

# HTTP PROXY SERVER USING SOCKET PROGRAMMING

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***Abstract-The proxy server is an internet-connected computer that takes incoming client requests and sends them to the destination server. It acts as a connection point between the end user and the internet. It has its own Internet Protocol (IP) address. It isolates the client and web server from the rest of the network. A proxy server operates on behalf of the user, since the word proxy implies "to act on behalf of another." In this project, we used socket programming to construct an HTTP and HTTPS proxy server, as well as cache and log file capabilities.***

***Keywords:server,client,proxy server ,socket programming.***

## I.INTRODUCTION

### A.PROXY SERVER

A proxy server is a system or router that acts as a connector for users and the internet. As a result, it aids in the prevention against computer hackers on a private network. It's a server that acts as a "intermediary" between end-users and the web pages they browse on the internet.

An IP address is used when a system connects to the internet. This is comparable to your home's street address in that it directs incoming data where it should go and provides a return address for other devices to authenticate. A proxy server is a machine access to the network that has its own IP address.

It can be used to accomplish several key tasks such as:

- 1)Improve security
- 2)Secure employees' internet activity from people trying to snoop on them.
- 3)Balance internet traffic to prevent crashes

4)Control the websites employees and staff access in the office.

5)Save bandwidth by caching files or compressing incoming traffic

Also there are some disadvantages such as :-

- 1)there will be browsing history logs
- 2) there will no data encryption

A proxy server functions in go for a desktop computer since that has its own IP address. When you submit an internet request, it is routed to the proxy, which then receives the answer from the web server and sends the data from the page to your computer's browser, such as Chrome, Safari, Firefox, or Microsoft Edge. There are two types of versions: hardware and software. Among your network and the internet, hardware connections receive, send, the forward and data from the internet. Typically, software proxies are hosted by a network operator or reside in the cloud. On your computer, you download and install an application that allows you to interact with the proxy. A software proxy is easily obtainable for a monthly subscription. They are occasionally available for free. Free proxies often have fewer addresses and may only cover a few devices, whereas commercial proxies can suit the needs of a company with numerous devices. You must first configure a proxy server on your computer, device, or network before you can use it. Check the steps necessary for your computer or network. Each operating system has its own setup processes.

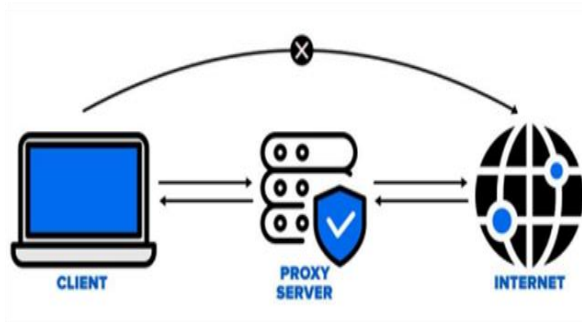


Fig 1: proxy server methodology

However, in the vast majority of situations, setup entails the use of an automated configuration script. There will be alternatives to manually input the IP address and the relevant port if you wish to do it that way. It functions as both a firewall and a filter. A proxy meant to safeguard data and privacy might be chosen by an end-user or a network administrator. This programme checks the data that enters and exits your computer or network. It then follows a set of rules to keep you from having to reveal your digital address to the rest of the world. Hackers and other undesirable actors can only view the proxy's IP address. People online do not have direct access to personal data, schedules, apps, or files unless they know your personal IP address. With it in place, online requests are routed through the proxy, which then connects to the internet and retrieves the information you want. If the server has encryption capabilities, passwords and other personal data get an extra tier of protection.

## B.SOCKET PROGRAMMING

Socket programming is a method of allowing two network nodes to interact with one another. One socket (node) waits on a certain port at an IP address, while the other socket establishes a connection with it. While the client connects to the server, the server creates the listener socket. A socket is one of the two ends of a two-way communication channel between two networked programmes.

The socket mechanism establishes named contact points between which communication takes place, allowing for inter-process communication (IPC). Pipes are constructed

using the 'Pipe' system call, and sockets are generated with the socket' system call. Over the network, the socket offers bidirectional FIFO communication. At either end of the connection, a socket connecting to the network is formed. Each socket has its own unique address. An IP address plus a port number make up this address. In most client-server applications, sockets are used. The server builds a socket, assigns it to a network port address, and then waits for the client to initiate communication with it. After creating a socket, the client tries to connect to the server socket. When the connection is established, transfer of data takes place.

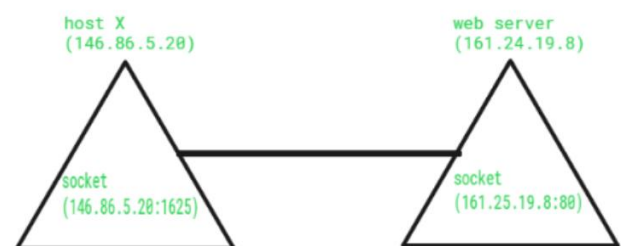


Fig 2: data exchange between server and client using socket .

### Types of Sockets :

There are two types of Sockets: the datagram socket and the stream socket.

#### Datagram Socket :

This is a network in which packets are sent and received without the use of a link. It resembles a mailbox. Letters (data) are gathered and delivered (transmitted) to a mailbox (receiving socket).

#### Stream Socket:

A stream socket is a type of interprocess communications socket or network socket in a computer operating system that provides a connection-oriented, sequenced, and unique flow of data without record boundaries, as well as well-defined mechanisms for creating and destroying connections and detecting errors. It is comparable to a telephone. The phones (two ends) establish a connection, and a dialogue (data transmission) takes place.

Stream Socket has been used in our project.

## C.SOCKET PROGRAMMING ARCHITECTURE

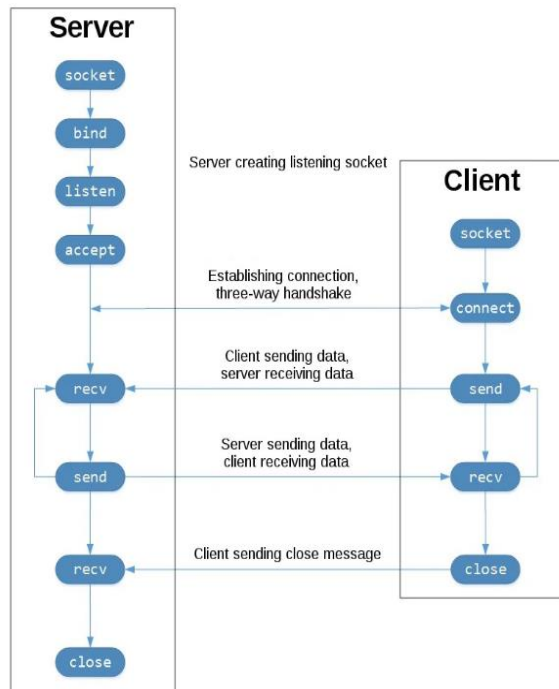


Fig 3 :-Tcp Socket Flow

The left-hand column represents the server. On the right-hand side is the client. Starting in the top left-hand column, note the API calls that the server makes to set up a “listening” socket: `socket()` .`bind()` .`listen()` .`accept()` A listening socket does just what its name suggests. It keeps an ear out for client connections. The server makes a call when a client joins. `accept()` is used to accept or close a connection. The customer dials the number. `connect()` is used to connect to the server and begin the three-way handshake. The three-way handshake, often known as the TCP 3-way handshake, is a protocol for establishing a connection between a server and a client in a TCP/IP network. Before the true data transmission process begins, both the client and the server must exchange synchronisation and acknowledgement packets. The handshake stage is vital because it verifies that both sides of the connection are reachable on the network, i.e., that the client and server can communicate with each other. Only one host, client, or server may be able to communicate with the other. The round-trip part occurs in the middle, when data is sent and received between the client and server via calls to `send()` and `recv()` (). The

client and server shut their respective sockets at the bottom.

## II.LITERATURE REVIEW

Web proxy server users claim that the proxy server's caching technology has significantly lowered network expenses. Many businesses purchased proxy servers to reduce access times. However, caching had an unanticipated benefit: it lowered traffic on Internet connections. Proxy servers, according to industry observers, typically lowered traffic sufficiently to negate the need for additional bandwidth servers. Proxy servers were in high demand among corporations, organisations, government, and academic institutions. Proxy-server software is available from Microsoft, Netscape, and Novell as part of their Internet server packages. Given the stated gains in performance from consumers, the need is understandable. End-user speed improvements from proxy servers are generally about 20% to 25%, resulting in a one-quarter reduction in access time. In addition, organisations reported a high volume of proxy server cache access, up to 40%, and particularly active caches with thousands of Web items.

There hasn't been much discussion about proxy servers' limits or drawbacks. Proxy servers, in general, are unable to offer independent firewalls with comprehensive event statistics, reports, alarms, and audit monitoring. A high-end proxy server, on the other hand, costs around \$1,000. Firewalls range in price from \$5,000 to \$50,000. Proxy servers, according to industry experts, cannot replace a second, high-speed Web access connection if the first is overwhelmed. Apart from these disadvantages, proxy servers have been claimed to have relatively few disadvantages.

With all of the good feedback, it's no surprise that proxy servers are still a hot topic of study. The majority of the study focuses on ways to improve the performance of proxy servers rather than the filtering capabilities of proxy

### III.IMPLEMENTATION

Step 1 -

The proxy acts as the man-in-middle between client which is our browser and the web server to which the request (HTTP or HTTPS) is sent. To use the proxy, we will have to set it in the browser proxy setting with IP 127.0.1.1 at port 8080.

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Step 2 -

To do that, open terminal and type: `sudo lssof -t -i tcp:8080 | xargs kill -9`

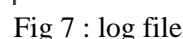
### Step -3

```
bhuvanachandra@bhuvanachandra-ubuntu: ~/proxy
File Edit View Search Terminal Help
[2022-06-08 23:10:34] [+] Finding : b'www.youtube.com:443'
[2022-06-08 23:10:34] [+] Finding : b'www.youtube.com:443'
Requested File b'www.youtube.com:443'
[2022-06-08 23:10:34] [+] Connect HTTPS request
[2022-06-08 23:10:34] [+] Finding : b'www.youtube.com:443'
Requested File b'www.youtube.com:443'
[2022-06-08 23:10:35] [+] Connect HTTPS request
[2022-06-08 23:10:35] [+] HTTPS Connection Established
[2022-06-08 23:10:35] [+] Finding : b'www.youtube.com:443'
[2022-06-08 23:10:35] [+] HTTPS Connection Established
[2022-06-08 23:10:35] [+] HTTPS Connection Established
[2022-06-08 23:10:35] [+] HTTPS Connection Established
[2022-06-08 23:10:35] [+] Started accepting connections
[2022-06-08 23:10:35] [+] Started accepting connections
[2022-06-08 23:10:35] [+] Started accepting connections
Requested File b'http://ocsp.pki.goog/gts1c3'
[2022-06-08 23:10:35] [+] Connect HTTP request
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[2022-06-08 23:10:35] [+] Connect HTTP request
[2022-06-08 23:10:35] [+] Started accepting connections
Requested File b'http://ocsp.pki.goog/gts1c3'
[2022-06-08 23:10:36] [+] Connect HTTP request
[2022-06-08 23:10:36] Searching for: b'_ocsp_pki_googgts1c3'
```

Fig 5: Output of Proxy Server Program



## Log file:



#### IV.CONCLUSION

This work shown that the created HTTP proxy server is a helpful tool. It may be used to speed up resource access, provide access control, and log traffic. It can also be used to increase user anonymity. The Squid proxy cache is one of the most widely used HTTP proxy servers nowadays. Further debate centred on the technologies required to construct a modern HTTP proxy employing socket programming technology. The focus of future development on this project will be on adding new features such as content filtering and access control, as well as implementing conditional GET capabilities.

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