An Overview of the File Transfer Protocol (FTP)

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Wiener Neustadt, am 9. Dezember 2013

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1 Overview

The File Transfer Protocol (FTP) was one of the first efforts to create a standard means of exchanging files over a TCP/IP network. FTP was designed to be used over networks as well as being engineered to have the capability with exchanging files with a broad variety of machines.

The base specification is RFC 959 and is dated October 1985. There are some additional RFCs relating to FTP. The purpose of this document is to provide general information about how the protocol works without getting into too many technical details. RFC 959 should be consulted for details on the protocol.

2 FTP Commands

- USER (Username)
  The argument field is a Telnet string identifying the user. The user identification is that which is required by the server for access to its file system.

- PASS (Password)
  The argument field is a Telnet string specifying the user's password. This command must be immediately preceded by the user name command, and, for some sites, completes the user's identification for access control.

- CWD (Change Working Directory)
  This command allows the user to work with a different directory or dataset without altering his login or account information. Makes the given directory be the current directory on the remote host.

- QUIT
  This command terminates a USER and, if file transfer is not in progress, closes the control connection. If file transfer is in progress, the connection will remain open for result response and the server will then close it.

- PORT
  This specifies an alternate data port. There are defaults for both the client and server data ports, and under normal circumstances this command and its reply are not needed.

- PASV
  This command requests the server's data transfer process to llistenön a data port (which is not its default data port) and to wait for a connection rather than initiate one upon receipt of a transfer command. The response to this command includes the host and port address this server is listening on.

- TYPE
  The argument specifies the file type.

- PWD (Print Working Directory)
  This command causes the name of the current working directory to be returned in the reply.

- RETR
  This command causes the server to transfer a copy of the file specified in pathname to the client. The status and contents of the file at the server site are unaffected.

- STOR
  This command causes the FTP server to accept the data transferred via the data connection and to store the data as a file at the FTP server. If the file specified in pathname exists at the server site, then its contents shall be replaced by the data being transferred. A new file is created at the FTP server if the file specified in pathname does not already exist.

- LIST
  This command causes a list of file names and file details to be sent from the FTP site Note that a directory listing is considered a file transfer.

- SYST
  This command is used to find out the operating system of the server.

- FEAT
  This command causes the FTP server to list all new FTP features that the server supports beyond those described in RFC 959.

- EPRT
  Specifies an extended address and port to which the server should connect.

3 Communication

The protocol can be thought of as interactive, because clients and servers actually have a conversation where they authenticate themselves. In addition, the protocol specifies that the client and server do not exchange data on the conversation channel. Instead, clients and servers negotiate how to send data files on separate connections, with one connection for each data transfer.

4 Connection

A critical concept in understanding FTP is that while it uses TCP like many other applications, it does not use just one TCP connection for all communication the way most protocols do. The FTP model is designed around two logical channels of communication between the server and user FTP processes:

- Control Connection
  This is the main logical TCP connection that is created when an FTP session is established. It is maintained throughout the FTP session and is used only for passing control information, such as FTP commands and replies. It is not used to send files.

- Data Connection
  Each time that data is sent from the server to the client or vice-versa, a distinct TCP data connection is established between them. Data is transferred over this connection. When the file transfer is complete, the connection is terminated.

5 Failover Scenarios

If a command is not implemented a default message is sent back to the client.