

### Part A: Configure Static NAT on given network.

### Part B: Configure Dynamic NAT on given network.

## Lab-10

### Static NAT& Dynamic NAT

Part A: Configure Static NAT on given network in figure 27. After completing this activity, private IP of Users G, H and P must be translated into Public IP of attached router.

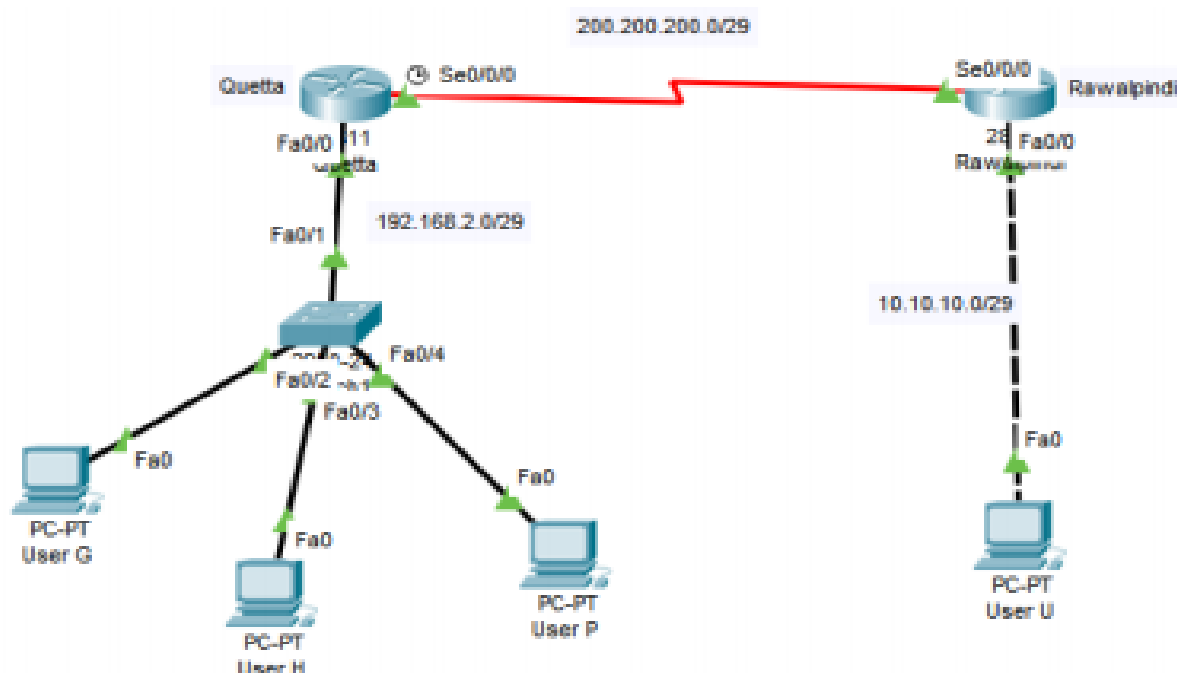


Figure 27

## Network Address Translation (NAT)

To access the Internet, one public IP address is needed, but we can use a private IP address in our private network. The idea of NAT is to allow multiple devices to access the Internet through

a single public address. To achieve this, the translation of private IP address to a public IP address is required. Network Address Translation (NAT) is a process in which one or more local IP address is translated into one or more Global IP address and vice versa in order to provide Internet access to the local hosts. Also, it does the translation of port numbers i.e. masks the port number of the host with another port number, in the packet that will be routed to the destination. It then makes the corresponding entries of IP address and port number in the NAT table. NAT generally operates on router or firewall.

### **Network Address Translation (NAT) working**

Generally, the border router is configured for NAT i.e. the router which has one interface in local (inside) network and one interface in the global (outside) network, when a packet traverse outside the local (inside) network, then NAT converts that local (private) IP address to a global (public) IP address. When a packet enters the local network, the global (public) IP address is converted to a local (private) IP address. If NAT run out of addresses, i.e., no address is left in the pool configured then the packets will be dropped and an Internet Control Message Protocol (ICMP) host unreachable packet to the destination is sent.

### **Static NAT**

In this, a single private IP address is mapped with single Public IP address, i.e., a private IP address is translated to a public IP address. It is used in Web hosting.

## **Task 1, Assign the IP address on each Router**

### **RouterQuetta:**

```
Quetta >enable
```

```
Quetta #configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Quetta (config)#interface serial 0/0/0
```

```
Quetta (config-if)#ip address 200.200.200.1 255.255.255.248
```

```
Quetta (config-if)#clock rate 64000
```

```
Quetta (config-if)#no shutdown
```

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

```
Quetta (config)#interface fa 0/0
```

```
Quetta (config-if)#ip address 192.168.2.1 255.255.255.248
```

```
Quetta (config-if)#no shutdown
```

Quetta (config-if)#exit

### **RouterRawalpindi:**

Rawalpindi>enable

Rawalpindi #configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Rawalpindi (config)#interface serial 0/0/0

Rawalpindi (config-if)#ip address 200.200.200.2 255.255.255.252

Rawalpindi (config-if)#no shutdown

Rawalpindi (config-if)#exit

Rawalpindi (config)#interface fa 0/0

Rawalpindi (config-if)#ip address 10.10.10.1 255.255.255.248

Rawalpindi (config-if)#no shutdown

Rawalpindi (config-if)#exit

### **Task 2, Configure OSPF-77 on each Router**

#### **RouterQuetta:**

Quetta (config)#router ospf 77

Quetta (config-if)#network 192.168.2.0 0.0.0.7 area 0

Quetta (config-if)#network 200.200.200.0 0.0.0.7 area 0

Quetta (config-if)#exit

#### **RouterRawalpindi:**

Rawalpindi (config)# router ospf 77

Rawalpindi (config-if) # network 200.200.200.0 0.0.0.7 area 0

Rawalpindi (config-if) # network 10.10.10.0 0.0.0.7 area 0

Rawalpindi (config-if) # exit

### Task 3, Configure Static NAT

Quetta (config)#ip nat inside source static 192.168.2.2 200.200.200.3

Quetta (config)#interface se 0/0/0

Quetta (config-if)#ip nat outside

Quetta (config-if)#exit

Quetta (config)#interface fa 0/0

Quetta (config-if)#ip nat inside

Quetta (config-if)#exit

## Dynamic NAT

Part B: Configure Dynamic NAT on given network in figure 28. Students can make a Public Pool for IP's translation. Pool name should be on Student Names. ACL-ID's should be used as assigned in lab session to each student.

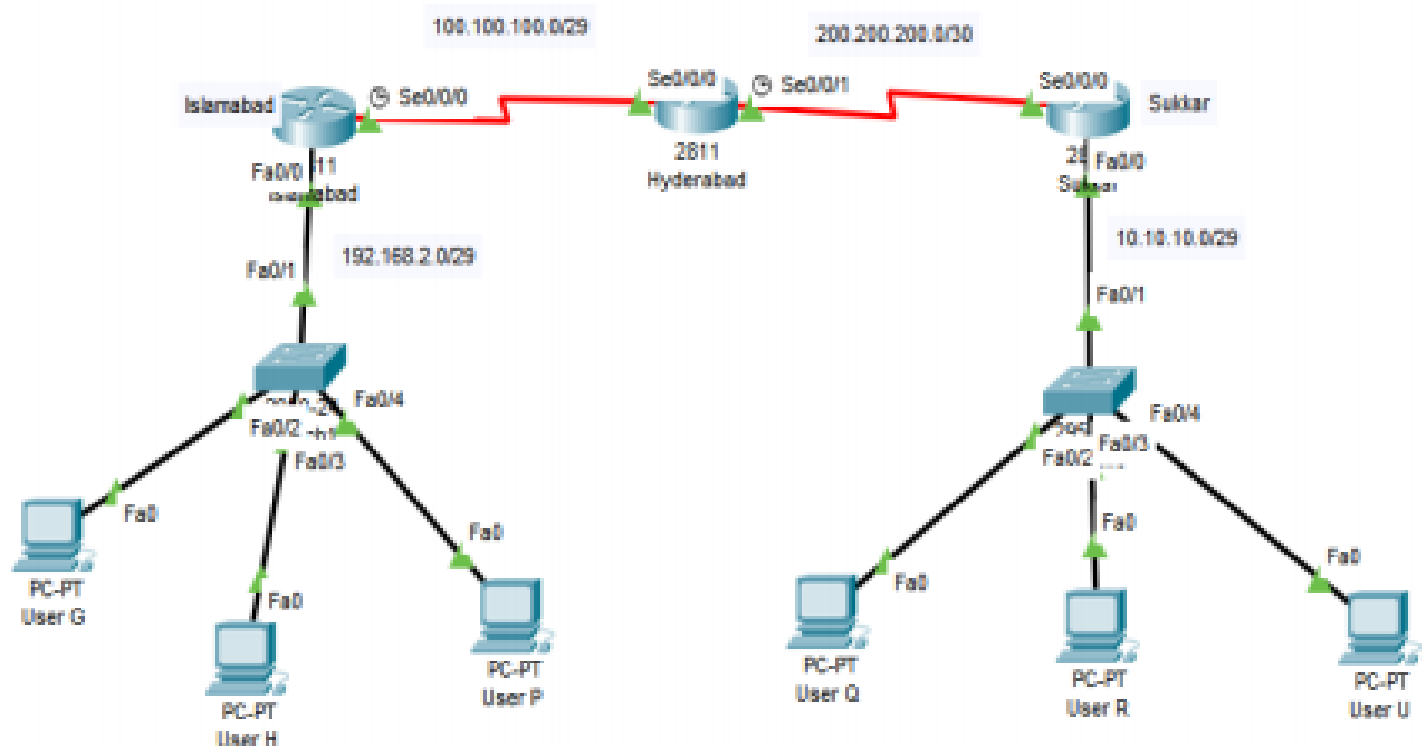


Figure 28

### Dynamic NAT

In this type of NAT, multiple private IP address is mapped to a pool of public IP address. It is used when we know the number of fixed users wants to access the Internet at a given point of time.

#### Task 1, Assign the IP address on each Router

##### RouterIslamabad:

Islamabad >enable

Islamabad #configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

```
Islamabad (config)#interface serial 0/0/0

Islamabad (config-if)#ip address 100.100.100.1 255.255.255.248

Islamabad (config-if)#clock rate 64000

Islamabad (config-if)#no shutdown

Islamabad (config-if)#exit

Islamabad (config)#interface fa 0/0

Islamabad (config-if)#ip address 192.168.2.1 255.255.255.248

Islamabad (config-if)#no shutdown

Islamabad (config-if)#exit
```

### **RouterHyderabad:**

```
Hyderabad >enable

Hyderabad #configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Hyderabad (config)#interface serial 0/0/0

Hyderabad (config-if)#ip address 100.100.100.2 255.255.255.248

Hyderabad (config-if)#no shutdown

Hyderabad (config-if)#exit

Hyderabad (config)#interface serial 0/0/1

Hyderabad (config-if)#ip address 200.200.200.1 255.255.255.252

Hyderabad (config-if)#clock rate 64000

Hyderabad (config-if)#no shutdown

Hyderabad (config-if)#exit
```

### **RouterSukkar:**

```
Sukkar >enable
```

Sukkar #configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Sukkar (config)#interface serial 0/0/0

Sukkar (config-if)#ip address 200.200.200.2 255.255.255.252

Sukkar (config-if)#clock rate 64000

Sukkar (config-if)#no shutdown

Sukkar (config-if)#exit

Sukkar (config)#interface fa 0/0

Sukkar (config-if)#ip address 10.10.10.1 255.255.255.248

Sukkar (config-if)#no shutdown

Sukkar (config-if)#exit

## Task 2, Configure OSPF-555 on each Router

### RouterIslamabad:

Islamabad (config)#router ospf555

Islamabad (config-if)#network 192.168.2.0 0.0.0.7 area 0

Islamabad (config-if)#network 100.100.100.0 0.0.0.7 area 0

Islamabad (config-if)#exit

### RouterHyderabad:

Hyderabad (config)# router ospf555

Hyderabad (config-if)# network 100.100.100.0 0.0.0.7 area 0

Hyderabad (config-if)# network 200.200.200.0 0.0.0.3 area 0

Hyderabad (config-if)#exit

### RouterSukkar:

```
Sukkar (config)# router ospf555
```

```
Sukkar (config-if) # network 200.200.200.0 0.0.0.3 area 0
```

```
Sukkar (config-if) # network 10.10.10.0 0.0.0.7 area 0
```

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

### Task 3, Configure Dynamic NAT

```
Islamabad (config)#ip nat pool DNAT 100.100.100.3 100.100.100.6 netmask 255.255.255.248
```

```
Islamabad (config)#access-list 25 permit 192.168.2.0 0.0.0.7
```

```
Islamabad (config)#ip nat inside source list 25 pool DNAT
```

```
Islamabad (config)#interface se 0/0/0
```

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

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

```
Islamabad (config)#interface fa 0/0
```

```
Islamabad (config-if)#ip nat inside
```

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

### Lab-10 Exercise:

Design a hybrid network which consists of 4 routers. Attach 3 PC's with each router. Configure OSPF on this network and also configure Dynamic NAT for router 1. Students can make a Public Pool for IP's translation. Pool name should be on Student Names. What do you understand when you use the command "Show IP NAT Translation" on router 1?