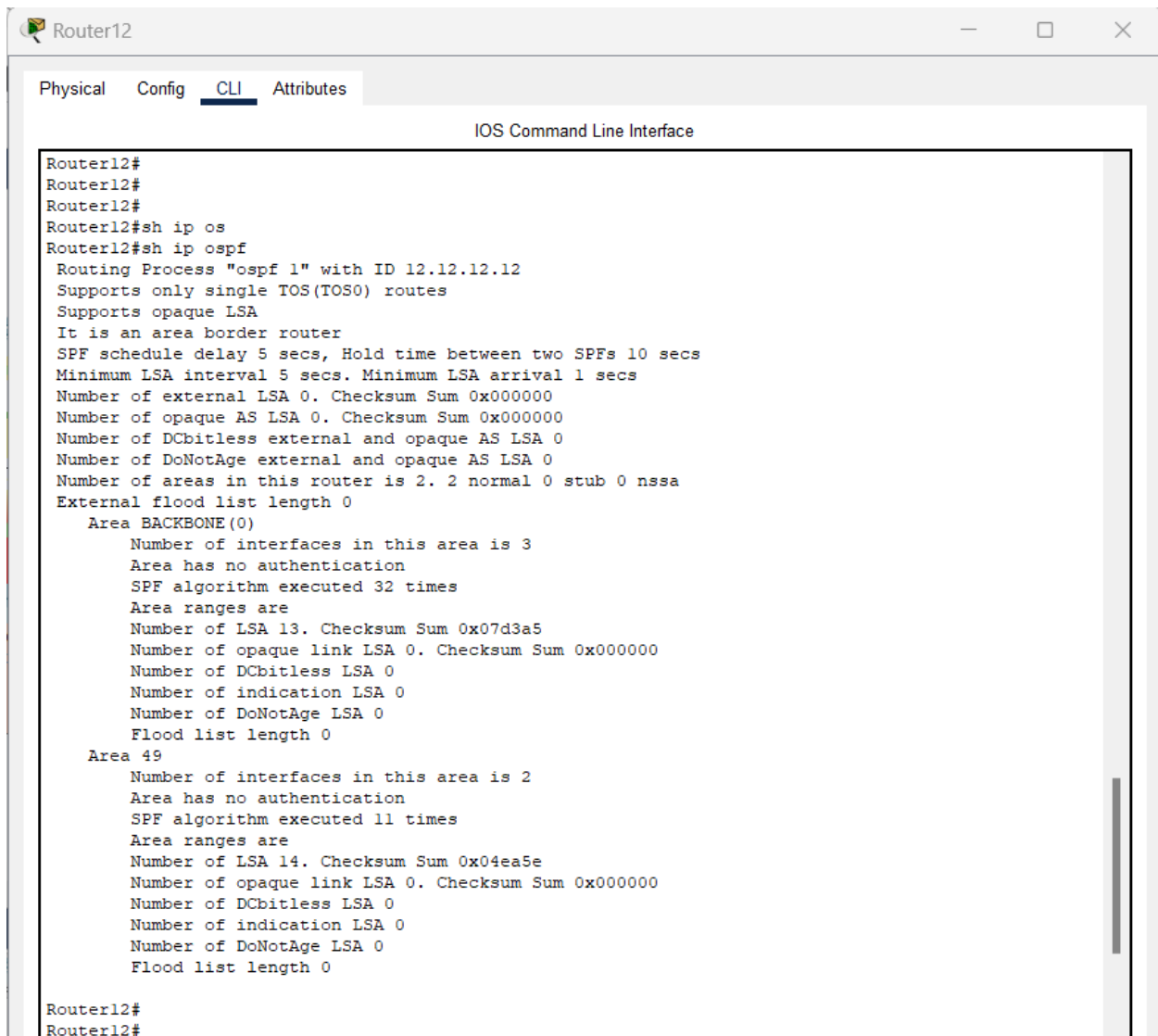
This path remains the optimal path based on b/w



The screenshot shows a window titled "Router2" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The command prompt is "Router#". The command "sh ip ospf" has been entered, and the following output is displayed:

```
Router#
Router#
Router#
Router#
Router#sh ip ospf
Routing Process "ospf 1" with ID 2.2.2.2
Supports only single TOS(TOS0) routes
Supports opaque LSA
It is an area border router
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 2. 2 normal 0 stub 0 nssa
External flood list length 0
  Area BACKBONE(0)
    Number of interfaces in this area is 3
    Area has no authentication
    SPF algorithm executed 37 times
    Area ranges are
    Number of LSA 13. Checksum Sum 0x07d3a5
    Number of opaque link LSA 0. Checksum Sum 0x000000
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
  Area 47
    Number of interfaces in this area is 1
    Area has no authentication
    SPF algorithm executed 15 times
    Area ranges are
    Number of LSA 13. Checksum Sum 0x05e45f
    Number of opaque link LSA 0. Checksum Sum 0x000000
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
Router#
Router#
```

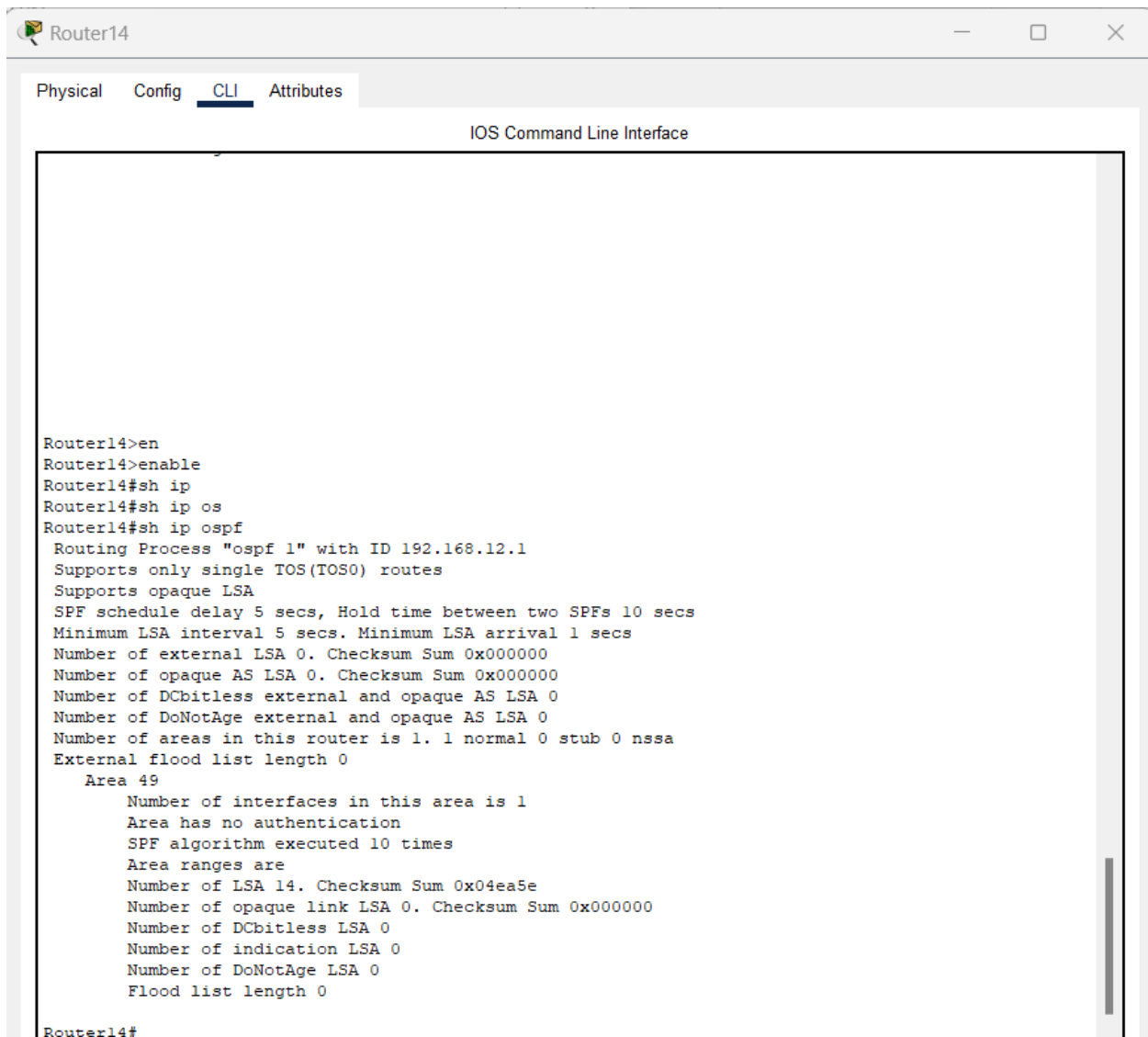
Figure 28 Router 2 show ip ospf



The screenshot shows a web-based interface for a device named 'Router12'. At the top, there are tabs for 'Physical', 'Config', 'CLI' (which is selected), and 'Attributes'. Below the tabs, the title 'IOS Command Line Interface' is displayed. The main area contains a text box with the following text:

```
Router12#
Router12#
Router12#
Router12#sh ip os
Router12#sh ip ospf
Routing Process "ospf 1" with ID 12.12.12.12
Supports only single TOS(TOS0) routes
Supports opaque LSA
It is an area border router
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 2. 2 normal 0 stub 0 nssa
External flood list length 0
  Area BACKBONE(0)
    Number of interfaces in this area is 3
    Area has no authentication
    SPF algorithm executed 32 times
    Area ranges are
    Number of LSA 13. Checksum Sum 0x07d3a5
    Number of opaque link LSA 0. Checksum Sum 0x000000
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
  Area 49
    Number of interfaces in this area is 2
    Area has no authentication
    SPF algorithm executed 11 times
    Area ranges are
    Number of LSA 14. Checksum Sum 0x04ea5e
    Number of opaque link LSA 0. Checksum Sum 0x000000
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
Router12#
Router12#
```

Figure 29 Router 12 show ip ospf



The screenshot shows a web-based interface for a device named 'Router14'. At the top, there are tabs for 'Physical', 'Config', 'CLI', and 'Attributes', with 'CLI' being the active tab. Below the tabs, the title 'IOS Command Line Interface' is displayed. The main area contains a text box with the following text:

```
Router14>en
Router14>enable
Router14#sh ip
Router14#sh ip os
Router14#sh ip ospf
Routing Process "ospf 1" with ID 192.168.12.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Minimum LSA interval 5 secs. Minimum LSA arrival 1 secs
Number of external LSA 0. Checksum Sum 0x000000
Number of opaque AS LSA 0. Checksum Sum 0x000000
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
External flood list length 0
  Area 49
    Number of interfaces in this area is 1
    Area has no authentication
    SPF algorithm executed 10 times
    Area ranges are
    Number of LSA 14. Checksum Sum 0x04ea5e
    Number of opaque link LSA 0. Checksum Sum 0x000000
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
Router14#
```

Figure 30 Router 14 show ip ospf

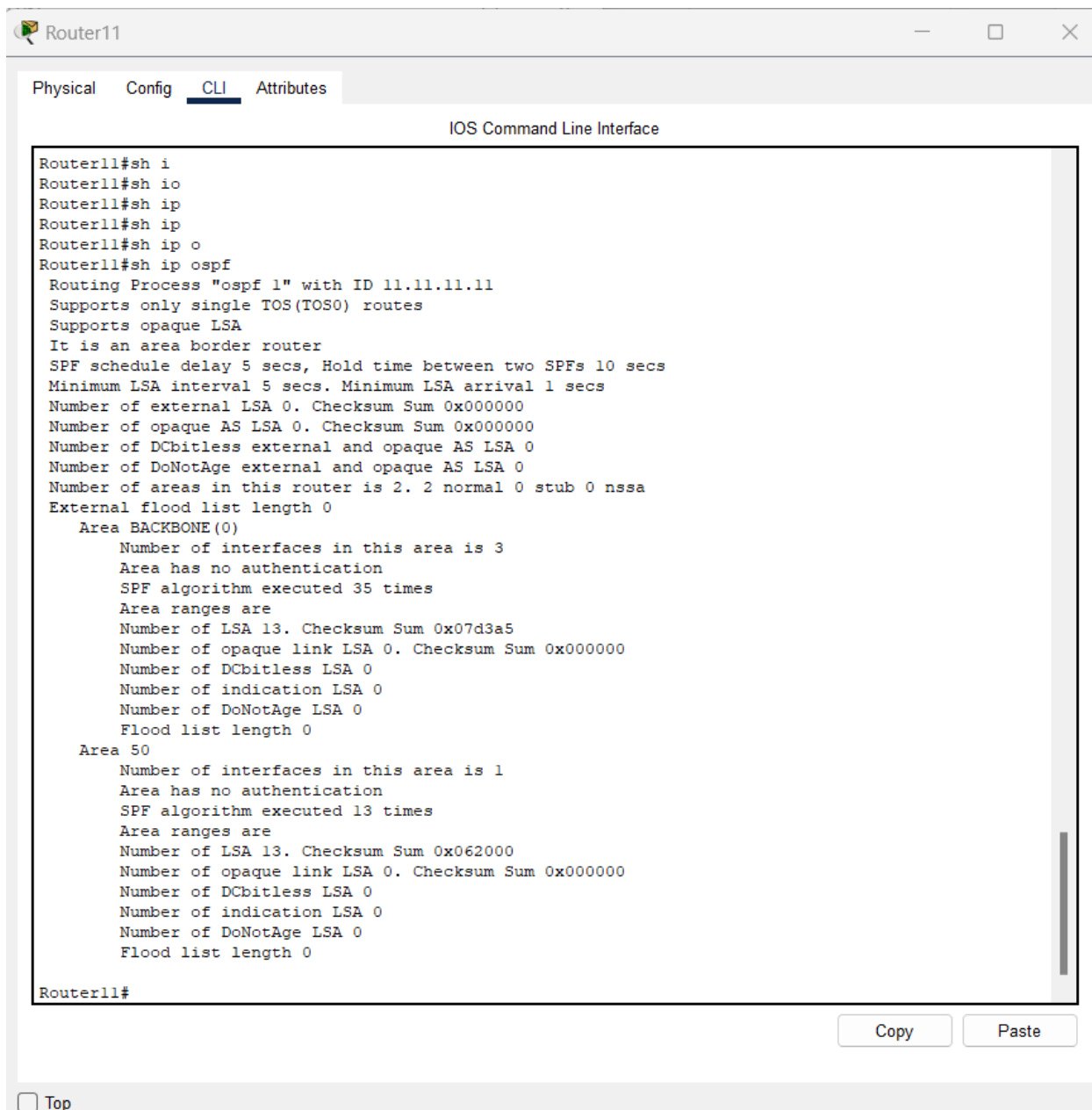


Figure 31 Router 11 show ip ospf

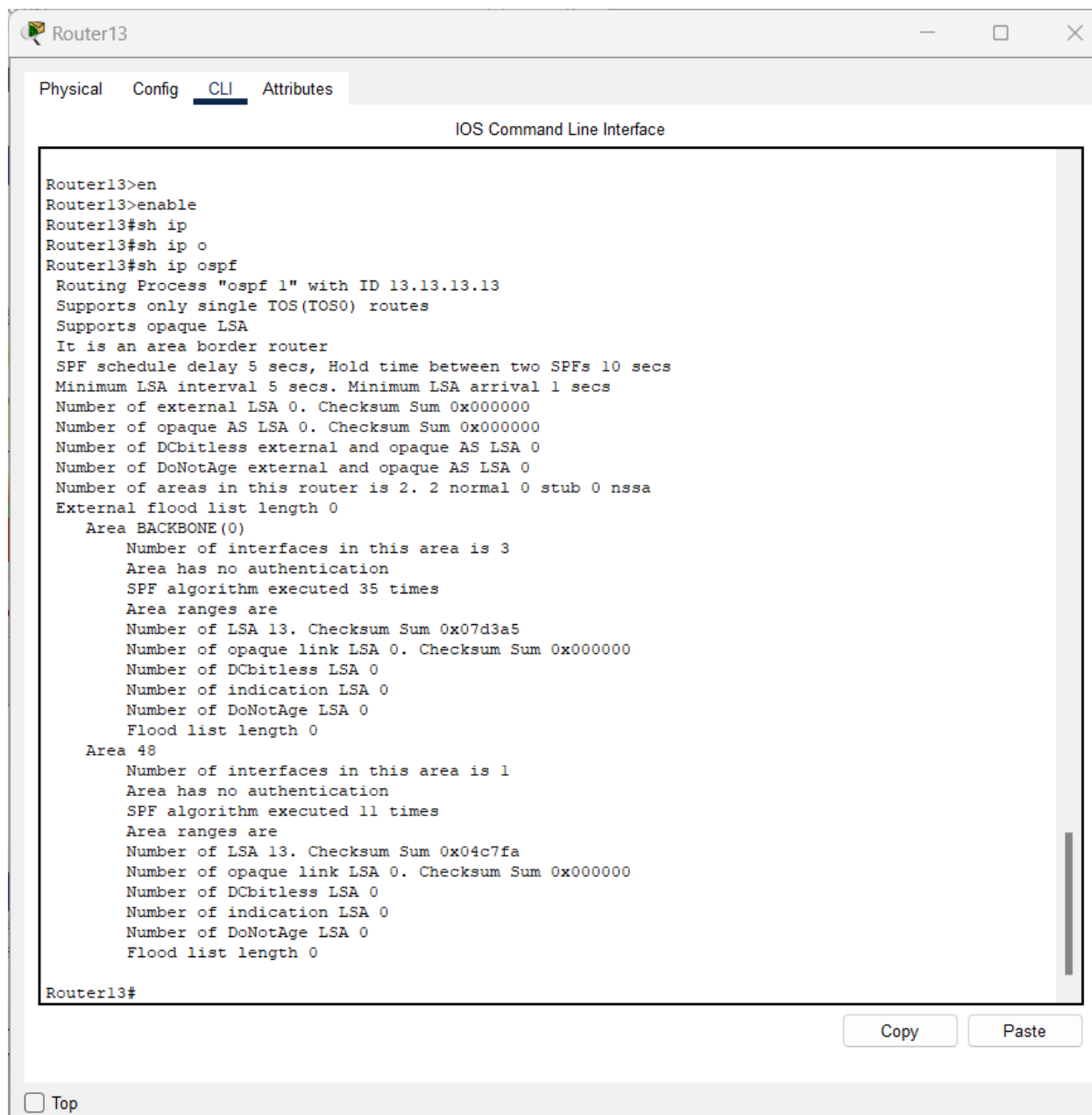


Figure 32 Router 13 show ip ospf

Router 11

```
Router11#show running-config
Building configuration...
```

```
Current configuration : 1048 bytes
```

```
!
```

```
version 12.2
```



```
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
```

```
!
hostname Router11
```

```
!
!
!
!
!
!
!
!
```

```
no ip cef
no ipv6 cef
```

```
!
!
!
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!
!
```

```
interface FastEthernet0/0
ip address 47.0.0.1 255.255.255.252
duplex auto
speed auto
```

```
!
interface FastEthernet1/0
ip address 50.0.0.25 255.255.255.252
duplex auto
speed auto
```

```
!
interface Serial2/0
no ip address
clock rate 2000000
```

```
shutdown
!
interface Serial3/0
no ip address
clock rate 2000000
shutdown
!
interface FastEthernet4/0
ip address 47.0.0.9 255.255.255.252
!
interface FastEthernet5/0
ip address 47.0.0.5 255.255.255.252
!
interface Modem8/0
no ip address
!
interface Modem9/0
no ip address
!
router ospf 1
router-id 11.11.11.11
log-adjacency-changes
network 47.0.0.0 0.0.0.3 area 0
network 47.0.0.4 0.0.0.3 area 0
network 47.0.0.8 0.0.0.3 area 0
network 50.0.0.24 0.0.0.3 area 50
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
```

Router11#

```
!  
interface FastEthernet0/0  
ip address 47.0.0.17 255.255.255.252  
duplex auto  
speed auto  
!  
interface FastEthernet1/0  
ip address 49.0.0.30 255.255.255.252  
duplex auto  
speed auto  
!  
interface Serial2/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Serial3/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface FastEthernet4/0  
ip address 47.0.0.21 255.255.255.252  
!  
interface FastEthernet5/0  
ip address 47.0.0.10 255.255.255.252  
!  
interface FastEthernet6/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface FastEthernet7/0  
ip address 49.0.0.25 255.255.255.252  
duplex auto  
speed auto  
!  
interface FastEthernet9/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
router ospf 1  
router-id 12.12.12.12
```

```
log-adjacency-changes
network 47.0.0.8 0.0.0.3 area 0
network 47.0.0.16 0.0.0.3 area 0
network 47.0.0.20 0.0.0.3 area 0
network 49.0.0.24 0.0.0.3 area 49
network 49.0.0.28 0.0.0.3 area 49
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end
```

Router12#

Router 2

```
Router#show running-config
Building configuration...

Current configuration : 1122 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
```



```
!  
interface FastEthernet4/0  
ip address 47.0.0.13 255.255.255.252  
!  
interface FastEthernet5/0  
ip address 47.0.0.2 255.255.255.252  
!  
interface Ethernet8/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Ethernet9/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
router ospf 1  
router-id 2.2.2.2  
log-adjacency-changes  
network 47.0.0.0 0.0.0.3 area 0  
network 47.0.0.12 0.0.0.3 area 0  
network 47.0.0.16 0.0.0.3 area 0  
network 47.0.0.24 0.0.0.3 area 47  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!  
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login  
!  
!
```

Router#

```
Router13#show running-config
Building configuration...

Current configuration : 1128 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router13
!
!
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
```



```
!  
interface FastEthernet0/0  
ip address 47.0.0.6 255.255.255.252  
duplex auto  
speed auto  
!  
interface FastEthernet1/0  
ip address 48.0.0.25 255.255.255.252  
duplex auto  
speed auto  
!  
interface Serial2/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Serial3/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface FastEthernet4/0  
ip address 47.0.0.14 255.255.255.252  
!  
interface FastEthernet5/0  
ip address 47.0.0.22 255.255.255.252  
!  
interface Ethernet8/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Ethernet9/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
router ospf 1  
router-id 13.13.13.13  
log-adjacency-changes  
network 47.0.0.12 0.0.0.3 area 0  
network 47.0.0.4 0.0.0.3 area 0  
network 47.0.0.20 0.0.0.3 area 0  
network 48.0.0.24 0.0.0.3 area 48
```

```
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login  
!  
!  
!  
end
```

Router13#

Router 4

```
Router#sh run  
Building configuration...  
  
Current configuration : 960 bytes  
!  
version 12.2  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname Router  
!  
!  
!  
!
```

```
ip dhcp pool router4
network 192.168.48.0 255.255.255.0
default-router 192.168.64.1
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface Loopback4
ip address 192.168.13.1 255.255.255.0
!
interface FastEthernet0/0
ip address 50.0.0.26 255.255.255.252
duplex auto
speed auto
!
interface FastEthernet1/0
no ip address
duplex auto
speed auto
shutdown
!
interface Serial2/0
no ip address
clock rate 2000000
shutdown
!
interface Serial3/0
```

```
no ip address
clock rate 2000000
shutdown
!
interface FastEthernet4/0
no ip address
shutdown
!
interface FastEthernet5/0
no ip address
shutdown
!
router ospf 1
log-adjacency-changes
network 50.0.0.24 0.0.0.3 area 50
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end
```

Router#

Router 17

```
Router17#sh run
Building configuration...
```



```
!  
interface FastEthernet1/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial2/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Serial3/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface FastEthernet4/0  
no ip address  
shutdown  
!  
interface FastEthernet5/0  
no ip address  
shutdown  
!  
router ospf 1  
log-adjacency-changes  
network 47.0.0.24 0.0.0.3 area 47  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!  
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login
```

```
!  
!  
!  
end
```

```
Router17#
```

Router 16

```
Router16#sh run  
Building configuration..  
  
Current configuration : 1052 bytes  
!  
version 12.2  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname Router16  
!  
!  
!  
!  
!  
ip dhcp pool router16  
network 192.168.66.0 255.255.255.0  
default-router 192.168.66.1  
ip dhcp pool router16-2  
network 192.168.48.0 255.255.240.0  
default-router 192.168.16.1  
!  
!  
!  
ip cef  
no ipv6 cef  
!  
!  
!  
!  
!  
!  
!  
!  
!
```

```
!  
!  
!  
!  
!  
!  
!  
!  
!  
interface Loopback2  
ip address 192.168.11.1 255.255.255.0  
!  
interface FastEthernet0/0  
ip address 48.0.0.26 255.255.255.252  
duplex auto  
speed auto  
!  
interface FastEthernet1/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial2/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Serial3/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface FastEthernet4/0  
no ip address  
shutdown  
!  
interface FastEthernet5/0  
no ip address  
shutdown  
!  
router ospf 1  
log-adjacency-changes  
network 48.0.0.24 0.0.0.3 area 48  
!  
ip classless
```



```
!  
ip flow-export version 9  
!  
!  
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login  
!  
!  
!  
end
```

Router16#

Router 15

```
Router15#sh run  
Building configuration...  
  
Current configuration : 815 bytes  
!  
version 12.2  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname Router15  
!  
!  
!  
!  
!  
!  
!  
!  
ip cef
```



```
shutdown
!
router ospf 1
log-adjacency-changes
network 49.0.0.28 0.0.0.3 area 49
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end
```

Router15#

Router 14

```
Router14#sh run
Router14#sh running-config
Building configuration...

Current configuration : 1052 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router14
!
```



```
!  
interface Serial2/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Serial3/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface FastEthernet4/0  
no ip address  
shutdown  
!  
interface FastEthernet5/0  
no ip address  
shutdown  
!  
router ospf 1  
log-adjacency-changes  
network 49.0.0.24 0.0.0.3 area 49  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!  
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login  
!  
!  
!  
end
```

Router14#