

**NATIONAL UNIVERSITY OF COMPUTER &
EMERGING SCIENCE**
Computer Networks Lab (CL307)
Lab Session 02

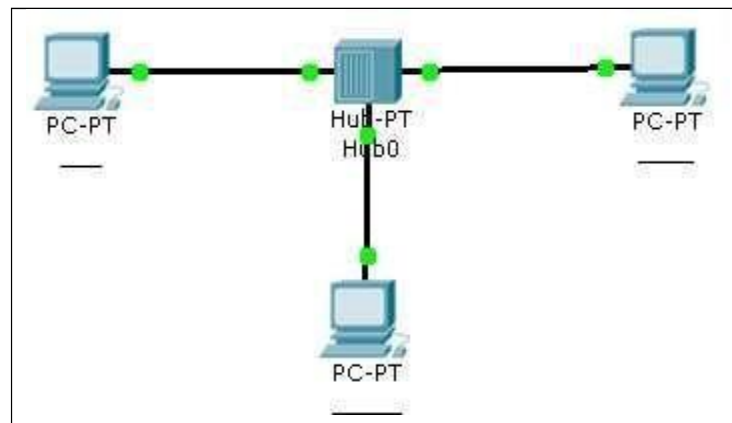
INTRODUCTION TO CISCO PACKET TRACER

Network Infrastructure

Aim: Study of following Network (Layer 1, Layer 2 and Layer 3) Devices in Detail.

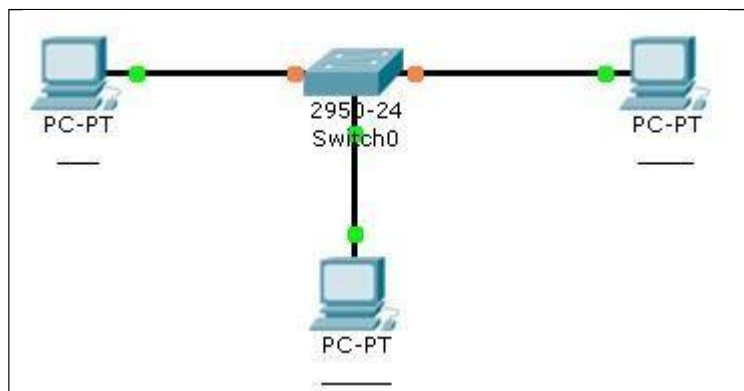
- Hub
- Switch
- Router

Task#1: Understand Network Topology and network hardware (L1) devices.



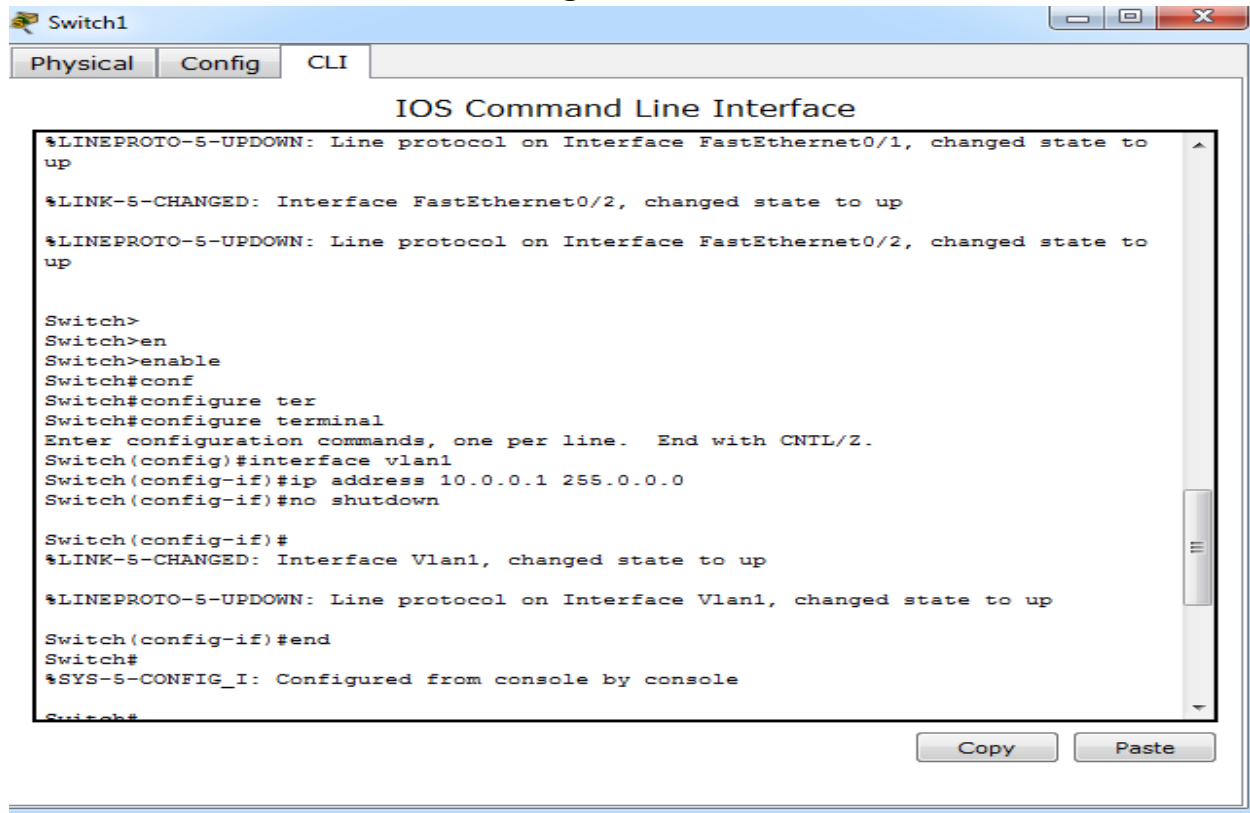
At which layer the HUB operates? _____

Task#2: Understand Network Topology and network hardware (L2) devices.



CONFIGURATION:

Click Switch → CLI → then run following commands.



```
Switch1
Physical Config CLI
IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

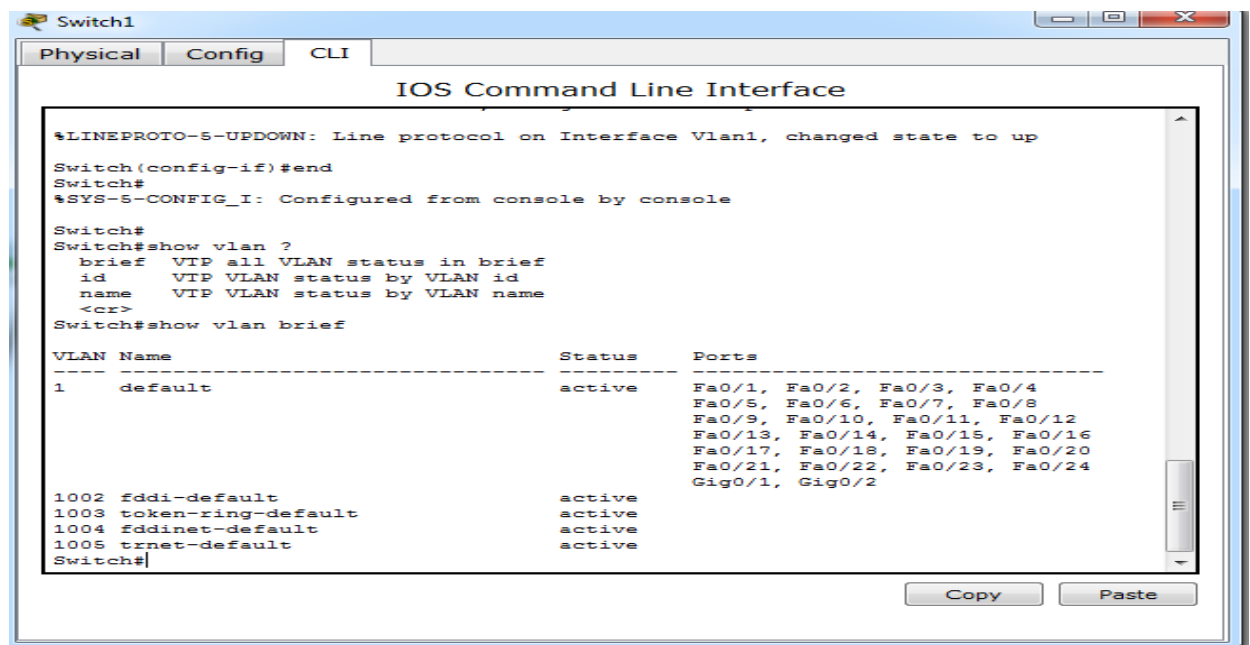
Switch>
Switch>en
Switch>enable
Switch#conf
Switch#configure ter
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface vlan1
Switch(config-if)#ip address 10.0.0.1 255.0.0.0
Switch(config-if)#no shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#
```

We have to assign IP address on Interface Vlan1 which is default interface in Switch as shown below.



```
Switch1
Physical Config CLI
IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch(config-if)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console

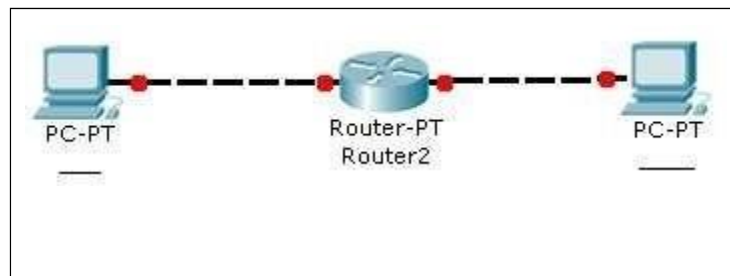
Switch#
Switch#show vlan ?
brief VTP all VLAN status in brief
id VTP VLAN status by VLAN id
name VTP VLAN status by VLAN name
<cr>
Switch#show vlan brief

VLAN Name                Status    Ports
----
1    default                active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                           Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                           Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                           Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                           Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                           Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                           Gig0/1, Gig0/2

1002 fddi-default          active
1003 token-ring-default    active
1004 fddinet-default        active
1005 trnet-default          active
Switch#
```

At which layer the SWITCH operates? _____

Task#3: Understand Network Topology and network hardware (L3) devices.



CONFIGURATION:

```
Router0
Physical Config CLI
IOS Command Line Interface

Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa 0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

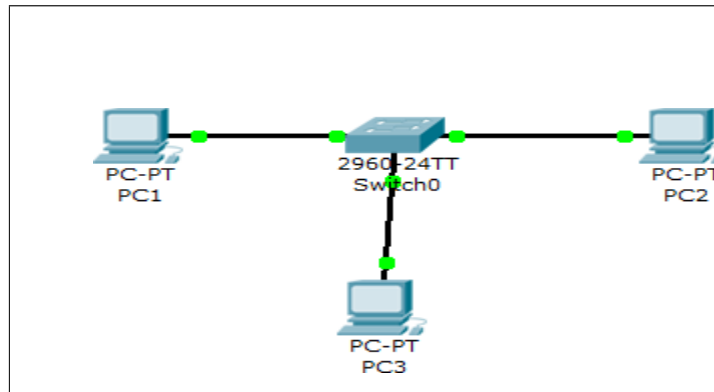
Router(config-if)#exit
Router(config)#int fa 0/1
Router(config-if)#ip address 11.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

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

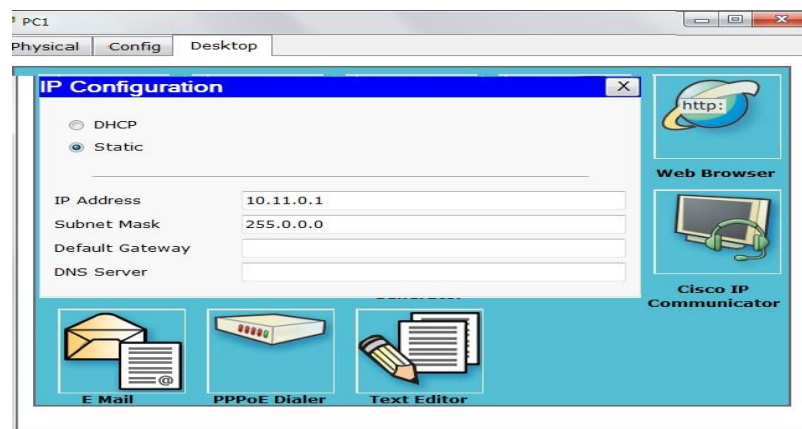
At which layer the ROUTER operates? _____

Task#4: Start the packet tracer and configure the following network and show the packet header format of ICMP protocol.

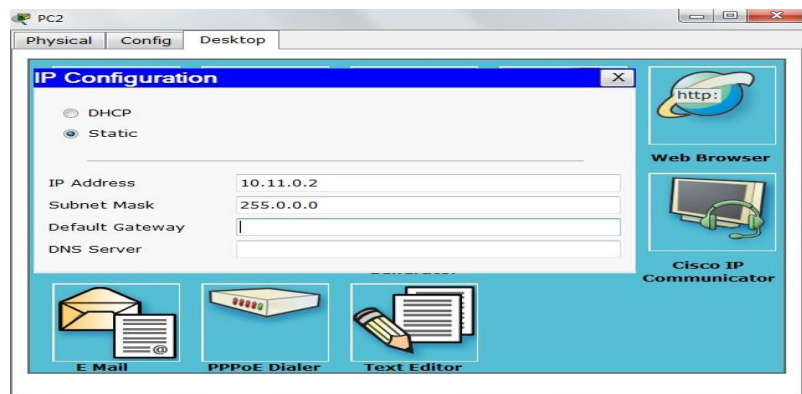


Step#1: configure PC1.

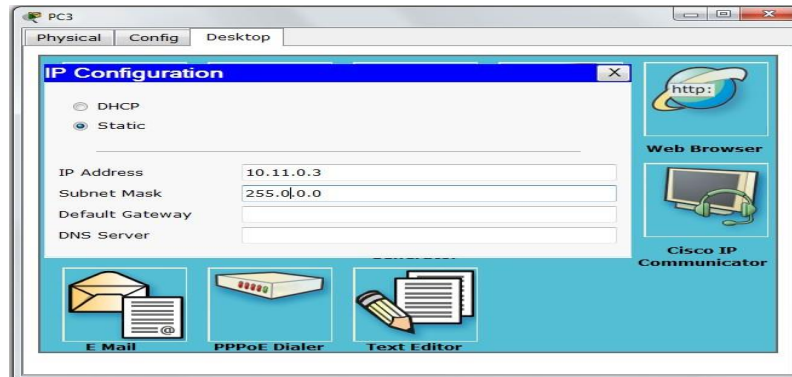
a) Click on the PC1 and go to Desktop →IP Configuration



b) Click on the PC2 and go to Desktop →IP Configuration



c) Click on the PC3 and go to Desktop → IP Configuration



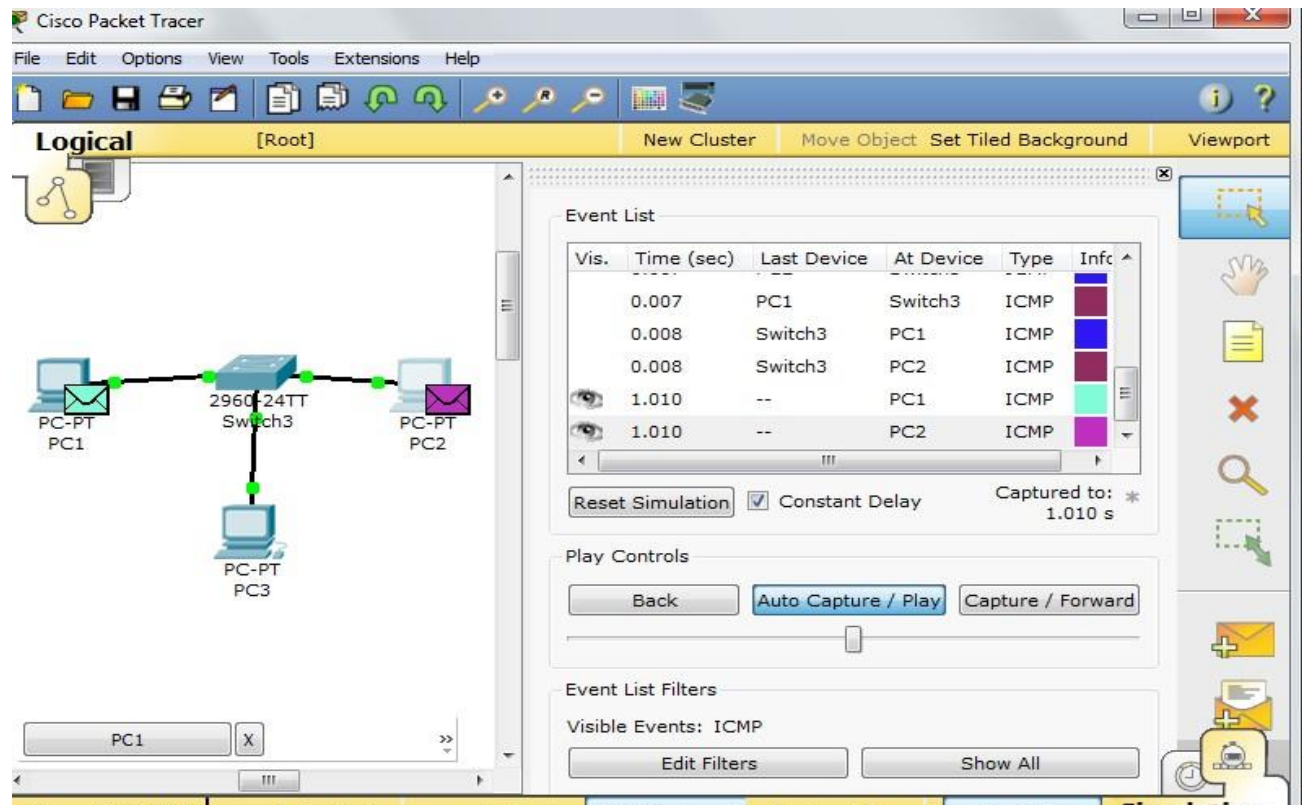
Step#2:

a) Now click on simulation icon in the right bottom of packet Tracer.

b) Now click on edit filter and to capture ICMP protocol packets, Click on ICMP check box.

c) Now click on auto capture /play icon for packet capturing.

d) Click on the PC1 and go to Desktop → Command Prompt then Ping PC1 from PC2.



Step#3: Now click on the ICMP packet show its header.

a) Shows OSI layers involved in transmission.

The popped up window (below) will enable you to trace the content of the message through the OSI layer and what changes will occur at each layer (use next and previous buttons to trace each layer content).

PDU Information at Device: PC2

OSI Model | Inbound PDU Details | Outbound PDU Details

At Device: PC2
Source: PC1
Destination: 10.11.0.2

In Layers

| |
|---|
| Layer7 |
| Layer6 |
| Layer5 |
| Layer4 |
| Layer 3: IP Header Src. IP: 10.11.0.1, Dest. IP: 10.11.0.2 ICMP Message Type: 8 |
| Layer 2: Ethernet II Header 0030.A30B.95A8 >> 000C.8561.C7A4 |
| Layer 1: Port FastEthernet |

Out Layers

| |
|---|
| Layer7 |
| Layer6 |
| Layer5 |
| Layer4 |
| Layer 3: IP Header Src. IP: 10.11.0.2, Dest. IP: 10.11.0.1 ICMP Message Type: 0 |
| Layer 2: Ethernet II Header 000C.8561.C7A4 >> 0030.A30B.95A8 |
| Layer 1: Port(s): FastEthernet |

1. FastEthernet receives the frame.

b) Shows Inbound PDU Details.

The inbound tab shows the content of the message (header format) during the receiving process.

PDU Information at Device: Switch3

OSI Model | Inbound PDU Details | Outbound PDU Details

PDU Formats

Ethernet II

| | | | | | |
|-------------------------|---|--------------------------|----|-------------------------|-------|
| 0 | 4 | 8 | 14 | 19 | Bytes |
| PREAMBLE: 101010...1011 | | DEST MAC: 0030.A30B.95A8 | | SRC MAC: 000C.8561.C7A4 | |
| TYPE: 0x800 | | DATA (VARIABLE LENGTH) | | FCS: 0x0 | |

IP

| | | | | | | |
|------------------------|---|----------|-----------|--------|---------|------|
| 0 | 4 | 8 | 16 | 19 | 31 | Bits |
| 4 | | 4 | DSCP: 0x0 | | TL: 128 | |
| ID: 0xe | | 0x0 | | 0x0 | | |
| TTL: 128 | | PRO: 0x1 | | CHKSUM | | |
| SRC IP: 10.11.0.2 | | | | | | |
| DST IP: 10.11.0.1 | | | | | | |
| OPT: 0x0 | | | | | | |
| DATA (VARIABLE LENGTH) | | | | | | |

ICMP

| | | | | | |
|-----------|---|---------------|----|----------|--|
| 0 | 8 | 16 | 31 | Bits | |
| TYPE: 0x8 | | CODE: 0x0 | | CHECKSUM | |
| ID: 0x3 | | SEQ NUMBER: 5 | | | |

c) Shows Outbound PDU Details.

The outbound tab shows the content of the message (header format) during the Sending process

