CPSC471-04 Final Project

Application Layer Protocol Design

1.Overview

There are two channels established during the FTP client-server communication: the ‘data channel’ and the ‘control channel’.

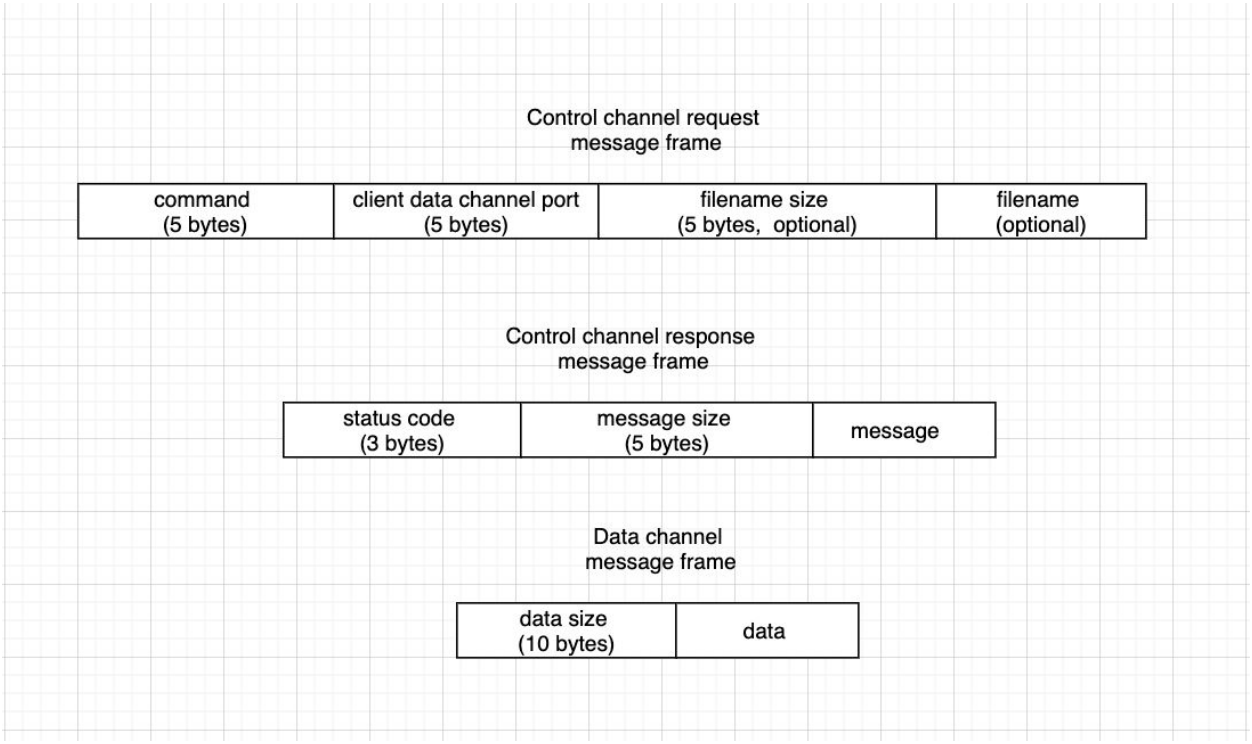
The control channel is in charge of sending command requests from the client and receiving the command request response from the server side. After the server receives a client request, it then sends back a status indicating if the client request is accepted or not, along with a status message explaining the accept/refuse decision.

The data channel is used to send file data from the client to the server, and send file data/server file lists from the server to the client. The data frame of the data channel will contain the data size to transfer and the actual data to transfer. With the data size sent to the receiving side, it is easier for the receiving side to understand what is the size of the data to be transferred. In this way, the receiver will know when to stop receiving data from the data channel.

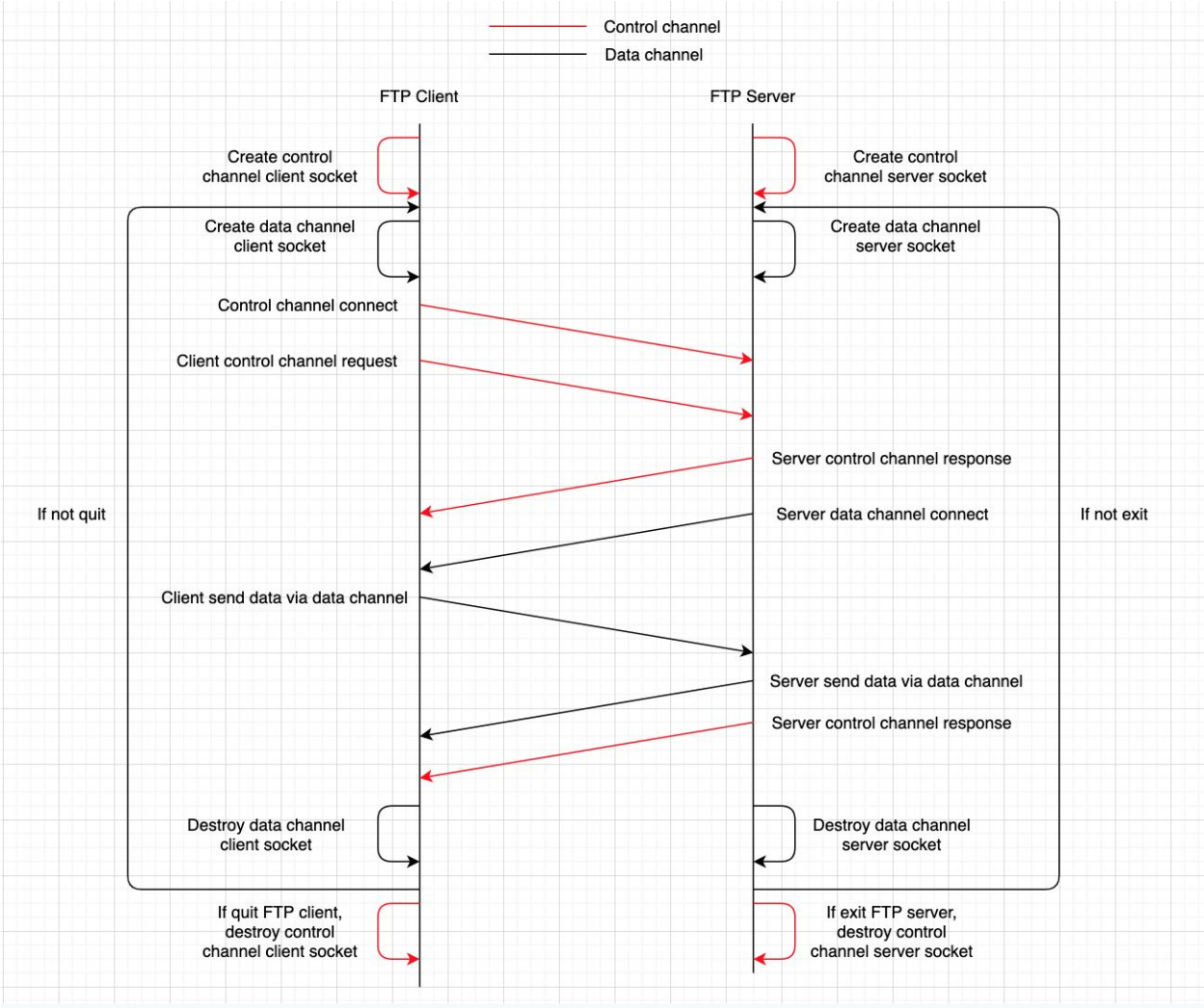
The server and client has to connect their sockets via the same unique port number in order for the transfer to be successful. For the data channel establishment, an ephemeral port is used for creating the client socket. The client then sends the data channel port number to the server via control channel when the client sends the command request. The server then connects to the client via the data channel using the received port number. The files then get transferred from client to server or from server to client via the ephemeral data socket. The data channel sockets get deleted upon completion of the transfer.

Once the data channel transfer is complete, the data channel sockets are closed. If the program exits, the control channel sockets are closed.

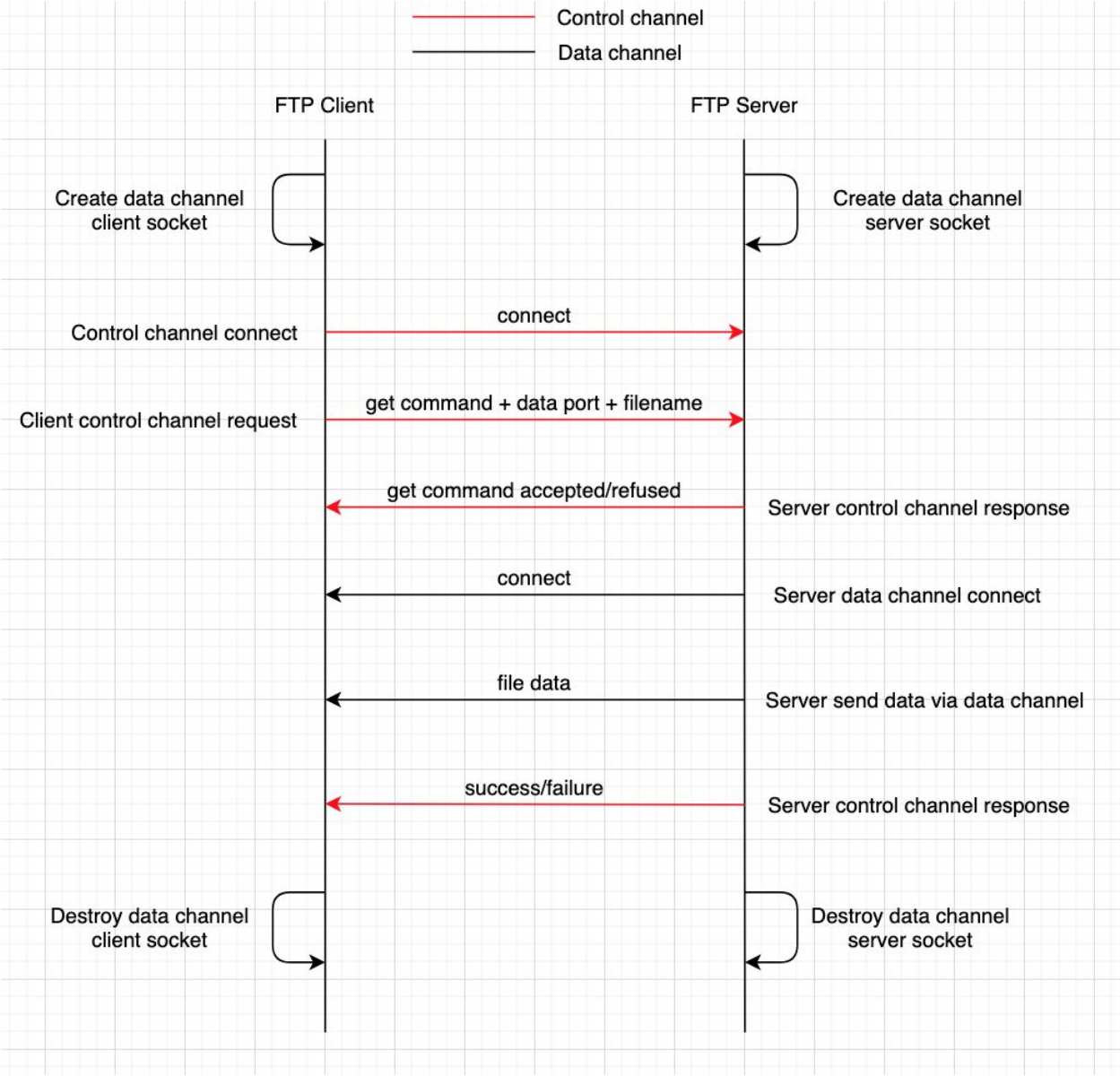
2. FTP server-client communication message frame design



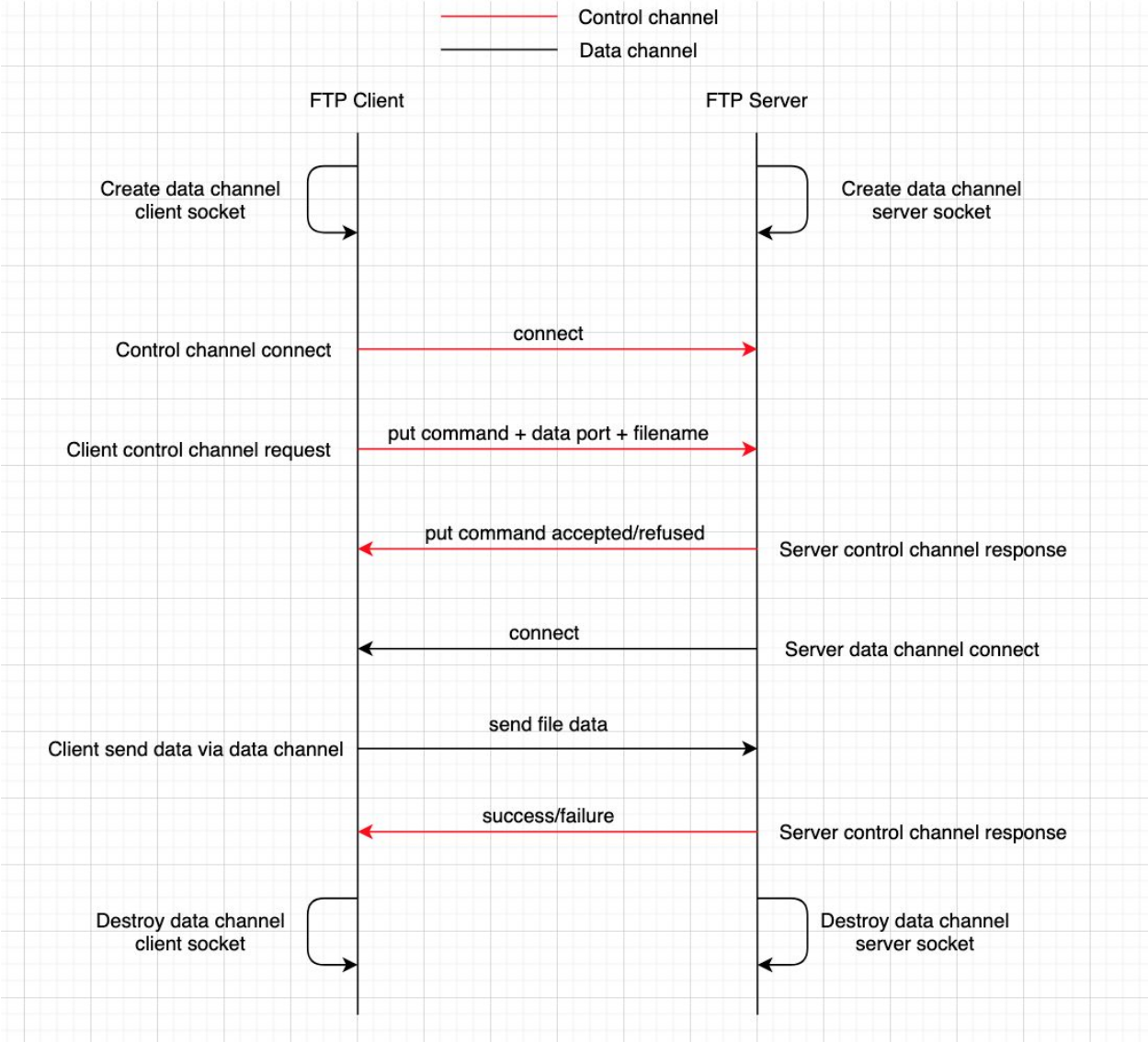
3. General flow for FTP server-client communication



4. GET command flow



5. PUT command flow



6. LS command flow