

# CS558 - System Lab

## Assignment 2 - Socket Programming

Group No:- 14

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- We have implemented 3 programs **Client.cpp**, **ProxyServer.cpp** and **DNSServer.cpp**.
  - Open 3 terminals where one terminal will behave like a live **client**, second one will behave like **Proxy Server** and third one will behave like a **DNS Server**.
  - Compile 3 programs with the command (**g++ Client.cpp -o client, g++ ProxyServer.cpp** and **g++ DNSServer.cpp -o dns**).
  - 3 Executable files will be generated as **client**, **proxy** and **dns**. We have to run all the 3 files with proper argument.
  - We have considered all 3 programs run on a local host (127.0.0.1).
  - While running Client.cpp we have to provide the IP address and Port number, for running the DNSServer.cpp we have to provide the DNS Server's port number and while running ProxyServer.cpp we have to provide the port number for the proxy server.

One example like:-

- **\$ . /dns 4207**
- **\$ . /proxy 4209**
- **\$ . /client 127.0.0.1 4209**

## 1. Type 1 Request :-

- Client will send the Domain Name and want an IP address:

```
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ g++ DNSServer.cpp -o dns
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./dns 4207
Socket creation successful.
```

```
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ g++ ProxyServer.cpp -o proxy
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./proxy 4209
Socket creation successful.
Request from Client: 1 www.apple.com
```

```
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./client 127.0.0.1 4209
Socket creation successful.
Connection established with the server.
Type your request in standard format:-
Type 1 request format: 1 www.abcd.com
Type 2 request format: 2 1.1.1.1
1 www.apple.com
Response from Server :- Cache hit. Proxy server response: 10.10.10.10
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$
```

- Here DNS Server will use Port No 4207 and Proxy Server will use Port No 4209. Client Program will use the IP address 127.0.0.1 and Port No 4209 and send the request to the Proxy server for the IP address for a Domain Name.
- Proxy server finds it in his cache and returns the IP address.

## 2. Type 2 Request :-

- Client will send the IP address and want Domain Name:

```
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ g++ DNSServer.cpp -o dns
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./dns 4207
Socket creation successful.
```

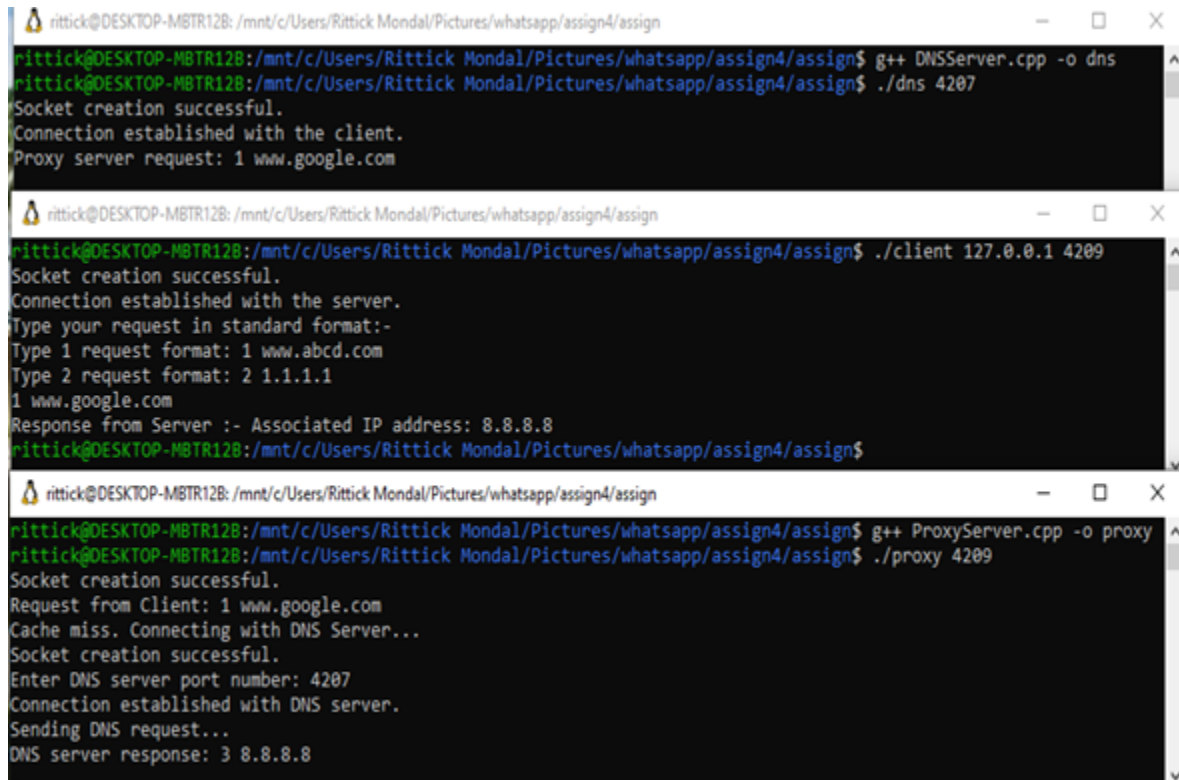
```
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./client 127.0.0.1 4209
Socket creation successful.
Connection established with the server.
Type your request in standard format:-
Type 1 request format: 1 www.abcd.com
Type 2 request format: 2 1.1.1.1
2 1.1.1.1
Response from Server :- Cache hit. Proxy server response: abcd.com
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$
```

```
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ g++ ProxyServer.cpp -o proxy
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./proxy 4209
Socket creation successful.
Request from Client: 2 1.1.1.1
```

- Here DNS Server will use Port No 4207 and Proxy Server will use Port No 4209. Client Program will use the IP address 127.0.0.1 and Port No 4209 and send the request with an IP address and want corresponding domain name.
- Proxy server will return the Domain Name.

### 3. Type 3 Request :-

- Client will send the Domain Name/IP Address and that will not be present in Proxy server's cache. Proxy server sends request to DNS Server's database and gets response from it. After that it's cache using FIFO. Now the Proxy server returns the Ip address to the client.



```
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ g++ DNSServer.cpp -o dns
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./dns 4207
Socket creation successful.
Connection established with the client.
Proxy server request: 1 www.google.com

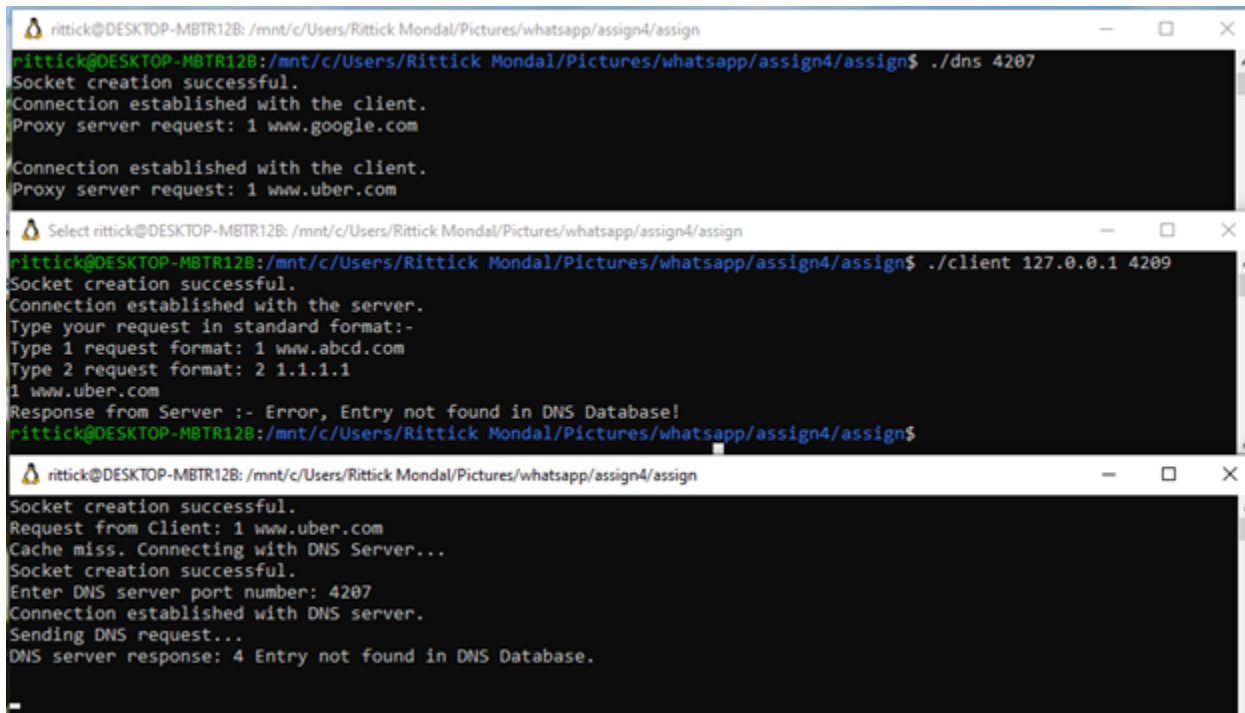
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./client 127.0.0.1 4209
Socket creation successful.
Connection established with the server.
Type your request in standard format:-
Type 1 request format: 1 www.abcd.com
Type 2 request format: 2 1.1.1.1
1 www.google.com
Response from Server :- Associated IP address: 8.8.8.8
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$

rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ g++ ProxyServer.cpp -o proxy
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./proxy 4209
Socket creation successful.
Request from Client: 1 www.google.com
Cache miss. Connecting with DNS Server...
Socket creation successful.
Enter DNS server port number: 4207
Connection established with DNS server.
Sending DNS request...
DNS server response: 3 8.8.8.8
```

- Here DNS Server will use Port No 4207 and Proxy Server will use Port No 4209. Client Program will use the IP address 127.0.0.1 and Port No 4209 and send the request to the Proxy server for the IP address for a Domain Name.
- IP not present in Proxy Server's cache, so proxy server will request to the DNS Server for the IP address. From DNS server IP will be received to the Proxy server. It updates its cache and returns to the client.

#### 4. Type 4 Request:-

- Client will send the Domain Name/IP Address and that will not present in Proxy server's cache. Proxy server sends the request to the DNS server, but the IP address will not be present in the DNS server's Database also. So it will show an Error Message.



```
rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./dns 4207
Socket creation successful.
Connection established with the client.
Proxy server request: 1 www.google.com
Connection established with the client.
Proxy server request: 1 www.uber.com

Select rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$ ./client 127.0.0.1 4209
Socket creation successful.
Connection established with the server.
Type your request in standard format:-
Type 1 request format: 1 www.abcd.com
Type 2 request format: 2 1.1.1.1
1 www.uber.com
Response from Server :- Error, Entry not found in DNS Database!
rittick@DESKTOP-MBTR12B:/mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign$

rittick@DESKTOP-MBTR12B: /mnt/c/Users/Rittick Mondal/Pictures/whatsapp/assign4/assign
Socket creation successful.
Request from Client: 1 www.uber.com
Cache miss. Connecting with DNS Server...
Socket creation successful.
Enter DNS server port number: 4207
Connection established with DNS server.
Sending DNS request...
DNS server response: 4 Entry not found in DNS Database.
```

- Here DNS Server will use Port No 4207 and Proxy Server will use Port No 4209. Client Program will use the IP address 127.0.0.1 and Port No 4209 and send the request to the Proxy server for the IP address for the Domain Name.
- IP not present in Proxy Server's cache, so proxy server will request to the DNS Server for the IP address. But, the IP address is not present in the Database of DNS Server, so it will return an Error message to the client.