

COMPUTER NETWORKS

PRACTICAL -6

TITLE: Design a Network of an organization using fundamentals of subnetting.

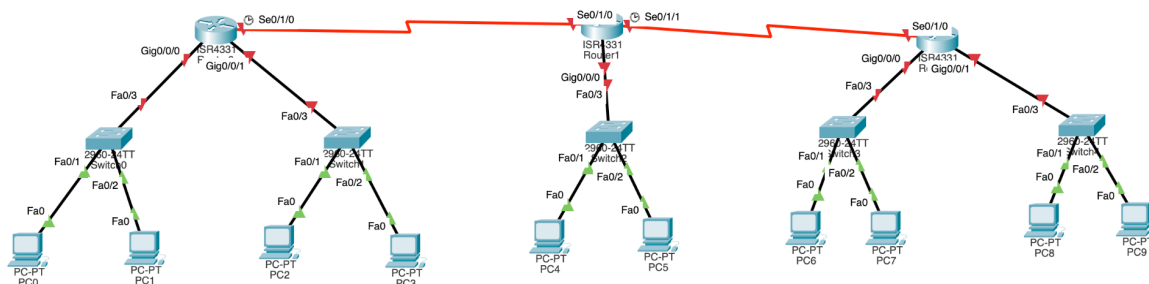
SCENARIO:

Organization named Zenith enterprise has set up a branch office at Noida and hired you as a Network Engineer. The branch office will be having 5 different Departments and each department has its own network. Each department has actually 14 devices. The IP address range given to you is 201.1.1.0/24. Design the network such that wastage of IP addresses is less. So, for designing purposes you can take 4 devices in each department. Also assign IP addresses dynamically to the device for ease of the implementation.

PROCEDURE:

Created topology as shown below.

Connected all the PC's and servers with the respective switches and then with the respective Routers. To connect router to router I have added NIM2T in each router and connected them with serial DTE wire.



ROUTER-1 CONFIGURATION(Dept-A & Dept-B)

GLOBAL	GigabitEthernet0/0/0
Settings	Port Status <input checked="" type="checkbox"/> On
Algorithm Settings	Bandwidth <input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto
ROUTING	Duplex <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto
Static	MAC Address 0001.9631.3401
RIP	IP Configuration
SWITCHING	IPv4 Address 201.1.1.1
VLAN Database	Subnet Mask 255.255.255.240
INTERFACE	
GigabitEthernet0/0/0	Tx Ring Limit 10
GigabitEthernet0/0/1	
GigabitEthernet0/0/2	
Serial0/1/0	
Serial0/1/1	

Equivalent IOS Commands

GLOBAL	GigabitEthernet0/0/1
Settings	Port Status <input checked="" type="checkbox"/> On
Algorithm Settings	Bandwidth <input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto
ROUTING	Duplex <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto
Static	MAC Address 0001.9631.3402
RIP	IP Configuration
SWITCHING	IPv4 Address 201.1.1.17
VLAN Database	Subnet Mask 255.255.255.240
INTERFACE	
GigabitEthernet0/0/0	Tx Ring Limit 10
GigabitEthernet0/0/1	
GigabitEthernet0/0/2	
Serial0/1/0	
Serial0/1/1	

ROUTER -2 CONFIGURATION(Dept-C)

GLOBAL	GigabitEthernet0/0/0	
Settings	Port Status <input checked="" type="checkbox"/> On	
Algorithm Settings	Bandwidth <input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto	
ROUTING	Duplex <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto	
Static	MAC Address 000A.4113.5601	
RIP	<div>IP Configuration</div> <div>IPv4 Address 201.1.1.33</div> <div>Subnet Mask 255.255.255.240</div>	
SWITCHING	Tx Ring Limit 10	
VLAN Database		
INTERFACE		
GigabitEthernet0/0/0		

ROUTER-3 CONFIGURATION(Dept-D & Dept-E)

Static		
RIP		
SWITCHING		
VLAN Database		
INTERFACE		
GigabitEthernet0/0/0	<div>MAC Address 0001.6338.3101</div> <div> <div>IP Configuration</div> <div>IPv4 Address 201.1.1.49</div> <div>Subnet Mask 255.255.255.240</div> </div> <div>Tx Ring Limit 10</div>	
GigabitEthernet0/0/1		
GigabitEthernet0/0/2		
RIP		
SWITCHING		
VLAN Database		
INTERFACE		
GigabitEthernet0/0/0	<div>MAC Address 0001.6338.3102</div> <div> <div>IP Configuration</div> <div>IPv4 Address 201.1.1.65</div> <div>Subnet Mask 255.255.255.240</div> </div> <div>Tx Ring Limit 10</div>	
GigabitEthernet0/0/1		
GigabitEthernet0/0/2		
Serial0/1/0		
Serial0/1/1		

Configuring router 0 using cli

```
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/1
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#no ip dhcp pool deptB
Router(config)#ip dhcp pool deptB
Router(dhcp-config)#network 201.1.1.16 255.255.255.240
Router(dhcp-config)#default-router 201.1.1.17
Router(dhcp-config)#exit
Router(config)#no ip dhcp pool deptA
Router(config)#ip dhcp pool deptA
Router(dhcp-config)#network 201.1.1.0 255.255.255.240
Router(dhcp-config)#default-router 201.1.1.1
Router(dhcp-config)#exit
Router(config)#|
```

Similarly configured other 2 routers.

Give Ip to serial port with network id as 10.0.0.0 and 20.0.0.0
Change to dhcp mode in pc.

PC0

Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address: 201.1.1.2

Subnet Mask: 255.255.255.240

Default Gateway: 201.1.1.1

DNS Server: 0.0.0.0

IP v6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::20B:BEFF:FED5:604

Default Gateway:

DNS Server:

Give Static routing to all routers.

Router0

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0/0

GigabitEthernet0/0/1

GigabitEthernet0/0/2

Serial0/1/0

Serial0/1/1

Static Routes

Network: 201.1.1.64

Mask: 255.255.255.240

Next Hop: 10.0.0.2

Add

Network Address

201.1.1.32/28 via 10.0.0.2

201.1.1.48/28 via 10.0.0.2

201.1.1.64/28 via 10.0.0.2

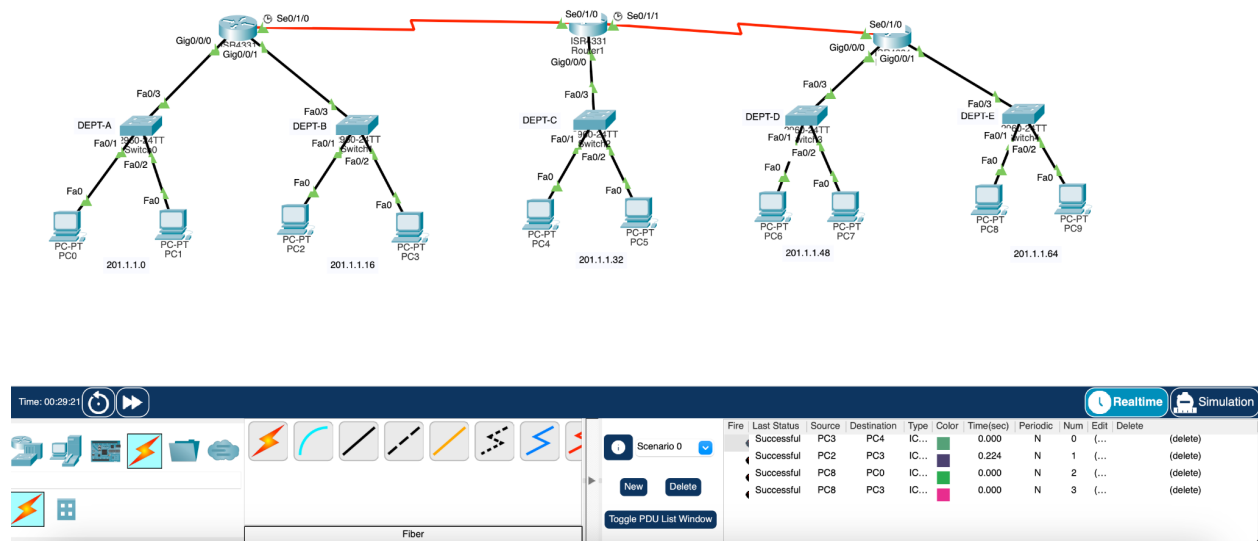
Remove

Equivalent IOS Commands

```

Router(dhcp-config)#exit
Router(config)#
Router(config)#
Router(config)#interface Serial0/1/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
Router(config-if)#
Router(config-if)#exit
  
```

Testing:



CONCLUSION: I learned how to divide a network into small departments and how to subnet them.