

FTP

What is FTP? One of the most popular uses of the Internet is to download files - that is, transfer files from a computer on the Internet to your computer. Many thousands of files are downloaded every day from the Internet. Most of these files are downloaded using the Internet's File Transfer Protocol, commonly referred to as FTP. This protocol can also be used to upload files from your computer to another computer on the Internet.

FTP (File Transfer Protocol)

File Transfer Protocol is a standard network protocol used to exchange and manipulate files over a TCP/IP-based network, such as the Internet. FTP is built on client-server architecture and utilizes separate control and data connections between the client and server applications. FTP is used with user-based password authentication or with anonymous user access. Applications were originally interactive command-line tools with standardized command syntax, but graphical user interfaces have been developed for all desktop operating systems in use today. The Trivial File Transfer Protocol (TFTP) is a similar, but simplified, not interoperable, and unauthenticated version of FTP.

Numerous FTP servers all over the world allow users anywhere on the Internet to log in and download files placed on them. The main competitor for FTP is HTTP (Hyper Text Transfer Protocol) and the day is not very far when sites would run HTTP servers instead of the FTP servers. It is so because HTTP servers can do whatever FTP server can do and do it more efficiently.

As the Web gains popularity, downloading software is becoming even easier. You can use your Web browser and click on links to files; behind the scenes, FTP is often still downloading the files.

One problem with downloading files over the Internet is that some files are so large that it can take a tremendous amount of time to download them. As a way to speed up file transfers and save space on the FTP server, files are commonly *compressed*. Many different methods are used to compress files. After the files have been downloaded, you will need to run the decompression software such as PK UNZIP to decompress the files to use them.

Once you have the compressed file such as data.zip, you will need to unzip or decompress it to get to the setup file and install the program. You can use the WinZip file to uncompress this file.

Features of FTP

The basic features of FTP are:

1. Data representation

- FTP handles three types of data representations-ASCII (7 bit), EBCDIC (8-bit) and 8-binary data.
- The **ASCII file** is the default format for transferring text files

- Each character is encoded using 7-bit ASCII. The sender transforms the file from its own representation into ASCII characters and the receiver transforms the ASCII character to its own representation.
- The **image file** is the default format for transferring binary files. The file is sent as continuous streams of bits without any interpretation or encoding.

2. File organization and Data structures

- FTP supports both unstructured and structured file.
- An unstructured file contains string of bytes and is enl-marked by EOF (End of file). The data structure that corresponds to such a file is called **file structure**.
- A structured file contains a list of records and each record is delimited by EDR (End of Record). The data structure of such file is called **record structure** *i.e.* file is divided into records.
- Another structured file contains pages, with each page having a page number and a page header. The pages can be stored and accessed randomly or sequentially. The corresponding data structure is called **page structure** *i.e.* file is divided into pages.

3. Transmission modes

- FTP can transfer a file by using one of the following three modes:

Stream mode

- It is the default mode.
- File is transmitted as continuous stream of bytes to TCP.
- TCP is responsible for chopping data into segments of appropriate size.

Block mode

- Data is delivered from FTP to TCP in blocks.
- Each block is preceded by 3 bytes header.
- The first byte is called the block descriptor.
- The second and third byte defines the size of the block in bytes.

Compressed mode

- Data is usually compressed if the file to be transmitted is very big.
- The compression method normally used in Run-length encoding.
- In a text file, usually spaces (blanks) are removed.
- In a binary file, null characters are compressed.

4. Error control

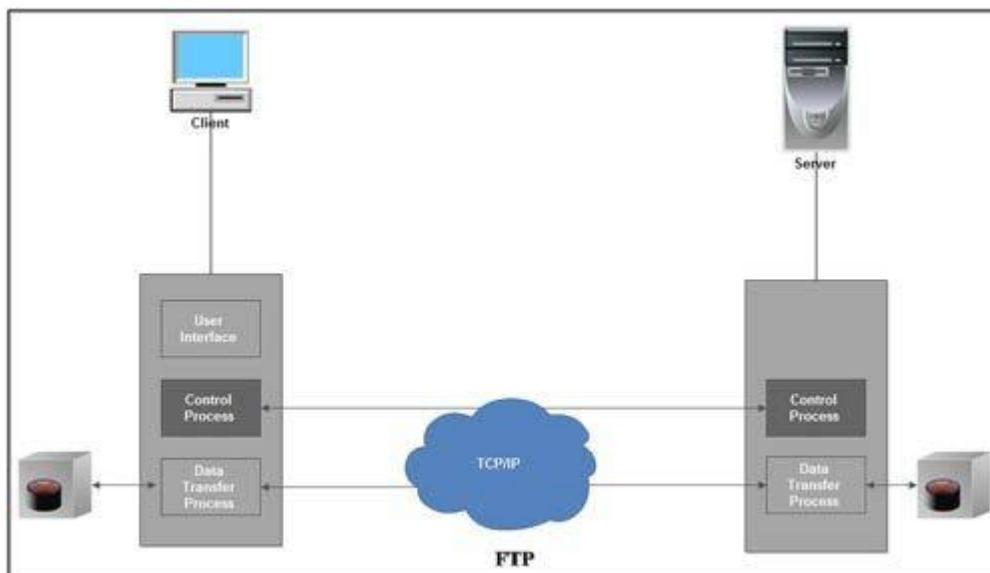
- Since TCP is used for data transfer no additional error recovery mechanism is required.

5. Access control

- File access protection is done using login procedure with login name and password.

FTP operation

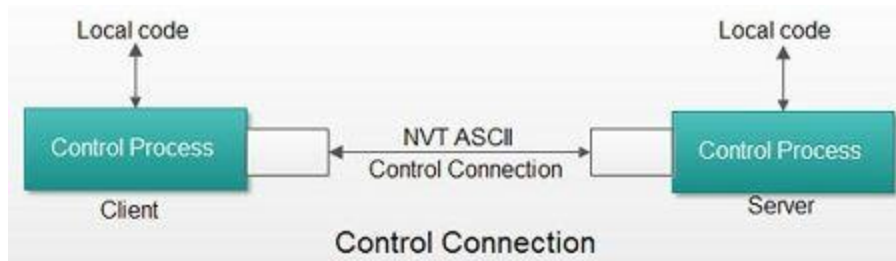
- FTP uses client/server model for communication.
- Two TCP connections are used for file transfer.
- On one connection control signals (commands and responses) are exchanged and the other connection is used for actual data transfer. These two connections are called control connection and data connection respectively.



Control Connection

The Control connection has following features:

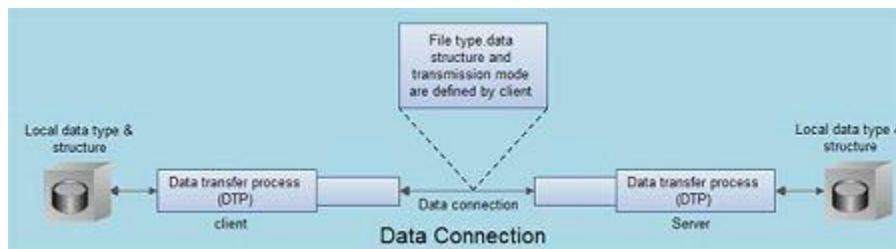
1. It is used to transfer control signals (commands and responses) between the client and server.
2. This connection is used by the control process of client and server. The control process is called Protocol Interpreter (PI).
3. The TCP connection for control signal uses well-known FTP server port 21.
4. This control connection remains connected during the entire interactive FTP session.
5. The control connection uses very simple rules of communication. We need to transfer only a line of command or a line of response at a time.



Data Connection

The Data connection has following features:

1. Data connection is used for actual data transfer.
2. This connection is established between the Data Transfer Process (DTP) of client and server
3. The server port used for data connection is Port 20.
4. The data connection is opened and then closed for each file transferred. It opens each time commands that involve transferring files are used, and it closes when the file is transferred.



Thus file transfer in FTP means one of three things:

1. A file is to be copied from the server to the client. This is called *retrieving a file*. It is done with help of *RETR command*.
2. A file is to be copied from the client to the server. This is called *storing a file*. It is done with *STOR command*.
3. A list of directory or file names is to be sent from the server to the client. This is done with *LLST command*.

Anonymous FTP

- To Use FTP, a user needs an account (user name) and a password on the Remote server.
- Some sites have a set of files available for public access; to enable *anonymous FTP*.

- To access these files, a user does not need to have an account or password. Instead, the user can use *Anonymous* as the user name and *guest* as the password.

FTP Servers

Similar to the Web servers, the Internet also has the installations of FTP servers. Many organizations use FTP servers to handle the distribution of files. When a user links to download something, the link actually redirects to FTP, instead of HTTP. Some files in the FTP servers may be accessible to the general public, while others are accessible only by the user. To separate the general public from the more private users, FTP servers are divided into two parts:

Anonymous server

Non-anonymous server

- 1. Anonymous Server:** Anonymous server is the most common use of FTP, the Internet file transfer protocol. FTP sites that allow anonymous FTP do not require a password for access. You only have to log in as anonymous and enter your e-mail address as password (for their records).
- 2. Non-anonymous Server:** If you use a non-anonymous server, then you will log in as yourself and give your password.

FTP Commands – Some of the FTP commands are :

USER – This command sends the user identification to the server.

PASS – This command sends the user password to the server.

CWD – This command allows the user to work with a different directory or dataset for file storage or retrieval without altering his login or accounting information.

RMD – This command causes the directory specified in the path-name to be removed as a directory.

MKD – This command causes the directory specified in the pathname to be created as a directory.

PWD – This command causes the name of the current working directory to be returned in the reply.

RETR – This command causes the remote host to initiate a data connection and to send the requested file over the data connection.

STOR – This command causes to store a file into the current directory of the remote host.

LIST – Sends a request to display the list of all the files present in the directory.

ABOR – This command tells the server to abort the previous FTP service command and any associated transfer of data.

QUIT – This command terminates a USER and if file transfer is not in progress, the server closes the control connection.