

# CS359 Computer Networks Lab 8

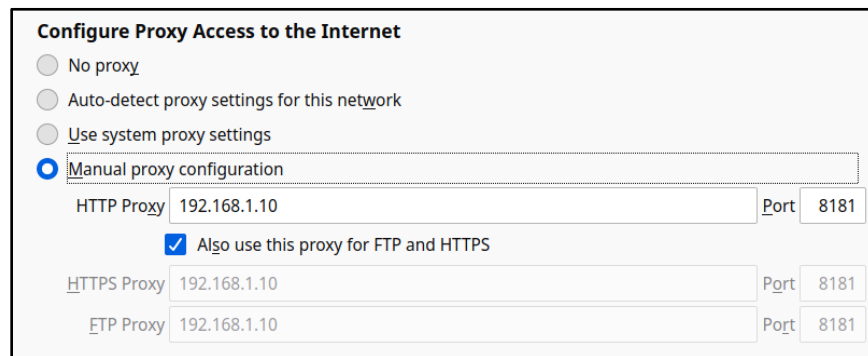
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## Implement a Simple Application Proxy Server

**Introduction:** I have implemented a TCP proxy server using `select()` and `fcntl()` system calls. Incoming connection requests from the browser are redirected to the proxy server through a local server over TCP. The `select()` system call services multiple requests over different sockets and the `fcntl()` system call is used for non-blocking I/O.

Since the institute proxy IP and port mentioned in the assignment didn't work for me, I used a proxy IP and port from this website: [www.freeproxylists.net](http://www.freeproxylists.net)

**Browser Configuration:** I used Mozilla Firefox on Ubuntu 18.04



**Compilation:** `gcc proxy.c -o proxy`

**Execution:** `./proxy`

**Sample Session:** `listen_port=8181,` `proxy_IP=165.225.77.47 (located in France),` `proxy_port=443`

```
[maheeth@maheeth-PC:~/D/W/C/lab8]--[11:16:43 IST]
>$ ./proxy 8181 165.225.77.47 443
Proxy running on port 8181.
All connections Forwarded to 165.225.77.47:443
Connection accepted from 0.0.0.0:0
Connection accepted from 192.168.1.10:39966
Connection accepted from 192.168.1.10:39970
Connection accepted from 192.168.1.10:39974
Connection accepted from 192.168.1.10:39978
Connection accepted from 192.168.1.10:39982
Connection accepted from 192.168.1.10:39986
Connection accepted from 192.168.1.10:39992
Connection accepted from 192.168.1.10:39996
Connection accepted from 192.168.1.10:40000
Connection accepted from 192.168.1.10:40004
Connection accepted from 192.168.1.10:40008
Connection accepted from 192.168.1.10:40012
Connection accepted from 192.168.1.10:40016
Connection accepted from 192.168.1.10:40020
Connection accepted from 192.168.1.10:40024
Connection accepted from 192.168.1.10:40028
Connection accepted from 192.168.1.10:40032
```

```
Connection accepted from 192.168.1.10:40036
Connection accepted from 192.168.1.10:40040
Connection accepted from 192.168.1.10:40044
Connection accepted from 192.168.1.10:40048
Connection accepted from 192.168.1.10:40052
Connection accepted from 192.168.1.10:40056
Connection accepted from 192.168.1.10:40060
Connection accepted from 192.168.1.10:40064
Connection accepted from 192.168.1.10:40068
Connection accepted from 192.168.1.10:40072
Connection accepted from 192.168.1.10:40076
Connection accepted from 192.168.1.10:40080
Connection accepted from 192.168.1.10:40084
Connection accepted from 192.168.1.10:40088
Connection accepted from 192.168.1.10:40092
Connection accepted from 192.168.1.10:40096
Connection accepted from 192.168.1.10:40100
Connection accepted from 192.168.1.10:40104
exit
----- Exiting now -----
```

**Corresponding Website:** Notice that the website is in French, language of France. Also, the proxy IP I used is located in France.

Google search results for "france". The page shows the Google logo, search bar, and navigation links. The search results include a map of France, a list of links to French websites, and a section for "France" with details about its geography, population, and government.

france

À la une

Le Parisien

Belles mais dangereuses : attention, les chenilles processionnaires enva...

franceinfo

L'édition 2021 des Eurockéennes de Belfort, prévue du 1er au 4 juillet, est annulée

Le Télégramme

Covid-19 : le Finistère reconfiné, un mal pour un bien ?

France

Pays en Europe

La France, pays de l'Europe occidentale, compte des villes médiévales, des villages alpins et des plages. Paris, sa capitale, est célèbre pour ses maisons de mode, ses musées d'art classique, dont celui du Louvre, et ses monuments comme la Tour Eiffel. Le pays est également réputé pour ses vins et sa cuisine raffinée. Les peintures rupestres des grottes de Lascaux, le théâtre romain de Lyon et l'immense château de Versailles témoignent de sa riche histoire. — Google

Président : Emmanuel Macron Tendances

Capitale : Paris

Population : 67,06 millions (2019) Banque mondiale

Fête nationale : 14 Juillet

Clubs et équipes : Équipe de France de football, PLUS

Sport national

Forme

Dernier roi

Spécialité

**Wireshark Packet Capture:** Total Packets captured = 449

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	192.168.1.10	165.225.77.47	TCP	74	41800 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 TSval=1729367818 TSecr=0 WS=128
2	0.174704899	165.225.77.47	192.168.1.10	TCP	74	443 → 41800 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1412 WS=32 SACK_PERM=1 TSval=1054347018 TSecr=1729367818
3	0.174786171	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=1 Ack=1 Win=64256 Len=0 TSval=1729367992 TSecr=1054347018
4	0.174863016	192.168.1.10	165.225.77.47	HTTP	275	CONNECT www.google.com:443 HTTP/1.1
5	0.366023325	165.225.77.47	192.168.1.10	HTTP	131	HTTP/1.1 200 Connection Established
6	0.356049348	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=210 Ack=66 Win=64256 Len=0 TSval=1729368174 TSecr=1054347037
7	0.357863941	192.168.1.10	165.225.77.47	TCP	704	41800 → 443 [PSH, ACK] Seq=210 Ack=66 Win=64256 Len=638 TSval=1729368176 TSecr=1054347037
8	0.624847996	165.225.77.47	192.168.1.10	TCP	66	443 → 41800 [ACK] Seq=66 Ack=848 Win=65792 Len=0 TSval=1054347067 TSecr=1729368176
9	0.624841688	165.225.77.47	192.168.1.10	TCP	278	443 → 41800 [PSH, ACK] Seq=66 Ack=848 Win=65792 Len=212 TSval=1054347067 TSecr=1729368176
10	0.624852576	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=848 Ack=278 Win=64128 Len=0 TSval=1729368443 TSecr=1054347067
11	0.625387321	192.168.1.10	165.225.77.47	TCP	130	41800 → 443 [PSH, ACK] Seq=848 Ack=278 Win=64128 Len=64 TSval=1729368443 TSecr=1054347067
12	0.626647534	192.168.1.10	165.225.77.47	TCP	1466	41800 → 443 [ACK] Seq=912 Ack=278 Win=64128 Len=1466 TSval=1729368444 TSecr=1054347067
13	0.810966021	165.225.77.47	192.168.1.10	TCP	66	443 → 41800 [ACK] Seq=278 Ack=2312 Win=64320 Len=0 TSval=1054347088 TSecr=1729368443
14	0.810911391	192.168.1.10	165.225.77.47	TCP	138	41800 → 443 [PSH, ACK] Seq=2312 Ack=278 Win=64128 Len=72 TSval=1729368629 TSecr=1054347088
15	0.840524264	165.225.77.47	192.168.1.10	TCP	677	443 → 41800 [PSH, ACK] Seq=278 Ack=2312 Win=65792 Len=611 TSval=1054347091 TSecr=1729368443
16	0.840555818	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=2384 Ack=889 Win=64128 Len=0 TSval=1729368658 TSecr=1054347091
17	1.080768530	165.225.77.47	192.168.1.10	TCP	66	443 → 41800 [ACK] Seq=889 Ack=2384 Win=65792 Len=0 TSval=1054347118 TSecr=1729368629
18	1.080791534	192.168.1.10	165.225.77.47	TCP	97	41800 → 443 [PSH, ACK] Seq=2384 Ack=889 Win=64128 Len=31 TSval=1729368898 TSecr=1054347118
19	1.090704062	165.225.77.47	192.168.1.10	TCP	1466	443 → 41800 [ACK] Seq=889 Ack=2384 Win=65792 Len=1466 TSval=1054347119 TSecr=1729368629
20	1.090724412	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=2415 Ack=2289 Win=64128 Len=0 TSval=1729368908 TSecr=1054347119
21	1.090734885	165.225.77.47	192.168.1.10	TCP	1466	443 → 41800 [ACK] Seq=2289 Ack=2384 Win=65792 Len=1466 TSval=1054347119 TSecr=1729368629
22	1.090736831	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=2415 Ack=3689 Win=63488 Len=0 TSval=1729368908 TSecr=1054347119
23	1.092162891	165.225.77.47	192.168.1.10	TCP	1466	443 → 41800 [ACK] Seq=3689 Ack=2384 Win=65792 Len=1466 TSval=1054347119 TSecr=1729368629
24	1.092169990	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=2415 Ack=5089 Win=64128 Len=0 TSval=1729368910 TSecr=1054347119
25	1.092174651	165.225.77.47	192.168.1.10	TCP	1466	443 → 41800 [ACK] Seq=5089 Ack=2384 Win=65792 Len=1466 TSval=1054347119 TSecr=1729368629
26	1.092176194	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=2415 Ack=6489 Win=63488 Len=0 TSval=1729368910 TSecr=1054347119
27	1.092178232	165.225.77.47	192.168.1.10	TCP	1466	443 → 41800 [ACK] Seq=6489 Ack=2384 Win=65792 Len=1466 TSval=1054347119 TSecr=1729368629
28	1.092179665	192.168.1.10	165.225.77.47	TCP	66	41800 → 443 [ACK] Seq=2415 Ack=7889 Win=62592 Len=0 TSval=1729368910 TSecr=1054347119
29	1.272853390	165.225.77.47	192.168.1.10	TCP	1466	443 → 41800 [ACK] Seq=7889 Ack=2415 Win=65792 Len=1466 TSval=1054347140 TSecr=1729368898
30	1.272910562	192.168.1.10	165.225.77.47	TCP	1315	41800 → 443 [PSH, ACK] Seq=2415 Ack=9289 Win=64128 Len=1249 TSval=1729369091 TSecr=1054347140
31	1.275055348	165.225.77.47	192.168.1.10	TCP	1466	443 → 41800 [ACK] Seq=9289 Ack=2415 Win=65792 Len=1466 TSval=1054347140 TSecr=1729368898
32	1.276089999	165.225.77.47	192.168.1.10	TCP	1466	443 → 41800 [ACK] Seq=10689 Ack=2415 Win=65792 Len=1466 TSval=1054347140 TSecr=1729368898

Frame 11: 130 bytes on wire (1040 bits), 130 bytes captured (1040 bits) on interface wlx00ad24495b8d, id 0

Ethernet II, Src: D-LinkIn\_49:5b:8d (08:ad:24:49:5b:8d), Dst: HuaweiTe\_03:a5:16 (f4:a4:d6:03:a5:16)

Internet Protocol Version 4, Src: 192.168.1.10, Dst: 165.225.77.47

Transmission Control Protocol, Src Port: 41800, Dst Port: 443, Seq: 848, Ack: 278, Len: 64

Hypertext Transfer Protocol

Data (64 bytes)

Data: 140303000101170303003598a4245e06e7572396203d3e792a239b2d7a8528093d395454

[Length: 64]

0030 01 f5 2b 86 00 00 01 01 08 0a 67 14 11 7b 3e d8 ...>

0040 0f 2b 14 03 03 00 01 01 17 03 03 00 35 03 a5 28 ...5>

0050 5c 65 67 57 23 06 20 3d 3e 79 2a 23 9b 2d 7a 85 ...f.W. > y\*W-z

0060 28 09 3d 39 54 54 7c 83 7f 2b b7 3b 47 ce 6e 78 ...=9TT| .+;G.nX

0070 9c fa 48 50 25 ce 97 85 f7 3b 52 d4 55 bf a6 e5 ...HPK...;R.U..

0080 a8 c6