**FILE TRANSFER PROTOCOL IS USED FOR TRANSFERING FILES TO AND FROM A REMOTE COMPUTER.**

**FTP IS A APLLICATION LAYER PROTOCOL.**

**FTP CLIENT MAKES A REQUEST TO THE FTP SERVER FOR A FILE USING APPROPRIATE COMMANDS AND FTP SERVER RESPONDS BY SENDING THE FILE**

**UNLIKE OTHER APLICATION LAYER PROTOCOLS**

**FTP USES TWO CONNECTIONS BETWEEN A CLIENT AND A SERVER**

**ONE CONNECTION IS USED FOR THE FILE’S ACTUAL DATA TRANSFER AND THE OTHER IS USED FOR CONTROL INFORMATION (COMMANDS AND RESPONSES)**

**THIS SEPARATION MAKES FTP MORE EFFICIENT**

**User Interface**

**Control Process**

**Data Transfer Process**

**Control Process**

**Data Transfer Process**

**Control Connection**

**Data Transfer Connection**

* SERVER KEEPS A TRACK OF HOW MUCH DATA IS BEING SENT AND HOW MUCH IS REMAINING.
* THIS INFORMATION IS SENT SIMULTANEOUSLY ON THE CONTROL CONNCTION TO THE USER WHO IS UPLOADING/DOWNLOADING THE FILE
* THUS CONTROLL CONNECTION REASSURES THE USER THAT DATA TRANSFER IS PROCEDING NORMALLY.

**Control Process**

**Data Transfer Process**

**Control Process**

**Data Transfer Process**

**Passive open**

**STAGE 1: Passive open by the server**

**Control Process**

**Data Transfer Process**

**Control Process**

**Data Transfer Process**

**Passive open**

**Active open**

**STAGE 2: Active open by the client**

**Client**

**Server**

**Client**

**Server**

**FTP CONNECTIONS INCLUDE DATA AND CONTROL CONNECTIONS THAT ARE OPENED AND CLOSED BY THE CLIENT AND SERVER DURING A FTP SESSION**

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CONTROL CONNECTION

* THE OPENING OF A CONTROL CONNECTION CONSISTES OF THE FOLLOWING STEPS

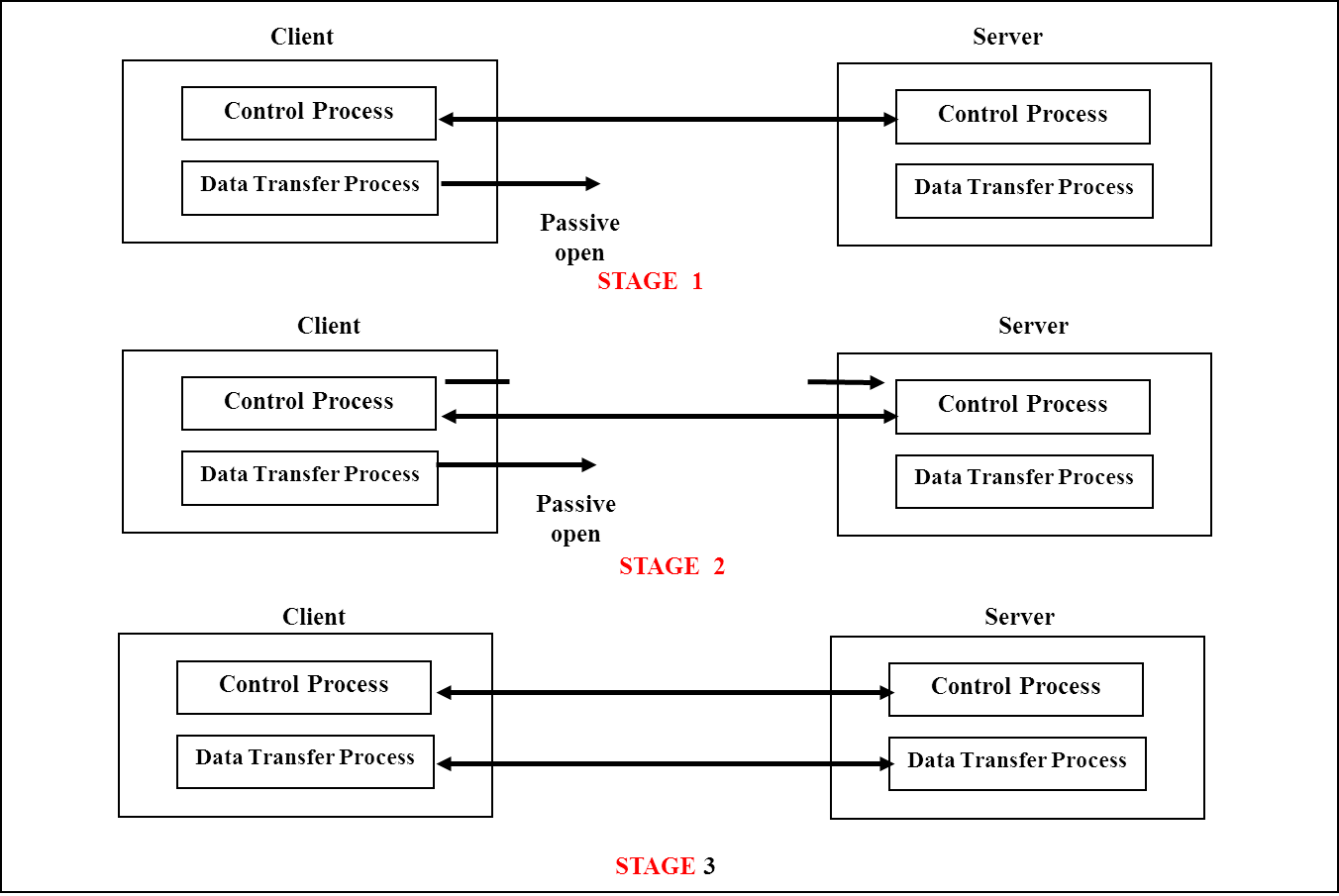
1.THE USER ON THE CLIENT OPENS THE FTP CLIENT SOFTWARE THAT PROMPS FOR THE DOMAIN NAME/IP ADDRESS OF THE SERVER

2. ON ENTERING THE DTEAILS FTP CLIENT SOFTWARE ISSUES A TCP CONNECTION REQUEST TO THE UNDERLYING TCP SOFTWARE ON THE CLIENT. IP ADDRESS OF SERVER IS ALSO PROVIDED

3.THE TCP SOFTWARE ON THE CLIENT COMPUTER THEN ESTABLISHES A TCP CONNECTION BETWEEN CLIENT AND SERVER USING 3 WAY HANDSHAKE. INTERNALLY PROTOCOLS SUCH AS IP AND ARP ARE ALSO USED.

4.WHEN A SUCCESSFUL TCP CONNECTION IS ESTABLISHED FTP SERVER IS READY TO SERVE CLIENTS REQUEST. CLIENT CAN EITHER UPLOAD OR DOWNLOAD FILE.

DATA TRANSFER CONNECTION



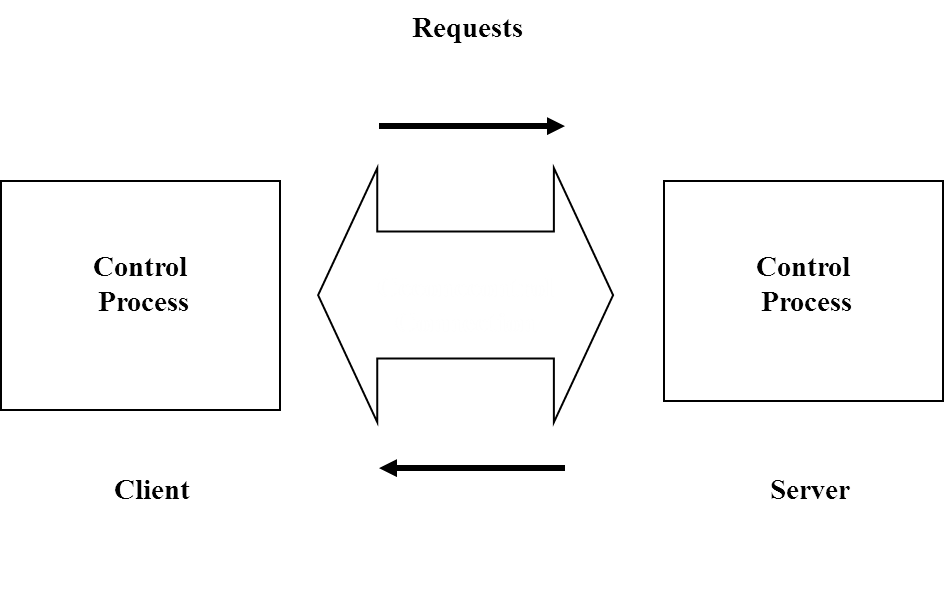
THE CONNECTION FOR DATA TRANSFER USES THE CONTROL CONNECTION PREVIOUSLY ESTABLISHED. THERE ARE 3 STEPS TO OPEN A DATA TRANSFER CONNECTION

1.THE CLIENT ISSUES A PASSIVE OPEN COMMAND FOR THE DATA TRANSFER CONNECTION. ON A SPECIFIC PORT NUMBER X

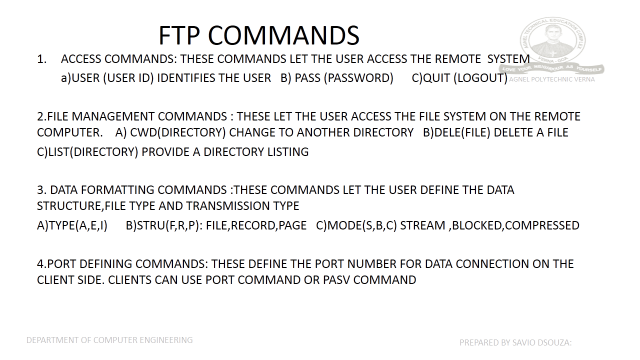
2.THE CLIENT USES THIS CONTROL CONNECTION ESTABLISHED EARLIER TO SEND THIS PORT NO. X TO THE SERVER.

3. THE SERVER RECEIVES THE PORT NUMBER X FROM THE CLIENT OVER THE CONTROL CONNECTION AND INVOKES AN OPEN REQUEST FOR THE DATA TRANSFER CONNECTION ON ITS SIDE.i.e SERVER ALSO HAS NOW OPENED A DATA TRANSFER CONNECTION WHICH IS ON PORT 20 THE STANDARD PORT FOR FTP

**CLIENT SERVER COMMUNICATION USING FTP**



* Once the control and data transfer connections are opened client and server are ready to transfer files
* Both can use different OS,file formats,character sets and file structure.
* FTP resolves all these incompatibility issues by using control and data transfer connection.
* Over the control connection FTP communication consists of one request and one response. This is shown in the figure.
* The request sent are four character commands i.e
* QUIT --- TO LOG OUT OF THE SYSTEM
* ABOR ---- ABORT THE PREVIOUS COMMAND
* LIST ----- VIEW DIRECTORY STRUCTURE
* RETR --- RETREIVE FILE STOR------UPLOAD FILE.
* THE DATA TRANSFER CONNECTION IS USED TO TRANSFER FILES FROM SERVER TO CLIENT AND BACK
* THE SENDER MUST SPECIFY THE FOLLOWING ATTRIBUTES OF THE FILE
* TYPE OF FILE TO BE TRANSFERRED i.e ASCII,EBCDIC OR IMAGE FILE
* STRUCTURE OF THE DATA: BYTE ORIENTED DATA OR RECORD ORIENTED STRUCTURE.
* TRANSMISSION MODE: STREAM MODE
* BLOCK MODE
* COMPRESSED MODE



FILE TRANSFERRING COMMANDS :THESE LET THE USER TRANSFER FILES A)RETR---RETREIVE A FILE B)STOR---STORE A FILE TO SERVER C)APPE--- APPEND A EXISTING FILE.

MISCELLANEOUS COMMANDS

A) HELP--- ASK FOR HELP

B)NOOP--- CHECK IF SERVER IS ALIVE

FTP RESPONSES

EVERY FTP COMMAND GENERATES AT LEAST ONE RESPONSE FROM THE SERVER. A RESPONSE CONSISTS OF TWO PARTS:

1.THREE DIGIT CODE SAY xyz

1. X 1st digit defines status of the command
2. Y 2nd digit provides more details on the status of the command
3. Z 3rd digit provides additional information.

2. text(contains parameters or extra information

* TFTP USES UDP FOR DATA TRANSFER.
* TFTP IS NOT INTERACTIVE
* TFTP DOES NOT ALLOW CHANGING DIRECTORY OF A REMOTE COMPUTER
* TFTP DOES NOT ALLOW TO ABTAIN A LIST OF FILES IN THE DIRECTORY OF THE REMOTE COMPUTER.
* USEFUL IN REMOTE BOOTING
* TFTP DOES NOT ALLOW FOR USER AUTHENTICATION.