

# **Data Communication and Computer Networks**

**EEE314**

Lab # 07

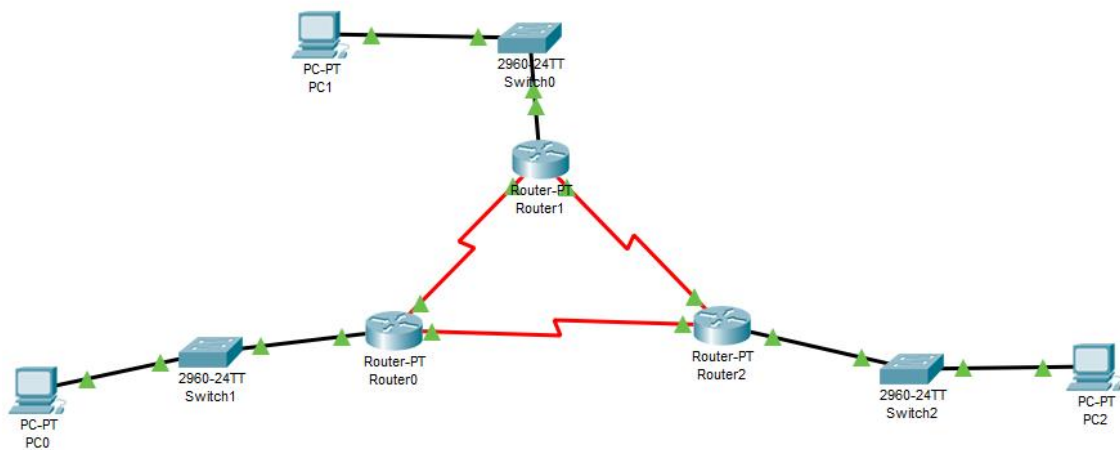


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## Lab #07 OSPF Configuration

### In-Lab Task

#### Task 1



PDU List Window										
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC1	ICMP		0.000	N	0	(edit)	
	Successful	PC0	PC2	ICMP		0.000	N	1	(edit)	
	Successful	PC1	PC0	ICMP		0.000	N	2	(edit)	
	Successful	PC1	PC2	ICMP		0.000	N	3	(edit)	
	Successful	PC2	PC1	ICMP		0.000	N	4	(edit)	
	Successful	PC2	PC0	ICMP		0.000	N	5	(edit)	

## **Home Task**

### **TASK 1:**

#### **➤ Router 0:**

#### **show running-config:**

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

```
Current configuration : 923 bytes
```

```
!
```

```
version 12.2
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname Router
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
ip cef
```

```
no ipv6 cef
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

## Lab#07 OSPF Configuration

---

```
!  
!  
!  
!  
!  
!  
interface Loopback0  
ip address 10.1.1.1 255.255.255.255  
!  
interface FastEthernet0/0  
ip address 172.16.1.17 255.255.255.240  
duplex auto  
speed auto  
!  
interface FastEthernet1/0  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial2/0  
ip address 192.168.10.1 255.255.255.252  
clock rate 64000  
!  
interface Serial3/0  
ip address 192.168.10.5 255.255.255.252  
!  
interface FastEthernet4/0  
no ip address  
shutdown  
!  
interface FastEthernet5/0  
no ip address  
shutdown  
!  
router ospf 1  
log-adjacency-changes  
network 172.16.1.16 0.0.0.15 area 0  
network 192.168.10.0 0.0.0.3 area 0  
!  
ip classless  
!  
ip flow-export version 9  
!  
!  
!
```

```
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login  
!  
!  
!  
end
```

## **show ip route:**

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

```
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks  
C 10.1.1.1/32 is directly connected, Loopback0  
O 10.10.10.0/24 [110/65] via 192.168.10.2, 00:05:14, Serial2/0  
172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks  
C 172.16.1.16/28 is directly connected, FastEthernet0/0  
O 172.16.1.32/29 [110/129] via 192.168.10.2, 00:05:04, Serial2/0  
192.168.10.0/30 is subnetted, 3 subnets  
C 192.168.10.0 is directly connected, Serial2/0  
C 192.168.10.4 is directly connected, Serial3/0  
O 192.168.10.8 [110/128] via 192.168.10.2, 00:05:14, Serial2/0
```

## **show ip interface brief:**

```
Router#show ip interface brief
```

```
^
```

```
% Invalid input detected at '^' marker.
```

```
Router#show ip interface brief
```

```
Interface IP-Address OK? Method Status Protocol
```

```
FastEthernet0/0 172.16.1.17 YES manual up up
```

```
FastEthernet1/0 unassigned YES unset administratively down down
```

```
Serial2/0 192.168.10.1 YES manual up up
```

```
Serial3/0 192.168.10.5 YES manual up up
```

```
FastEthernet4/0 unassigned YES unset administratively down down
```

```
FastEthernet5/0 unassigned YES unset administratively down down
```

```
Loopback0 10.1.1.1 YES manual up up
```

## **show ip protocol:**

```
Router#show ip protocol
```

```
Routing Protocol is "ospf 1"
```

```
Outgoing update filter list for all interfaces is not set
```

```
Incoming update filter list for all interfaces is not set
```

```
Router ID 10.1.1.1
```

```
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
```

```
Maximum path: 4
```

```
Routing for Networks:
```

```
172.16.1.16 0.0.0.15 area 0
```

```
192.168.10.0 0.0.0.3 area 0
```

```
Routing Information Sources:
```

```
Gateway Distance Last Update
```

```
10.1.1.1 110 00:06:16
```

```
10.2.2.2 110 00:06:16
```

```
10.3.3.3 110 00:06:17
```

```
Distance: (default is 110)
```

## ➤ Router 1:

### show running-config:

Router#show running-config  
Building configuration...

Current configuration : 957 bytes

```
!  
version 12.2  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
no service password-encryption  
!  
hostname Router  
!  
!  
!  
!  
!  
!  
ip cef  
no ipv6 cef  
!  
!  
!  
!  
!  
!  
!  
!  
!  
!  
!  
interface Loopback0  
ip address 10.2.2.2 255.255.255.255  
!  
interface FastEthernet0/0  
ip address 10.10.10.1 255.255.255.0  
duplex auto  
speed auto  
!
```

## Lab#07 OSPF Configuration

---

```
interface FastEthernet1/0
no ip address
duplex auto
speed auto
shutdown
!
interface Serial2/0
ip address 192.168.10.2 255.255.255.252
!
interface Serial3/0
ip address 192.168.10.9 255.255.255.252
clock rate 64000
!
interface FastEthernet4/0
no ip address
shutdown
!
interface FastEthernet5/0
no ip address
shutdown
!
router ospf 1
log-adjacency-changes
network 10.10.10.0 0.0.0.255 area 0
network 192.168.10.0 0.0.0.3 area 0
network 192.168.10.8 0.0.0.3 area 0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
```



```
!  
end
```

## **show ip route:**

```
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

```
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks  
C 10.2.2.2/32 is directly connected, Loopback0  
C 10.10.10.0/24 is directly connected, FastEthernet0/0  
172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks  
O 172.16.1.16/28 [110/65] via 192.168.10.1, 00:07:12, Serial2/0  
O 172.16.1.32/29 [110/65] via 192.168.10.10, 00:07:12, Serial3/0  
192.168.10.0/30 is subnetted, 3 subnets  
C 192.168.10.0 is directly connected, Serial2/0  
O 192.168.10.4 [110/128] via 192.168.10.10, 00:07:12, Serial3/0  
C 192.168.10.8 is directly connected, Serial3/0
```

## **Show ip interface brief:**

```
Router#show ip interface brief  
Interface IP-Address OK? Method Status Protocol  
FastEthernet0/0 10.10.10.1 YES manual up up  
FastEthernet1/0 unassigned YES unset administratively down down  
Serial2/0 192.168.10.2 YES manual up up  
Serial3/0 192.168.10.9 YES manual up up  
FastEthernet4/0 unassigned YES unset administratively down down  
FastEthernet5/0 unassigned YES unset administratively down down  
Loopback0 10.2.2.2 YES manual up up
```

## **show ip protocol:**

```
Router#show ip protocol  
  
Routing Protocol is "ospf 1"  
Outgoing update filter list for all interfaces is not set
```

Incoming update filter list for all interfaces is not set  
Router ID 10.2.2.2  
Number of areas in this router is 1. 1 normal 0 stub 0 nssa  
Maximum path: 4  
Routing for Networks:  
10.10.10.0 0.0.0.255 area 0  
192.168.10.0 0.0.0.3 area 0  
192.168.10.8 0.0.0.3 area 0  
Routing Information Sources:  
Gateway Distance Last Update  
10.1.1.1 110 00:08:06  
10.2.2.2 110 00:08:06  
10.3.3.3 110 00:08:07  
Distance: (default is 110)

## ➤ **Router 2:**

### **Show running-config:**

```
Router#show running-config
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
!
!
!
!
!
!
!
```

## Lab#07 OSPF Configuration

---

```
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
interface Loopback0
ip address 10.3.3.3 255.255.255.255
!
interface FastEthernet0/0
ip address 172.16.1.33 255.255.255.248
duplex auto
speed auto
!
interface FastEthernet1/0
no ip address
duplex auto
speed auto
shutdown
!
interface Serial2/0
ip address 192.168.10.6 255.255.255.252
clock rate 64000
!
interface Serial3/0
ip address 192.168.10.10 255.255.255.252
!
interface FastEthernet4/0
no ip address
shutdown
!
interface FastEthernet5/0
no ip address
shutdown
!
router ospf 1
```

## Lab#07 OSPF Configuration

---

```
log-adjacency-changes
network 172.16.1.32 0.0.0.7 area 0
network 192.168.10.4 0.0.0.3 area 0
network 192.168.10.8 0.0.0.3 area 0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end
```

### **show ip route:**

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

```
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.3.3.3/32 is directly connected, Loopback0
O 10.10.10.0/24 [110/65] via 192.168.10.9, 00:08:46, Serial3/0
172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
O 172.16.1.16/28 [110/129] via 192.168.10.9, 00:08:36, Serial3/0
C 172.16.1.32/29 is directly connected, FastEthernet0/0
```

192.168.10.0/30 is subnetted, 3 subnets  
O 192.168.10.0 [110/128] via 192.168.10.9, 00:08:46, Serial3/0  
C 192.168.10.4 is directly connected, Serial2/0  
C 192.168.10.8 is directly connected, Serial3/0

## **Show ip interface brief:**

```
Router#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 172.16.1.33 YES manual up up
FastEthernet1/0 unassigned YES unset administratively down down
Serial2/0 192.168.10.6 YES manual up up
Serial3/0 192.168.10.10 YES manual up up
FastEthernet4/0 unassigned YES unset administratively down down
FastEthernet5/0 unassigned YES unset administratively down down
Loopback0 10.3.3.3 YES manual up up
```

## **show ip protocol:**

```
Router#show ip protocol

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 10.3.3.3
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
 172.16.1.32 0.0.0.7 area 0
 192.168.10.4 0.0.0.3 area 0
 192.168.10.8 0.0.0.3 area 0
Routing Information Sources:
Gateway Distance Last Update
10.1.1.1 110 00:09:24
10.2.2.2 110 00:09:24
10.3.3.3 110 00:09:25
Distance: (default is 110)
```

## Critical Analysis / Conclusion

In this lab we learnt about Open shortest path first (OSPF) configuration. It is a classless routing protocol that can be used to provide subnet mask information in the routing updates, this feature of OSPF helps the VLSM subnet information to be available throughout the network.

Moreover, we implemented this on a topology given to us and successfully sent packets between PC's connected to different routers.

Lab Assessment		
Pre Lab	/5	/25
Performance	/5	
Results	/5	
Viva	/5	
Critical Analysis	/5	
Instructor Signature and Comments		