

COMP 4981

server.c | server

User Guide

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Purpose

The server.c program's purpose is to allow you to communicate between a server and clients. Also, this program helps us to understand the flow of TCP traffic. Utilizing Wireshark, we can see the traffic flow of the communication within the program and between different operating systems or browsers.

Installing

Obtaining from repo

```
git clone https://github.com/WilsonSue/COMP4537A1
cd ./COMP4981A1
sudo chmod u+x *
./generate-flags.sh
./generate-cmakelists.sh
./change-compiler.sh -c <gcc or clang or clang-16>
./build.sh
```

OR Building from pax file

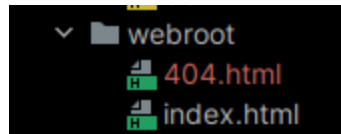
```
mkdir ./COMP4981A1
cd ./COMP4981A1
./generate-flags.sh
./generate-cmakelists.sh
./change-compiler.sh -c <gcc or clang or clang-16>
./build.sh
```

Commands for running the server

```
./build/server //this is of defaulting to localhost:8080
./build/server <server_IP> <PORT>
```

Features

- The server can be started and then accept any amount of client requests
- The server has a webroot directory that can store more additional static HTML pages
- Ctrl-c closes the server connection
- Can keep the connection on for clients
 - It can also detect when a client disconnects
- Webroot has a 404 not found redirected for GET that doesn't find the requested file



-
- GET and HEAD can be run from these browsers
 - Chrome
 - Chrome mobile(android)
 - Brave
 - Opera
 - Chromium
 - Edge
 - Edge mobile(android/ios)
- POST can
 - Take a string to server
 - Store it in database
 - Override the current data stored
 - Read it back
 - Send it back to the client as a response

Built-in Commands

Command	Purpose
START SERVER	
<code>ip a grep "scope global" grep -Po '(?<=inet)[\d.]+'</code>	Retrieve IP for servers local machine
<code>./build/server</code>	This defaults to localhost:8080
<code>./build/server <server_IP> <PORT></code>	Initializes and starts server to specified IP and PORT
GET request from Browser	
FROM BROWSER: <server_IP>:<PORT>	To handle a GET request input which redirects to index.html
<server_IP>:<PORT>/index.html	To handle a GET request to reach the homepage
<server_IP>:<PORT> / <HTMLfile>	To handle a GET request and access an explicit HTML added to webroot
127.0.0.1:8080 OR http://localhost:8080/	Input url on browser if default ./server was run
GET from curl	
<code>curl -0 http://localhost:8080</code>	Runs a POST request from terminal for localhost
<code>curl -0 <server_IP> : <PORT></code>	Runs a POST request from terminal for server_IP
GET from wget	
<code>wget <server_IP>:<PORT></code>	Get command to go to homepage
POST with curl	
curl -X POST localhost:8080/submit -d "String" OR curl -X POST 127.0.0.1:8080/submit -d "String"	POST request with localhost
curl -X POST <server_IP>:<PORT>/submit -d "String"	POST request with server_IP

POST with wget	
wget --post-data "String" localhost:8080/submit OR wget --post-data "String" 127.0.0.1:8080/submit	POST request with localhost
wget --post-data "String" <server_IP>:<PORT>/submit	Post request with server_IP
HEAD with curl and wget	
curl -I <server_IP>:<PORT>/index.html	HEAD Request with curl
wget --spider --server-response <server_IP>:<PORT>/index.html	HEAD Request with wget
Quitting Server or client	
ctrl-c	Quit from either any Client or Server connection

Limitations

- The program must have an IP address and port if you wish to have requests across local network
- The server must first establish a connection, then the client can connect.
- Server must be on to handle requests

The following browsers are not supported for GET

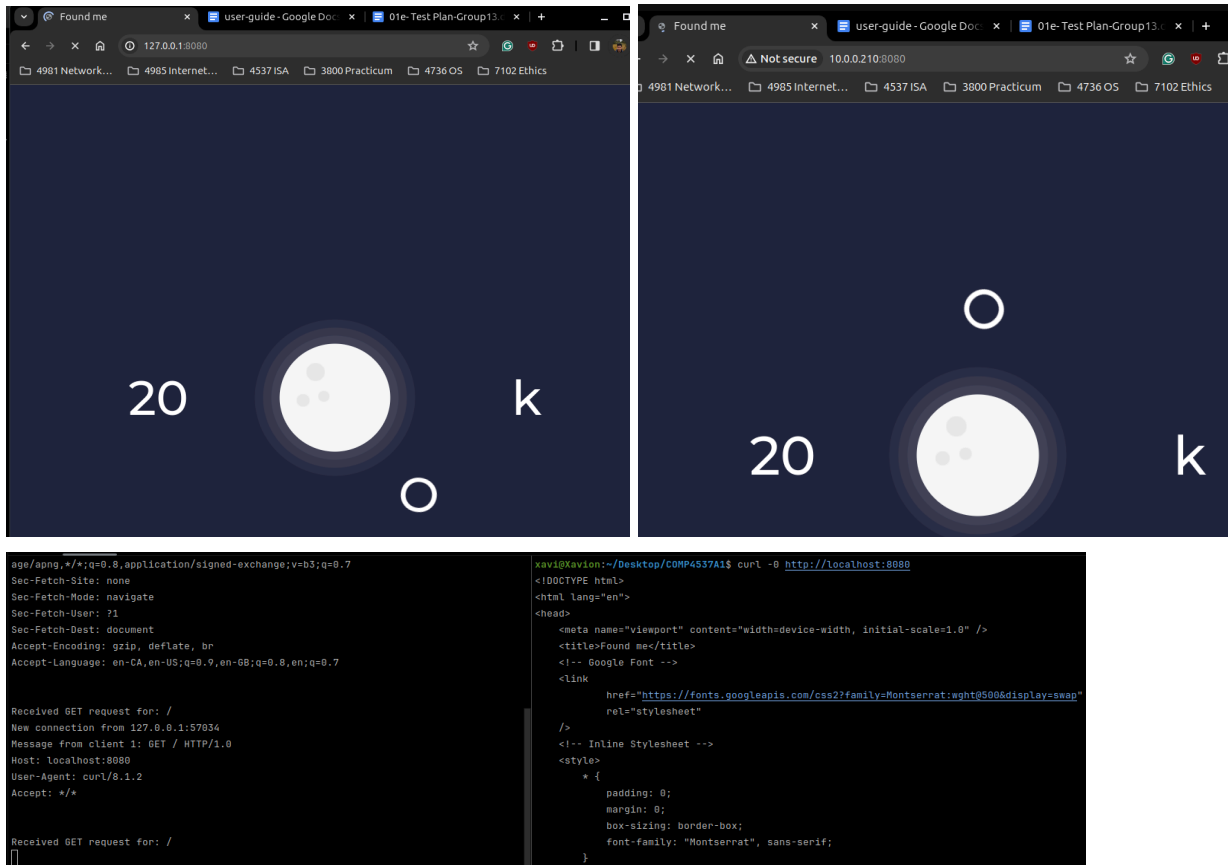
- Chrome mobile(ios)
- Safari mobile (ios)
- Firefox

Demonstrations

Start Server

```
xavi@Xavion:~/Desktop/COMP4537A1$ ./server
Server listening on 127.0.0.1:8080
```

GET request from Browser



GET from curl

```
Terminal: Local x + v
^C
xavi@Xavion:~/Desktop/COMP4537A1$ ./server 10.0.0.210 8080
Server listening on 10.0.0.210:8080
New connection from 10.0.0.210:51882
Message from client 0: GET / HTTP/1.1
Host: 10.0.0.210:8080
Connection: Keep-alive
DNT: 1
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/121.0.0.0 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Accept-Encoding: gzip, deflate
Accept-Language: en-CA,en-US;q=0.9,en-GB;q=0.8,en;q=0.7

Received GET request for: /

xavi@Xavion:~/Desktop/COMP4537A1$ curl -O http://localhost:8080
<!DOCTYPE html>
<html lang="en">
<head>
  <meta name="viewport" content="width=device-width, initial-scale=1.0" />
  <title>Found me</title>
  <!-- Google Font -->
  <link
    href="https://fonts.googleapis.com/css2?family=Montserrat:wght@500&display=swap"
    rel="stylesheet"
  />
  <!-- Inline Stylesheet -->
  <style>
    * {
      padding: 0;
      margin: 0;
      box-sizing: border-box;
      font-family: "Montserrat", sans-serif;
```

GET from wget

```
Host: 10.0.0.210:8080
User-Agent: Wget/1.21.3
Accept: /*
Accept-Encoding: identity
Connection: Keep-Alive

Received GET request for: /index.html

xavi@Xavion:~/Desktop/COMP4537A1$ wget 10.0.0.210:8080/index.html
--2024-02-04 01:03:04-- http://10.0.0.210:8080/index.html
Connecting to 10.0.0.210:8080... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: 'index.html.2'

index.html.2  [ 100%] 1.24KB 0.00s 0KB/s
```

POST with curl

```
Parsed method: POST, Parsed path: /submit
POST Data: String
Client disconnected or error occurred for client 1

xavi@Xavion:~/Desktop/COMP4537A1$ curl -X POST localhost:8080/submit -d "String"
This is read from DB:String
xavi@Xavion:~/Desktop/COMP4537A1$
```

POST with wget

```
User-Agent: Wget/1.21.3
Accept: /*
Accept-Encoding: identity
Connection: Keep-Alive
Content-Type: application/x-www-form-urlencoded
Content-Length: 6

String
Parsed method: POST, Parsed path: /submit
POST Data: String
Client disconnected or error occurred for client 1

xavi@Xavion:~/Desktop/COMP4537A1$ wget --post-data "String" 10.0.0.210:8080/submit
--2024-02-04 01:01:49-- http://10.0.0.210:8080/submit
Connecting to 10.0.0.210:8080... connected.
HTTP request sent, awaiting response... 200 OK
Length: 29 [text/plain]
Saving to: 'submit.1'

submit.1 100%[=====] 29 --.-KB/s in 0s

2024-02-04 01:01:49 (286 KB/s) - 'submit.1' saved [29/29]

xavi@Xavion:~/Desktop/COMP4537A1$
```

HEAD with curl and wget

```
Accept: /*

Parsed method: HEAD, Parsed path: /index.html
Client disconnected or error occurred for client 0

xavi@Xavion:~/Desktop/COMP4537A1$ curl -I 10.0.0.210:8080/index.html
HTTP/1.1 200 OK
Content-Length: 2750
Content-Type: text/html; charset=UTF-8

xavi@Xavion:~/Desktop/COMP4537A1$

Parsed method: HEAD, Parsed path: /index.html
Client disconnected or error occurred for client 0
New connection from 10.0.0.210:40910
Message from client 0: HEAD /index.html HTTP/1.1
Host: 10.0.0.210:8080
User-Agent: Wget/1.21.3
Accept: /*
Accept-Encoding: identity
Connection: Keep-Alive

Parsed method: HEAD, Parsed path: /index.html
Client disconnected or error occurred for client 0

xavi@Xavion:~/Desktop/COMP4537A1$ wget --spider --server-response 10.0.0.210:8080/index.html
Spider mode enabled. Check if remote file exists.
--2024-02-04 01:08:15-- http://10.0.0.210:8080/index.html
Connecting to 10.0.0.210:8080... connected.
HTTP request sent, awaiting response...
HTTP/1.1 200 OK
Content-Length: 2750
Content-Type: text/html; charset=UTF-8
Length: 2750 (2.7K) [text/html]
Remote file exists and could contain further links,
but recursion is disabled -- not retrieving.

xavi@Xavion:~/Desktop/COMP4537A1$
```


Quitting Server or Client

```
Client disconnected or error occurred for client 0
New connection from 10.0.0.210:59464
Message from client 0: GET / HTTP/1.1
Host: 10.0.0.210:8080
User-Agent: Wget/1.21.3
Accept: */*
Accept-Encoding: identity
Connection: Keep-Alive

Received GET request for: /
Client disconnected or error occurred for client 0
^C

Length: 2750 (2.7K) [text/html]
Remote file exists and could contain further links,
but recursion is disabled -- not retrieving.

xavi@Xavion:~/Desktop/COMP4537A1$ wget 10.0.0.210:8080
--2024-02-04 01:11:55-- http://10.0.0.210:8080/
Connecting to 10.0.0.210:8080... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: 'index.html.3'

index.html.3      [ <=> ] 2.69K --.-KB/s
C
```