The Following Document contains the Source Code of the Proxy Project

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| Source Name | Description | Remarks |
| CPingClient.cpp | A Simple Ping Client implementation | Levarages ClientSocket |
| CPingClient.h | Header file for Ping Client |  |
| CProtocolServer.cpp | Has got implementation of Protocol Server and Proxy Server |  |
| CProtocolServer.h | Header file for Protocol and Proxy Server | Leverages ServerSpcket |
| ClientSocket.cpp | A Simple S0cket Client | Leveraged in ProxyServer |
| ClientSocket.h | Header file for Socket Client |  |
| ServerSocket.cpp | The Core Server Code |  |
| ServerSocket.h | The Core Server Header |  |
| Utils.cpp | Utility/Environment Functions |  |
| Utils.h | Header files |  |
| First.cpp | A Simple Passthrough Proxy for Filer Transfer |  |
| makefile | The makefile | Make -f makefile |
| Spawner.cpp | A GNU Linux program | Not used now |

Let us compile the Code to generate the Proxy

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Project\_Engine$ make  g++ -c -std=c++17 Utils.cpp -o Utils.o  g++ -c -std=c++17 ServerSocket.cpp -o ServerSocket.o  g++ -c -std=c++17 ClientSocket.cpp -o ClientSocket.o  g++ -c -std=c++17 CPingClient.cpp -o CPingClient.o  g++ -c -std=c++17 CProtocolServer.cpp -o CProtocolServer.o  g++ -std=c++17 spawner.cpp Utils.o ServerSocket.o ClientSocket.o CProtocolServer.o -lpthread -o spawner.exe  g++ -std=c++17 first.cpp ServerSocket.o ClientSocket.o CPingClient.o CProtocolServer.o -lpthread -o first.exe  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Project\_Engine$ |

Let us move to the directory which contains the File Transfer Protocol written by Midhun A Darvin in a Cross Platform Manner. Works on Windows and Linux.

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ls -l  total 104  -rw-r--r-- 1 pai pai 7310 May 6 16:11 Client.cpp  -rwxr-xr-x 1 pai pai 28280 May 6 16:55 Client.dmp  -rw-r--r-- 1 pai pai 2746 May 6 16:48 Client.h  -rw-r--r-- 1 pai pai 28280 May 6 18:15 DEST\_WIRE.out  -rw-r--r-- 1 pai pai 4206 May 6 16:23 Payload.cpp  -rw-r--r-- 1 pai pai 0 May 6 16:22 Playload.cpp  -rw-r--r-- 1 pai pai 786 May 6 16:11 README.md  -rw-r--r-- 1 pai pai 11226 May 6 16:24 Server.cpp  -rw-r--r-- 1 pai pai 2992 May 6 16:11 Server.h  -rw-r--r-- 1 pai pai 96 May 6 16:29 makefile  -rwxrwxrwx 1 pai pai 95 May 6 16:50 makefile.sh  -rw-r--r-- 1 pai pai 0 May 6 16:23 payload.cpp  -rw-r--r-- 1 pai pai 2316 May 6 16:21 payload.h  -rw-r--r-- 1 pai pai 11 May 6 16:11 sample.txt  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ |

Now Let us Compile, the Server.exe and Client.exe

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ g++ Server.cpp Payload.cpp -lpthread -o Server.exe  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ g++ Client.cpp Payload.cpp -lpthread -o Client.exe  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ls \*.exe  Client.exe Server.exe  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ |

Now Let us run the stuff without Proxy

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ./Server.exe 4000 &  [2] 1217  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ./Client.exe Client.dmp localhost 4000 |

Now let us kill all the Server.exe process using the Kill command

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ps  PID TTY TIME CMD  72 tty2 00:00:00 bash  997 tty2 01:46:50 Server.exe  1217 tty2 00:02:45 Server.exe  1232 tty2 00:00:00 ps  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ kill 997 1217  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ps  PID TTY TIME CMD  72 tty2 00:00:00 bash  1233 tty2 00:00:00 ps  [1]- Terminated ./Server.exe 9000  [2]+ Terminated ./Server.exe 4000  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ |

The Proxy is written in such a way that Proxy does port forwarding to the Port 9000. So, next time Server.exe should listen on Port 9000

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ./Server.exe 9000 &  [1] 1245  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ About to Bind.. ................  Listen. ................  Creating a POSIX Thread....... for Listener  Entered the Listener Thread....  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ |

Now, Let us start the Proxy on the Port 5000. Any request which comes to the Proxy will be forwarded to port 9000.

In the CProxyServer.cpp, look at the following line

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| //////////////////////////////////////////  // Get a Default Endpoint  //  END\_POINT \* GetDefaultEndpoint() {  return new END\_POINT { "127.0.0.1" ,9000 , 1,"",0," "};  } |

Let us start the Proxy Server, at the Port 5000

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Project\_Engine$ ./first.exe 5000  Received from Command line 5000  First Thread =><str>  Started First Listening Thread  Entered the Listener Thread....  node info => string(info.node\_info)  ................ |

Now, start the Client and hit at the Port 5000. The Proxy will receive the request and forward it to Port 9000. The File is getting transferred correctly.

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ./Client.exe Client.dmp localhost 5000  File name: Client.dmp File size: 28280  ....................After the Accept.................  ....................Accepted a new Connection........ |

The Screen dump of the Proxy is given below

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Project\_Engine$ ./first.exe 5000  Received from Command line 5000  First Thread =><str>  Started First Listening Thread  Entered the Listener Thread....  node info => string(info.node\_info)  ................  ....................After the Accept........  ....................Accepted a new Connection........  B4 callint Client Threaed => ClientData.node\_info  Remote IP address == 127.0.0.1  ................  Resolved 127.0.0.1 9000  Entered Nested Loop  ==================================  Received a Client packet.....................  Length of Packet is 12  Packet Type = 1  ======================================  ==================================  Received a Server packet.....................  Length of Packet is 12  Packet Type = 2  ======================================  ==================================  Received a Client packet.....................  Length of Packet is 280  Packet Type = 3  ======================================  ==================================  Received a Server packet.....................  Length of Packet is 12  Packet Type = 2  ======================================  ==================================  Received a Client packet.....................  Length of Packet is 5016  Packet Type = 4  ======================================  ==================================  Received a Client packet.....................  Length of Packet is 30104  Packet Type = 4  ======================================  ==================================  Received a Server packet.....................  Length of Packet is 12  Packet Type = 2  ====================================== |

The Screen dump of the Server.exe and Client.exe is given below

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| pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ ./Client.exe Client.dmp localhost 5000  File name: Client.dmp File size: 28280  ....................After the Accept.................  ....................Accepted a new Connection........  Acquired the Lock....  1  Finished Sending the Acknowledgement ... bytes send= 12  Ready to Transfer File ...................  file name = Client.dmp size = 28280finished .....sending acknowledgement.....transferring files  Waiting for the content  Now, we will iterate to send the content of the file......  Opened File..............Client.dmp  Sequence ............... 1  Sending Bytes ............... 4096  Sequence ............... 2  Sending Bytes ............... 4096  Sequence ............... 3  Sending Bytes ............... 4096  Sequence ............... 4  Packet Type = 4  Sending Bytes ............... 4096  Packet sequence ...... 1  Sequence ............... 5  Sending Bytes ............... 4096  Sequence ............... 6  Sending Bytes ............... 4096  Residue = 3704  Coming out of the Send Loop Send Residue  Finished Sending File, About to send EOF  Finished Sending EOF  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ Packet Type = 4  Packet sequence ...... 2  Packet Type = 4  Packet sequence ...... 3  Packet Type = 4  Packet sequence ...... 4  Packet Type = 4  Packet sequence ...... 5  Packet Type = 4  Packet sequence ...... 6  Packet Type = 4  Packet sequence ...... 7  Packet Type = 5  End of File Received  pai@LAPTOP-QIG6F4HD:~/RecursiveMake/Midhun\_Code$ |

To Run the Program, we started two instances of WSL terminal. One Terminal was used to run Server.exe (in the background using &) and Client.exe in the foreground. In the Sercond terminal, we used Proxy (.first.exe)