
Exercise 4: File Transfer (Telnet, TCP, FTP)

Objective

In this exercise we introduce the File Transfer Protocol (FTP) for retrieving files from a remote host. We examine the following phases of an FTP session: TCP connection setup, log in, opening and closing of a data port, and TCP close.

Protocols Examined

FTP protocol for file retrieval and establishment of control and data connections.

Background Material

Refere correspondig chaper of your Textbook

RFC: FTP (RFC 959, try <http://www.freesoft.org/CIE/RFC/959/index.htm>)

Telnet command: Consult your system documentation for information on using Telnet.

For example, in Windows XP, start “Help and Support”, then enter “ftp” in the search window and press Enter.

Prerequisite

Exercise 3: Telnet and HTTP.

Procedure

1. Start an Ethereal packet capture.
2. Open a Command Prompt window. (In Windows XP, from the “All Programs” Menu, select “Accessories” and then “Command Prompt”).
3. Type “ftp <hostname>”. Most FTP sites require a user ID and password, but some sites allow anonymous FTP users. In this case, the user logs on with the username “anonymous” and then uses an e-mail address for the password. For example, Cisco maintains an FTP site that allows anonymous access at ftp.cisco.com.
4. Log into an ftp site as an anonymous user. The server will respond with a message such as “User anonymous logged in” or “Anonymous access granted.”
5. You will next see the following prompt: ftp>. You have a choice of commands you can use at this point, but the exact characters for each command varies, so you should try the following:
 - CWD or cd: Change the current directory
 - CDUP or cd..: Move up to the parent directory
 - LIST or ls or dir: List the contents of a directory
 - RETR or get: Retrieve a specified file
 - STOR or put: Store the specified fileThe directory **pub** usually contains the interesting files. Enter the list command which causes a data connection to be established.
6. The server will send a message listing the files in the directory.
7. Enter QUIT to end the FTP session.
8. Stop the packet capture.

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Protocol Analysis Questions

To answer the following questions, start Ethereal and open the packet capture file created above.

1. Examine the segments in the TCP three-way handshake and identify the IP address and port numbers for the client and server.
2. After the TCP connection setup, the FTP should reply with a response code 220 “server ready.”
3. Identify the FTP USER and PASS messages that carry the user ID (anonymous) and the password (e.g. emailaddress@university.edu).
4. Once the user is logged in, the client issues an FTP PORT message requesting that the server setup of a data connection to the client. The PORT message includes six numbers: The first four numbers are the IP address of the client, and the last two numbers (x and y) are used to determine the port number for the data connection. Usually the port number of the client is determined by the equation $256 * x + y$. The server uses the port number 20.
5. After the PORT message, look for the FTP request message NLST (“Name list”) requesting the listing of the current directory via a data connection.
6. Next look for the three-way TCP handshake that establishes the data connection. Verify the values of the IP addresses and port numbers.
7. What is the server’s response code that indicates the successful establishment of the data connection?
8. Identify the FTP message(s) that carry the requested data. Highlight the data payload in the middle pane of the Ethereal window and note the corresponding text in the bottom pane. Use “Follow TCP Stream” in the Tools Menu to display all the data exchanged between the server and client in the control connection as well as in the one or more data connections that take place during the session.
9. Identify the TCP segments that perform the graceful close of the data connection.
10. Next identify the FTP QUIT message and the response from the server, 221 “goodbye”.
11. Finally look for the TCP graceful close of the control connection.