NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCE
Computer Network Lab (CL3001)Lab
Session 07

Objective:

- To understand Simple Mail Transfer Protocol (SMTP)
- Implementation of SMTP in Cisco Packet Tracer
- To understand File Transfer Protocol (FTP)
- Implementation of FTP in Cisco Packet Tracer

SMTP

1. Introduction:

Simple Mail Transfer Protocol (SMTP) is an Internet standard for electronic mail (email) transmission. First defined by RFC 821 in 1982, it was last updated in 2008 with Extended SMTP additions by RFC 5321, which is the protocol in widespread use today. Although electronic mail servers and other mail transfer agents use SMTP to send and receive mail messages, user-level client mail applications typically use SMTP only for sending messages to a mail server for relaying. For retrieving messages, client applications usually use either IMAP or POP3.

SMTP communication between mail servers uses port 25. Mail clients on the other hand, often submit the outgoing emails to a mail server on port 587. Despite being deprecated, mail providers sometimes still permit the use of nonstandard port 465 for this purpose. SMTP runs over TCP.

2. Implementation:

Topology:

Construct the topology shown in figure 1. Turn on router interface & assign IP's to PC using DHCP through router as done in pervious lab. Assign static IP to email server.

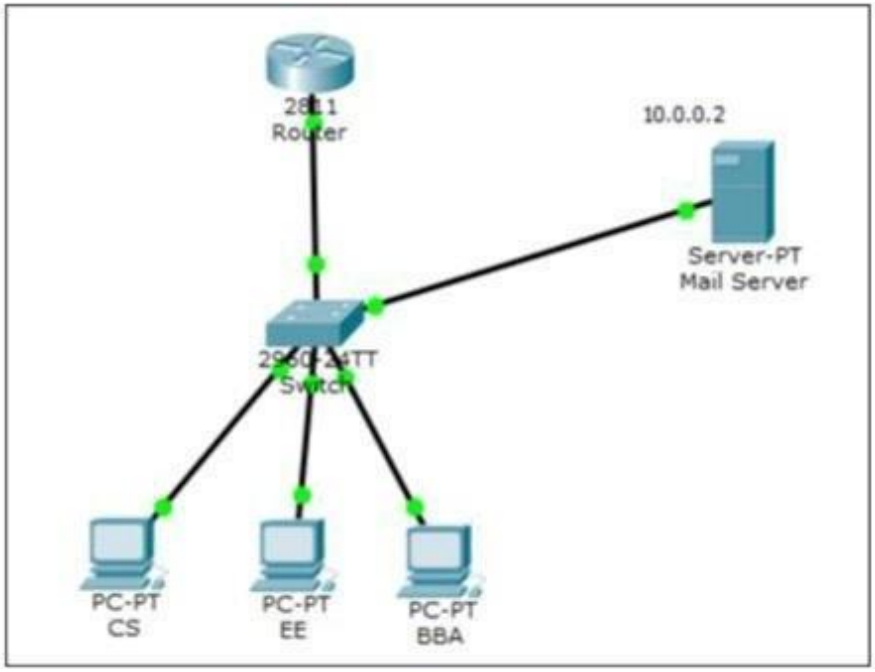


Fig-1: Topology

Configure and Verify Email Services

- Click on Mail server
- Go to services & then email services
- Enable SMTP & POP3 Service
- Set Domain name fast.com
- Add following users

Username	Password
cs	123
ee	456
bba	789

Table-1: User name & their passwords

Now configure user email account.
Goto PC → Desktop → Email
Fill the following fields as shown in figure 3.
Click "Save" to save the configurations and do the same for EE and BBA.

Fig-2: Mail Server view after configuration

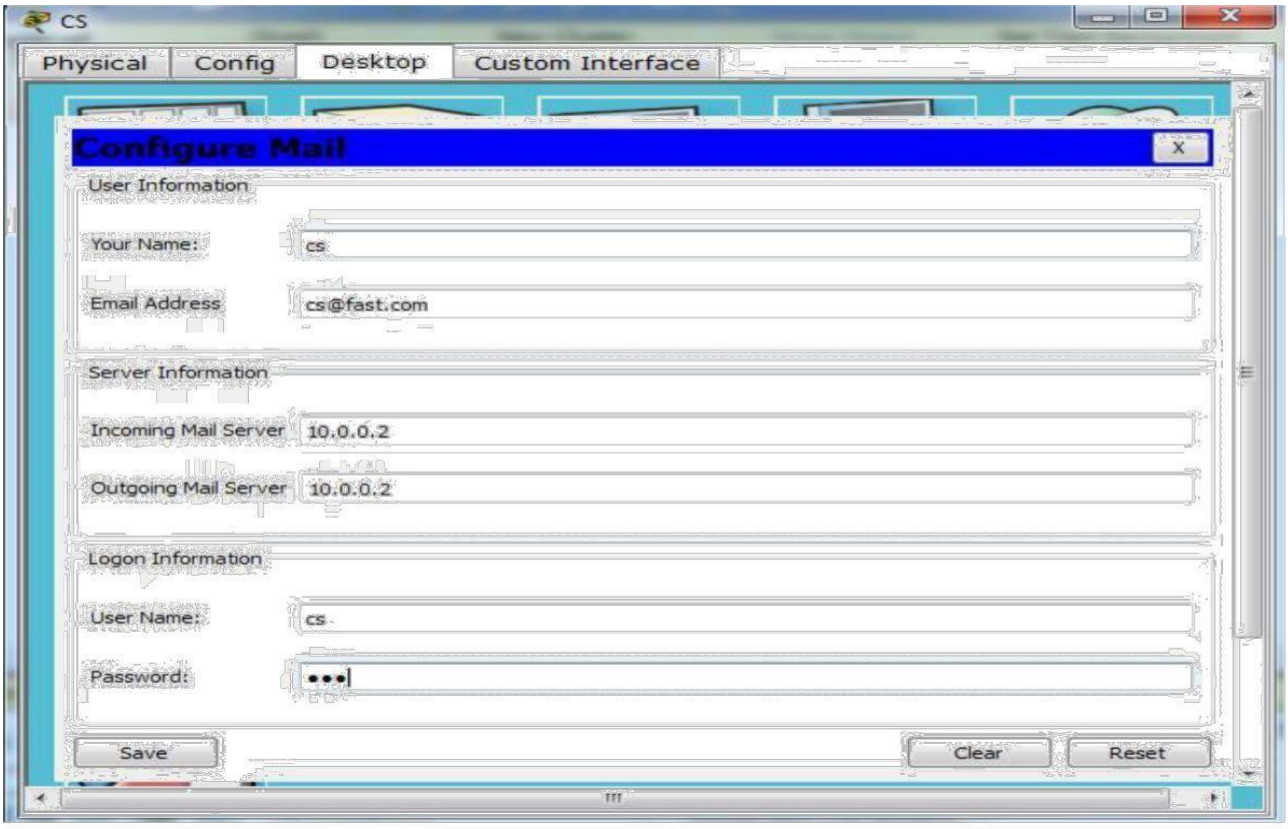


Fig-3: User Email configuration

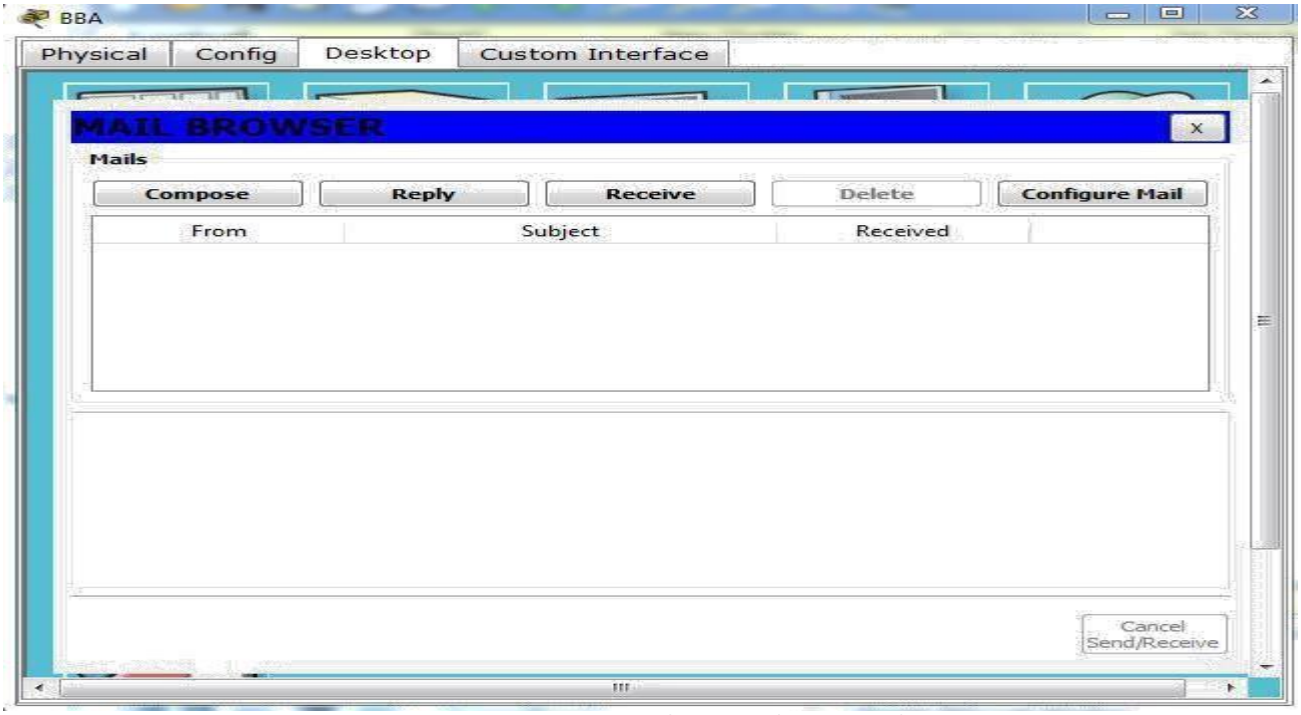


Fig-4: Mail browser view of user PC after mail configuration

Now compose email **cs@fast.com**

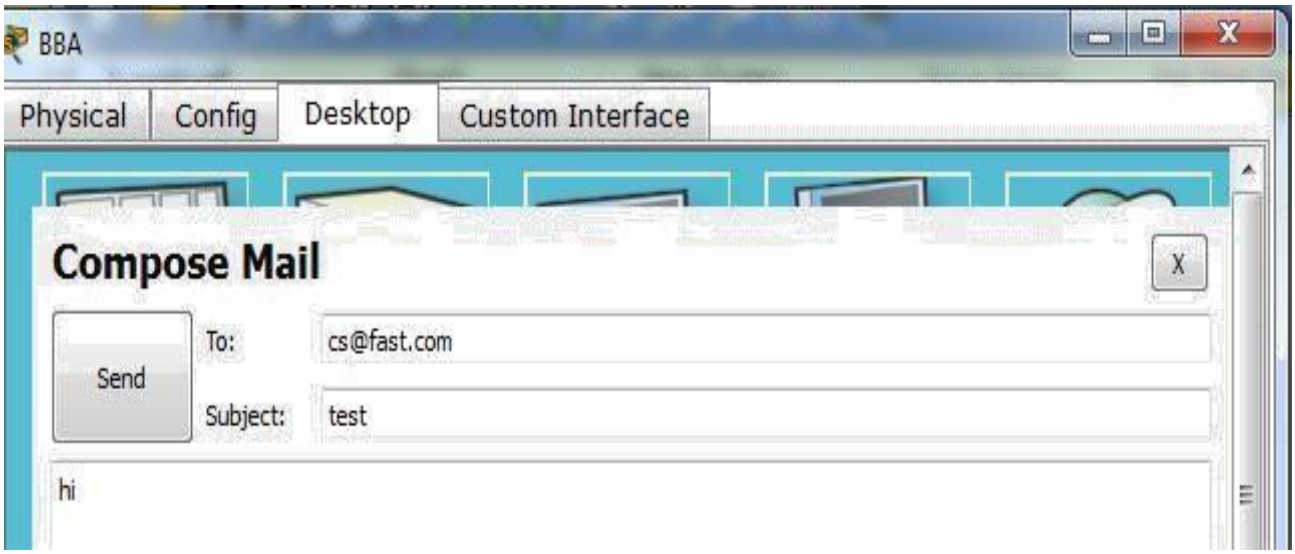


Fig-5: Composing Email

Click on “Send” to send Email.

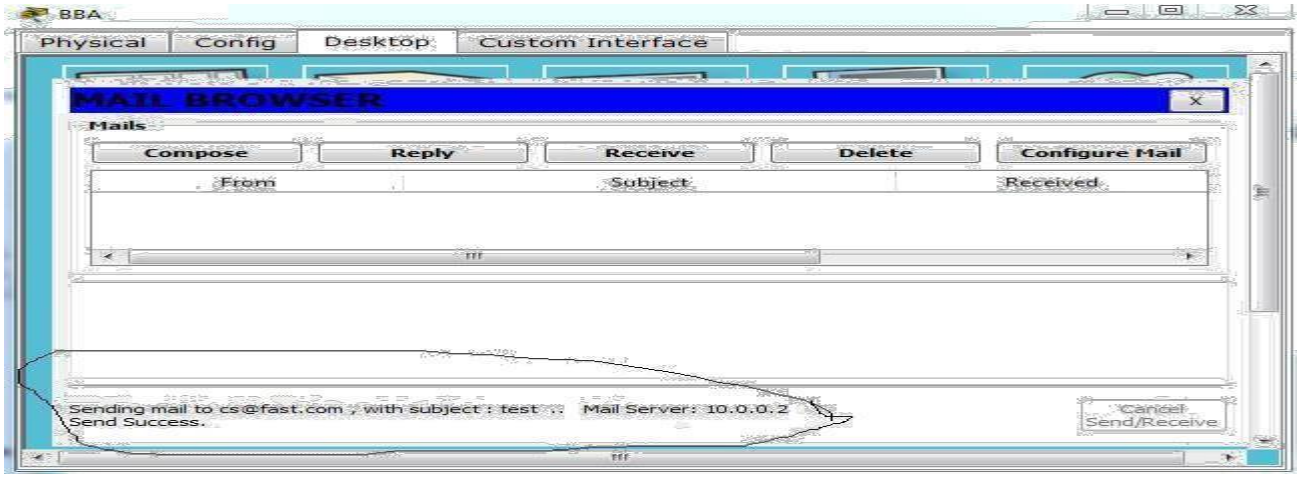
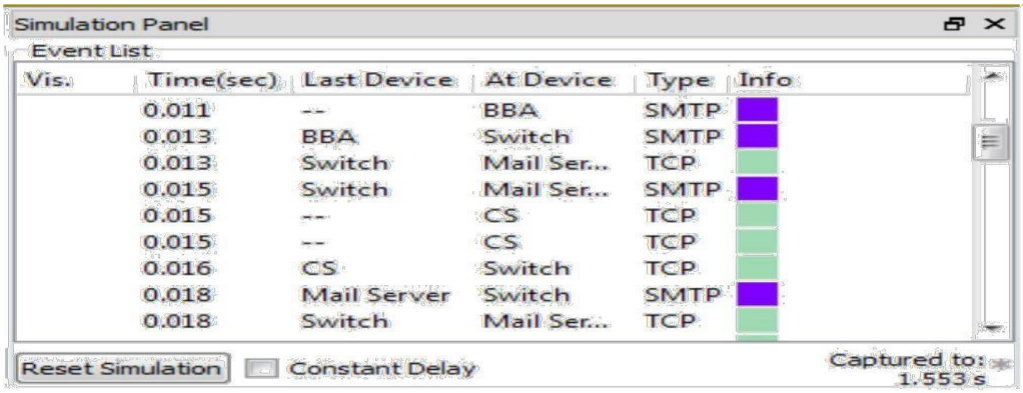


Fig-6: Sending Mail

Simulation

To note POP 3 header format information go to simulation mode → edit filters & check SMTP & POP 3 boxes. After that click on capture/forward button. Now see how mail server works.



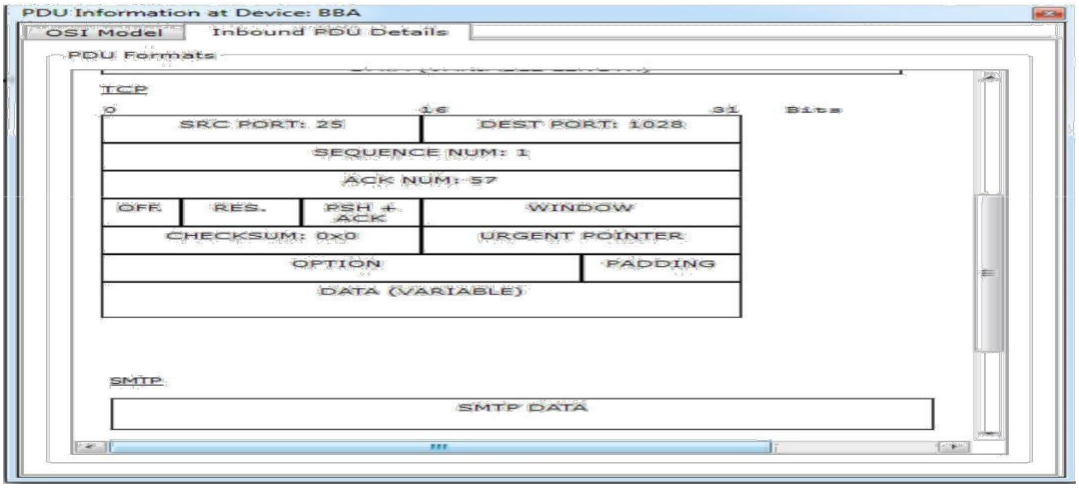


Fig-7: Packets capture in simulation mode & their PDU details

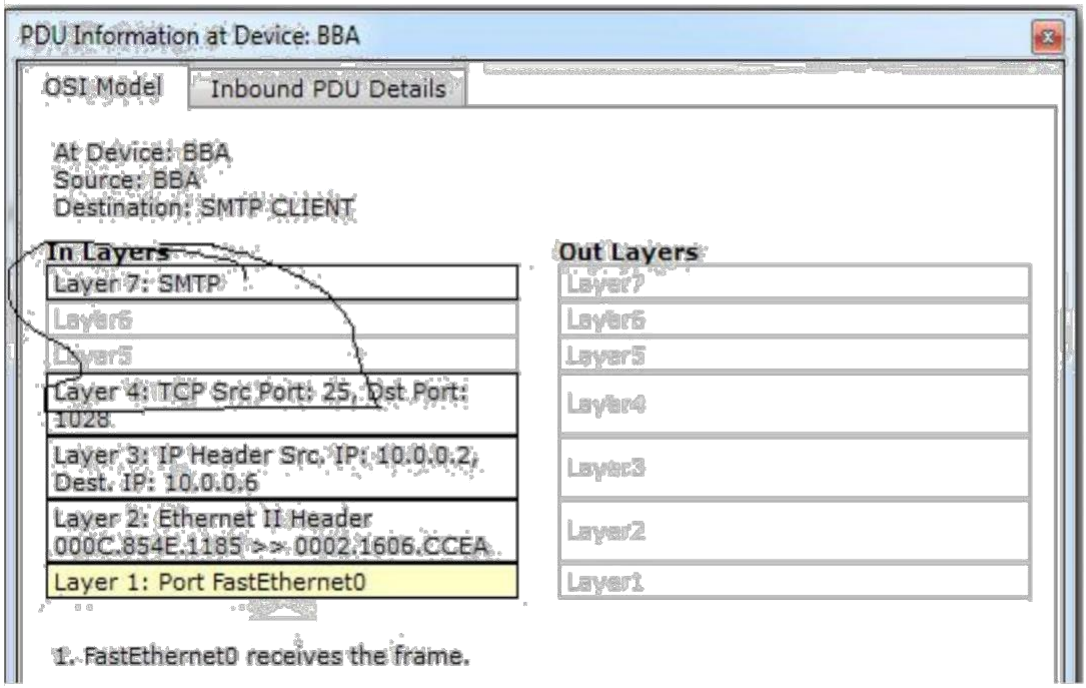


Fig-8: OSI layer information about protocols at each layer in sending mail packet

Now, go to CS record and click Receive:

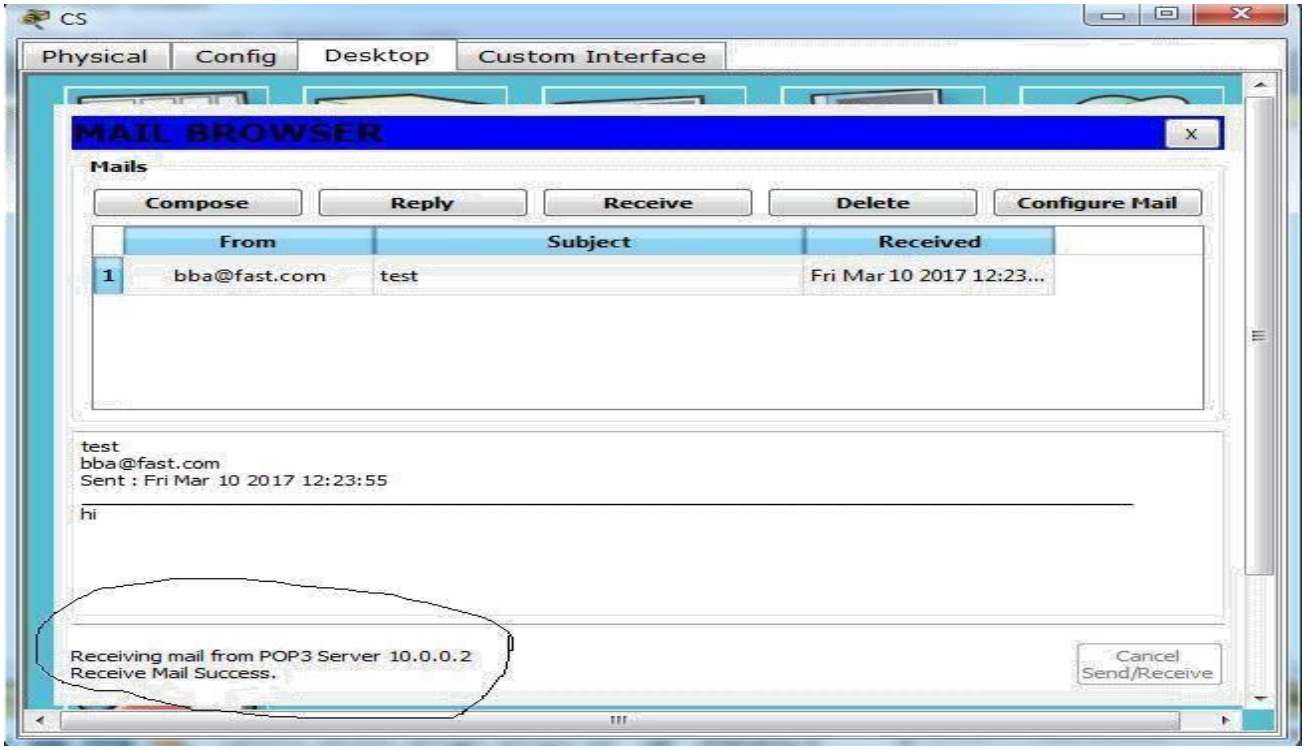


Fig-9: Mail received at destination

FTP

3. Introduction:

The File Transfer Protocol (FTP) is a standard network protocol used to transfer computer files between a client and server on a computer network. FTP is built on client-server model architecture and uses separate control and data connections between the client and the server. FTP users may authenticate themselves with a clear-text sign-in protocol, normally in the form of a username and password, but can connect anonymously if the server is configured to allow it. For secure transmission that protects the username and password, and encrypts the content, FTP is often secured with SSL/TLS (FTPS) or replaced with SSH File Transfer Protocol (SFTP). FTP uses TCP as its under layer transport protocol for data reliability transfer. It uses port 21.

FTP may run in *active* or *passive* mode, which determines how the data connection is established.

- In active mode, the client starts listening for incoming data connections from the server on port M. It sends the FTP command PORT M to inform the server on which port it is listening. The server then initiates a data channel to the client from its port 20, the FTP server data port.
- In situations where the client is behind a firewall and unable to accept incoming TCP connections, *passive mode* may be used. In this mode, the client uses the control connection to send a PASV command to the server and then receives a server IP address and server port number from the server, which the client then uses to open a data connection from an arbitrary client port to the server IP address and server port number received.

Both modes were updated in September 1998 to support IPv6. Further changes were introduced to the passive mode at that time, updating it to *extended passive mode*.

4. Implementation:

In this activity, you will configure FTP server in Cisco Packet Tracer. After configuration you will transfer file between client & server. This activity is divided into 3 parts. First Construct the figure 10 topology & repeat all essential steps which we are done in pervious section.

Part 1: Configure FTP services on server

a) Click Server > Config tab > FTP.

b) Click On to enable FTP service.

c) In User Setup, create the following user accounts. Click the + button to add the account:

Username	Password	Permissions
fast	123	limited to Read, write and List

Table-2: User name & its passwords with rights

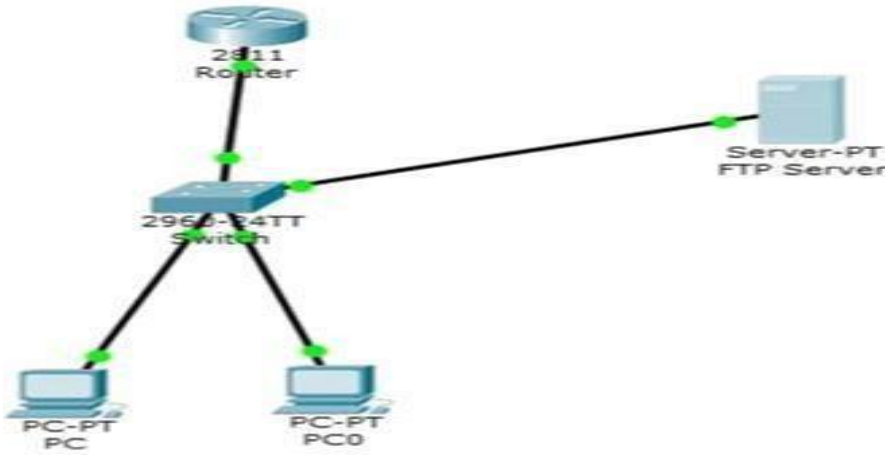


Fig-10: Topology

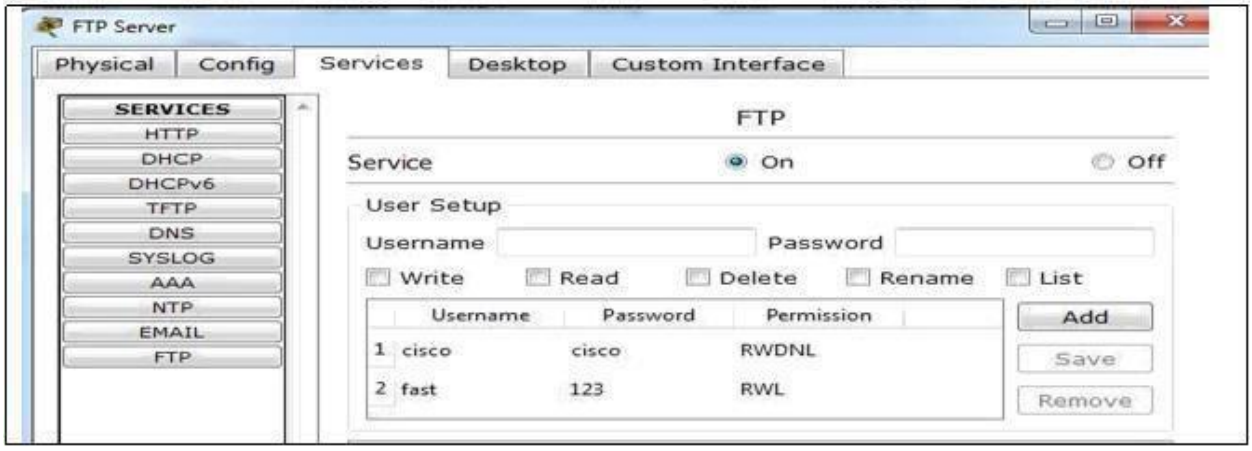


Fig-11: Enabling STP services on server

Now go to PC Desktop command prompt. Connect with the FTP server using username & password assign to FTP server.

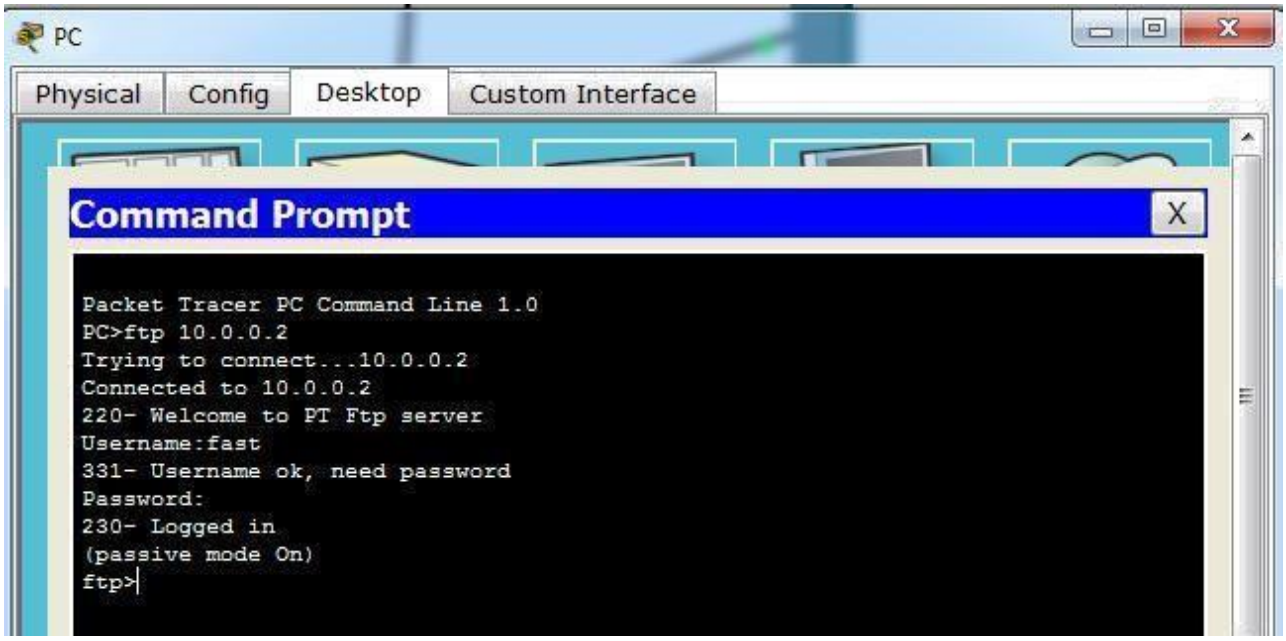


Fig-12: PC established connection with FTP server

Part 2: Upload the file to FTP server

Go to PC Desktop text editor create file named test.bin

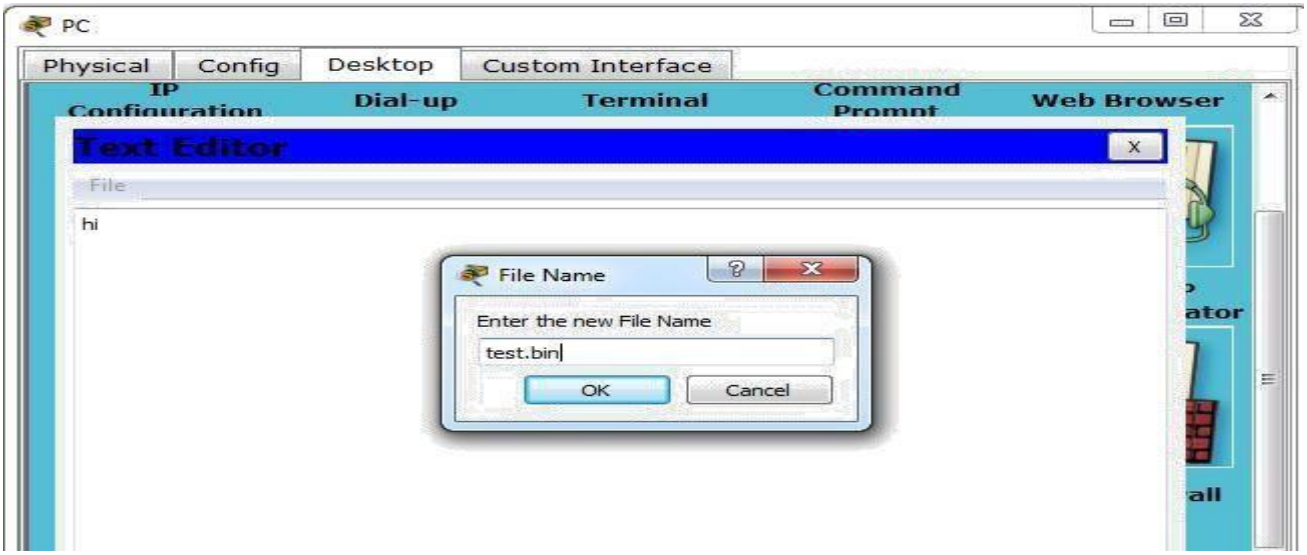


Fig-13: Creating text file in PC

After creating the file go to PC Desktop command prompt and write the following command to transfer file from PC to FTP server.

PUT test.bin

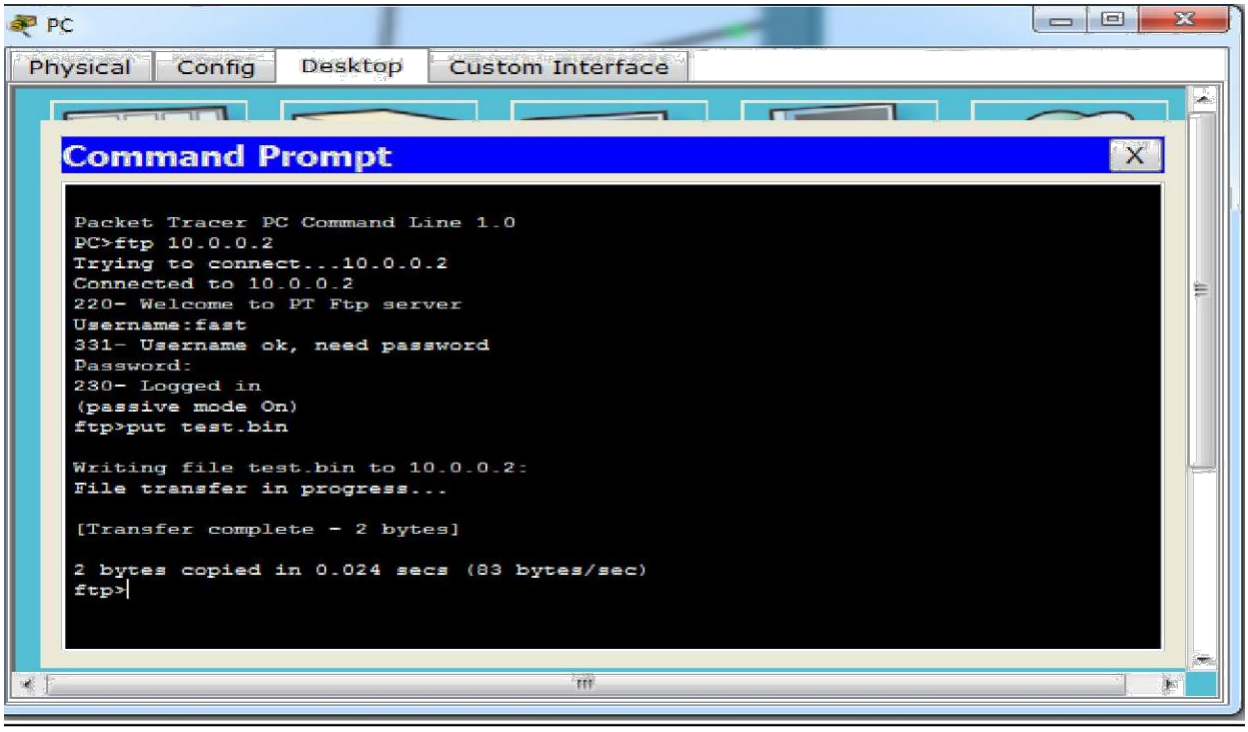


Fig-14: transfer of file from PC to FTP server

Part 3: Download the file from FTP server

Now go to other PC desktop command prompt. Established connection with FTP server and then write the ***dir*** command to see the files in FTP server.

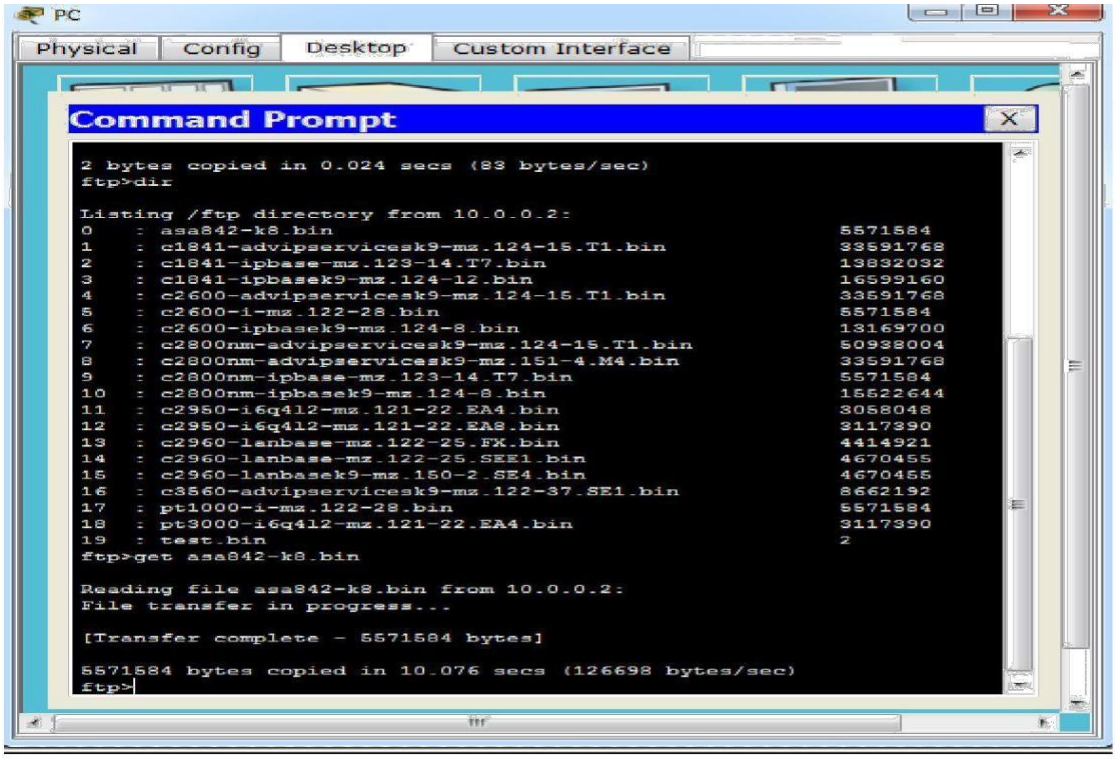


Fig-15: List of current Files in FTP server

Simulation

Select the simulation mode. Go to PC desktop command prompt again make connection with FTP server using its IP address.

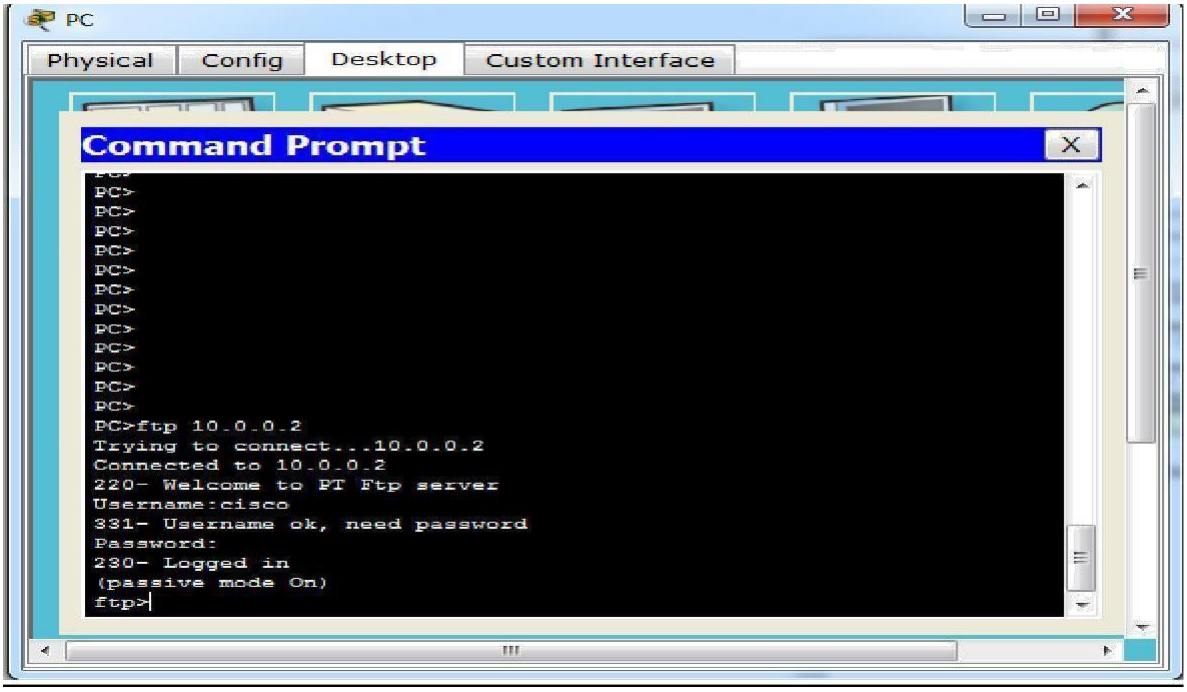
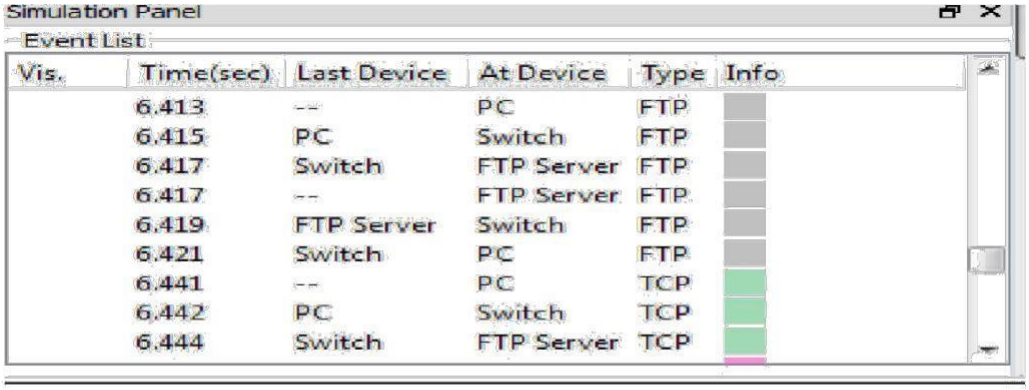
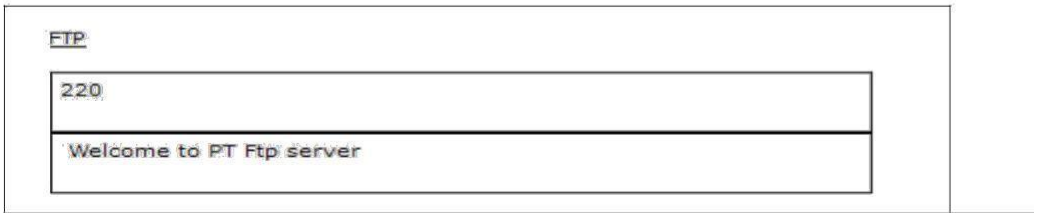


Fig-16: PC connection with FTP server

Now to note the FTP header format information go to simulation mode edit filters and click on FTP check boxthen click on capture/forward button.

How FTP server resolve the login request.





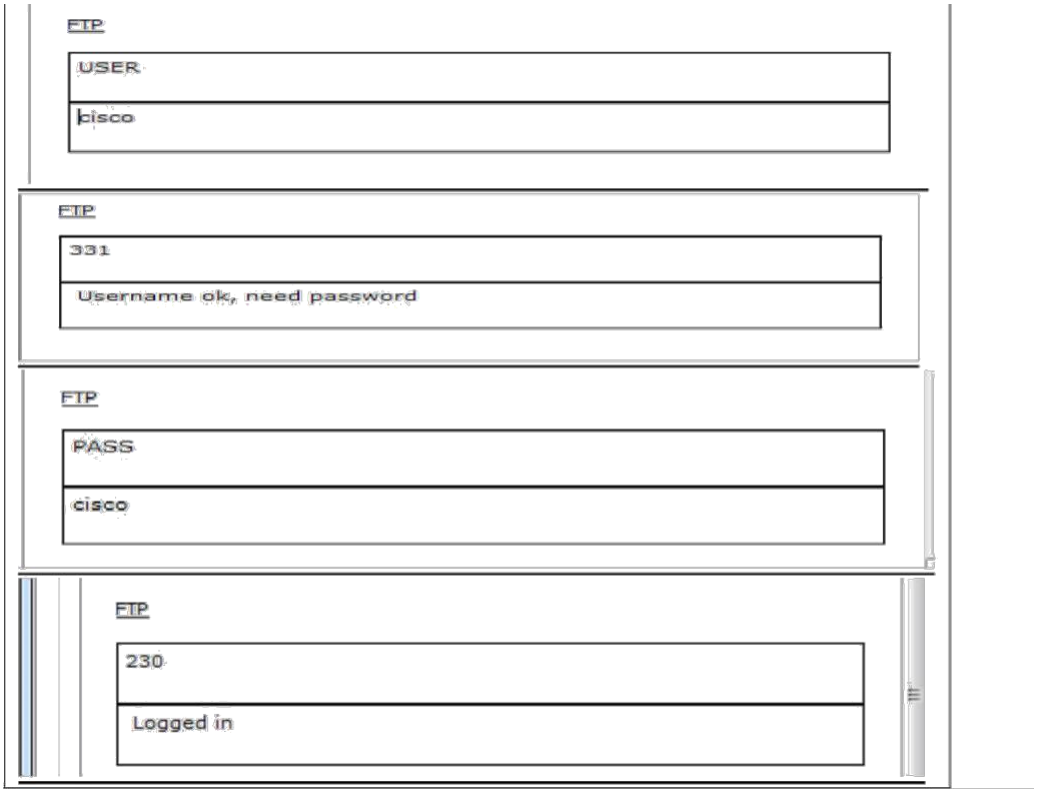


Fig-17: Packets capture in simulation mode

Now click on the FTP packet, you can note that the destination port is 21.

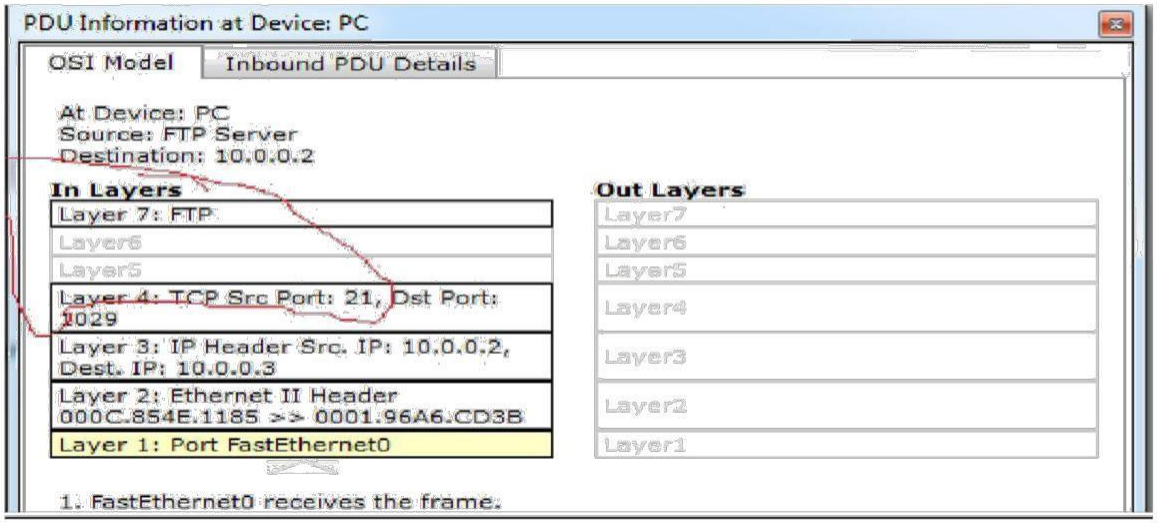


Fig-18: PDU information at PC

Now scroll the Outbound PDU Details, you can see the FTP PDU.

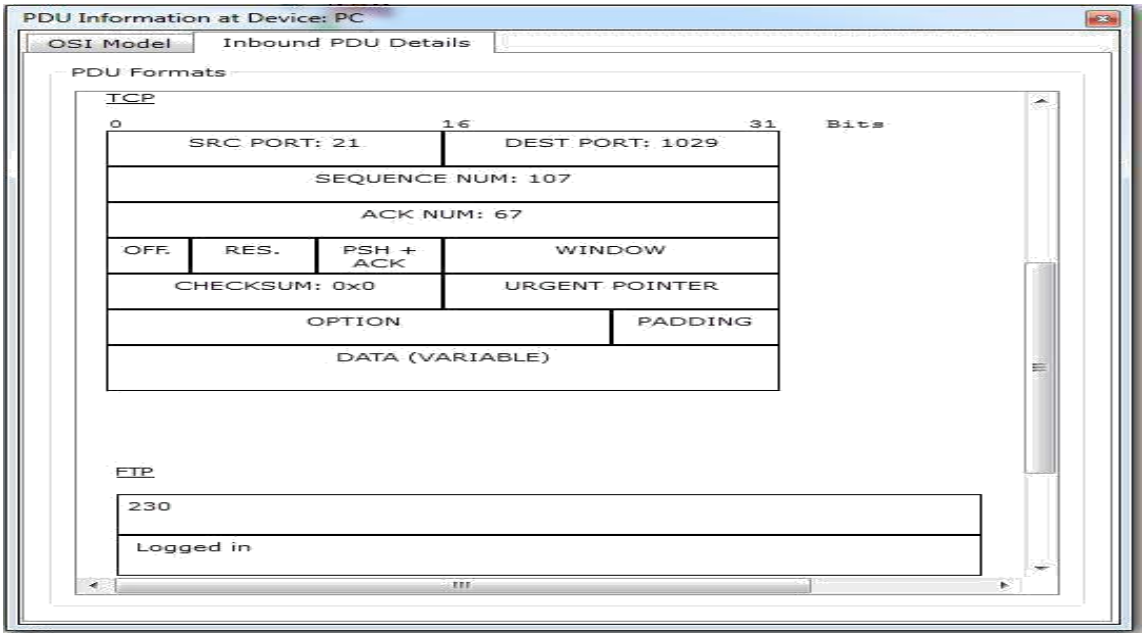


Fig-19: PDU details

5. Lab Exercise:

Let's suppose your organization need to create it's on small server (for provide someservices) based network. With bellow mentioned topology and instructions:

a) Configure one server as DHCP to provide dynamic IP to

b) Configure SMTP (create account with your last name) send mail from PC-A to PC-B.
c) Configure FTP server create account with your first name, password with your roll number andfile name with your last name (.bin extension) show all connection results.

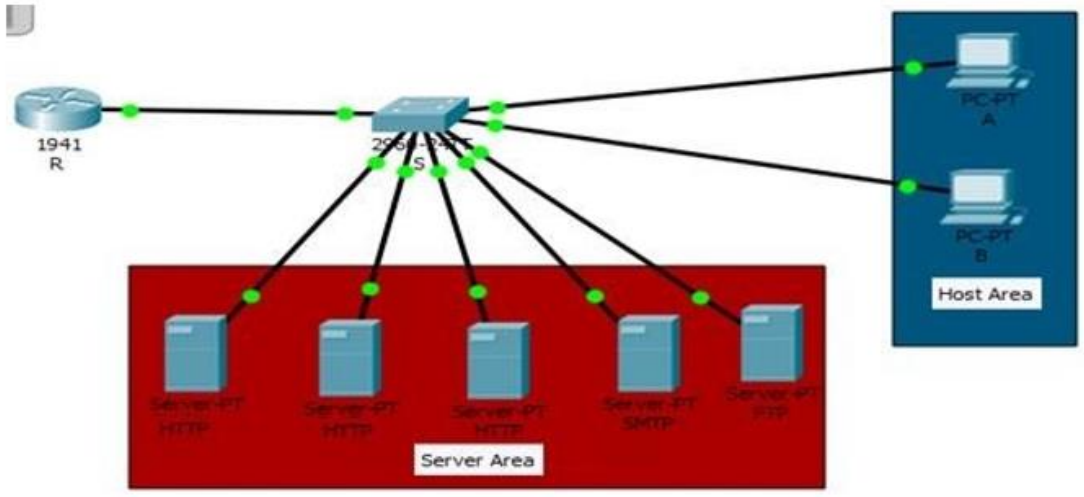


Fig-20: Lab Exercise Topology