

Part 1 – DHCP Configuration

1. Configure DHCP service on the router for both LANs.

```

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp excluded-address 192.168.10.1 192.168.10.9
Router(config)#ip dhcp excluded-address 192.168.20.1 192.168.20.9

```

2. Make sure gateway addresses are not included in the pool.

```

Router(config)#ip dhcp pool ADMIN
Router(dhcp-config)#network 192.168.10.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.10.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#domain-name admin.local

Router(config)#ip dhcp pool FACULTY
Router(dhcp-config)#network 192.168.20.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.20.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#domain-name faculty.local

Router(config)#interface GigabitEthernet0/1
Router(config-if)#description Admin_LAN
Router(config-if)#ip address 192.168.10.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#exit
Router(config)#interface GigabitEthernet0/2
Router(config-if)#description Faculty_LAN
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#no shut

```

3. Verify that Admin-PC and Faculty-PC automatically receive IPs.

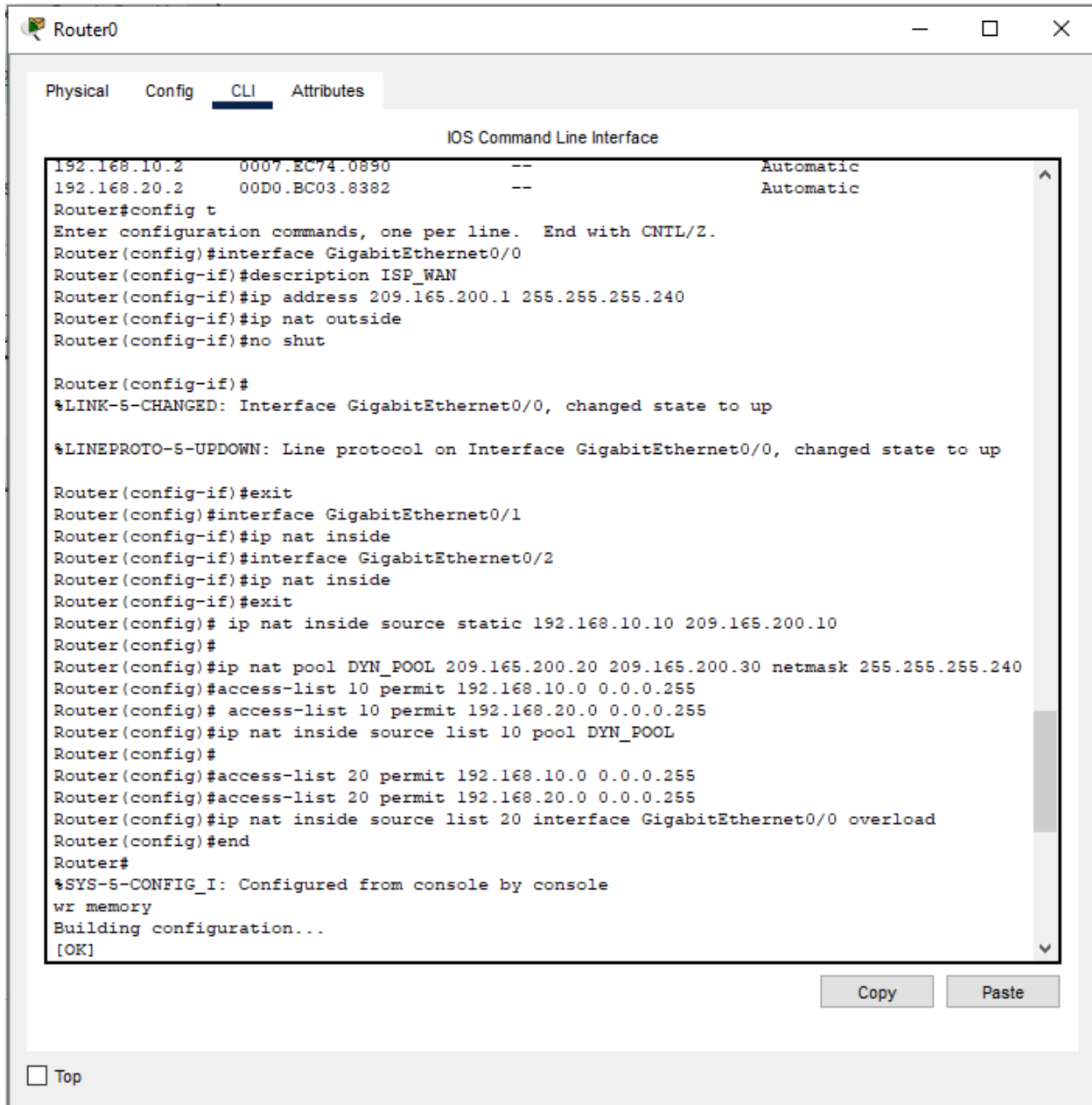
```

Router>show ip dhcp binding

```

IP address	Client-ID/ Hardware address	Lease expiration	Type
192.168.10.11	0007.EC74.0890	--	Automatic
192.168.20.10	00D0.BC03.8382	--	Automatic

Part 2 – NAT Configuration



The screenshot shows a Cisco Router CLI window titled "Router0". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The main area displays the "IOS Command Line Interface" with the following commands and output:

```
192.168.10.2    0007.EC74.0890    --    Automatic
192.168.20.2    00D0.BC03.8382    --    Automatic
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#description ISP_WAN
Router(config-if)#ip address 209.165.200.1 255.255.255.240
Router(config-if)#ip nat outside
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip nat inside
Router(config-if)#interface GigabitEthernet0/2
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)# ip nat inside source static 192.168.10.10 209.165.200.10
Router(config)#
Router(config)#ip nat pool DYN_POOL 209.165.200.20 209.165.200.30 netmask 255.255.255.240
Router(config)#access-list 10 permit 192.168.10.0 0.0.0.255
Router(config)# access-list 10 permit 192.168.20.0 0.0.0.255
Router(config)#ip nat inside source list 10 pool DYN_POOL
Router(config)#
Router(config)#access-list 20 permit 192.168.10.0 0.0.0.255
Router(config)#access-list 20 permit 192.168.20.0 0.0.0.255
Router(config)#ip nat inside source list 20 interface GigabitEthernet0/0 overload
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr memory
Building configuration...
[OK]
```

At the bottom right of the CLI window, there are "Copy" and "Paste" buttons. Below the CLI window, there is a "Top" button with a checkbox next to it.

1. Configure Static NAT for the web server.

```
Router(config)# ip nat inside source static 192.168.10.10 209.165.
```

2. Configure Dynamic NAT with the given IP pool.

```
Router(config)#ip nat pool DYN_POOL 209.165.200.20 209.165.200.30 netmask 255.255.255.240
Router(config)#access-list 10 permit 192.168.10.0 0.0.0.255
Router(config)# access-list 10 permit 192.168.20.0 0.0.0.255
Router(config)#ip nat inside source list 10 pool DYN_POOL
```

3. Configure PAT for all internal hosts.

```
Router(config)#access-list 20 permit 192.168.10.0 0.0.0.255
Router(config)#access-list 20 permit 192.168.20.0 0.0.0.255
Router(config)#ip nat inside source list 20 interface GigabitEthernet0/0 overload
Router(config)#end
```

4. Identify inside and outside interfaces correctly.

```
Router>show ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
---  209.165.200.10       192.168.10.10     ---               ---
```

Part 3 – Verification and Testing

- Check DHCP address assignment.

```
Router>show ip dhcp pool
```

Pool ADMIN :

```
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)          : 0 / 0
Total addresses                   : 254
Leased addresses                  : 1
Excluded addresses                : 3
Pending event                     : none
```

1 subnet is currently in the pool

Current index	IP address range	Leased/Excluded/Total
192.168.10.1	192.168.10.1 - 192.168.10.254	1 / 3 / 254

Pool FACULTY :

```
Utilization mark (high/low)      : 100 / 0
Subnet size (first/next)          : 0 / 0
Total addresses                   : 254
Leased addresses                  : 1
Excluded addresses                : 3
Pending event                     : none
```

1 subnet is currently in the pool

Current index	IP address range	Leased/Excluded/Total
192.168.20.1	192.168.20.1 - 192.168.20.254	1 / 3 / 254

- Ping external IP (e.g., 8.8.8.8) to verify Internet access.
- Use show ip nat translations and show ip nat statistics to verify NAT operation.

```
Router>show ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
---  209.165.200.10       192.168.10.10     ---               ---
```

```
Router>show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 0 extended)
Outside Interfaces: GigabitEthernet0/0
Inside Interfaces: GigabitEthernet0/1 , GigabitEthernet0/2
Hits: 0 Misses: 0
Expired translations: 0
Dynamic mappings:
-- Inside Source
access-list 10 pool DYN_POOL refCount 0
pool DYN_POOL: netmask 255.255.255.240
start 209.165.200.20 end 209.165.200.30
type generic, total addresses 11 , allocated 0 (0%), misses 0
```

- Test external access to the Admin Web Server's public IP.

