

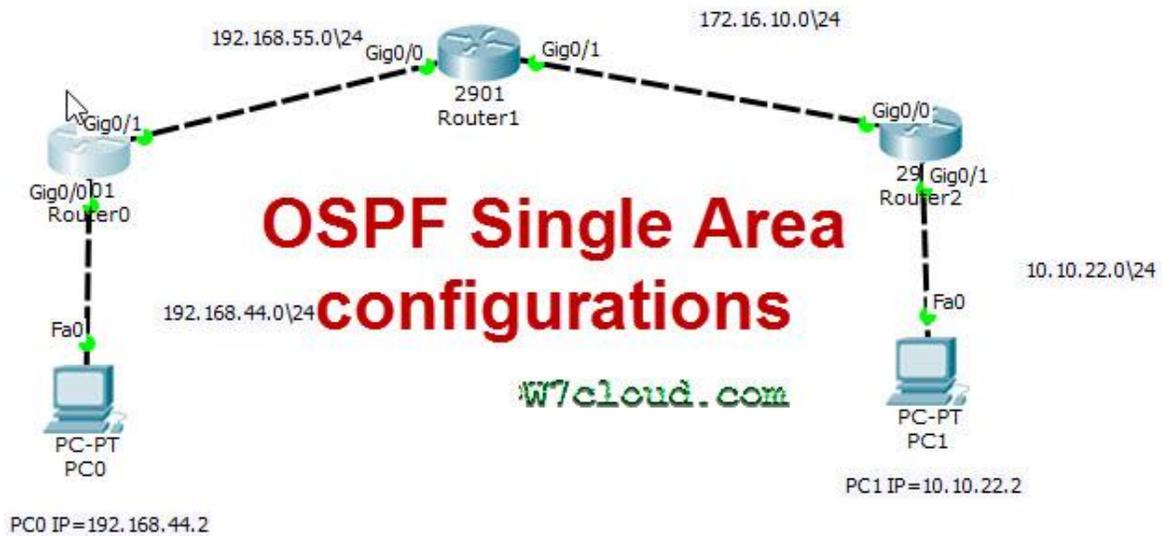
## OSPF single area configuration lab on packet tracer

This OSPF lab is created in packet tracer and you will learn the OSPF single area configuration from this lab.

### Configuring the OSPF Routing Process

This is a basic lab regarding OSPF single area configuration related to CCNA or ICND1/2 exam. In following figure there are the three routers with the following specification or required configurations:

Device Name	Protocol configuration	IP Scheme / Interface configurations
PC0	--	F0 = 192.168.44.2\24
PC1	--	F0 = 10.10.22.2\24
Router0	OSPF 1	G0/0 = 192.168.44.1\24, G0/1 = 192.168.55.1\24
Router1	OSPF 1	G0/0 = 192.168.55.2\24, G0/1 = 172.16.10.1\24
Router2	OSPF 1	G0/0 = 172.16.10.2\24, G0/1 = 10.10.22.1\24



### Lab Objective

- Setup an IP addressing scheme on all the devices according to above table.
- Configure and verify Open Shortest Path First (OSPF) routing.

Solution:

Configure and create the above lab in packet tracer and complete the IP configuration with following configurations:

### **Router0 IP and interface Configuration:**

On the router, enter the global configuration mode and configure the hostname as shown in the chart. Then configure the console, virtual terminal and enable passwords. Next configure the interfaces according to the chart.

```
Router>enable
Router#conf t
Router(config)#hostname Router0
Router0(config)#interface gigabitEthernet 0/0
Router0(config-if)#ip address 192.168.44.1 255.255.255.0
Router0(config-if)#no shut
Router0(config-if)#exit
Router0(config)#interface gigabitEthernet 0/1
Router0(config-if)#ip address 192.168.55.1 255.255.255.0
Router0(config-if)#no shutdown
```

### **Router1 IP Configuration:**

Perform the same configuration as on above router with their IP scheme.

```
Router>enable
Router#conf t
Router(config)#hostname Router1
Router1(config)#interface gigabitEthernet 0/0
Router1(config-if)#ip address 192.168.55.2 255.255.255.0
Router1(config-if)#no shut
Router1(config-if)#exi
Router1(config)#interface gigabitEthernet 0/1
Router1(config-if)#ip address 172.16.10.1 255.255.255.0
Router1(config-if)#no shutdown
```

### **Router2 IP and interface Configuration:**

```
Router>enable
Router#conf t
Router(config)#hostname Router2
Router2(config)#int gigabitEthernet 0/0
Router2(config-if)#ip address 172.16.10.2 255.255.255.0
Router2(config-if)#no shut
Router2(config-if)#exit
Router2(config)#interface gigabitEthernet 0/1
Router2(config-if)#ip address 10.10.22.1 255.255.255.0
Router2(config-if)#no shutdown
```

### **PC0 Configuration:**

Assign the IP address, subnet mask and gateway. 255.255.255.0 is the Subnet mask and gateway will be the next hop address of router or the IP of router-interface attached with PC, and in this case it is 192.168.44.1. Each workstation should be able to ping the attached router. For more details you can watch this video: <https://www.youtube.com/watch?v=btjCFINfy7Y>

### **PC1 Configuration:**

Configure this workstation with following IPs:

IP address: 10.10.22.2

Subnet Mask: 255.255.255.0

Gateway: 10.10.22.1

### **Task2-Configure and verify Open Shortest Path First (OSPF) routing:**

Configure an OSPF routing process on all routers. Use OSPF process number 1 and ensure all networks are in area 0. **For configuring any router with OSPF you need to advertise all the directly connected network in OSPF process.** For example on router0 you have the networks 192.168.44.0/24 and 192.168.55.0/24 so you can see that I have advertise these network in area 0 for OSPF configurations.

#### **Router0 OSPF Configuration:**

```
Router0#conf t
Router0(config)#router ospf 1
Router0(config-router)#network 192.168.44.0 0.0.0.255 area 0
Router0(config-router)#network 192.168.55.0 0.0.0.255 area 0
Router0(config-router)#exit
```

#### **Router1 OSPF Configuration:**

```
Router1#conf t
Router1(config)#router ospf 1
Router1(config-router)#network 192.168.55.2 0.0.0.255 area 0
Router1(config-router)#network 172.16.10.0 0.0.0.255 area 0
Router1(config-router)#exit
```

#### **Router2 OSPF Configuration:**

```
Router2#conf t
Router2(config)#router ospf 1
Router2(config-router)#network 172.16.10.0 0.0.0.255 area 0
Router2(config-router)#network 10.10.22.0 0.0.0.255 area 0
Router2(config-router)#exit
```

**Note:** You can use the “ip OSPF area 0” command for configuring OSPF. For this you have enter the interface mode and then run the commands in following way. for router2 you can use these commands:

```
Router2>en
Router2#conf t
Router2(config)#inter gigabitEthernet 0/0
Router2(config-if)#ip ospf area 0
```

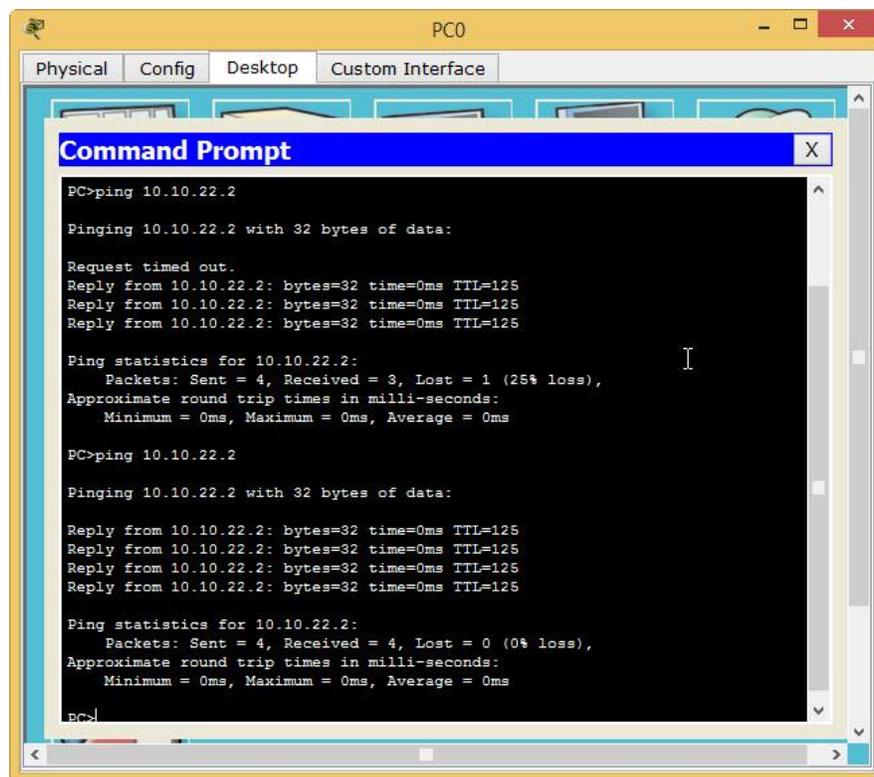
```
Router2(config)#inter gigabitEthernet 0/1
Router2(config-if)#ip ospf area 0
```

But you are required the newer version of IOS for configuring these commands.

### Testing for correct configuration:

You can ensure the correct configuration by following two ways:

1. end to end ping should be successful, this mean ping from PC0 to PC1 and vice versa should be successful. you can see the following image, we will have the same results in case of correct configurations.



2. Show ip route command will display all the OSPF routes (including the networks which are not connected to router). Screenshot of "Show ip route" on Router0 will have the following output in case of correct configurations.

Router0

Physical Config CLI

### IOS Command Line Interface

```
Router0#
%SYS-5-CONFIG_I: Configured from console by console

Router0#wr
Building configuration...
[OK]
Router0#sho
Router0#show ip rou
Router0#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, E - EIGRP summary
        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

  10.0.0.0/24 is subnetted, 1 subnets
O    10.10.22.0/24 [110/3] via 192.168.55.2, 00:02:11, GigabitEthernet0/1
  172.16.0.0/24 is subnetted, 1 subnets
O    172.16.10.0/24 [110/2] via 192.168.55.2, 00:02:38, GigabitEthernet0/1
  192.168.44.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.44.0/24 is directly connected, GigabitEthernet0/0
L    192.168.44.1/32 is directly connected, GigabitEthernet0/0
  192.168.55.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.55.0/24 is directly connected, GigabitEthernet0/1
L    192.168.55.1/32 is directly connected, GigabitEthernet0/1
Router0#
```

**OSPF Routes**

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