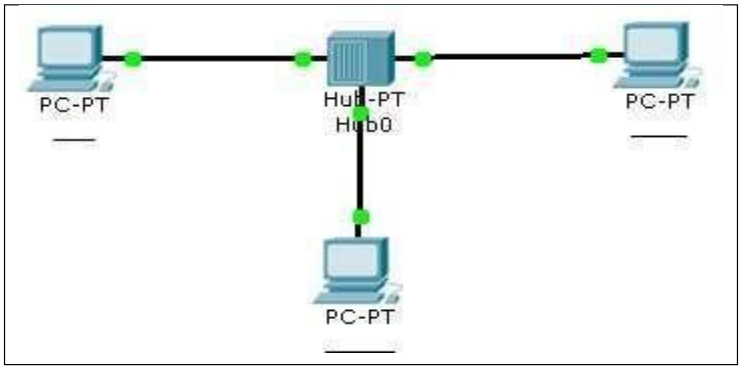
NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCE
Computer Networks Lab (CL307)
Lab Session 05A

Network Infrastructure

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

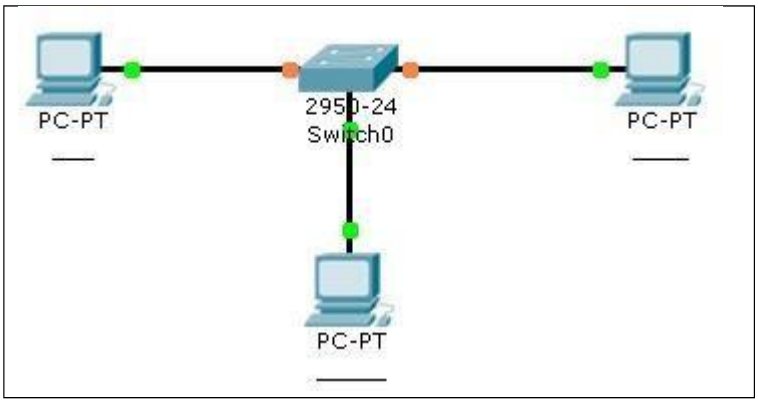
- **Switch**
- **Hub**
- **Router**

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



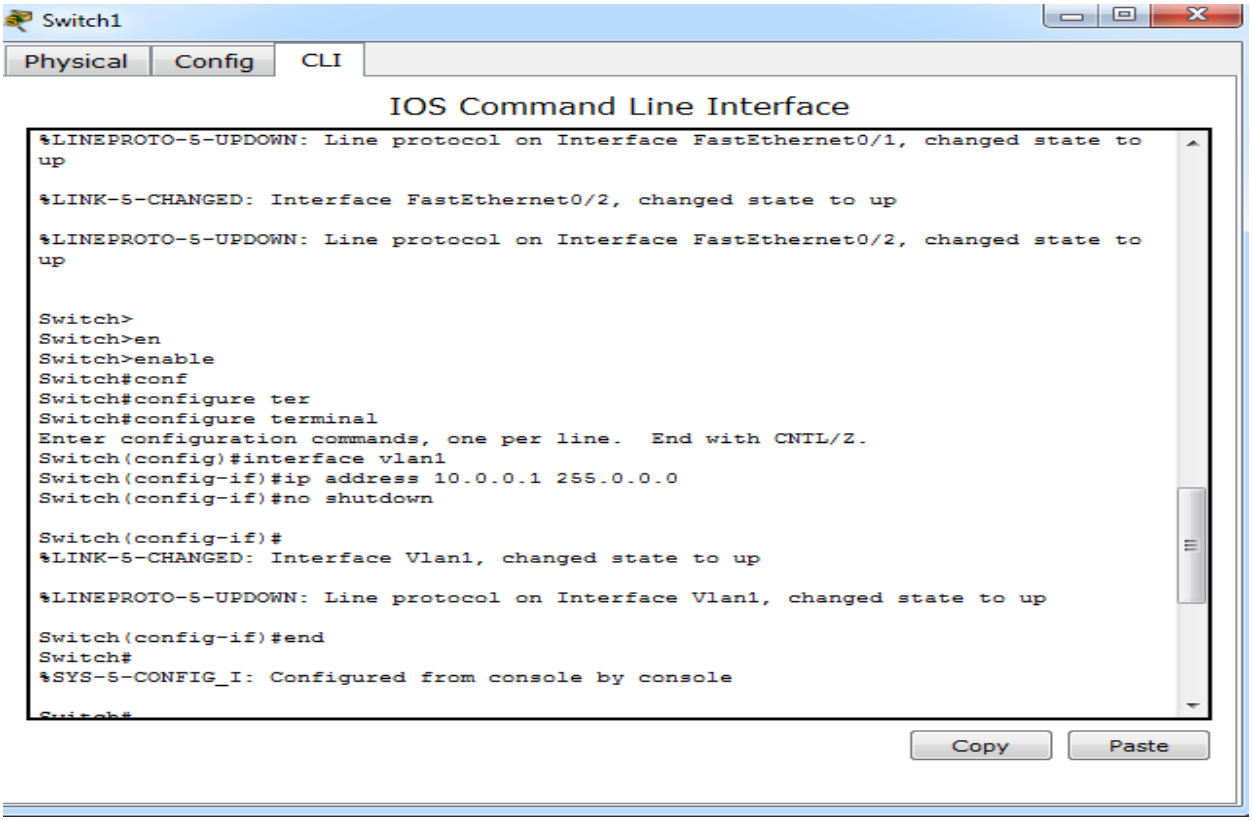
At which layer the HUB operates? _____

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

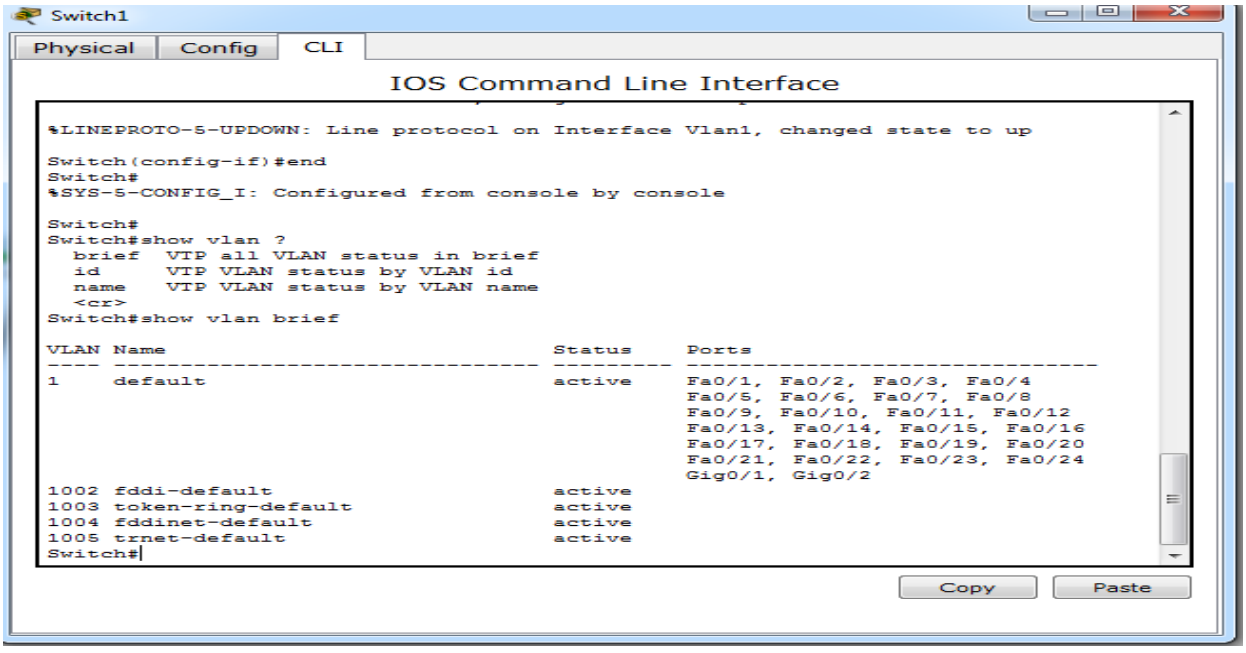


CONFIGURATION:

Click Switch → CLI →then run following commands.

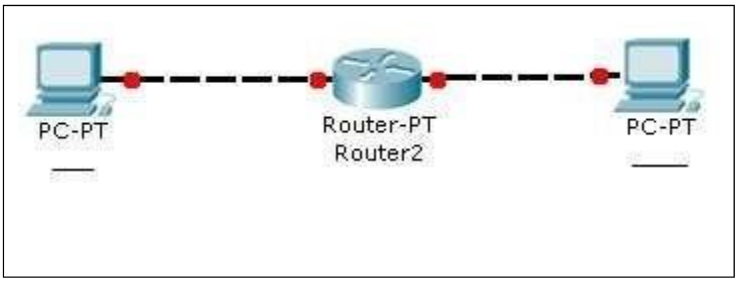


We have to assign IP address on Interface Vlan1 which is default interface in Switch as shown below.

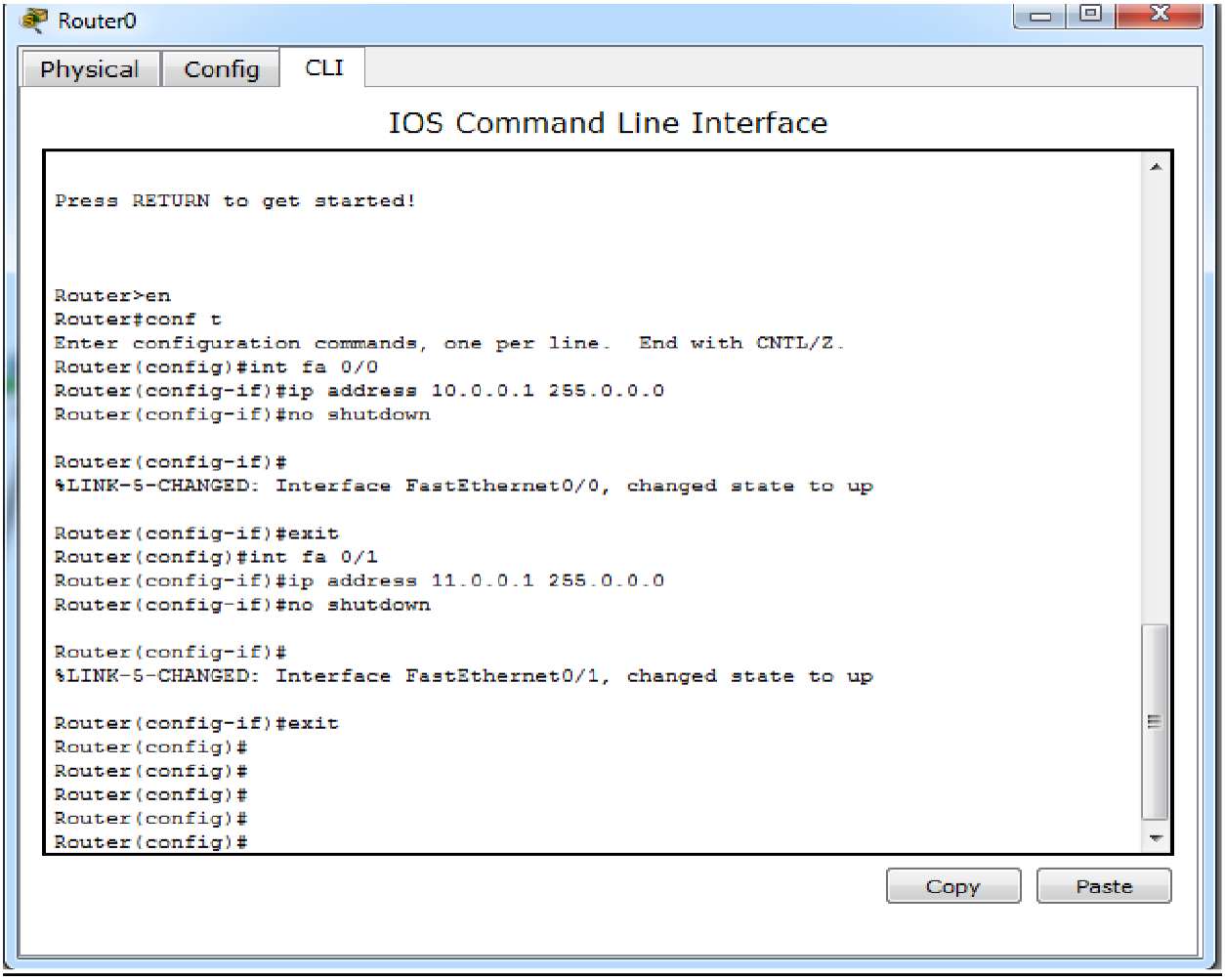


At which layer the SWITCH operates? _____

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

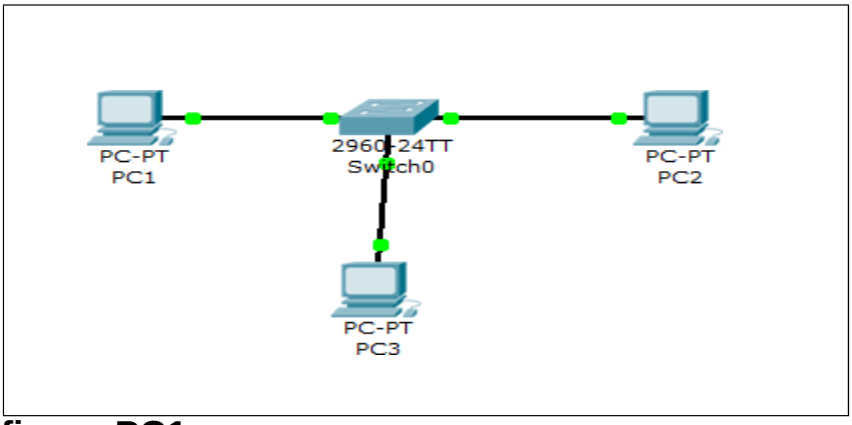


CONFIGURATION:



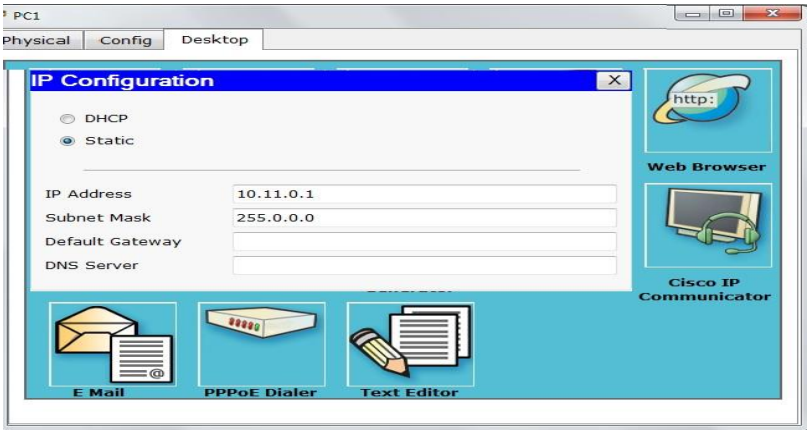
At which layer the ROUTER operates? _____

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

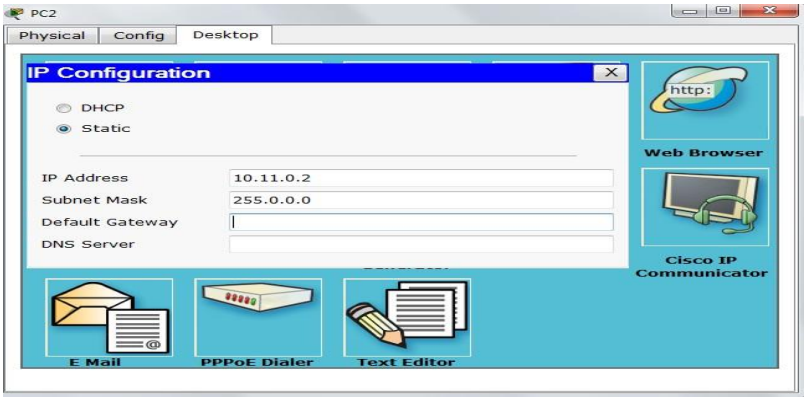


Step#1: configure PC1.

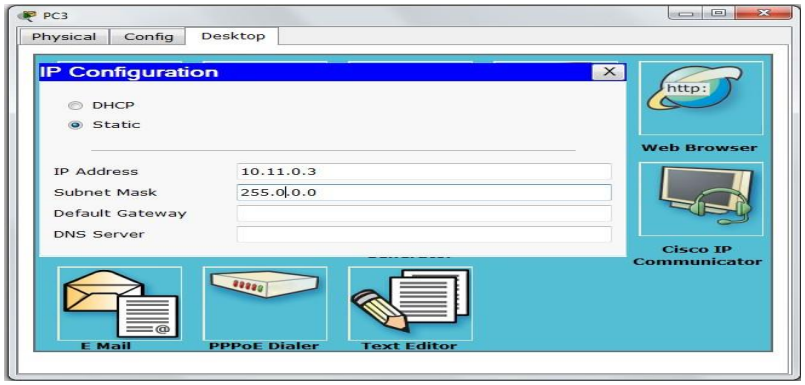
a) Click on the PC1 and go to Desktop →IP Configuration



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



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



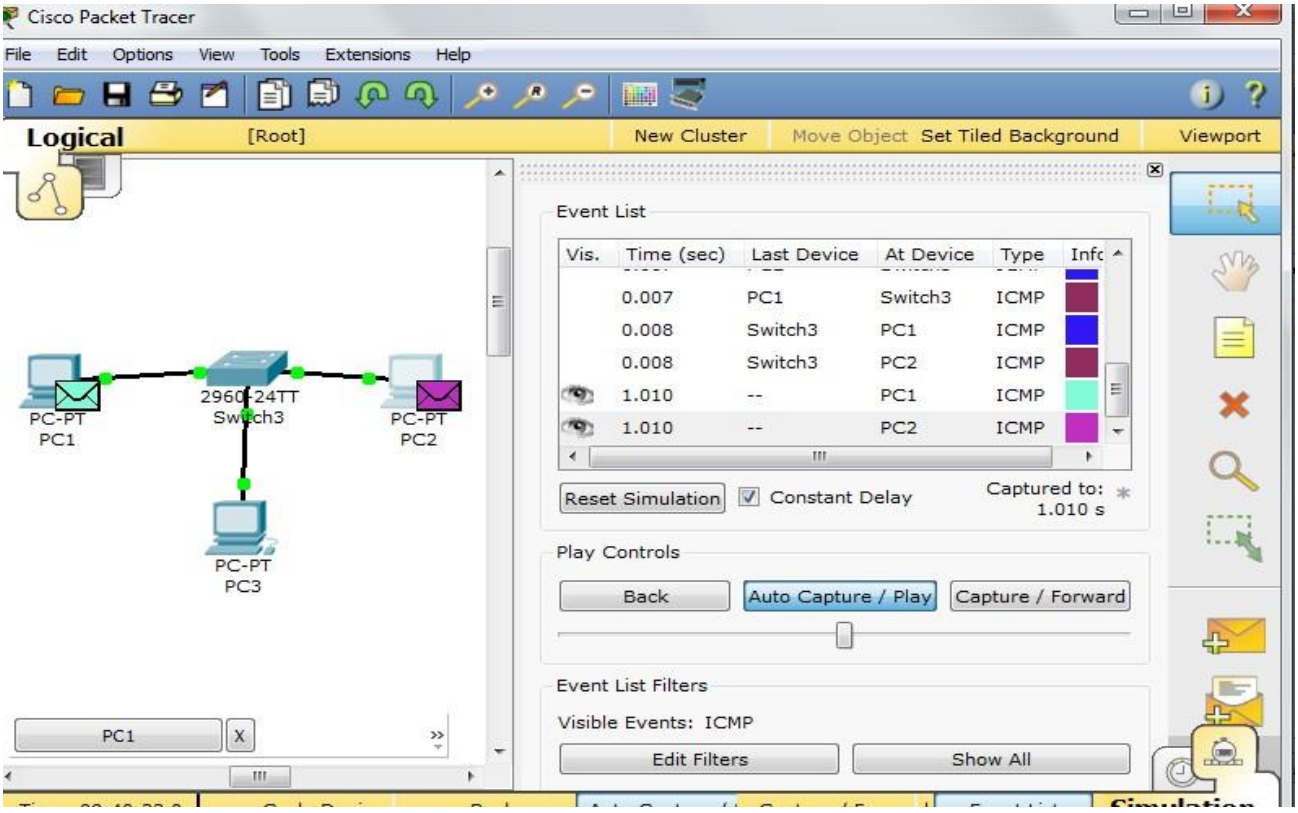
Step#2:

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.

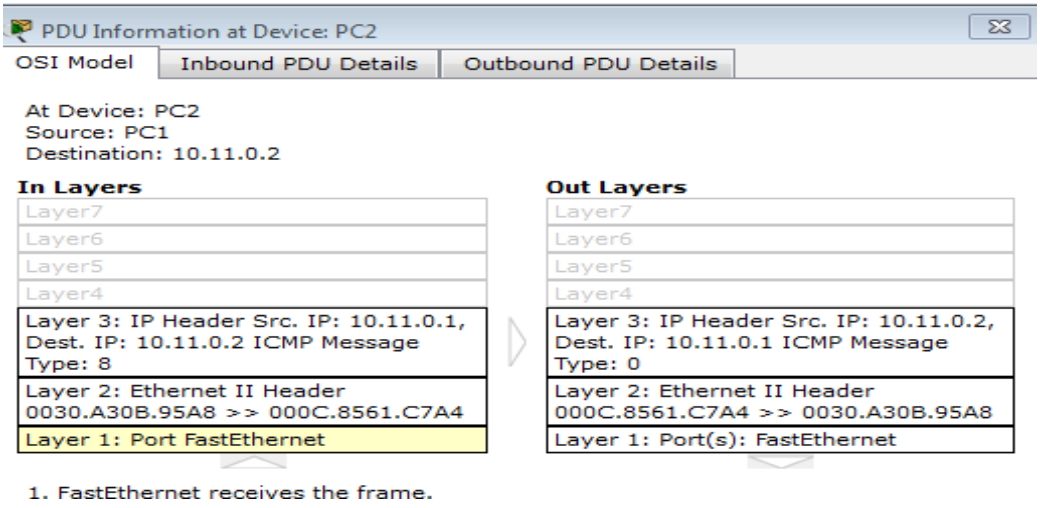
d) Click on the PC1 and go to Desktop →Command Prompt then Ping PC1 from PC2.



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

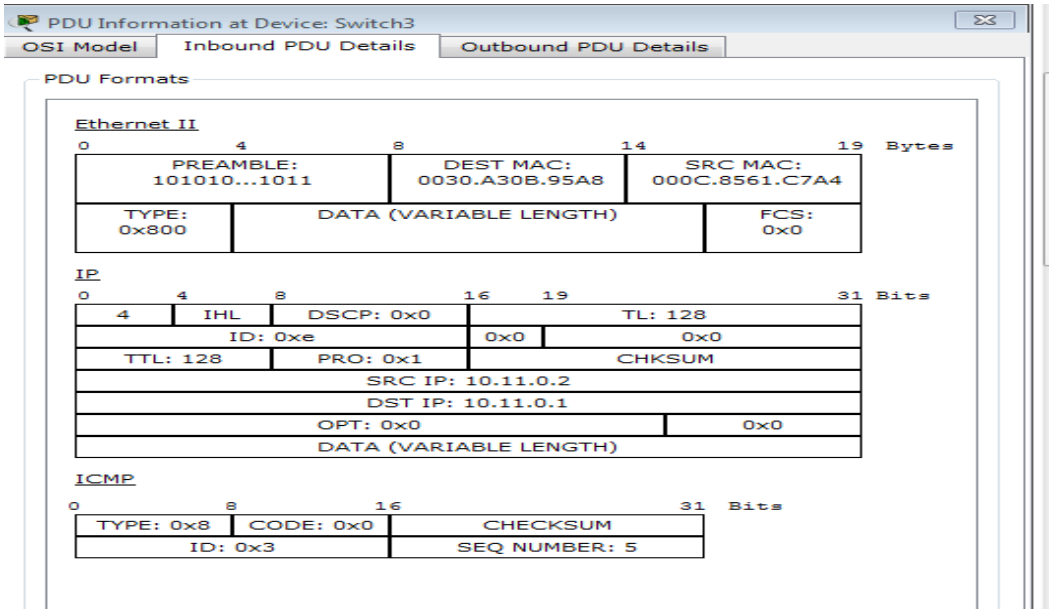
a) Shows OSI layers involved in transmission.

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).



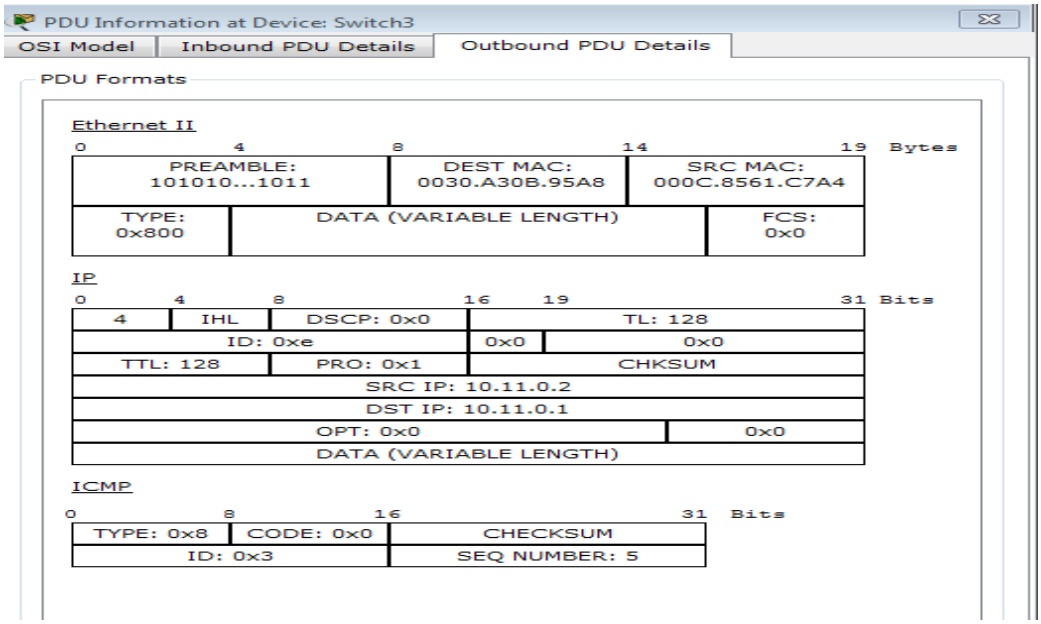
b) Shows Inbound PDU Details.

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



c) Shows Outbound PDU Details.

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

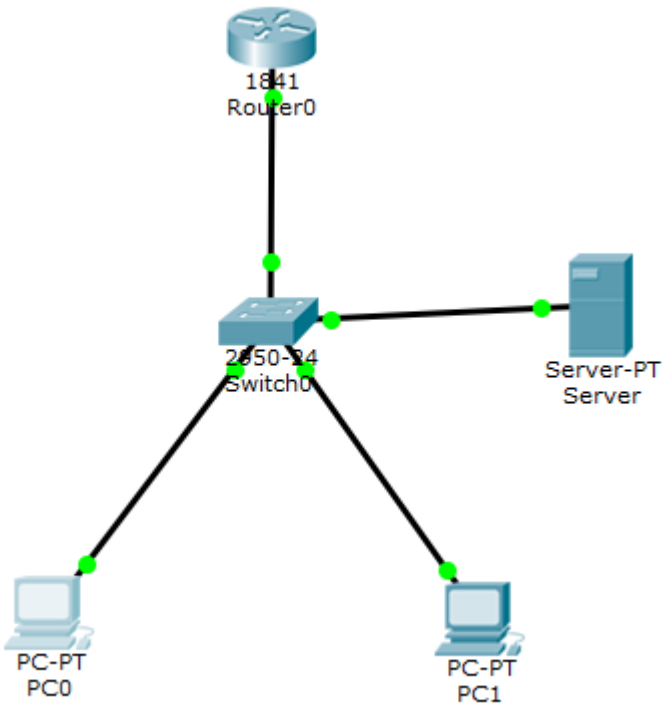


Dynamic Host Configuration Protocol Using Router

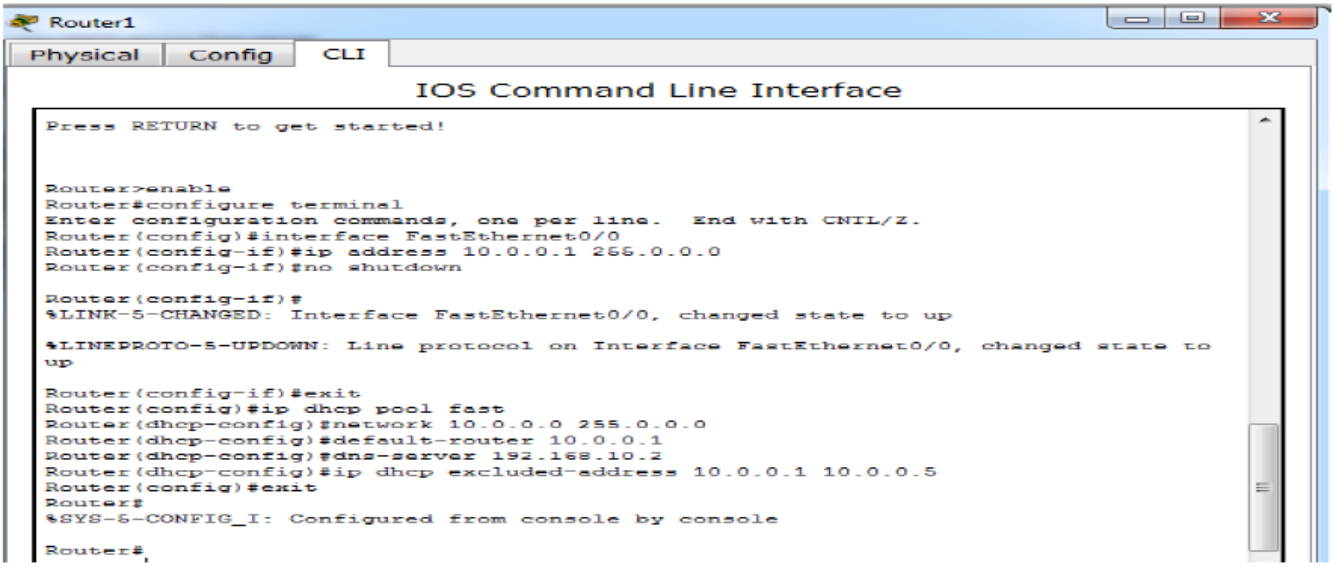
The Dynamic Host Configuration Protocol is used by computers for requesting Internet Protocol parameters, such as an IP address from a network server. The protocol operates based on the client-server model. DHCP is very common in all modern networks ranging in size from home networks to large campus networks and regional Internet service provider networks. Most residential network routers receive a globally unique IP address within the provider network. Within a local network, DHCP assigns a local IP address to devices connected to the local network.

When a computer or other networked device connects to a network, its DHCP client software in the operating system sends a broadcast query requesting necessary information. Any DHCP server on the network may service the request. The DHCP server manages a pool of IP addresses and information about client configuration parameters such as default gateway, domain name, the name servers, time servers. On receiving a request, the server may respond with specific information for each client, as previously configured by an administrator, or with a specific address and any other information valid for the entire network, and the time period for which the allocation (*lease*) is valid. A host typically queries for this information immediately after booting, and periodically thereafter before the expiration of the information. When an assignment is refreshed by the client computer, it initially requests the same parameter values, but may be assigned a new address from the server, based on the assignment policies set by administrators.

We can use DHCP service from router as well as from Server.



Now configuring network on Fa 0/0.



Now assigning IP to PC0 and PC1