

Submission includes:

TCPserver – master server, manages incoming requests from TCPclient, and manages the UDPclients for the micro-services

TCPclient – TCP client that sends the word/sentence to master server and instructions on how to transform it.

6 – UDP servers that represent each micro-service

UDPclient.cpp – class for creating udp clients to communicate to a micro-service

Udp.h – header file for configuration

Run.sh – script to compile everything at once

How to run:

Compiling the Master Server

By script:

```
$ ./run.sh
```

or Manually:

```
g++ UDPclient.cpp IDudpServer.cpp REVudpServer.cpp UPPudpServer.cpp LOWudpServer.cpp  
CAEudpServer.cpp SHIFTudpServer.cpp TCPserver.cpp -l pthread -o TCPserver
```

Compiling the client

```
g++ TCPclient.cpp -o TCPclient
```

First run the TCPserver

```
./TCPserver
```

Then run the TCPclient

```
./TCPclient
```

*end server with ctrl+c

By default, the master server communicates in:

```
#define SERVER_IP "127.0.0.1"  
#define MYPORTNUM 30037
```

By setting the ip to localhost, the server and client must communicate in the same device. Feel free to change this.

If you want the client and server to be in different devices, find the ip address of the device in which you are running the server on, and configure it in the header file (udp.h)

```
#define SERVER_IP "<device-ip>"
```

Finding your device's ip address: Windows

"ipconfig"

```
Windows IP Configuration

Ethernet adapter Local Area Connection:

   Media State . . . . . : Media disconnected
   Connection-specific DNS Suffix . : 
   Description . . . . . : Wireless LAN adapter Wireless Network Connection
   Connection-specific DNS Suffix . : 
   Link-local IPv6 Address . . . . . : fe80::56c8:1137:7ae7:a944%11
   IPv4 Address. . . . . : 192.168.1.104
   Subnet Mask . . . . . : 255.255.255.0
   Default Gateway . . . . . : 192.168.1.1

Tunnel adapter Teredo Tunneling Pseudo-Interface:

   Connection-specific DNS Suffix . : 
   IPv6 Address. . . . . : 2001:::9d38:90d7:864:16e0%8
   Link-local IPv6 Address . . . . . : fe80::964:16e0:8f2d:ead0%13
   Default Gateway . . . . . : 

Dhcp adapter isatap.{42CB28E3-99A5-4535-9E5E-321813BF3122}:
```

Finding your device's ip address: Linux

"ifconfig"

```
steve@steve:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.104 netmask 255.255.255.0 broadcast 192.168.1.255
    ether 08:00:27:00:00:00 txqueuelen 1000 (Ethernet)
    RX packets 73935 bytes 104560396 (104.5 MB)
    RX errors 3 dropped 3 overruns 0 frame 0
    TX packets 41051 bytes 2245186 (2.2 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 19 base 0x2000

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 296 bytes 22476 (22.4 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 296 bytes 22476 (22.4 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

steve@steve:~$
```

Issues: encountered issues have been fixed so there currently is no known issue in this program

****Bonus was done using POSIX Threads and data transformations modifies it word by word, not by sentence. 6-th data transformation is (SHIFTudpServer.cpp) see comments in the file for more info on how it works. Testing was done at home and in school.**