Write up – FTP Sever

What is FTP?

FTP (File Transfer Protocol) is a standard network protocol used to transfer files between a client and a server over a TCP-based network, such as the internet or an intranet. FTP allows for both the upload and download of files, making it essential for file sharing and data transfer between computers. FTP operates on a client-server model, where a client requests the file and the server responds by sending or receiving the file(s).

FTP is defined in two versions:

- **Active FTP (PORT mode)**: The server listens on a random port for incoming data.
- **Passive FTP (PASV mode)**: The client establishes both the control and data connections, making it more firewall-friendly.

Why FTP Requires Two Ports

FTP requires two ports to function because it works in two channels: the **control channel** and the **data channel**.

1. **Control Port (Port 21)**: This is used for sending commands between the client and the server. It's an established, persistent connection throughout the FTP session.
2. **Data Port (Port 20 or a range of ports in Passive mode)**: This is used for transferring the actual files between the client and server. In **active mode**, the data channel is established by the server, whereas in **passive mode**, the client establishes both channels to bypass potential firewall restrictions.

Active Mode FTP (PORT mode):

- The client sends a PORT command over the control channel, and the server opens a connection to the specified IP and port for data transfer.

Passive Mode FTP (PASV mode):

- The client sends a PASV command over the control channel, and the server responds with an IP address and port number to be used for the data transfer.

FTP Error and Return Codes

FTP commands return a series of status codes that indicate the result of the requested operation. These codes are divided into categories based on the first digit.

General FTP Return Codes:

- **1xx**: **Informational Codes** – Indicates that the request was received and is being processed.
- **2xx**: **Success Codes** – The command was successfully received, understood, and processed.
- **3xx**: **Redirection Codes** – The command has been accepted, but the action requires further input (e.g., password or another action).

- **4xx**: **Temporary Failure Codes** – The command failed due to a temporary condition (e.g., server overload, network timeout).
- **5xx**: **Permanent Failure Codes** – The command failed and the action cannot be completed (e.g., bad command syntax).

Common FTP Error and Return Codes:

Code	Meaning	Description
200	Command okay	The command was successful and completed.
220	Service ready	The FTP server is ready to accept connections.
221	Service closing control connection	The FTP server is closing the control connection.
230	User logged in	Login successful.
250	Requested file action okay	File action was successful.
331	User name okay, need password	The user name is okay, password required.
332	Need account for login	Account required for login.
421	Service not available, closing control connection	Server not available, closing connection.
425	Can't open data connection	Data connection couldn't be established.
426	Connection closed; transfer aborted	Transfer aborted due to a connection closure.
530	Not logged in	The user is not logged in or authenticated.
550	Requested action not taken	File or directory does not exist or permission denied.

10 Common FTP Commands with Examples

1. **USER**
    - **Purpose**: Used to send the username for authentication.
    - **Example**: USER ftpuser
2. **PASS**
    - **Purpose**: Used to send the password for authentication after the USER command.
    - **Example**: PASS mypassword

3. **LIST**
    - **Purpose**: Lists the files and directories in the current directory.
    - **Example**: LIST
4. **CWD (Change Working Directory)**
    - **Purpose**: Changes the current directory on the server.
    - **Example**: CWD /home/ftpuser/files
5. **PWD (Print Working Directory)**
    - **Purpose**: Displays the current directory on the server.
    - **Example**: PWD
6. **RETR (Retrieve File)**
    - **Purpose**: Downloads a file from the server.
    - **Example**: RETR example.txt
7. **STOR (Store File)**
    - **Purpose**: Uploads a file to the server.
    - **Example**: STOR uploadfile.txt
8. **DELE (Delete File)**
    - **Purpose**: Deletes a file on the server.
    - **Example**: DELE example.txt
9. **QUIT**
    - **Purpose**: Ends the FTP session and disconnects from the server.
    - **Example**: QUIT
10. **HELP**
    - **Purpose**: Lists all available commands or provides help on a specific command.
    - **Example**: HELP

      or to get help on a specific command:

      HELP LIST

Conclusion

FTP (File Transfer Protocol) is a crucial protocol for file sharing over a network. It uses two ports (control and data ports) to facilitate communication between the client and the server. FTP commands are varied and designed for different file manipulation tasks like uploading, downloading, and deleting files. Understanding FTP error codes, return codes, and commands is vital for effective management and troubleshooting of FTP servers.