



# **American International University-Bangladesh (AIUB)**

Faculty of Science and Technology (FST)  
Department of Computer Science (CS)  
Undergraduate Program

**Course Code and Title: CSC 3116: Computer  
Networks**

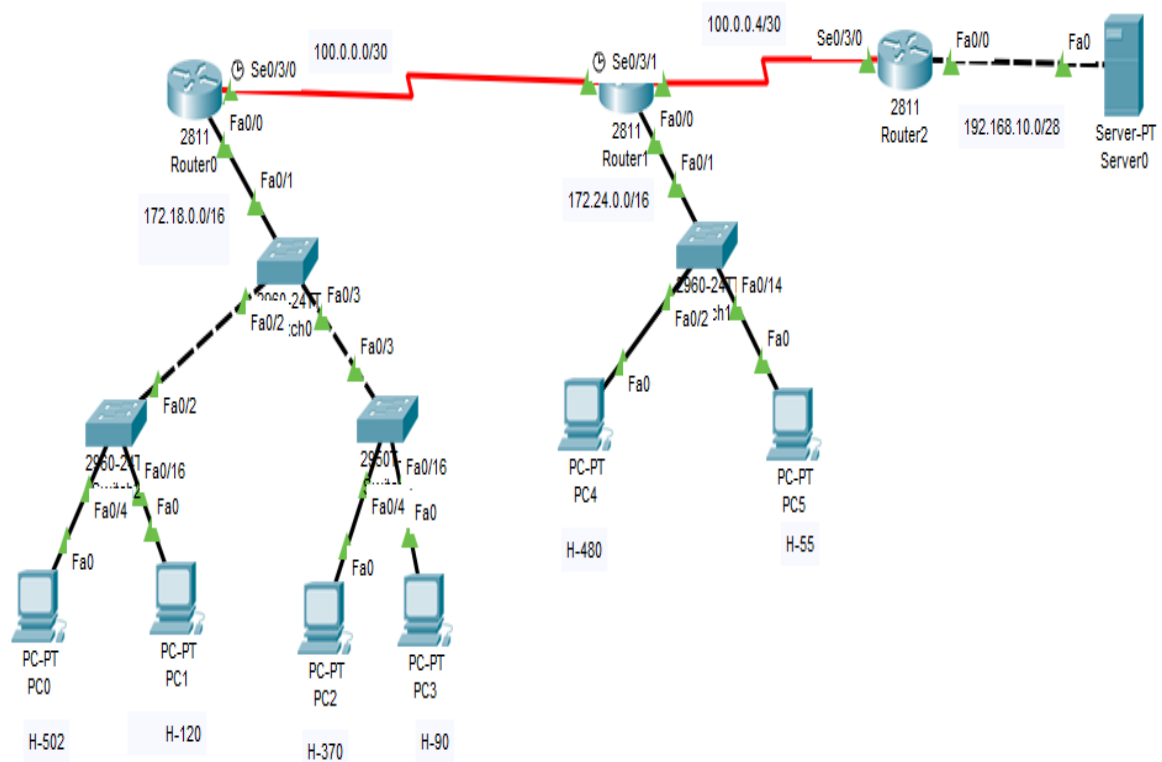
**Credit: 3**

**Lab Manual: 10**

**Title: Configuration of VLAN, VLAN-VTP and NAT with DHCP**

**Software: cisco packet tracer (version 7.3.0)**

## Network Design:



### Question:

#### Switch 0:

It is the server switch with the domain name AIUB

Two vlans are there CSE (vlan 2) and EEE (vlan 4)

Trunk port f0/1, f0/2 and f0/3

#### Switch 2:

It's the client switch

Range for vlan 2 is from f0/4 to f0/15 (Host -502)

Range for vlan 4 is from f0/16 to f0/24 (Host-120)

#### Switch 3:

It's the client switch

Range for vlan 2 is from f0/4 to f0/15 (Host -370)

Range for vlan 4 is from f0/16 to f0/24 (Host-90)

### **Switch 1:**

Two vlans are there IT (vlan 3) and MKT (vlan 6)

Trunk port f0/1

Range for vlan 3 is from f0/2 to f0/13 (Host-480)

Range for vlan 6 is from f0/14 to f0/24 (Host-55)

### **Router 0:**

Ip address is 172.18.0.0/16

Default gateway should be the last ip (ip before the broadcast)

DHCP pool name is dpool2 and dpool4

Ospf autonomous no is 40

### **Router 1:**

Ip address is 172.24.0.0/16

Default gateway should be the last ip (ip before the broadcast)

DHCP pool name is dpool3 and dpool6

Ospf autonomous no is 80

### **Router 2:**

Network ip address for Fast Ethernet is 192.168.10.0/28

Default gateway should be the last ip (ip before the broadcast)

DHCP pool name is svr

Ospf autonomous no is 100

**Apply Nat:** Nat access-list should have the same number as vlan number.

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## **Solution**

### **Configuration:**

#### **Switch0**

Switch>en

Switch#conf t

#### **❖ Assigning the name of VTP domain**

Switch(config)#vtp domain AIUB

#### **❖ Creating vlans and assigning names to the vlans**

Switch(config)#vlan 2

Switch(config-vlan)#name CSE

Switch(config-vlan)#exit

Switch(config)#vlan 4

Switch(config-vlan)#name EEE

Switch(config-vlan)#exit

#### **❖ Assigning trunk ports**

Switch(config)#int f0/1

Switch(config-if)#switchport mode trunk

Switch(config-if)#switchport trunk allowed vlan all

Switch(config-if)#exit

Switch(config)#int f0/2

Switch(config-if)#switchport mode trunk

Switch(config-if)#switchport trunk allowed vlan all

Switch(config-if)#exit

Switch(config)#int f0/3

Switch(config-if)#switchport mode trunk

Switch(config-if)#switchport trunk allowed vlan all

## **Switch1**

Switch>en

Switch#conf t

### **❖ Changing VTP mode**

Switch(config)#vtp mode client

### **❖ Assigning ports to the vlans**

Switch(config)#int range f0/4-f0/15

Switch(config-if-range)#switchport mode access

Switch(config-if-range)#switchport access vlan 2

Switch(config-if-range)#exit

Switch(config)#int range f0/16-f0/24

Switch(config-if-range)#switchport mode access

Switch(config-if-range)#switchport access vlan 4

## **Switch2**

Switch>en

Switch#conf t

### **❖ Changing VTP mode**

Switch(config)#vtp mode client

### **❖ Assigning ports to the vlans**

Switch(config)#int range f0/4-f0/15

Switch(config-if-range)#switchport mode access

Switch(config-if-range)#switchport access vlan 2

Switch(config-if-range)#exit

Switch(config)#int range f0/16-f0/24

Switch(config-if-range)#switchport mode access

Switch(config-if-range)#switchport access vlan 4

## **Router0**

Router>en

Router#conf t

### **❖ Applying encapsulation and assigning ip to sub-interfaces**

Router(config)#int f0/0

Router(config-if)#no shut

Router(config-if)#int f0/0.2

Router(config-subif)#encapsulation dot1q 2

Router(config-subif)#ip address 172.18.3.254 255.255.252.0

Router(config)#int f0/0.4

Router(config-subif)#encapsulation dot1q 4

Router(config-subif)#ip address 172.18.4.254 255.255.255.0

Router(config-subif)#exit

### **❖ Creating DHCP pool**

Router(config)#ip dhcp pool dpool2

Router(dhcp-config)#network 172.18.0.0 255.255.252.0

Router(dhcp-config)#default 172.18.3.254

Router(dhcp-config)#exit

Router(config)#ip dhcp pool dpool4

Router(dhcp-config)#network 172.18.4.0 255.255.255.0

Router(dhcp-config)#default 172.18.4.254

### **❖ Assigning ip to serial interface**

Router(config)#int s0/3/0

Router(config-if)#ip address 100.0.0.1 255.255.255.252

Router(config-if)#clock rate 64000

Router(config-if)#no shut

Router(config-if)#exit

### ❖ Assigning routing protocol (OSPF with autonomous number 40)

Router(config)#router ospf 40

Router(config-router)#network 172.18.0.0 0.0.3.255 area 0

Router(config-router)#network 172.18.4.0 0.0.0.255 area 0

Router(config-router)#network 100.0.0.0 0.0.0.3 area 0

## **Switch3**

Switch>en

Switch#conf t

### ❖ Creating vlans and assigning names to the vlans

Switch(config)#vlan 3

Switch(config-vlan)#name HR

Switch(config-vlan)#exit

Switch(config)#vlan 6

Switch(config-vlan)#name MKT

Switch(config-vlan)#exit

### ❖ Assigning trunk ports

Switch(config)#int f0/1

Switch(config-if)#switchport mode trunk

Switch(config-if)#switchport trunk allow vlan all

Switch(config-if)#exit

### ❖ Assigning ports to the vlans

Switch(config)#int range f0/2-f0/13

Switch(config-if-range)#switchport mode access

Switch(config-if-range)#switchport access vlan 3

Switch(config-if-range)#exit

Switch(config)#int range f0/14-f0/24

Switch(config-if-range)#switchport mode access

Switch(config-if-range)#switchport access vlan 6

## **Router1**

Router>en

Router#conf t

### **❖ Assigning ip to serial interface**

Router(config)#int s0/3/0

Router(config-if)#ip address 100.0.0.2 255.255.255.252

Router(config-if)#no shut

Router(config-if)#exit

Router(config)#int s0/3/1

Router(config-if)#ip address 100.0.0.5 255.255.255.252

Router(config-if)#clock rate 64000

Router(config-if)#no shut

Router(config)#int f0/0

Router(config-if)#no shut

Router(config-if)#exit

Router(config)#int f0/0

Router(config-if)#no shut

### **❖ Applying encapsulation and assigning ip to sub-interfaces**

Router(config-if)#int f0/0.3

Router(config-subif)#encapsulation dot1q 3

Router(config-subif)#ip address 172.24.1.254 255.255.254.0



```
Router(config-subif)#exit
Router(config)#int f0/0.6
Router(config-subif)#encapsulation dot1q 6
Router(config-subif)#ip address 172.24.2.62 255.255.255.192
Router(config-subif)#exit
```

### ❖ **Creating DHCP pool**

```
Router(config)#ip dhcp pool dpool3
Router(dhcp-config)#network 172.24.0.0 255.255.254.0
Router(dhcp-config)#default 172.24.1.254
Router(dhcp-config)#exit
Router(config)#ip dhcp pool dpool6
Router(dhcp-config)#network 172.24.2.0 255.255.255.192
Router(dhcp-config)#default 172.24.2.62
Router(dhcp-config)#exit
```

### ❖ **Assigning routing protocol (OSPF with autonomous number 80)**

```
Router(config)#router ospf 80
Router(config-router)#network 172.24.0.0 0.0.1.255 area 0
Router(config-router)#network 172.24.2.0 0.0.0.63 area 0
Router(config-router)#network 100.0.0.0 0.0.0.3 area 0
Router(config-router)#network 100.0.0.4 0.0.0.3 area 0
```

## **Router2**

```
Router>en
Router#conf t
```

### ❖ **Assigning ip to serial interface**

```
Router(config)#int s0/3/0
```

```
Router(config-if)#ip address 100.0.0.5 255.255.255.252
```

```
Router(config-if)#no shut
```

```
Router(config-if)#exit
```

### ❖ **Assigning ip to fast-ethernet interface**

```
Router(config)#int f0/0
```

```
Router(config-if)#ip address 192.168.10.14 255.255.255.240
```

```
Router(config-if)#no shut
```

```
Router(config-if)#exit
```

### ❖ **Creating DHCP pool**

```
Router(config)#ip dhcp pool svr
```

```
Router(dhcp-config)#network 192.168.10.0 255.255.255.240
```

```
Router(dhcp-config)#default 192.168.10.14
```

```
Router(dhcp-config)#exit
```

### ❖ **Assigning routing protocol (OSPF with autonomous number 100)**

```
Router(config)#router ospf 100
```

```
Router(config-router)#network 100.0.0.4 0.0.0.3 area 0
```

```
Router(config-router)#network 192.168.10.0 0.0.0.15 area 0
```

### ❖ **Natting in Router 0**

```
Router(config)#access-list 2 permit 172.18.0.0 0.0.3.255
```

```
Router(config)#access-list 4 permit 172.18.4.0 0.0.0.255
```

```
Router(config)#ip nat inside source list 2 interface s0/3/0 overload
```

```
Router(config)#ip nat inside source list 4 interface s0/3/0 overload
```

```
Router(config)#int s0/3/0
```

```
Router(config-if)#ip nat outside
```

Router(config-if)#exit

Router(config)#int f0/0

Router(config-if)#ip nat inside

### ❖ **Natting in Router 1**

Router(config)#access-list 3 permit 172.24.0.0 0.0.1.255

Router(config)#access-list 6 permit 172.24.2.0 0.0.0.63

Router(config)#ip nat inside source list 3 interface s0/3/1 overload

Router(config)#ip nat inside source list 6 interface s0/3/1 overload

Router(config)#int s0/3/1

Router(config-if)#ip nat outside

Router(config-if)#exit

Router(config)#int f0/0

Router(config-if)#ip nat inside

### ❖ **Natting in Router 2**

Router(config)#ip nat inside source static 192.168.10.1 100.0.0.6

Router(config)#int f0/0

Router(config-if)#ip nat inside

Router(config-if)#exit

Router(config)#int s0/3/0

Router(config-if)#ip nat outside