

**D. J. Sanghvi College of Engineering**  
**Department of Electronics & Telecommunication Engineering**

**Sem VI**

Computer Communication Network  
laboratory

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TE EXTC 2

**Experiment No. 2**

**Date: 12/03/2021**

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**Title:** IP networking and Network Commands

**Learning Objectives:** At the end of this experiment, students will be able to:

- Design their own computer networks using the concept of IP networking.
- Configure various ports of router

**Pre-requisite:** Basic concept of classes of IPv4 networking, hardware and software components of network, IP addressing classes

**Apparatus:** Cisco Packet Tracer

**Theory:**

**IP addressing**

Networks can be constructed to fit many needs and in a wide range of sizes. The larger a network, the more complicated its structure and topology. Because of hardware restrictions, a single network segment can have a limited number of hosts connected to it. If we have more machines to connect than the hardware allows, we can use switches and routers (also called gateways) to connect these individual segments. A router is simply a machine connected to more than one segment. It transfers data from one segment (or network) to the other. To identify each host in a network, IP addressing is used. Without IP addresses routing would be impossible. For large scale networks, Class A IP addressing is used. For medium scale networks, Class B IP addressing is used. For small size networks, Class C IP addressing is used.

**Commands:**

- 1) **Ping Command:** - The ping is a Command Prompt command used to test the ability of the source computer to reach a specified destination computer. The ping command is usually used as a simple way to verify that a computer can communicate over the network with another computer or network device.

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```
C:\Users\ADMIN>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time=5ms TTL=64
Reply from 192.168.1.1: bytes=32 time=17ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 17ms, Average = 6ms
```

- 2) **Ipconfig Command:** - Ipconfig command displays the IP address, subnet mask, and default gateway values for each interface of a network.

```
C:\Users\ADMIN>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : LAPTOP-mARS
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Hybrid
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :
    Description . . . . . : Realtek PCIe GbE Family Controller
    Physical Address. . . . . : 84-A9-3E-03-18-5A
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :
    Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
    Physical Address. . . . . : 06-D3-B0-BB-C4-FC
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :
    Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
    Physical Address. . . . . : 04-D3-B0-BB-C4-FD
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :
    Description . . . . . : Kaspersky Security Data Escort Adapter
    Physical Address. . . . . : 00-FF-36-0A-00-45
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
```

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```
Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : 
    Description . . . . . : Intel(R) Dual Band Wireless-AC 7265
    Physical Address. . . . . : 04-D3-B0-BB-C4-FC
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::9db6:2775:2435:df84%4(Preferred)
    IPv4 Address. . . . . : 192.168.1.103(Preferred)
    Subnet Mask . . . . . : 255.255.255.0
    Lease Obtained. . . . . : 13 March 2021 11:50:08
    Lease Expires . . . . . : 13 March 2021 19:30:33
    Default Gateway . . . . . : 192.168.1.1
    DHCP Server . . . . . : 192.168.1.1
    DHCPv6 IAID . . . . . : 50647984
    DHCPv6 Client DUID. . . . . : 00-01-00-01-25-AA-88-C1-84-A9-3E-03-18-5A
    DNS Servers . . . . . : 192.168.1.1
                           0.0.0.0
    NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 
    Description . . . . . : Bluetooth Device (Personal Area Network)
    Physical Address. . . . . : 04-D3-B0-BB-C5-00
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
```

- 3) **Tracert** :- Tracert is a computer network diagnostic tool for displaying the route (path) and measuring transit delays of packets across an Internet Protocol (IP) network. If you're visiting a Web site and pages are appearing slowly, you can use tracert to figure out where the longest delays are occurring.

```
C:\Users\ADMIN>Tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
              [-R] [-S srcaddr] [-4] [-6] target_name

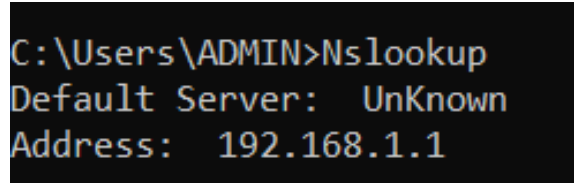
Options:
    -d                Do not resolve addresses to hostnames.
    -h maximum_hops  Maximum number of hops to search for target.
    -j host-list      Loose source route along host-list (IPv4-only).
    -w timeout        Wait timeout milliseconds for each reply.
    -R                Trace round-trip path (IPv6-only).
    -S srcaddr        Source address to use (IPv6-only).
    -4                Force using IPv4.
    -6                Force using IPv6.
```

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- 4) **Nslookup** is a network administration command-line tool available for many computer operating systems for querying the Domain Name System (DNS) to obtain domain name.



```
C:\Users\ADMIN>Nslookup
Default Server: UnKnown
Address: 192.168.1.1
```

**Configuring servers**

**DHCP server:** Dynamic Host Configuration Protocol (DHCP) is a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway.

**DNS server:** Domain Name System (DNS) is a standard technology for managing public names of Web sites and other Internet domains. It translates domain names, which can be easily memorized by humans, to the numerical IP addresses needed for the purpose of computer services and devices worldwide. The Domain Name System is an essential component of the functionality of most Internet services because it is the Internet's primary directory service.

**Procedure:**

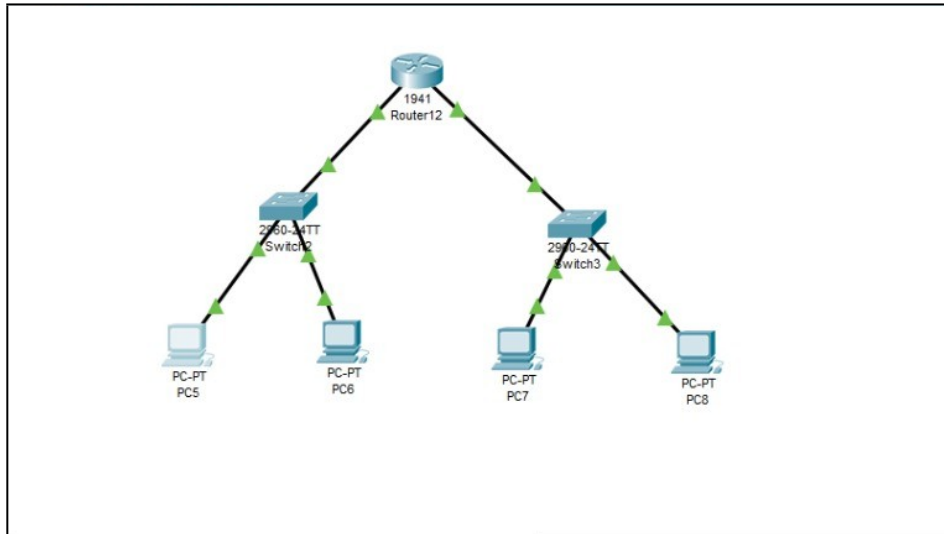
1. Design one network of class A (network address 10.0.0.0) which consist of two PC's and a switch, and another network of class A (20.10.0.0) which consist of two PC's and a switch, now connect them using router.
2. Configure various ports of router.
3. Assign IP addresses to each PC and server.
4. Run ping, ipconfig commands from command prompt and check the result.

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**Result and Conclusions:**



```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no sh

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 address 20.0.0.1 255.0.0.0
Router(config-if)#no sh

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#ping 10.0.0.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.2, timeout is 2 seconds:
..!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/20/79 ms

Router#
```

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PC6

Physical Config **Desktop** Programming Attributes

☐ DHCP ☒ Static

IP Address: 10.0.0.3

Subnet Mask: 255.0.0.0

Default Gateway: 10.0.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address: /

Link Local Address: FE80::290:21FF:FE8B:5C02

IPv6 Gateway:

IPv6 DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top

PC7

Physical Config **Desktop** Programming Attributes

☐ DHCP ☒ Static

IP Address: 20.0.0.2

Subnet Mask: 255.0.0.0

Default Gateway: 20.0.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address: /

Link Local Address: FE80::202:4AFF:FE85:318D

IPv6 Gateway:

IPv6 DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top



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Command Prompt

```
Request timed out.
Reply from 20.0.0.2: bytes=32 time=1ms TTL=127
Reply from 20.0.0.2: bytes=32 time<1ms TTL=127
Reply from 20.0.0.2: bytes=32 time<1ms TTL=127

Ping statistics for 20.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.3: bytes=32 time<1ms TTL=127
Reply from 20.0.0.3: bytes=32 time=1ms TTL=127
Reply from 20.0.0.3: bytes=32 time<1ms TTL=127

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ipconfig

FastEthernet0 Connection: (default port)

    Link-local IPv6 Address . . . . . : FE80::2E0:F7FF:FEBC:E54E
    IP Address. . . . . : 10.0.0.2
    Subnet Mask . . . . . : 255.0.0.0
    Default Gateway . . . . . : 10.0.0.1

Bluetooth Connection:

    Link-local IPv6 Address . . . . . : ::
    IP Address. . . . . : 0.0.0.0
    Subnet Mask . . . . . : 0.0.0.0
    Default Gateway . . . . . : 0.0.0.0
```

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1. **Write down the IP address of your pc in the laboratory.**

115.98.234.44

2. **Write down the IP address of DNS server of your pc.**

DNS Server IP address: 192.168.1.1