



TUBA TOPRAK

161044116 -Final

System Programming

The purpose of the project is to synchronize files between multiple clients and a server. The server side manages multiple clients simultaneously, acting as a multi-threaded internet server. After the connection with the server is established, both the server and client side directories are synchronized. Any new file created or updated on the client side reflects the same changes on the server side. A log of the movements of all files is kept under the server folder. In addition, the server sends the log information of each file to the client. Each newly added file or folder is instantly reflected on the server side.

Missing parts of the project:

The project just sends the client's files to the server. vica versa is not working. because when I want to delete a file on the server, I could not solve the problem of loading the same file from another client. This Status stays in an endless loop. Because of this and the problems it brings, there is only one-sided file streaming.

Bibakboxserver.c

The socket_establish function: creates a TCP socket and binds it to the specified port number.

The timeInfo function: retrieves the current time and formats it into a string.

The writeLog function: appends a log entry to the specified log file, including the type of action and the current time.

The toString function: converts the log information into a string format.

The isInclude function: checks if a given directory name is already included in the directory list.

The serverThreadRun function: is the main function for each server thread. It handles the communication with the client, receives file information, creates directories, and updates files accordingly.

The signal_handler function: handles the termination signals (SIGINT, SIGTERM, SIGTSTP).

The err_sys function: displays an error message and exits the program.

The main function : is the entry point of the server program. It takes the server directory path, thread pool size, and port number as command-line arguments. It creates a thread pool, listens for client connections, and assigns incoming connections to the available threads.

Bibakboxclient.c

The signal_handler function: is used to handle SIGINT, SIGTERM, and SIGTSTP signals.

The writeLog function: is used to write messages to the log file.

The main function: contains the main logic of the client. The client connects to the server and synchronizes the files.

The sendDirectory function: is used to send files inside a directory to the server.

The sendFiles function: is used to send files to the server.

/-----Cases with 5 threads-----\

Case 1: Send

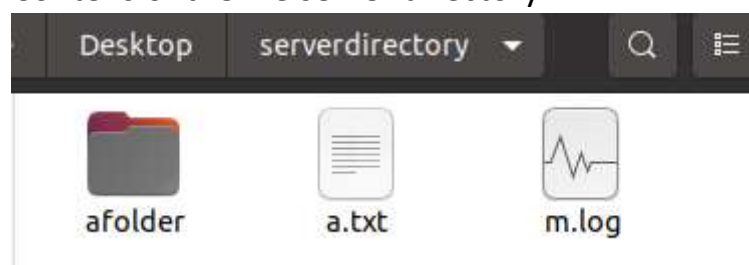
Contents of the file A(client directory)



```
toprak@toprak-virtual-machine: ~/Desktop/sisto
toprak@toprak-virtual-machine:~/Desktop/sisto$ ./bibakboxserver /home/toprak/Desktop/serverdirectory 5 4040
*****server listening*****
Client1 connected with ip: 2.0.218.40
```

```
toprak@toprak-virtual-machine: ~/Desktop/sisto
toprak@toprak-virtual-machine:~/Desktop/sisto$ ./bibakboxclient A 4040 127.0.0.0
```

Contents of the file server directory:



Case 2: Created:

Contents of the file B(client directory)



```
toprak@toprak-virtual-machine: ~/... x toprak@toprak-virtual-machine: ~/... x toprak@toprak-virtual-machine: ~/... x
toprak@toprak-virtual-machine: ~/Desktop/sisto$ ./bibakboxserver /home/toprak/Desktop/serverdirectory 5 4040
*****server listening*****
Client1 connected with ip: 2.0.218.40
Client2 connected with ip: 2.0.189.132
```

```
toprak@toprak-virtual-machine: ~/... x toprak@toprak-virtual-machine: ~/... x toprak@toprak-virtual-machine: ~/... x
toprak@toprak-virtual-machine: ~/Desktop/sisto$ ./bibakboxclient B 4040 127.0.0.0
```

Contents of the file server directory:

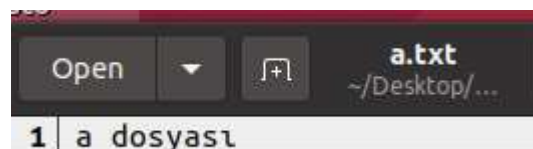


Contents of m.log:

```
Open m.log
~/Desktop/serverdirectory

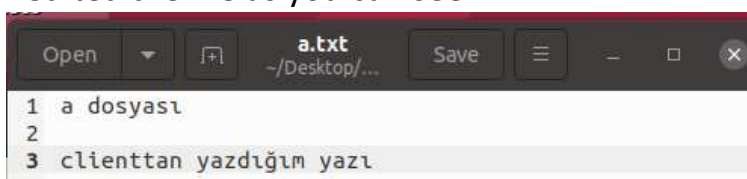
1 Client1 with A connected. 06/16/23 - 10:41:25 PM
2 a.txt CREATED 06/16/23 - 10:41:25 PM
3 afolder CREATED 06/16/23 - 10:41:25 PM
4 bnm.txt CREATED 06/16/23 - 10:41:25 PM
5 for CREATED 06/16/23 - 10:41:25 PM
6 cas.txt CREATED 06/16/23 - 10:41:25 PM
7 ger.txt CREATED 06/16/23 - 10:41:25 PM
8 Client2 with B connected. 06/16/23 - 10:44:59 PM
9 b.txt CREATED 06/16/23 - 10:44:59 PM
```

Case 3 : Update:

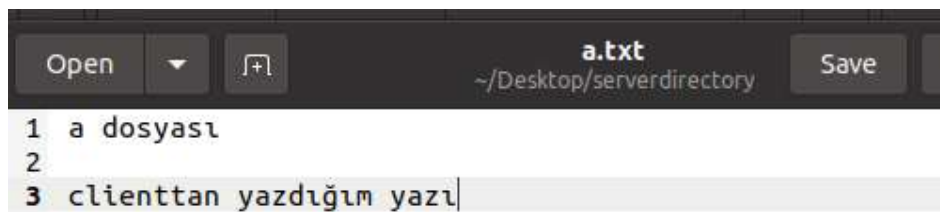


Contents of a.txt in client directory:

I edited the file as you can see.

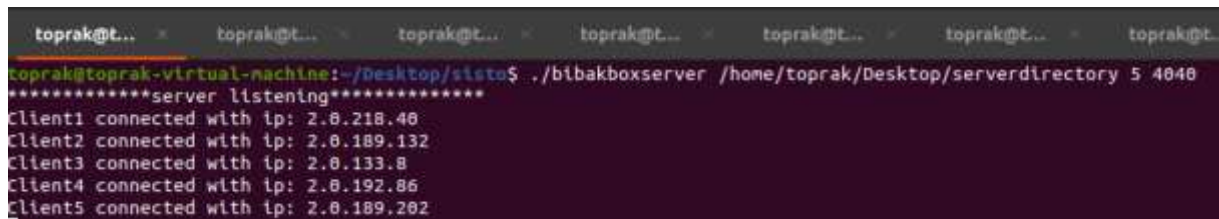


Contents of a.txt in server directory:



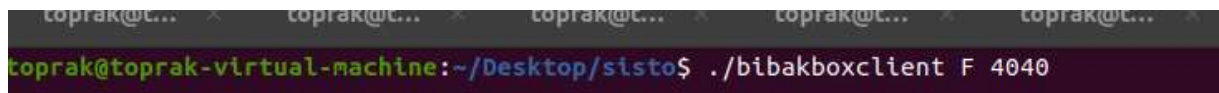
```
Open  a.txt  Save  
~/Desktop/serverdirectory  
1 a dosyası  
2  
3 clienttan yazdığım yazı
```

Case 4: Client Size Control:



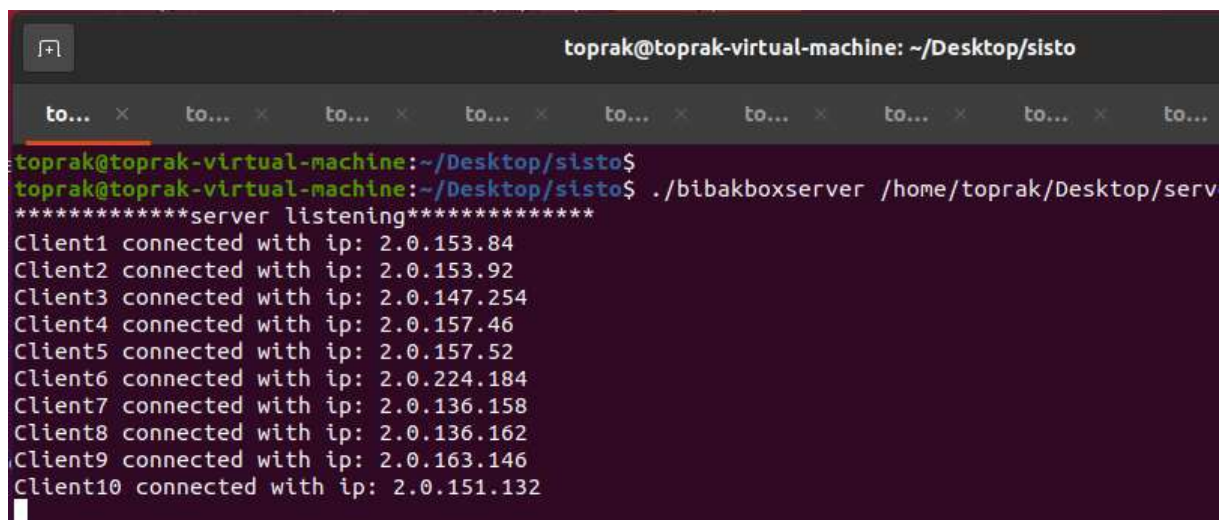
```
toprak@toprak-virtual-machine:~/Desktop/sisto$ ./bibakboxserver /home/toprak/Desktop/serverdirectory 5 4040  
*****server listening*****  
Client1 connected with ip: 2.0.218.40  
Client2 connected with ip: 2.0.189.132  
Client3 connected with ip: 2.0.133.8  
Client4 connected with ip: 2.0.192.86  
Client5 connected with ip: 2.0.189.202
```

F file could not be processed because thread size is full.



```
toprak@toprak-virtual-machine:~/Desktop/sisto$ ./bibakboxclient F 4040
```

Case 5: 10 threads



```
toprak@toprak-virtual-machine:~/Desktop/sisto$ ./bibakboxserver /home/toprak/Desktop/serverdirectory 10 4040  
*****server listening*****  
Client1 connected with ip: 2.0.153.84  
Client2 connected with ip: 2.0.153.92  
Client3 connected with ip: 2.0.147.254  
Client4 connected with ip: 2.0.157.46  
Client5 connected with ip: 2.0.157.52  
Client6 connected with ip: 2.0.224.184  
Client7 connected with ip: 2.0.136.158  
Client8 connected with ip: 2.0.136.162  
Client9 connected with ip: 2.0.163.146  
Client10 connected with ip: 2.0.151.132
```