

Application layer

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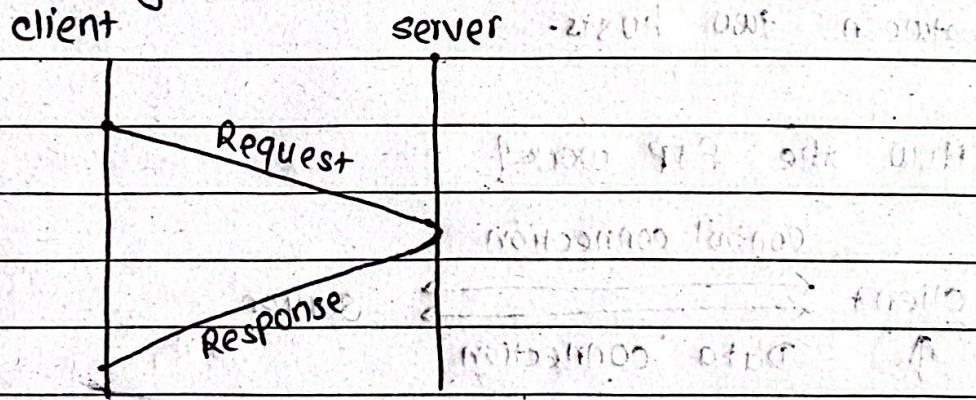
- Q) What is HTTP protocol? With an example explain how a request initiated by a HTTP client is served by a HTTP server. (1) (2069)

→ It is a protocol which can be used to transfer the data on the world wide web (www).

Features Of HTTP

- i) Connectionless
- ii) Stateless
- iii) Media Independent
- iv) Client - Server Architecture

HTTP Working



HTTP uses the concept of URL.

The importance of HTTP(s) while browsing any website are as follows:

- i) It preserves referrer data.
- ii) It prevents tampering by third parties.
- iii) It makes our site more secure for visitors.

(d) Explain working principle of FTP with data transfer process including proper port connection. Use diagram to justify your answer. (1)



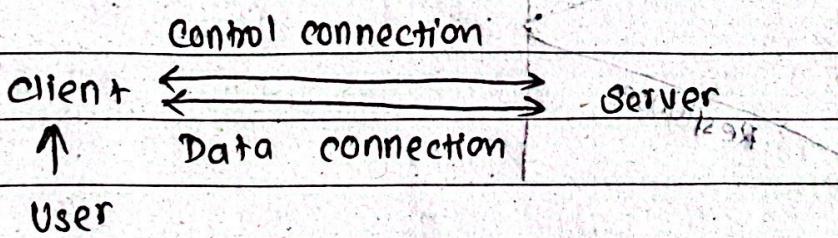
file transfer Protocol (FTP)

- Transmits the files from one host to another.
- Can be used for downloading the files to computer from other services.
- sharing of files.

FTP client

It is a program that implements a file transferring between two hosts.

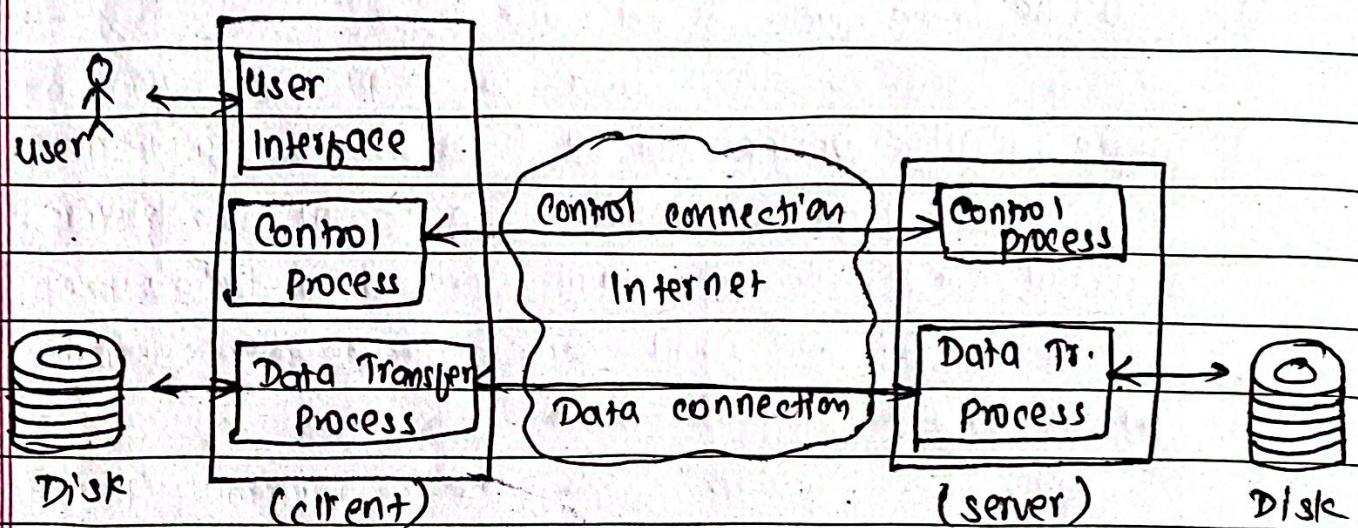
How the FTP work?



User

FTP establishes two connection → Data transfer (Port 20)
 [opens & closed for each file transfer]

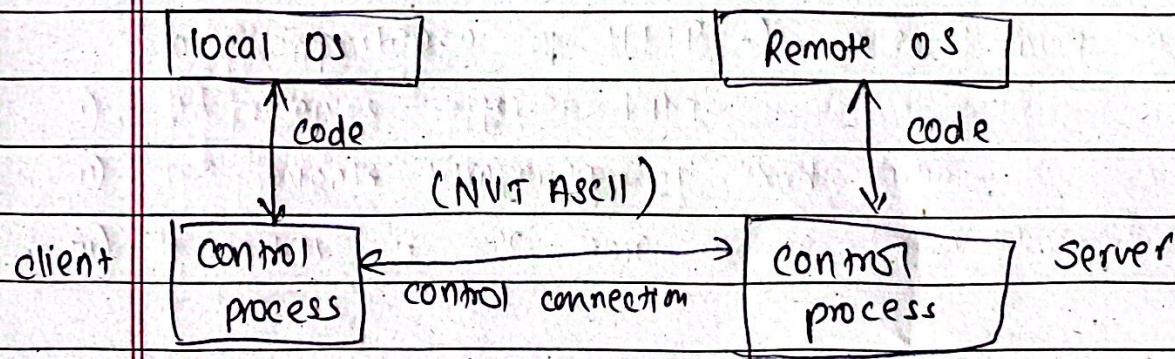
(Control) Information (Port 21) → [remain connected through entire FTP session]



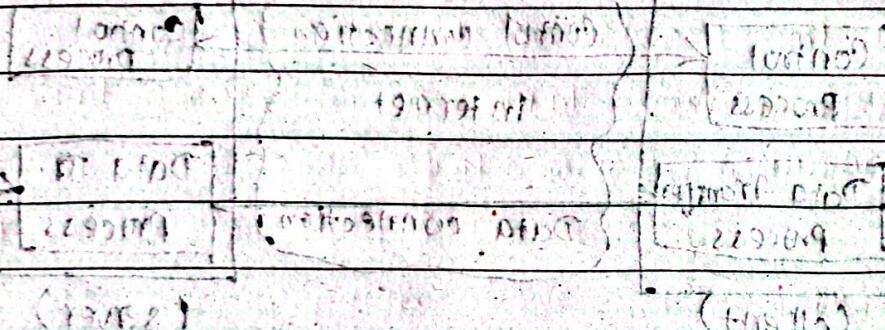
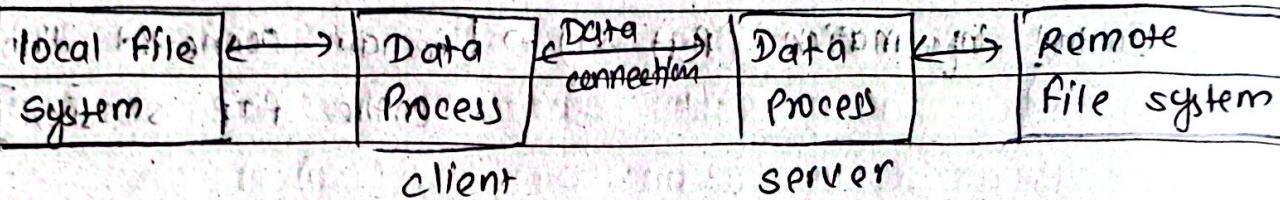
Communication in FTP:-

1) Communication over control connection

FTP uses a set of ASCII characters to communicate across control connection.



ii) Communication over Data connection
Used to transfer a file.



File transfer communication

Addressing mechanism

host or network address (192.168.1.1)

port number (22003)

File transfer communication

host or network address (192.168.1.1)

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File transfer communication

host or network address (192.168.1.1)

3) What is TFTP? (1)

→
 Tivial **F**ile **T**ransfer **P**rotocol (TFTP) is a minimal protocol for transferring files without authentication. It is mainly used for transfer files within a local area Network. It is not secure.

4) Which protocols are used in sending and receiving an email? Illustrate with necessary figure. (1+1)

What are different components of email server? (1)

What do you mean by email server? (1+1)

Explain working principle of E-mail system with a proper diagram.

4) What do you mean by email server?

→ A email server, or simply mail server, is an application in a network whose sole purpose is to act as a virtual post office.

The server stores incoming mail for distribution to local users and send out outgoing messages.

This uses a client-server application model to send and receive messages using Simple Mail Transfer Protocol (SMTP).

Mail servers send and receive email using standard email protocols. For eg:- the SMTP protocol sends messages and handles outgoing mail requests. The IMAP and POP3 protocol receive messages and are used to process incoming mail.

5) What are the protocols used on it?

1) Simple Mail Transfer protocol (SMTP)

SMTP is used when email is delivered from an email client, to an email server or when email is delivered from one email server to another. SMTP uses port 25.

Working of SMTP

- First, the client SMTP has TCP connection on Port 25 to the server.
- If the server is down, the client tries again later.
- Once the connection is established, the server and client perform some application layer handshaking.
- During the handshaking phase, the SMTP client indicates the email address of the recipient.
- Once the SMTP client & server have introduced themselves to each other, the client sends the messages.

User A

User B

User Agent

User Agent

MTA client

Internet

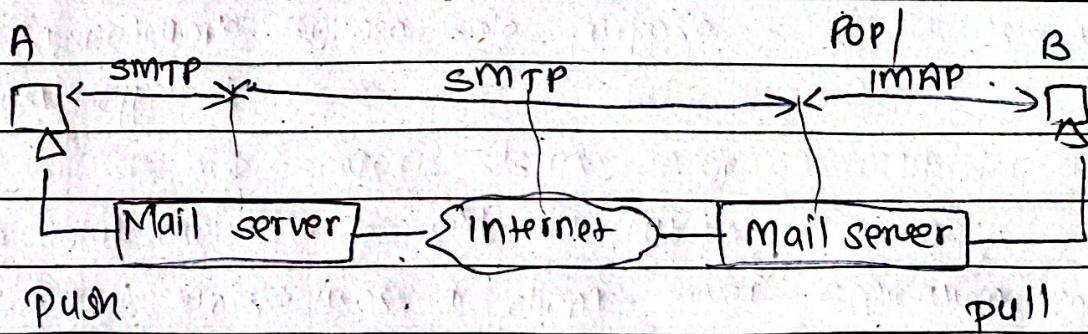
MTA server

11) Post Office Protocol 3 (POP3)

It is the third version of method of receiving email. Much like physical version of a post office clerk, POP3 receives and holds email for an individual until they pick it up.

Just as the post office doesn't keep copies of the mail it delivers, older version of the POP3 protocol would automatically delete emails from the server after you download them to your email client.

POP3 makes it easy for anyone to check their email from any computer in the world.



IMAP

IMAP allows us to access our email wherever we are much of the time.

IMAP lets you access your email messages from anywhere, usually via the Internet. Emails are stored on servers, and when you click your inbox, your email client connects to the server to show you your messages. When you read an email with IMAP, you're not downloading it to your computer; you're viewing it directly from the server. This allows you to check your email from multiple devices without missing anything. With the increasing use of smartphones, laptops, tablets and other devices, IMAP is becoming more popular. While POP is still popular for those who only check email on one or two devices or have slow internet connections, IMAP remains the preferred choice for many people due to its flexibility.

6) What are the different components of email server?

→

- i) Mail User Agent
- ii) Mail Transfer Agent
- iii) Mail Host & Mailboxes

7) Differences between POP3 and IMAP (1+1)

Post Office protocol (POP3)

Internet message Access Protocol (IMAP)

i) When anyone opens the mail box, new mail is moved or downloaded permanently from the host server and saves on the computer. Hence, if he/she wants to see the previous mail, he/she has to go back to the previous.

The mail is permanently stored in the server until you delete this. Thus, you can access them from various locations at various times.

Q) POP has only two modes i.e keep mode & delete mode for message.

A user can create, delete or rename mailboxes on the mail server.

g) Reading your email from multiple computers results in the message scattering.

Multiple computers can access the same email at the same time.