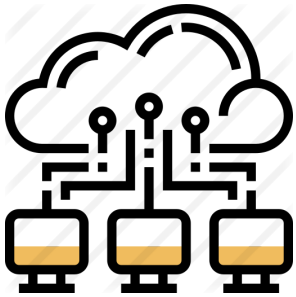
INSTITUTO POLITÉCNICO NACIONAL

ESCUELA SUPERIOR DE CÓMPUTO



ADMINISTRACIÓN DE SERVICIOS EN RED

PRÁCTICA 2

Challenge DHCP and NAT Configuration

EQUIPO 1

INTEGRANTES:

Arellano Aguillón Shu Nashy Nizarely

Banderas Solórzano Midori

Montaño Morales Angeles Aranza

Servín Quinterio Damaris Angelina

GRUPO: 4CV12

PROFESORA: Leticia Henestrosa Carrasco

Activity 7.4.2:

Challenge DHCP and NAT Configuration

Addressing Table

Device	Interface	IP Address	Subnet Mask
R1	**S0/0/0**	172.16.0.1	255.255.255.252
	Fa0/0	172.16.10.1	255.255.255.0
	Fa0/1	172.16.11.1	255.255.255.0
R2	**S0/0/0**	172.16.0.2	255.255.255.252
	S0/0/1	209.165.201.1	255.255.255.252
	Fa0/0	172.16.20.1	255.255.255.0
ISP	**S0/0/1**	209.165.201.2	255.255.255.252

Learning Objectives

- Perform basic router configurations.
- Configure a Cisco IOS DHCP server.
- Configure static and default routing.
- Configure static NAT.
- Configure dynamic NAT with a pool of addresses.
- Configure NAT overload.

Scenario

In this activity, configure the IP address services using the network shown in the topology diagram. If you need assistance, refer back to the basic DHCP and NAT configuration lab. However, try to do as much on your own as possible.

Task 1: Perform Basic Router Configurations

Step 1. Configure the routers.

Configure the R1, R2, and ISP routers according to the following guidelines:

- Configure the device hostname.

```
hostname <nombre>
```

- Disable DNS lookup.

```
no ip domain -lookup
```

- Configure a privileged EXEC mode password.

```
enable password escom
```

- Configure a message-of-the-day banner.

```
#banner motd #Mensaje# #
```

- Configure a password for the console connections.

```
line console 0
password redes
login
```

- Configure a password for all vty connections.

```
line vty 0
password redes
login
```

- Configure IP addresses on all routers. The PCs receive IP addressing from DHCP later in the lab.

```
interface <serial/ fastEthernet..> <puerto>
ip address <dirección ip> <máscara de red>
no shutdown
```

- Enable RIPv2 on R1 and R2. Do not advertise the 209.165.200.224/27 network.

```
router rip
version 2
network <dirección de red>
no auto-summary
```

Task 2: Configure a Cisco IOS DHCP Server

Configure R1 as the DHCP server for the two directly attached LANs.

Step 1. Exclude statically assigned addresses.

Exclude the first three addresses from each pool.

ip dhcp excluded-address <primera ip> <ultima ip>

```
R1(config)#ip dhcp excluded-address 172.16.10.1 172.16.10.3
R1(config)#ip dhcp excluded-address 172.16.11.1 172.16.11.3
```

Step 2. Configure the DHCP pool.

Create two DHCP pools. Name one of them R1_LAN10 for the 172.16.10.0/24 network, and name the other R1_LAN11 for the 172.16.11.0/24 network.

ip dhcp pool <nombre>
network <ip de red> <máscara de red>
default-router <dirección ip>

```
R1(config)#ip dhcp pool R1_LAN10
R1(dhcp-config)#network 172.16.10.0 255.255.255
                       ^
% Invalid input detected at '^' marker.

R1(dhcp-config)#network 172.16.10.0 255.255.255.0
R1(dhcp-config)#default
R1(dhcp-config)#default-router 172.16.10.1
R1(dhcp-config)#dns
R1(dhcp-config)#dns
R1(dhcp-config)#dns-server 172.16.20.254
R1(config)#ip dhcp pool R1_LAN11
R1(dhcp-config)#network 172.16.11.0 255.255.255.0
R1(dhcp-config)#default-router 172.16.11.1
```

Configure each pool with a default gateway and a simulated DNS at 172.16.20.254.

dns-server <dirección ip dns>

```
R1(dhcp-config)#dns-server 172.16.20.254
```

Step 3. Verify the DHCP configuration.

show ip dhcp binding

```
R1#show ip dhcp binding
IP address       Client-ID/              Lease expiration        Type
                 Hardware address
172.16.10.4      00E0.F70C.7E1E          --                      Automatic
172.16.11.4      0009.7CB0.39E6          --                      Automatic
```

Task 3: Configure Static and Default Routing

Step 1. Configure static and default routes.

- Configure ISP with a static route for the 209.165.201.0/27 network. Use the exit interface as an argument.

  ip route <red ip> <máscara de la red> <interface>

  ```
  ISP(config)#ip route 209.165.201.0 255.255.255.224 serial 0/0/1
  ISP(config)#
  ```

- Configure a default route on R2 and propagate the route in OSPF. Use the next-hop IP address as an argument.

  ip route 0.0.0.0 0.0.0.0 <ip del proximo salto>
  router rip
  default-information originate

  ```
  R2(config)#ip route 0.0.0.0 0.0.0.0 209.165.201.2
  R2(config)#router rip
  R2(config-router)#default
  R2(config-router)#default-information or
  R2(config-router)#default-information originate
  ```

Task 4: Configure Static NAT

Step 1. Statically map a public IP address to a private IP address.

Statically map the inside server IP address to the public address 209.165.201.30.

ip nat inside source static <ip privada> <ip pública>

```
R2(config)#
R2(config)#ip nat inside source static 172.16.20.254 209.165.201.30
R2(config)#
```

Step 2. Specify inside and outside NAT interfaces.

interface <interfaz>
ip nat outside
interface <interfaz>
ip nat inside

```
R2(config)#inter ser 0/0/1
R2(config-if)#ip nat outside
R2(config-if)#interface fa0/0
R2(config-if)#ip nat inside ?
  <cr>
R2(config-if)#ip nat inside
```

Step 3. Verify the static NAT configuration.

show ip nat translations

```
R2#sh ip nat translations
Pro  Inside global     Inside local       Outside local      Outside global
---  209.165.201.30    172.16.20.254      ---                ---
```

Task 5: Configure Dynamic NAT with a Pool of Addresses

Step 1. Define a pool of global addresses.

Create a pool named **NAT_POOL** for the IP addresses 209.165.201.9 through 209.165.201.14 using a /29 subnet mask.

ip nat pool <nombre> <direccion ip> <direccion ip> netmask <mascara de red>

```
R2(config)#ip nat pool NAT_POOL 209.165.201.9 209.165.201.14 netmask 255.255.255.248
```

Step 2. Create a standard named access control list to identify which inside addresses are translated.

Use the name **NAT_ACL** and allow all hosts attached to the two LANs on R1.

Note: The **.10** LAN must be configured first, then the **.11** LAN. Otherwise, Packet Tracer will not grade the ACL as correct.

ip access-list standard <nombre>
permit <red ip> <wildmask>

```
R2(config)#ip access-list standard NAT_ACL
R2(config-std-nacl)#permit 172.16.10. 0.0.0.255
                           ^
% Invalid input detected at '^' marker.

R2(config-std-nacl)#permit 172.16.10.0 0.0.0.255
R2(config-std-nacl)#permit 172.16.11.0 0.0.0.255
```

Step 3. Establish dynamic source translation.

Bind the NAT pool to the ACL and allow NAT overloading

ip nat source list <nombre de la ACL> pool <nombre del pool> overload

```
R2(config)#ip nat inside source list NAT_ACL pool NAT_POOL overload
```

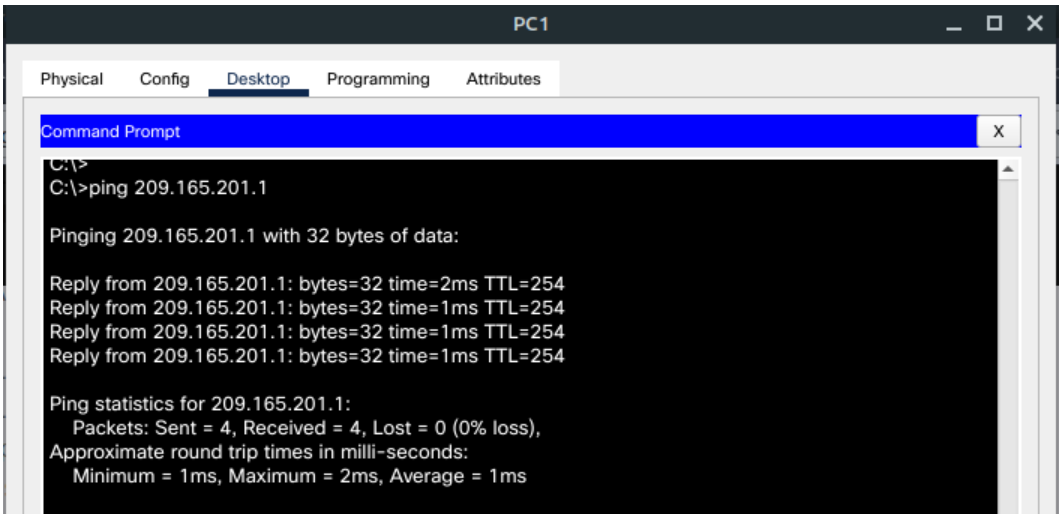
Step 4. Specify the inside and outside NAT interfaces.

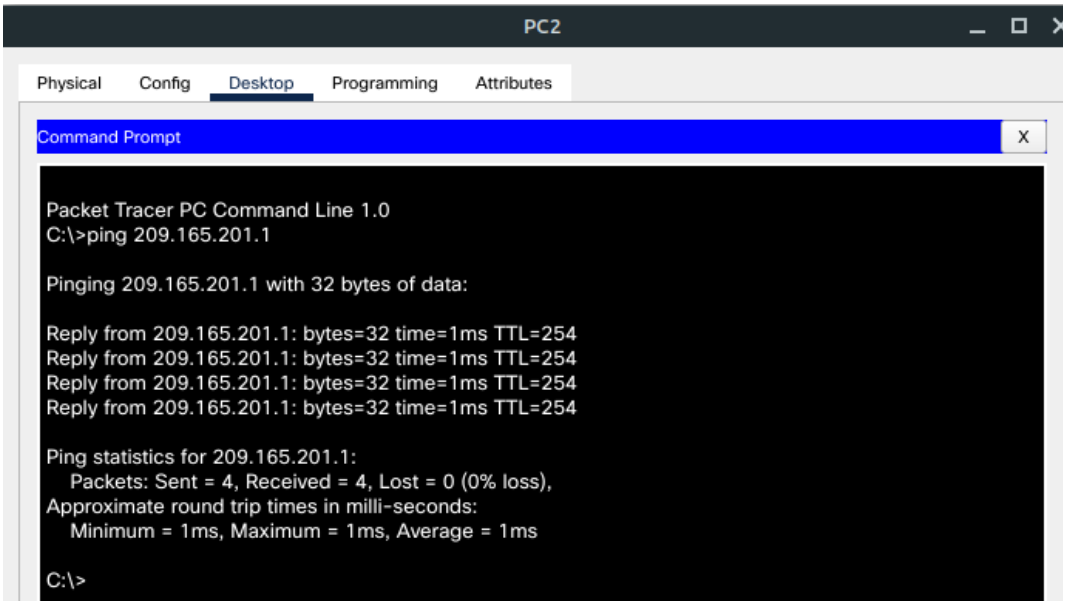
Verify that the inside and outside interfaces are all correctly specified.

interface <interfaz>
ip nat inside

```
R2(config)#inter ser 0/0/0
R2(config-if)#ip nat inside
```

Step 5. Verify the dynamic NAT configuration by pinging from PC1 and PC2 to ISP.





Task 6: Document the Network

On each router, issue the **show run** command and capture the configurations.

Router 1

```
hostname R1
!
!
!
enable secret 5 $1$mERr$Y1dRd4CONrgrn97PxToTz.
!
!
ip dhcp excluded-address 172.16.10.1 172.16.10.3
ip dhcp excluded-address 172.16.11.1 172.16.11.3
!
ip dhcp pool R1_LAN10
 network 172.16.10.0 255.255.255.0
 default-router 172.16.10.1
 dns-server 172.16.20.254
ip dhcp pool R1_LAN11
 network 172.16.11.0 255.255.255.0
 default-router 172.16.11.1
 dns-server 172.16.20.254
!
!
!
ip cef
no ipv6 cef
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface FastEthernet0/0
 ip address 172.16.10.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 ip address 172.16.11.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial0/0/0
 ip address 172.16.0.1 255.255.255.252
 clock rate 2000000
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
interface Vlan1
 no ip address
 shutdown
!
router rip
 version 2
 network 172.16.0.0
 no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
!
no cdp run
!
banner motd ^C
Prohibido acceso no autorizado ^C
!
line con 0
 password redes
 login
!
line aux 0
!
line vty 0
 password redes
 login
line vty 1 4
 login
!
!
!
end
```

Router 2

```
hostname R2
!
!
!
enable password redes
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
no ip domain-lookup
```

```
interface FastEthernet0/0
 ip address 172.16.20.1 255.255.255.0
 ip nat inside
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 172.16.0.2 255.255.255.252
 ip nat inside
!
interface Serial0/0/1
 ip address 209.165.201.1 255.255.255.252
 ip nat outside
 clock rate 2000000
!
interface Vlan1
 no ip address
 shutdown
```

```
router rip
 version 2
 network 172.16.0.0
 default-information originate
 no auto-summary
!
ip nat pool NAT_POOL 209.165.201.9 209.165.201.14 netmask 255.255.255.248
ip nat inside source list NAT_ACL pool NAT_POOL overload
ip nat inside source static 172.16.20.254 209.165.201.30
ip classless
ip route 0.0.0.0 0.0.0.0 209.165.201.2
!
ip flow-export version 9
!
!
ip access-list standard NAT_ACL
 permit 172.16.10.0 0.0.0.255
 permit 172.16.11.0 0.0.0.255
!
no cdp run
!
banner motd ^C
Prohibido acceso no autorizado ^C
```

```
line con 0
 password escom
 login
!
line aux 0
!
line vty 0
 password escom
 login
line vty 1 4
 login
!
!
!
end
```

ROUTER ISP

```
hostname ISP
!
!
!
enable secret 5 $1$mERr$Y1dRd4CONrgrn97PxToTz.
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
```

```
interface Serial0/0/1
 ip address 209.165.201.2 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
!
ip classless
ip route 209.165.201.0 255.255.255.224 Serial0/0/1
!
ip flow-export version 9
!
!
!
no cdp run
!
banner motd ^C
Prohibido el acceso no autorizado.^C
```

```
line con 0
 password redes
 login
!
line aux 0
!
line vty 0
 password redes
 login
line vty 1 4
 login
!
!
!
end
```