Distributed Programming

Network Programming Test

To be submitted by June 26 2013, 23.59

Develop a server for the simple file transfer protocol described in exercise 2.3 according to the following specifications:

1. The server receives exactly two arguments on the command line: the TCP port number to which it listens and the name of a configuration file.
2. The configuration file is a text file that lists zero or more servers, one per line. Each line is composed of two ASCII strings separated by a space. The first string can be either the IPv4 address of the server host in dotted decimal notation or the name of the server host. The second string is the server TCP port number.
3. The server interacts with the clients exactly as specified in exercise 2.3.
4. When the server receives a request for a file, it looks for the file in its local current directory. If the file is not found, the server tries to get the file from one of the servers listed in its configuration file (the server interacts with the other servers using the same protocol, but playing the client role). The server tries to contact the servers in the configuration file one by one, in the same order as they appear in the file, until one of them returns the file or the list scanning terminates.
5. If one of the servers listed in the configuration file returns the requested file, the server forwards the received file to the client that requested it. File forwarding must be done with minimum latency, i.e. the server must forward file data while they arrive from the other server (without waiting for the reception of the whole file).
6. Only if no server listed in the configuration file returns the requested file (either because the server is non-reachable or because it returns an ERR response) the server responds to the client with the ERR response.
7. If, while receiving the file from another server, that server closes the connection prematurely, the server to be implemented must do the same with the client, i.e. close the connection with the client prematurely.
8. The server must be developed for the Linux OS.
9. The server must be able to serve at least 5 clients simultaneously.

In order to test the server it is possible to use the same client that was developed for exercise 2.3 and several copies of the server (be careful in order to avoid loops when you create configuration files for the servers in your test environment). Also, if your client waits for the response for a limited amount of time, be careful to set the timeout to a reasonable value, in order to give time to the server to interrogate the other servers.

The C files of the server program must be included in a single zip archive created with this bash command:

```
zip socket.zip *.c *.h
```

Do not include the files used to test the protocol nor the files of the client, but include all the files that are necessary to compile the server (it is possible to use files from the book by Stevens, but these files need to be included).

The zip file with your solution must be submitted online by the deadline indicated above using the submission form available from inside the Politecnico campus at https://pad.polito.it/enginframe/dp1/dp1.xml or from outside the Politecnico campus at https://pad.polito.it:8080/enginframe/dp1/dp1.xml. Note that the submission system is not yet available. You will receive an e-mail with your credentials and then you'll be enabled to upload your solution.

Warning: the submission system is *automatic*. Submission will be closed automatically at the deadline. Submitting the solutions in the last minutes is strongly discouraged.

Note: submissions will be considered valid only if it is possible to compile the server by running the following command (from the directory where the archive has been extracted):

```
gcc -o socket_server *.c -lpthread -lm
```

On the day before the oral exam the submitted solutions will be tested and you will receive an e-mail with the test results for your submission.

In case of doubts and questions about this assignment, first check the forum pages in the didattica.polito.it course website to see if somebody else already asked your question, otherwise use the forum (not email to teachers) to post your question so that the answer is available for everybody.