భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

# ACN Programming Assignment-2: WWW Report


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# CLIENT

1.1. Objective

- Our aim is to create a web-client which can render any html index file(or simply an object file) and objects present in the html file using non-persistent http connection.

1.2. Flow

- The client will send an http GET request to the desired domain, the server will either respond with 200 OK success message if it was able to find the file sent by the server or 404 not found or other error messages, in case it was not able to fetch it.
- After receiving the index file from the server, the client will create a separate connection to the server to fetch all the objects present in the index file.
- After fetching the index file and server, the client will save it in the Download folder.
- After receiving the file we will calculate how much time it took to fetch all the objects.

1.3. Results

```
~/Documents/ACN/Assignment2 — -zsh                    ~/Documents/ACN/As
suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py 192.168.137.85 12000 /
no. of arguments passed:  4

connection established to get index file
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: 192.168.137.85/images/fb.png
object name: fb.png
connection closed for object: fb.png
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: 192.168.137.85/scripts/script1.js
object name: script1.js
connection closed for object: script1.js
Header of reply from server:
HTTP/1.0 200 OK
Latency: 0.0016410350799560547seconds
suryanshgautam@Suryanshs-Air Assignment2 %
```

- It is for 4 arguments.
- We can see in the result, client shows first that client shows that connection established and shows 200 OK.
- Again, it has established one connection to get fb.png.
- At last, again one connection is being established to get script1.js

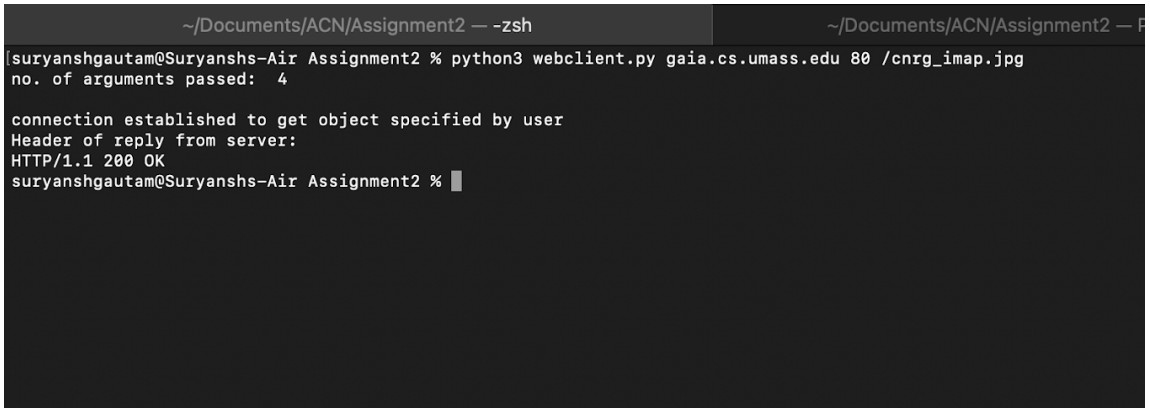
```
~/Documents/ACN/Assignment2 — -zsh                    ~/Documents/ACN/Assignment2 — P
suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py 192.168.137.85 12000 / 192.168.137.85 12001
no. of arguments passed:  6

connection established to get index file
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: 192.168.137.85/images/fb.png
object name: fb.png
connection closed for object: fb.png
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: 192.168.137.85/scripts/script1.js
object name: script1.js
connection closed for object: script1.js
Header of reply from server:
HTTP/1.0 200 OK
Latency: 0.002062082290649414seconds
suryanshgautam@Suryanshs-Air Assignment2 %
```

- It is for 6 arguments.
- One connection is made for getting the index file.
- We can see in the result, client shows first that client shows that connection established and shows 200 OK.
- Again, it has established one connection to get fb.png.
- At last, again one connection is being established to get script1.js

```
~/Documents/ACN/Assignment2 — -zsh                    ~/Documents/ACN/Assignme
suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py gaia.cs.umass.edu 80 /
no. of arguments passed:  4

connection established to get index file
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: gaia.cs.umass.edu/cnrg_imap.jpg
object name: cnrg_imap.jpg
connection closed for object: cnrg_imap.jpg
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: www.scalable-networks.com/images/qupmember.gif
object name: qupmember.gif
connection closed for object: qupmember.gif
Header of reply from server:
HTTP/1.1 403 Forbidden
Latency: 1.5364458560943604seconds
suryanshgautam@Suryanshs-Air Assignment2 %
```

- It is for 4 arguments using the website gaia.cs.umass.edu.
- One connection is made for getting the index file.

- We can see in the result, client shows first that client shows that connection established and shows 200 OK.
- Again, it has established one connection to cnrg_imap.jpg.
- At last, again one connection is being established to get qupmember.gif and we can observe that this object was not fetched and the associated error message.




- The above image shows the client working to get an object specified by the user.

# WEB-PROXY-SERVER

1.1. Objective

- Our aim is to create a web-proxy server which will get requests from clients. The proxy server will serve this request by contacting the desired server and fetching all the required objects from the server.
- The web proxy serves as an intermediary between client and server, so that the server will not be able to know who requested the objects/files.
- The proxy -server can be used with any browser or personal client/server code.
- The web-proxy server can handle any multiple of clients.

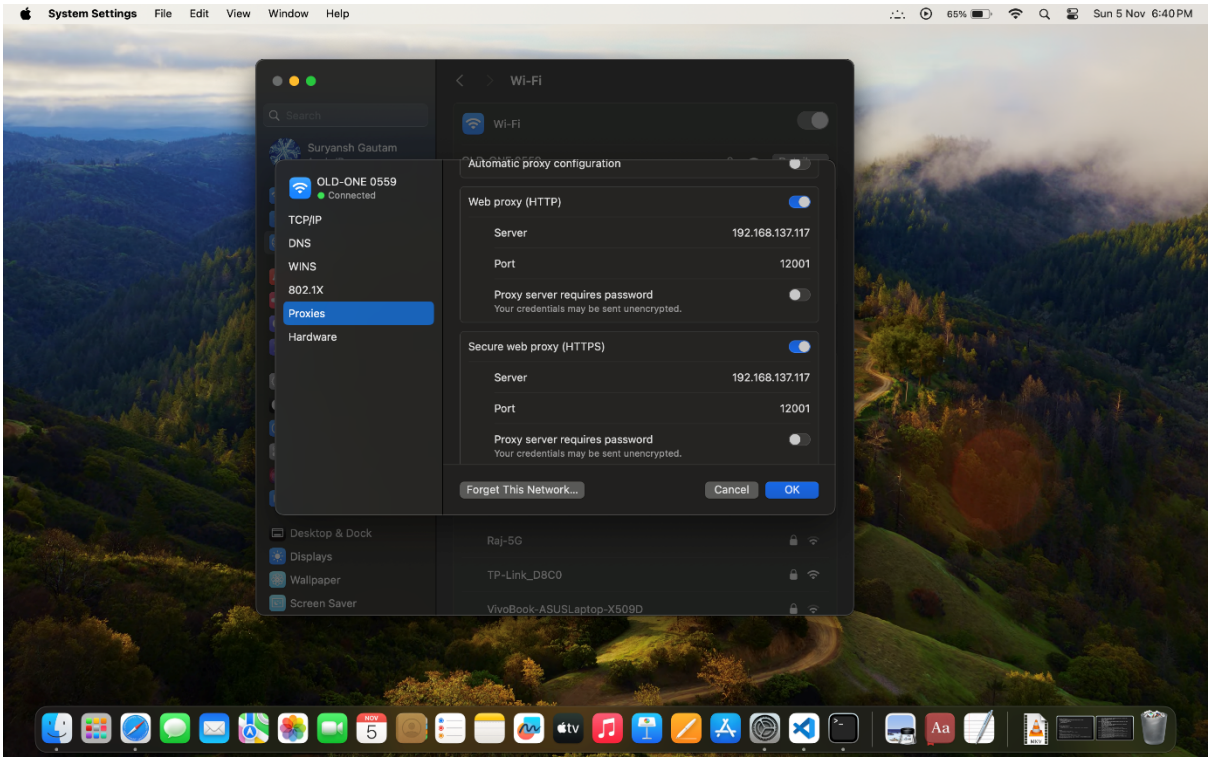
1.2. Flow

- The client will send an http GET request to the web-proxy server.
- The proxy-server will get the request from the client, and extract domain name and path of from the received request
- The server will then make a connection to the server using its own ip address and fetch the desired file/object.
- It will send this received file/object to the respected client.

1.3. Results

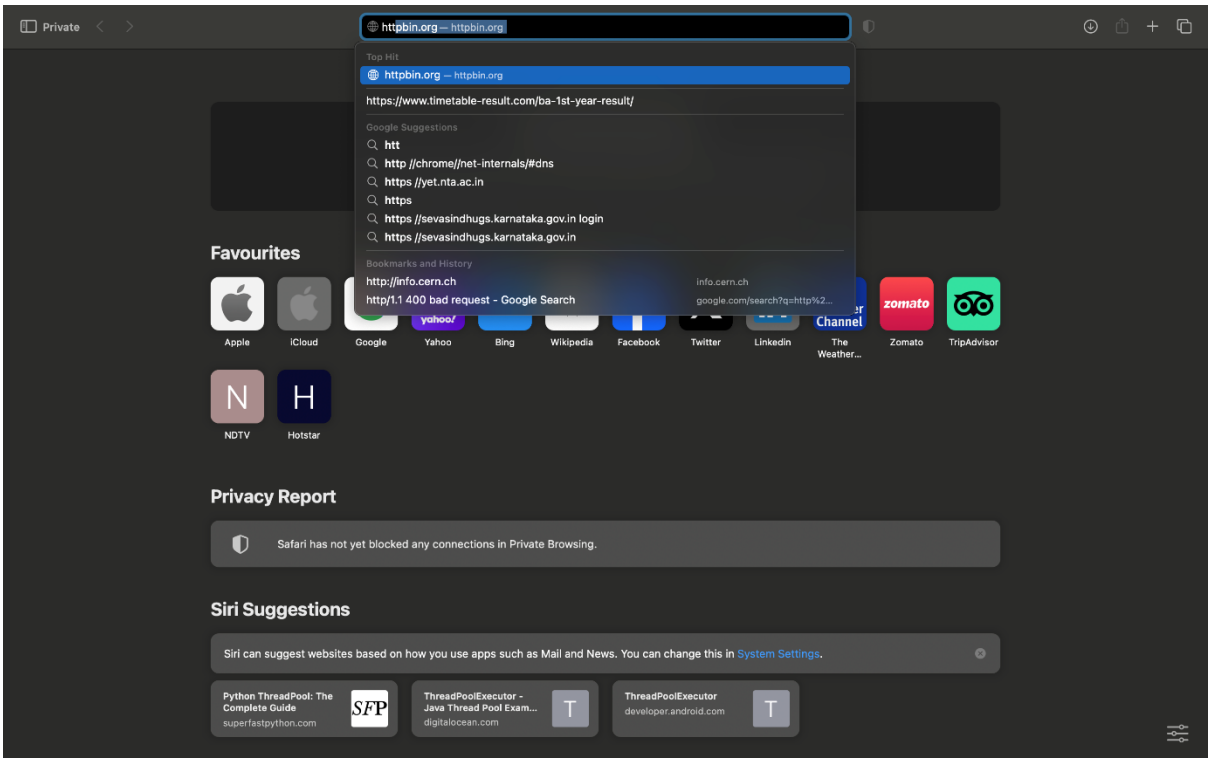
1.Browser setting

Setting proxy setting in browser



Browser:

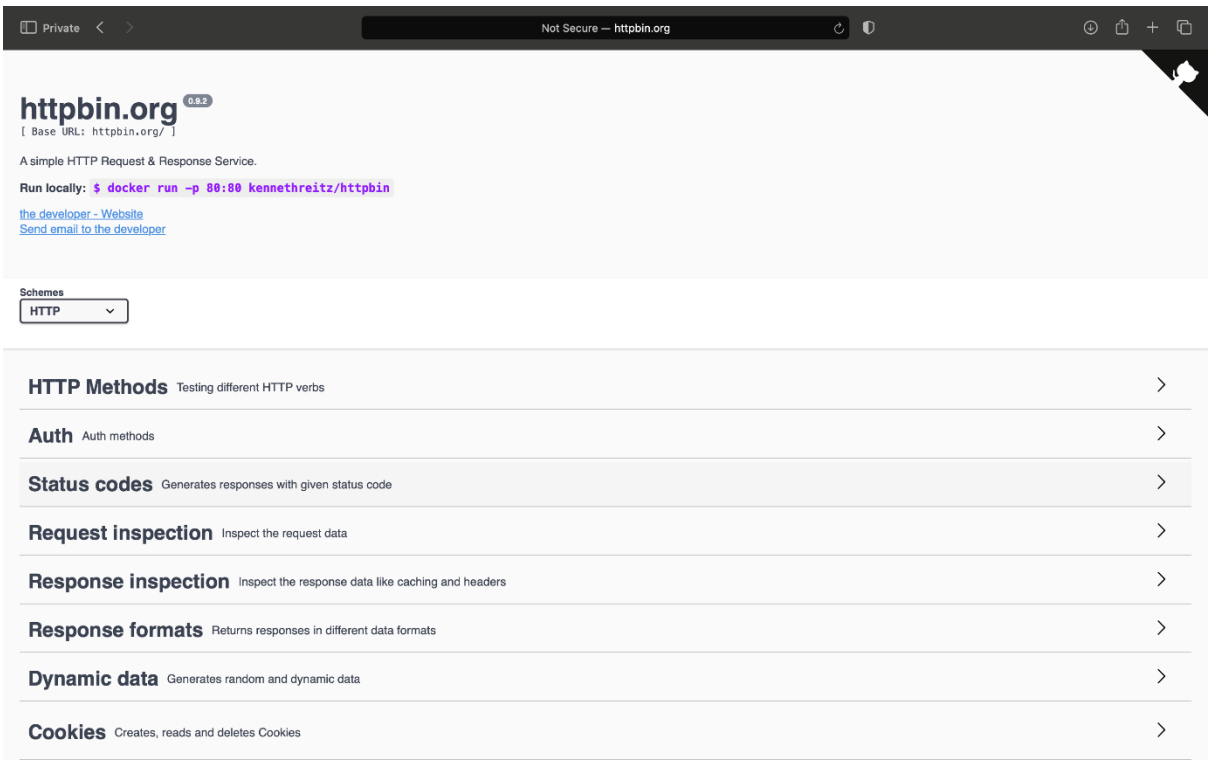
Opening httbin.org using proxy server



Proxy Server:

```
~/Documents/ACN/Assignment2 — -zsh    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — Python proxy_server.py
connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 51203)
Received request:
GET http://httpbin.org/spec.json HTTP/1.1
Host: httpbin.org
Connection: keep-alive
Proxy-Connection: keep-alive
Accept: */*
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/17.1 Safari/605.1.15
Accept-Language: en-IN,en-GB;q=0.9,en;q=0.8
Referer: http://httpbin.org/
Accept-Encoding: gzip, deflate


80 httpbin.org

connection established to server: httpbin.org
Accepted connection from ('192.168.137.85', 51205)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 51207)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 51209)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 51211)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: ssl.gstatic.com
```

Displaying index file after fetching index file and objects associated with it



2. Visiting gaia.cs.umass.edu website
   Proxy server:

```
~/Documents/ACN/Assignment2 — -zsh    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — Python proxy_server.py

Accepted connection from ('192.168.137.85', 51968)
Received request:
CONNECT api-glb-aaps1b.smoot.apple.com:443 HTTP/1.1
Host: api-glb-aaps1b.smoot.apple.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 api-glb-aaps1b.smoot.apple.com

connection established to server: api-glb-aaps1b.smoot.apple.com
Accepted connection from ('192.168.137.85', 51970)
Received request:
GET http://gaia.cs.umass.edu/ HTTP/1.1
Host: gaia.cs.umass.edu
Proxy-Connection: keep-alive
Upgrade-Insecure-Requests: 1
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/605.1.15 (KHTML, like Gecko) Version/17.1 Safari/605.1.15
Accept-Language: en-IN,en-GB;q=0.9,en;q=0.8
Accept-Encoding: gzip, deflate
Connection: keep-alive


80 gaia.cs.umass.edu
Accepted connection from ('192.168.137.85', 51971)
Accepted connection from ('192.168.137.85', 51972)
Received request:
CONNECT www.keysight.com:443 HTTP/1.1
Host: www.keysight.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 www.keysight.com

connection established to server: www.keysight.com

connection established to server: gaia.cs.umass.edu
Accepted connection from ('192.168.137.85', 51975)
Received request:
CONNECT www.youtube.com:443 HTTP/1.1
Host: www.youtube.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 www.youtube.com

connection established to server: www.youtube.com
Accepted connection from ('192.168.137.85', 51977)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: ssl.gstatic.com
```

Browser:

From Terminal: -

1. https://www.iith.ac.in/

Client:

```
~/Documents/ACN/Assignment2 — -zsh    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — Python proxy_server.py

suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py www.iith.ac.in 443 / 192.168.137.85 12001
no. of arguments passed:  6

connection established to get index file
HTTP/1.1 200 OK
Date: Sun, 05 Nov 2023 12:05:51 GMT
Server: Apache
Last-Modified: Sat, 04 Nov 2023 14:48:18 GMT
ETag: "dc16-609546262f83"
Accept-Ranges: bytes
Content-Length: 56342
Vary: Accept-Encoding
Connection: close
Content-Type: text/html


Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: www.iith.ac.in/assets/images/logo.png
object name: logo.png
connection closed for object: logo.png
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: www.iith.ac.in/assets/images/horzlogolong.png
object name: horzlogolong.png
connection closed for object: horzlogolong.png
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: www.iith.ac.in/assets/images/towers/tower2.jpg
object name: tower2.jpg
connection closed for object: tower2.jpg
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: www.iith.ac.in/assets/images/towers/tower3.jpg
object name: tower3.jpg
connection closed for object: tower3.jpg
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: www.iith.ac.in/assets/images/towers/tower1.jpg
object name: tower1.jpg
connection closed for object: tower1.jpg
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: www.iith.ac.in/assets/images/highlights/Priyanka-ICACMP-2023-conference.jpg
object name: Priyanka-ICACMP-2023-conference.jpg
connection closed for object: Priyanka-ICACMP-2023-conference.jpg
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: www.iith.ac.in/assets/images/highlights/Chinnikrishnan Innovation Award 2023.jpg
object name: Chinnikrishnan Innovation Award 2023.jpg
connection closed for object: Chinnikrishnan Innovation Award 2023.jpg
Header of reply from server:
```

Proxy:

```
~/Documents/ACN/Assignment2 — -zsh    ~/Document

connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 53501)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 53503)
Received request:
GET / HTTP/1.0
Host: www.iith.ac.in:443


443 www.iith.ac.in

connection established to server: www.iith.ac.in
Accepted connection from ('192.168.137.85', 53505)
Received request:
GET /assets/images/logo.png HTTP/1.0
Host: www.iith.ac.in:443


443 www.iith.ac.in

connection established to server: www.iith.ac.in
Accepted connection from ('192.168.137.85', 53507)
Received request:
GET /assets/images/horzlogolong.png HTTP/1.0
Host: www.iith.ac.in:443


443 www.iith.ac.in

connection established to server: www.iith.ac.in
Accepted connection from ('192.168.137.85', 53509)
Received request:
GET /assets/images/towers/tower2.jpg HTTP/1.0
Host: www.iith.ac.in:443


443 www.iith.ac.in

connection established to server: www.iith.ac.in
Accepted connection from ('192.168.137.85', 53511)
Received request:
GET /assets/images/towers/tower3.jpg HTTP/1.0
Host: www.iith.ac.in:443
```

2. http://www.espncricinfo.com/

Client:

```
~/Documents/ACN/Assignment2 — -zsh        ~/Documents/ACN/Assignment2 — Python server.py        ~/Docum
suryanshgautam@Suryanshs-Air Assignment2 % clear

suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py www.espncricinfo.com 443 / 192.168.137.85 12001
no. of arguments passed:  6

connection established to get index file
HTTP/1.0 200 OK
Content-Type: text/html; charset=utf-8
x-hsci-cache-time: 2023-11-05T11:49:31.543Z
Expires: Sun, 05 Nov 2023 11:49:54 GMT
Cache-Control: max-age=0, no-cache, no-store
Pragma: no-cache
Date: Sun, 05 Nov 2023 11:49:54 GMT
Connection: close
Set-Cookie: country=in; path=/
Set-Cookie: edition=espncricinfo-en-in; expires=Sun, 12-Nov-2023 11:49:54 GMT; path=/
Set-Cookie: edition-view=espncricinfo-en-in; expires=Sun, 12-Nov-2023 11:49:54 GMT; path=/
Set-Cookie: region=unknown; expires=Sun, 12-Nov-2023 11:49:54 GMT; path=/
Set-Cookie: _dcf=1; expires=Sun, 12-Nov-2023 11:49:54 GMT; path=/
Set-Cookie: connectionspeed=full; expires=Sun, 12-Nov-2023 11:49:54 GMT; path=/
Set-Cookie: SWID=252c6697-edbf-4301-94bd-f39777ea0b2f; expires=Sat, 31-Oct-2043 11:49:54 GMT; path=/; domain=.espncricinfo.com
strict-transport-security: max-age=15552000


Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: wassets.hscicdn.com/static/images/lazyimage-transparent.png
object name: lazyimage-transparent.png
connection closed for object: lazyimage-transparent.png
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: wassets.hscicdn.com/static/images/lazyimage-transparent.png
object name: lazyimage-transparent.png
connection closed for object: lazyimage-transparent.png
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: wassets.hscicdn.com/static/images/lazyimage-transparent.png
object name: lazyimage-transparent.png
connection closed for object: lazyimage-transparent.png
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: wassets.hscicdn.com/static/images/lazyimage-transparent.png
```

Proxy:

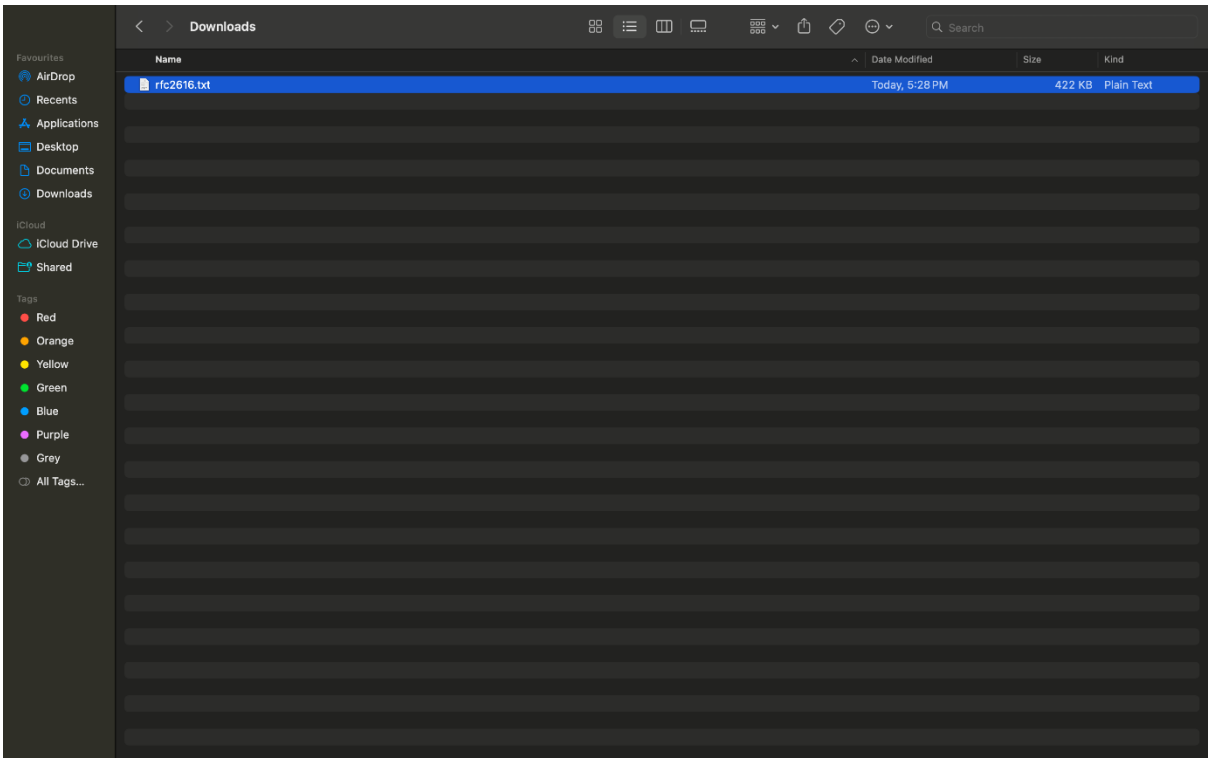
```
~/Documents/ACN/Assignment2 — -zsh        ~/Documents/ACN/Assignment2 — Python server.py        ~/Do
Connection: keep-alive


443 ocsp2.apple.com

connection established to server: ocsp2.apple.com
Accepted connection from ('192.168.137.85', 52165)
Received request:
GET / HTTP/1.0
Host: www.espncricinfo.com:443


443 www.espncricinfo.com

connection established to server: www.espncricinfo.com
Accepted connection from ('192.168.137.85', 52167)
Received request:
GET /static/images/lazyimage-transparent.png HTTP/1.0
Host: wassets.hscicdn.com:443


443 wassets.hscicdn.com

connection established to server: wassets.hscicdn.com
Accepted connection from ('192.168.137.85', 52169)
Received request:
GET /static/images/lazyimage-transparent.png HTTP/1.0
Host: wassets.hscicdn.com:443


443 wassets.hscicdn.com
Accepted connection from ('192.168.137.85', 52171)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: wassets.hscicdn.com

connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 52173)
Received request:
GET /static/images/lazyimage-transparent.png HTTP/1.0
Host: wassets.hscicdn.com:443
```

3. (http://www.ietf.org/rfc/rfc2616.txt)

Client:

```
~/Documents/ACN/Assignment2 — -zsh        ~/Documents/ACN/Assignment2 — Python server.py
suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py www.ietf.org/rfc/rfc2616.txt 443 / 192.168.137.85 12001
no. of arguments passed:  6

connection established to get index file



Header of reply from server:

Latency: 2.4080276489257812e-05seconds
suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py www.ietf.org 443 /rfc/rfc2616.txt 192.168.137.85 12001
no. of arguments passed:  6

connection established to get object specified by user
HTTP/1.1 200 OK
Date: Sun, 05 Nov 2023 11:58:55 GMT
Content-Type: text/plain
Connection: close
Last-Modified: Fri, 11 Jun 1999 18:46:53 GMT
ETag: W/"67187-34d0931a3e140-gzip"
Vary: Accept-Encoding
Strict-Transport-Security: max-age=31536000; preload
X-Xss-Protection: 1; mode=block
X-Content-Type-Options: nosniff
Content-Security-Policy: frame-ancestors 'self' ietf.org *.ietf.org meetecho.com *.meetecho.com gather.town *.gather.town
X-Frame-Options: ALLOW-FROM ietf.org *.ietf.org meetecho.com *.meetecho.com gather.town *.gather.town
Access-Control-Allow-Origin: *
Access-Control-Allow-Headers: *
CF-Cache-Status: HIT
Age: 262142
Expires: Sun, 05 Nov 2023 15:58:55 GMT
Cache-Control: public, max-age=14400
Server: cloudflare
CF-RAY: 8214ed7f1e3e179c-MAA
alt-svc: h3=":443"; ma=86400


Header of reply from server:
HTTP/1.1 200 OK
suryanshgautam@Suryanshs-Air Assignment2 %
```

Downloaded file



4. https://people.iith.ac.in/tbr/teaching/teaching.html

Client:

```
~/Documents/ACN/Assignment2 — -zsh    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — -zsh
suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py people.iith.ac.in 443 /tbr/teaching/teaching.html 192.168.137.85 12001
no. of arguments passed:  6

connection established to get index file
HTTP/1.1 200 OK
Date: Sun, 05 Nov 2023 12:02:30 GMT
Server: Apache/2.4.41 (Ubuntu)
Last-Modified: Sat, 06 Oct 2018 08:00:43 GMT
ETag: "140c-5778ac8ef5adc"
Accept-Ranges: bytes
Content-Length: 5132
Vary: Accept-Encoding
Connection: close
Content-Type: text/html


Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: people.iith.ac.in/spring.css
object name: spring.css
connection closed for object: spring.css
Header of reply from server:
HTTP/1.1 404 Not Found
Latency: 0.03050494194030761 7seconds
suryanshgautam@Suryanshs-Air Assignment2 %
```

Proxy:

```
~/Documents/ACN/Assignment2 — -zsh    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — -zsh
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 53344)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com
Accepted connection from ('192.168.137.85', 53346)
Received request:
GET /tbr/teaching/teaching.html HTTP/1.0
Host: people.iith.ac.in:443


443 people.iith.ac.in
connection established to server: ssl.gstatic.com

connection established to server: people.iith.ac.in
Accepted connection from ('192.168.137.85', 53348)
Received request:
GET /spring.css HTTP/1.0
Host: people.iith.ac.in:443


443 people.iith.ac.in

connection established to server: people.iith.ac.in
Accepted connection from ('192.168.137.85', 53350)
Received request:
CONNECT ssl.gstatic.com:443 HTTP/1.1
Host: ssl.gstatic.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 ssl.gstatic.com

connection established to server: ssl.gstatic.com
Accepted connection from ('192.168.137.85', 53352)
Received request:
CONNECT chat.google.com:443 HTTP/1.1
Host: chat.google.com
Proxy-Connection: keep-alive
Connection: keep-alive


443 chat.google.com

connection established to server: chat.google.com
Accepted connection from ('192.168.137.85', 53354)
Received request:
```

# SERVER

1.1. Objective

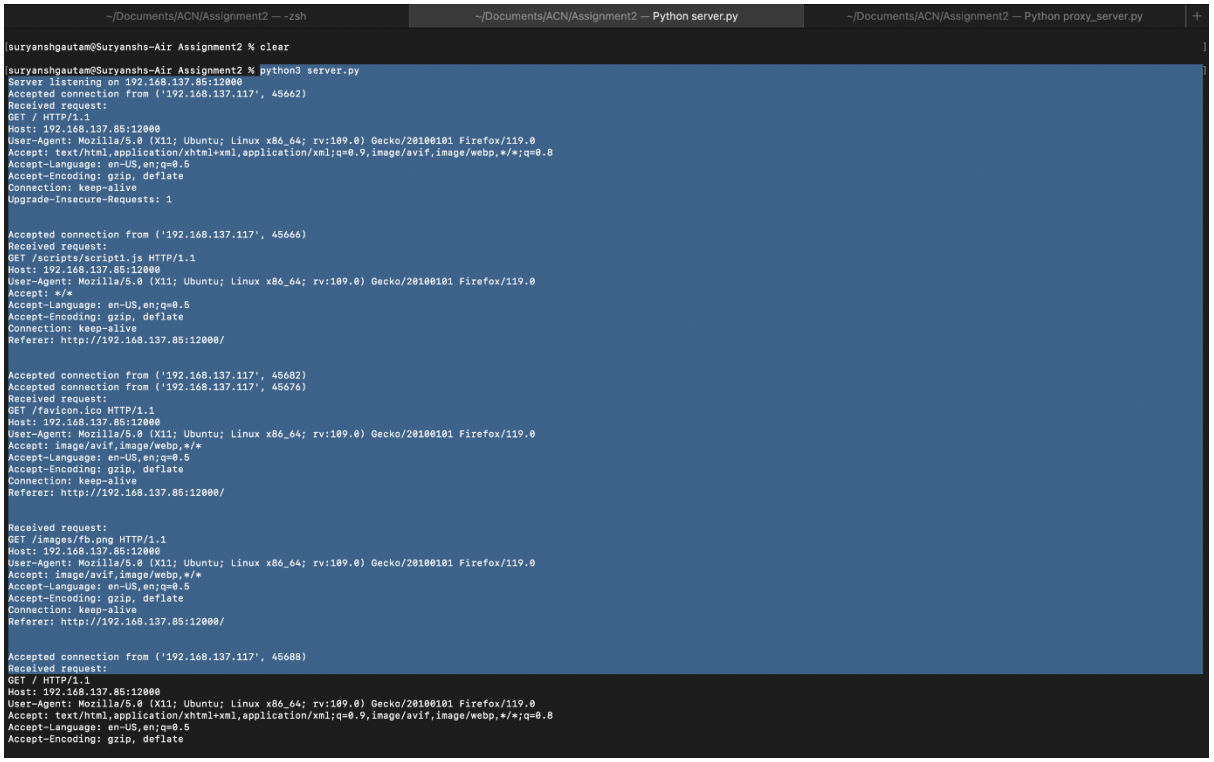
- The objective of the web-server is to deliver the file/object requested by the client if present in the server or reply with an error message.
- The web-server can handle any number of clients at a time.

1.2. Flow

- The server will create a fixed socket in which all the clients can connect.
- When any client-request any file/object, the server will see if it is present with it, if present it will send the file/object to the client or else it will reply with 404 Not Found message.

1.3. Results

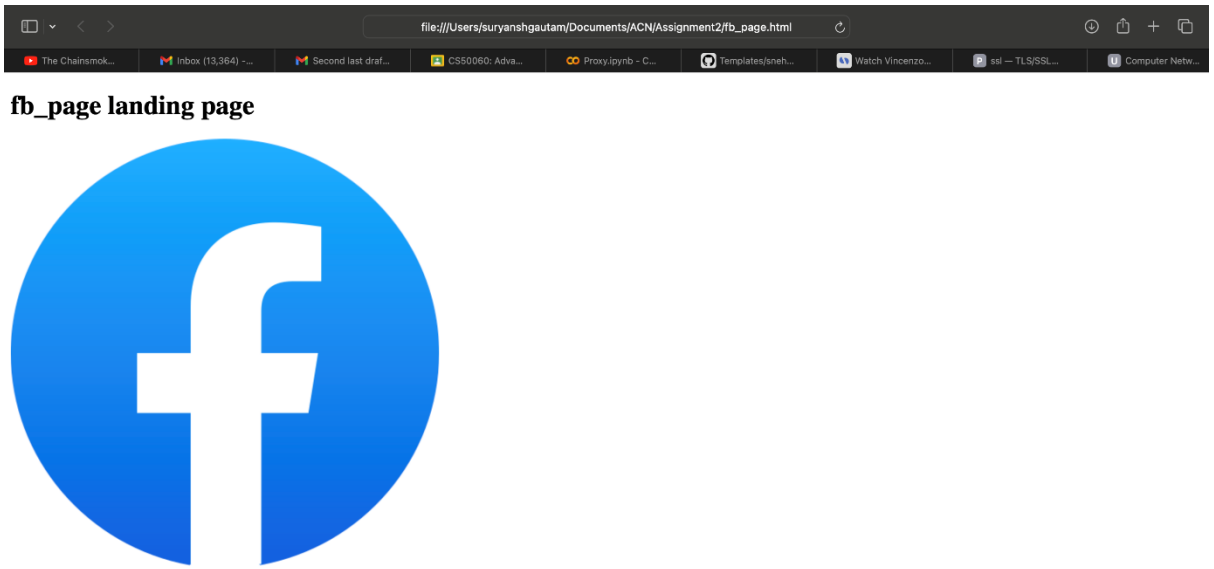
Server:



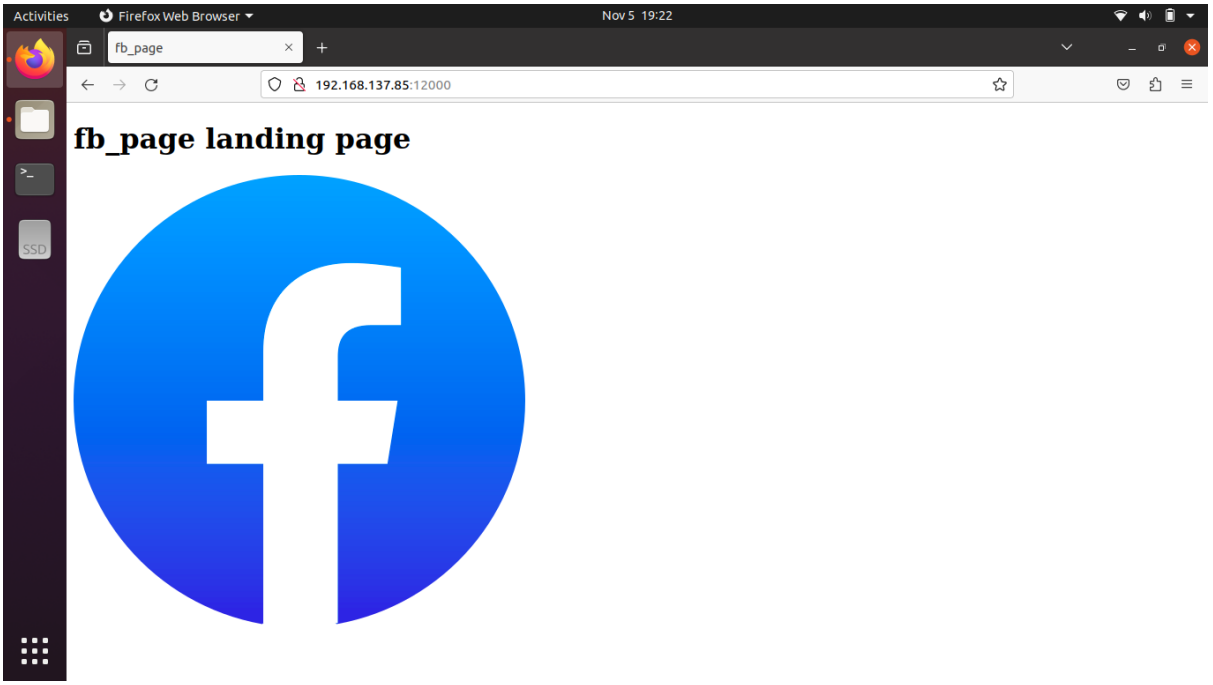
```
~/Documents/ACN/Assignment2 — -zsh    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — Python proxy_server.py

[suryanshgautam@Suryanshs-Air Assignment2 % clear

[suryanshgautam@Suryanshs-Air Assignment2 % python3 server.py
Server listening on 192.168.137.85:12000
Accepted connection from ('192.168.137.117', 45662)
Received request:
GET / HTTP/1.1
Host: 192.168.137.85:12000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/119.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1


Accepted connection from ('192.168.137.117', 45666)
Received request:
GET /scripts/script1.js HTTP/1.1
Host: 192.168.137.85:12000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/119.0
Accept: */*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Referer: http://192.168.137.85:12000/


Accepted connection from ('192.168.137.117', 45682)
Accepted connection from ('192.168.137.117', 45676)
Received request:
GET /favicon.ico HTTP/1.1
Host: 192.168.137.85:12000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/119.0
Accept: image/avif,image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Referer: http://192.168.137.85:12000/


Received request:
GET /images/fb.png HTTP/1.1
Host: 192.168.137.85:12000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/119.0
Accept: image/avif,image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Referer: http://192.168.137.85:12000/


Accepted connection from ('192.168.137.117', 45688)
Received request:
GET / HTTP/1.1
Host: 192.168.137.85:12000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/119.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
```

Multiple Client output

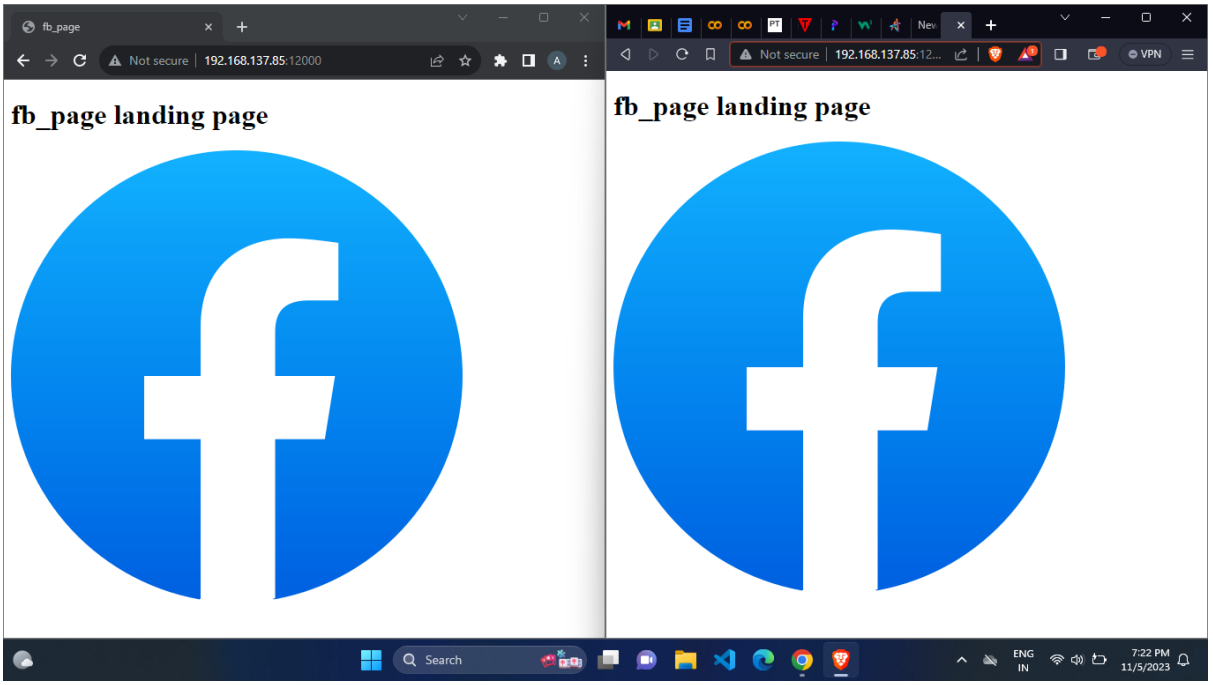
Client1:




Client 2:




Client 3:


fb_page
Not secure | 192.168.137.85:12000
fb_page landing page
Not secure | 192.168.137.85:12...
VPN
fb_page landing page
Search
ENG
IN
7:22 PM
11/5/2023

# EXTENSION

1.1. Objective

- The objective is to take the web-client created in part-1 and use parallel connection (non-persistent) to fetch the objects instead of fetching it one after another.
- We will also find the difference in latency when we use non persistent and parallel connection

1.2. Flow

- The client will send an http GET request to the desired domain, the server will either respond with 200, ok success message if it was able to find the file send by the server or 404 not found, in case it was not able to fetch it.
- After receiving the index file from the server, client will create a parallel connection to the server to fetch all the objects present in the index file.
- After fetching the index file and server, client will save it in folder.
- After receiving the file we will calculate how much time it took to fetch all the objects in parallel

1.2. Results

Client Run on Normal Web client

```
...ment2 — Python webclient.py cse.iith.ac.in 443 / 192.168.137.85 12001    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — Python proxy_server.py
  File "/Users/suryanshgautam/Documents/ACN/Assignment2/webclient.py", line 11, in create_socket
    clientSocket.connect((addr, int(port)))
ConnectionRefusedError: [Errno 61] Connection refused
suryanshgautam@Suryanshs-Air Assignment2 % python3 webclient.py cse.iith.ac.in 443 / 192.168.137.85 12001
no. of arguments passed:  6

connection established to get index file
HTTP/1.0 200 OK
Cache-Control: max-age=600
Content-Length: 16175
Content-Type: text/html; charset=utf-8
Etag: "37cb204fee5c849fc7216c465d6f7d8be48a3ee3bb10bc73e2d63e1784521352"
Expires: Sun, 05 Nov 2023 13:52:59 UTC
Last-Modified: Fri, 20 Oct 2023 10:12:17 GMT
Permissions-Policy: interest-cohort=()
Vary: Origin
Date: Sun, 05 Nov 2023 13:43:00 GMT


Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/images/CSELogo.png
object name: CSELogo.png
connection closed for object: CSELogo.png
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/images/gallery/LYD01709.jpg
object name: LYD01709.jpg
connection closed for object: LYD01709.jpg
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/images/gallery/LYD01882.jpg
object name: LYD01882.jpg
connection closed for object: LYD01882.jpg
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/images/gallery/LYD01721.jpg
object name: LYD01721.jpg
connection closed for object: LYD01721.jpg
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/images/gallery/LYD01843.jpg
object name: LYD01843.jpg
connection closed for object: LYD01843.jpg
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/js/ie/html5shiv.js
object name: html5shiv.js
connection closed for object: html5shiv.js
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: www.googletagmanager.com/gtag/js?id=UA-137608318-2
object name: js?id=UA-137608318-2
connection closed for object: js?id=UA-137608318-2
```

## Latency on normal client

```
~/Documents/ACN/Assignment2 — -zsh    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — Python proxy_server.py
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/images/favicon.png
object name: favicon.png
connection closed for object: favicon.png
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/css/main.css
object name: main.css
connection closed for object: main.css
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/css/stylesheet.css
object name: stylesheet.css
connection closed for object: stylesheet.css
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/css/ie8.css
object name: ie8.css
connection closed for object: ie8.css
Header of reply from server:
HTTP/1.0 200 OK

connection established to get object at: cse.iith.ac.in/assets/css/ie9.css
object name: ie9.css
connection closed for object: ie9.css
Header of reply from server:
HTTP/1.0 200 OK
Latency: 31.06727409362793seconds
suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
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suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
suryanshgautam@Suryanshs-Air Assignment2 %
```
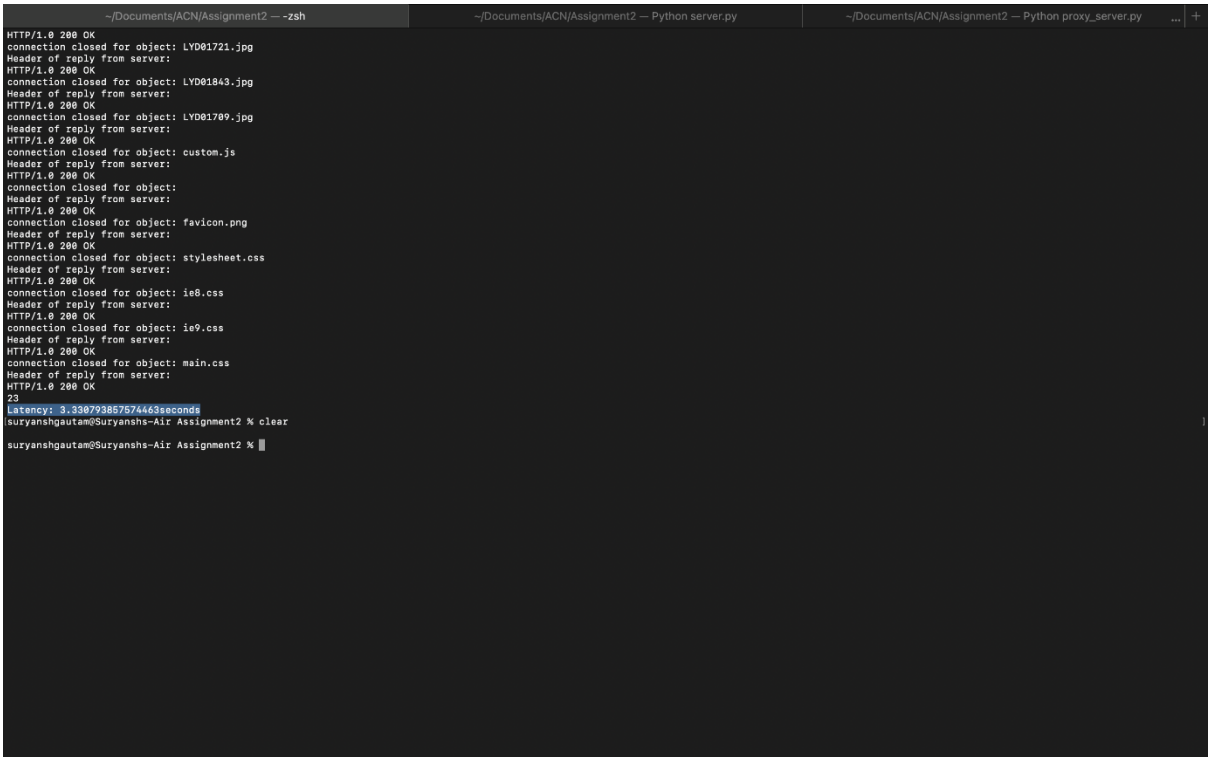

## Client Run on Parallel web client

```
~/Documents/ACN/Assignment2 — -zsh    ~/Documents/ACN/Assignment2 — Python server.py    ~/Documents/ACN/Assignment2 — Python proxy_server.py
suryanshgautam@Suryanshs-Air Assignment2 % python3 client_extension.py cse.iith.ac.in 443 / 192.168.137.85 12001
no. of arguments passed:  6

connection established to get index file
HTTP/1.0 200 OK
Downloading referenced objects using parallel Non-Persistent TCP Connections:

connection established to get object at: cse.iith.ac.in/assets/images/CSELogo.png
object name: CSELogo.png

connection established to get object at: cse.iith.ac.in/assets/images/gallery/LYD01709.jpg
object name: LYD01709.jpg

connection established to get object at: cse.iith.ac.in/assets/images/gallery/LYD01882.jpg
object name: LYD01882.jpg

connection established to get object at: cse.iith.ac.in/assets/images/gallery/LYD01721.jpg
object name: LYD01721.jpg

connection established to get object at: cse.iith.ac.in/assets/images/gallery/LYD01843.jpg
object name: LYD01843.jpg

connection established to get object at: cse.iith.ac.in/assets/js/ie/html5shiv.js
object name: html5shiv.js

connection established to get object at: cse.iith.ac.in/search-script.js
object name: search-script.js

connection established to get object at: www.googletagmanager.com/gtag/js?id=UA-137608318-2
object name: js?id=UA-137608318-2

connection established to get object at: code.jquery.com/jquery-1.12.4.min.js
object name: jquery-1.12.4.min.js

connection established to get object at: cse.iith.ac.in/assets/js/jquery.scrollzer.min.js
object name: jquery.scrollzer.min.js

connection established to get object at: cse.iith.ac.in/assets/js/jquery.scrolly.min.js
object name: jquery.scrolly.min.js

connection established to get object at: cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.0/umd/popper.min.js
object name: popper.min.js
connection closed for object: popper.min.js
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: maxcdn.bootstrapcdn.com/bootstrap/3.3.7/js/bootstrap.min.js
object name: bootstrap.min.js
connection closed for object: jquery-1.12.4.min.js
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: cse.iith.ac.in/assets/js/skel.min.js
object name: skel.min.js
connection closed for object: bootstrap.min.js
Header of reply from server:
HTTP/1.1 200 OK

connection established to get object at: cse.iith.ac.in/assets/js/util.js
object name: util.js
```

Latency on parallel client




Speedup = Time taken on normal web client/ time taken on parallel web client

=31.06/3.33

=9.32

Speedup is almost 9 times that of normal client using a parallel web client.

# ANTI-PLAGIARISM Statement

*We certify that this assignment/report is our own work, based on our personal study and/or research and that we have acknowledged all material and sources used in its preparation, whether they be books, articles, packages, datasets, reports, lecture notes, and any other kind of document, electronic or personal communication. We also certify that this assignment/report has not previously been submitted for assessment/project in any other course lab, except where specific permission has been granted from all course instructors involved, or at any other time in this course, and that we have not copied in part or whole or otherwise plagiarized the work of other students and/or persons. Additionally, we acknowledge that we may have used AI tools, such as language models (e.g., ChatGPT, Bard), for assistance in generating and refining my assignment, and we have made all reasonable efforts to ensure that such usage complies with the academic integrity policies set for the course. I pledge to uphold the principles of honesty and responsibility at CSE@IITH. In addition, we understand our responsibility to report honour violations by other students if we become aware of it.*

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Date: 5/11/2023
Signatures: S. G., A. G. K., K. K. S.

# REFERENCES


- https://www.geeksforgeeks.org/how-to-use-threadpoolexecutor-in-python3/
- https://docs.python.org/3/library/ssl.html
- https://www.google.com/search?client=safari&rls=en&q=how+to+add+elements+from+one+list+to+another+in+python&ie=UTF-8&oe=UTF-8
- https://stackoverflow.com/questions/11384211/sending-variables-using-sockets
- https://w3.cs.jmu.edu/kirkpams/OpenCSF/Books/csf/html/TCPSockets.html#:~:text=Both%20HTTP%20requests%20and%20responses,adhere%20to%20a%20given%20structure.
- https://stackoverflow.com/questions/26851034/opening-a-ssl-socket-connection-in-python
- https://now-its-abhi.medium.com/tcp-client-server-network-using-socket-programming-python-9210cba749fe
- https://www.daniweb.com/programming/software-development/threads/310285/sending-html-file-over-tcp
- https://www.geeksforgeeks.org/file-transfer-using-tcp-socket-in-python/
- https://stackoverflow.com/questions/3674435/how-to-read-and-send-a-html-file-over-a-tcp-socket
- https://www.w3schools.com/python/ref_string_split.asp#:~:text=Definition%20and%20Usage,number%20of%20elements%20plus%20one.https://coderanch.com/t/589310/java/Transferring-image-socket
- https://www.w3schools.com/tags/tag_img.asp