

Department of Computer Engineering
TE Computer-B (2025-26 Sem I)
Computer Networks and Security
CNS Simulation Assignment 2: TELNET and SSH

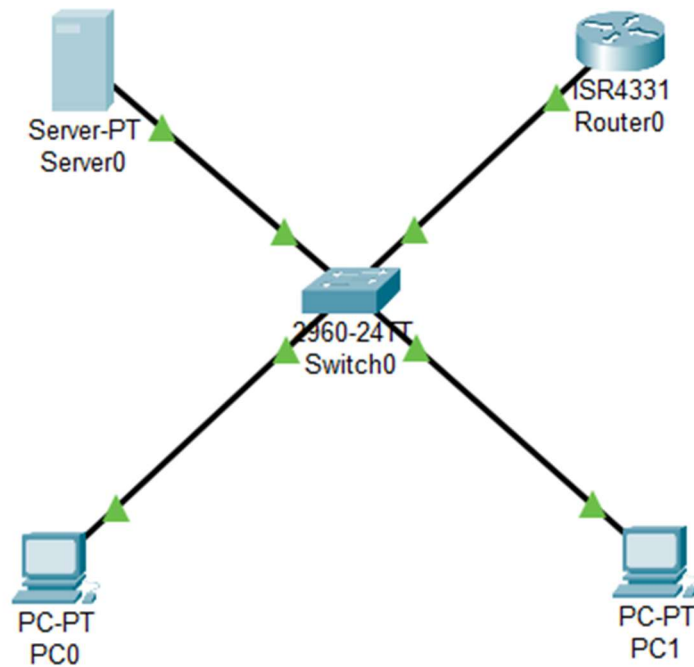
1. Network Topology Setup

i. Create the Network

- Open Cisco Packet Tracer
- Add devices: 1 Router, 1 Server (acts as DHCP Server), 2 PCs (rename to PC0 and PC1), and 1 Switch

ii. Connect Devices

- Connect PC0, PC1, and Server to Switch using Copper Straight-Through cables
- Connect Switch to Router's Gigabit Ethernet 0/0 using Copper Straight-Through cable



2. IP Address Configuration using DHCP

i. Configure Router Interface

- Allocate IP: 192.168.15.1
- Subnet Mask: 255.255.255.0

ii. Configure DHCP Server

Server Configuration:

- IP Address: 192.168.15.2
- Default Gateway: 192.168.15.1

DHCP Pool:

- Default Gateway: 192.168.15.1
- DNS Server: 192.168.15.2
- Start IP: 192.168.15.3
- Subnet Mask: 255.255.255.0

iii. Configure PCs for DHCP

- PC0 → Config Tab → Fast Ethernet → Select DHCP
- PC1 → Config Tab → Fast Ethernet → Select DHCP

The screenshot shows the 'Server0' configuration window with the 'Services' tab selected. The 'DHCP' service is configured for the 'FastEthernet0' interface. The 'Service' is set to 'On'. The 'Pool Name' is 'serverPool'. The 'Default Gateway' is '192.168.15.1'. The 'DNS Server' is '192.168.15.2'. The 'Start IP Address' is '192.168.15.3' and the 'Subnet Mask' is '255.255.255.0'. The 'Maximum Number of Users' is '253'. The 'TFTP Server' and 'WLC Address' are both '0.0.0.0'. A table at the bottom lists the DHCP pool configuration.

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	192.168.15.1	192.168.15.2	192.168.15.3	255.255.255.0	253	0.0.0.0	0.0.0.0

The screenshot shows the 'PC0' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing the 'FastEthernet0' interface. The 'DHCP' radio button is selected, and the 'Static' radio button is unselected. The 'IPv4 Address' is '192.168.15.3', the 'Subnet Mask' is '255.255.255.0', the 'Default Gateway' is '192.168.15.1', and the 'DNS Server' is '192.168.15.2'.

The screenshot shows the 'PC1' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing the 'FastEthernet0' interface. The 'DHCP' radio button is selected, and the 'Static' radio button is unselected. The 'IPv4 Address' is '192.168.15.4', the 'Subnet Mask' is '255.255.255.0', the 'Default Gateway' is '192.168.15.1', and the 'DNS Server' is '192.168.15.2'.

3. Router Configuration for Remote Access

i. Basic Router Configuration

```
Router> enable
Router# configure terminal
Router(config)# hostname HQ
HQ(config)# interface gigabitethernet0/0/0
HQ(config-if)# ip address 192.168.X.1 255.255.255.0
```

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

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

ii. SSH Configuration

```
HQ(config)# ip domain-name cns-assignment.com
```

```
HQ(config)# crypto key generate rsa
```

(Choose 1024 bits modulus)

```
HQ(config)# ip ssh version 2
```

```
HQ(config)# ip ssh time-out 60
```

```
HQ(config)# ip ssh authentication-retries 2
```

iii. User and Line Configuration

```
HQ(config)# username admin secret admin123
```

```
HQ(config)# enable secret class123
```

```
HQ(config)# line vty 0 15
```

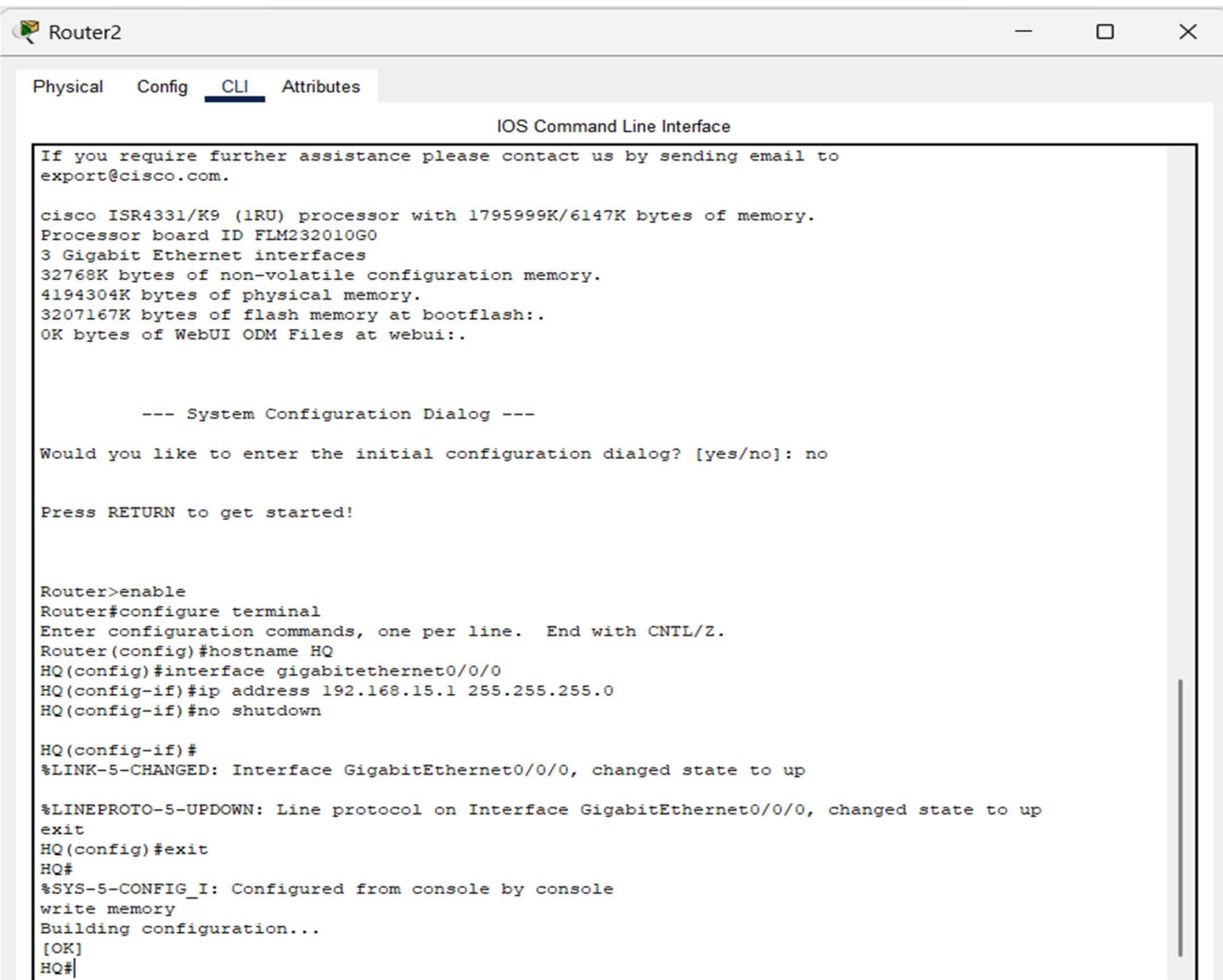
```
HQ(config-line)# login local
```

```
HQ(config-line)# transport input all
```

```
HQ(config-line)# exit
```

```
HQ(config)# exit
```

```
HQ# write memory
```



The screenshot shows a Cisco Router CLI window titled "Router2". The "CLI" tab is selected, displaying the "IOS Command Line Interface". The output shows system information for a Cisco ISR4331/K9, including processor, memory, and interface details. It then prompts for the initial configuration dialog, which is skipped. The user enters "enable" and "configure terminal". The configuration steps shown are: setting the hostname to "HQ", configuring the GigabitEthernet0/0/0 interface with IP address 192.168.15.1 and no shutdown. The interface state is shown as up. The user exits the configuration mode and writes the memory. The final output shows the configuration is built and the user is back at the HQ prompt.

```
Router2
Physical Config CLI Attributes
IOS Command Line Interface
If you require further assistance please contact us by sending email to
export@cisco.com.

cisco ISR4331/K9 (1RU) processor with 1795999K/6147K bytes of memory.
Processor board ID FLM232010G0
3 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
4194304K bytes of physical memory.
3207167K bytes of flash memory at bootflash:.
OK bytes of WebUI ODM Files at webui:.

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname HQ
HQ(config)#interface gigabitethernet0/0/0
HQ(config-if)#ip address 192.168.15.1 255.255.255.0
HQ(config-if)#no shutdown

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
exit
HQ(config)#exit
HQ#
%SYS-5-CONFIG_I: Configured from console by console
write memory
Building configuration...
[OK]
HQ#
```

```

HQ#enable
HQ#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
HQ(config)#ip domain-name cns-assignment.com
HQ(config)#crypto key generate rsa
The name for the keys will be: HQ.cns-assignment.com
Choose the size of the key modulus in the range of 360 to 4096 for your
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

HQ(config)#ip ssh version 2
*Mar 1 0:13:27.367: %SSH-5-ENABLED: SSH 1.99 has been enabled
HQ(config)#ip ssh time-out 60
HQ(config)#ip ssh authentication-retries 2
HQ(config)#username admin secret admin123
HQ(config)#enable secret class123
HQ(config)#line vty 0 4
HQ(config-line)#login local
HQ(config-line)#transport input telnet ssh
^
% Invalid input detected at '^' marker.

HQ(config-line)#transport input ssh
HQ(config-line)#exit
HQ(config)#exit
HQ#
%SYS-5-CONFIG_I: Configured from console by console
write memory
Building configuration...
[OK]
HQ#

```

```

HQ#enable
HQ#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
HQ(config)#line vty 0 15
HQ(config-line)#login local
HQ(config-line)#transport input all
HQ(config-line)#exit
HQ(config)#exit
HQ#
%SYS-5-CONFIG_I: Configured from console by console
write memory
Building configuration...
[OK]
HQ#show running-config | include transport
HQ#

```

4. Access Remote Device – Telnet

PC1 → Desktop Tab → Command Prompt

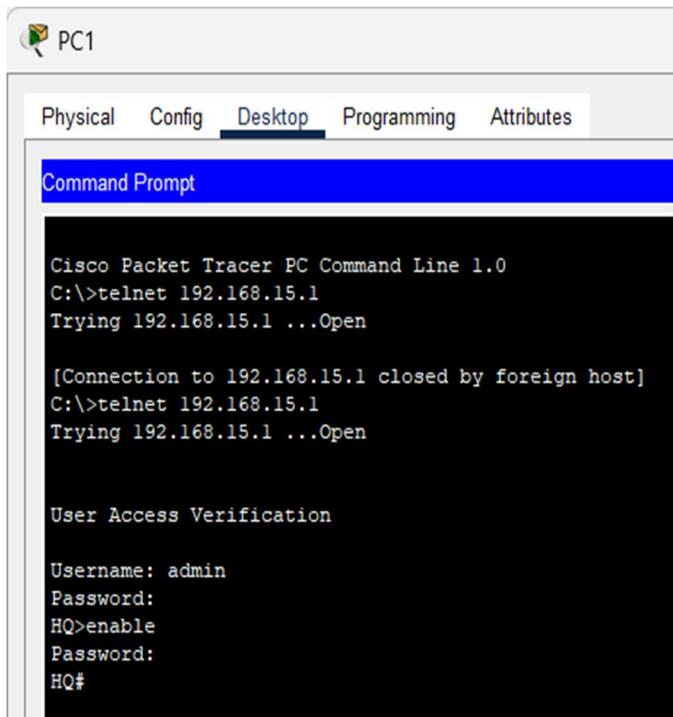
> telnet 192.168.15.1

Username: admin

Password: admin123

HQ> enable

Password: class123



```

Cisco Packet Tracer PC Command Line 1.0
C:\>telnet 192.168.15.1
Trying 192.168.15.1 ...Open

[Connection to 192.168.15.1 closed by foreign host]
C:\>telnet 192.168.15.1
Trying 192.168.15.1 ...Open

User Access Verification

Username: admin
Password:
HQ>enable
Password:
HQ#

```

```

C:\>ping 192.168.15.1

Pinging 192.168.15.1 with 32 bytes of data:

Reply from 192.168.15.1: bytes=32 time<1ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.15.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.15.2

Pinging 192.168.15.2 with 32 bytes of data:

Reply from 192.168.15.2: bytes=32 time<1ms TTL=128
Reply from 192.168.15.2: bytes=32 time<1ms TTL=128
Reply from 192.168.15.2: bytes=32 time<1ms TTL=128
Reply from 192.168.15.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

```

5. Access Remote Device – SSH

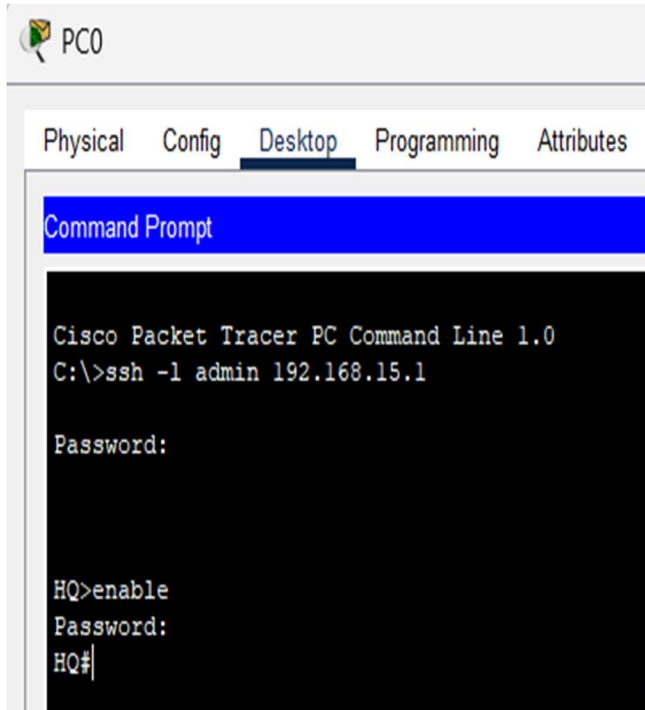
PC0 → Desktop Tab → Command Prompt

```
C:\> ssh -l admin 192.168.15.1
```

Password: admin123

```
HQ> enable
```

Password: class123



```
C:\>ping 192.168.15.1

Pinging 192.168.15.1 with 32 bytes of data:

Reply from 192.168.15.1: bytes=32 time=10ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255
Reply from 192.168.15.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.15.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>ping 192.168.15.2

Pinging 192.168.15.2 with 32 bytes of data:







Reply from 192.168.15.2: bytes=32 time<1ms TTL=128
Reply from 192.168.15.2: bytes=32 time<1ms TTL=128
Reply from 192.168.15.2: bytes=32 time<1ms TTL=128
Reply from 192.168.15.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.15.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

6. Real Mode and Event Simulation

i. Real Mode

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	Router2	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC1	Router2	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC0	PC1	ICMP		0.000	N	2	(edit)	(delete)

ii. Event Simulation

