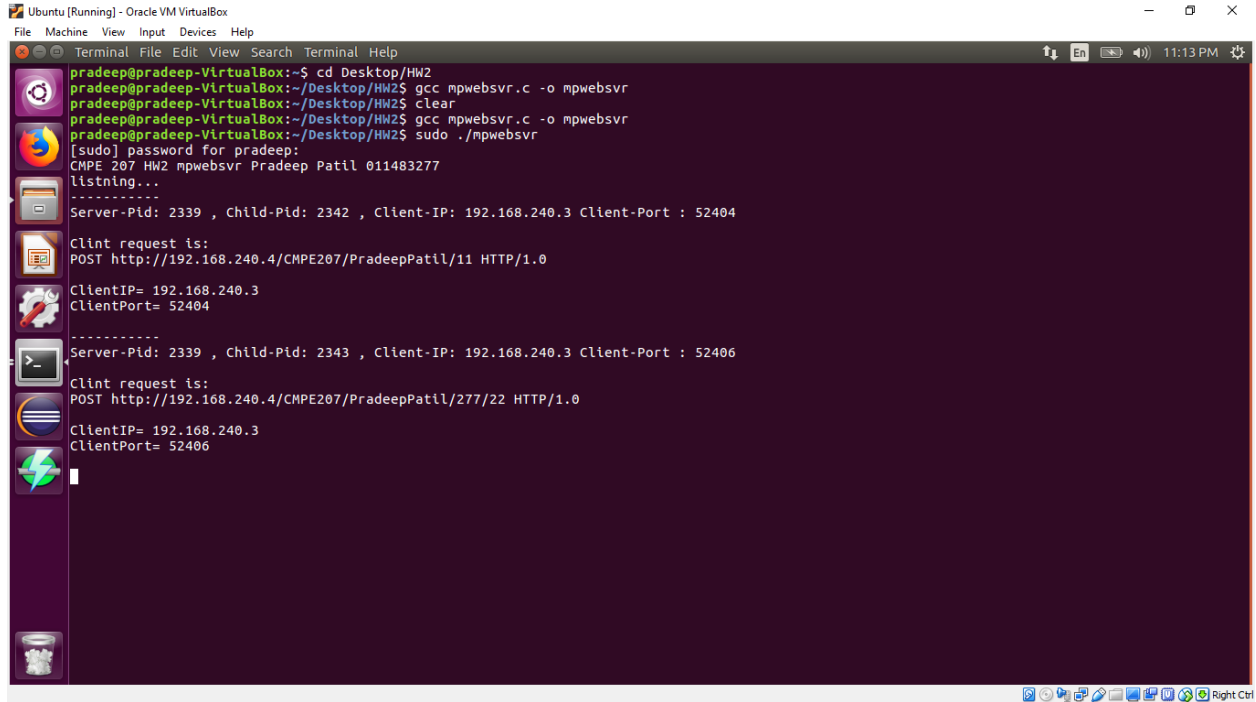


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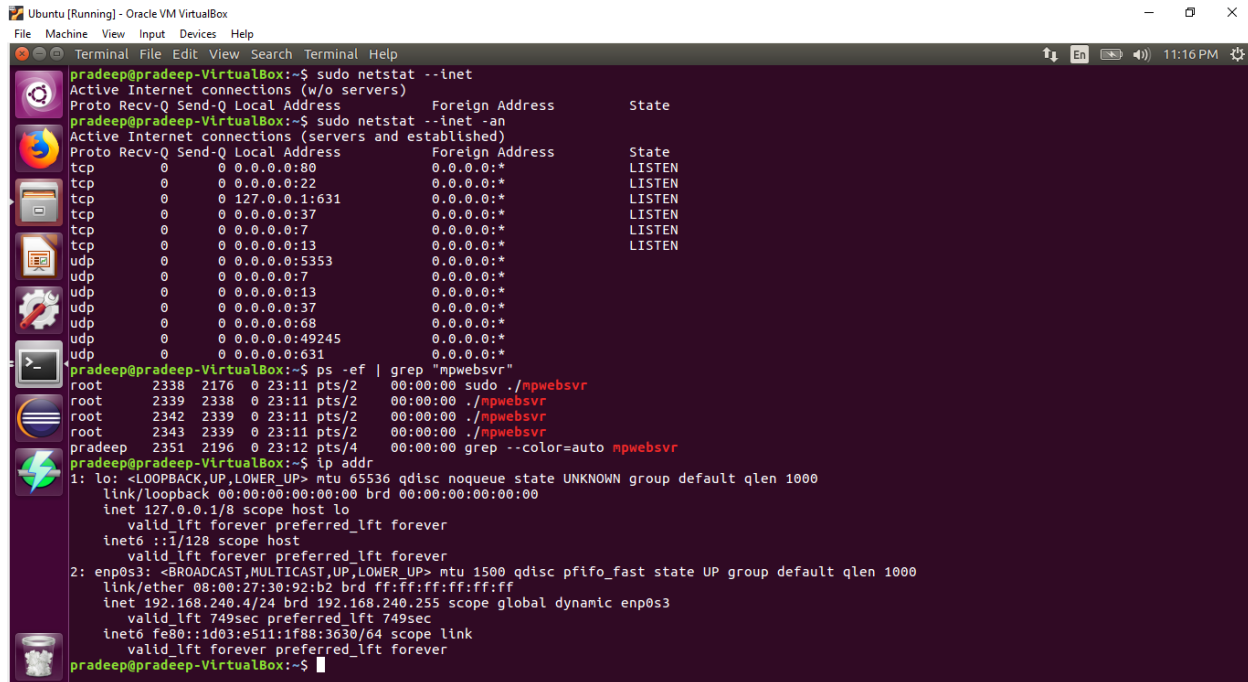
- 1) The stdout of the shell executing “sudo ./mpwebsvr” on VM1 after step b – which should show the web server on VM1 served those two URLs/clients.



```
pradeep@pradeep-VirtualBox:~$ cd Desktop/HW2
pradeep@pradeep-VirtualBox:~/Desktop/HW2$ gcc mpwebsvr.c -o mpwebsvr
pradeep@pradeep-VirtualBox:~/Desktop/HW2$ clear
pradeep@pradeep-VirtualBox:~/Desktop/HW2$ gcc mpwebsvr.c -o mpwebsvr
pradeep@pradeep-VirtualBox:~/Desktop/HW2$ sudo ./mpwebsvr
[sudo] password for pradeep:
CMPE 207 HW2 mpwebsvr Pradeep Patil 011483277
listening...
-----
Server-Pid: 2339 , Child-Pid: 2342 , Client-IP: 192.168.240.3 Client-Port : 52404
Client request is:
POST http://192.168.240.4/CMPE207/PradeepPatil/11 HTTP/1.0
ClientIP= 192.168.240.3
ClientPort= 52404
-----
Server-Pid: 2339 , Child-Pid: 2343 , Client-IP: 192.168.240.3 Client-Port : 52406
Client request is:
POST http://192.168.240.4/CMPE207/PradeepPatil/277/22 HTTP/1.0
ClientIP= 192.168.240.3
ClientPort= 52406
```

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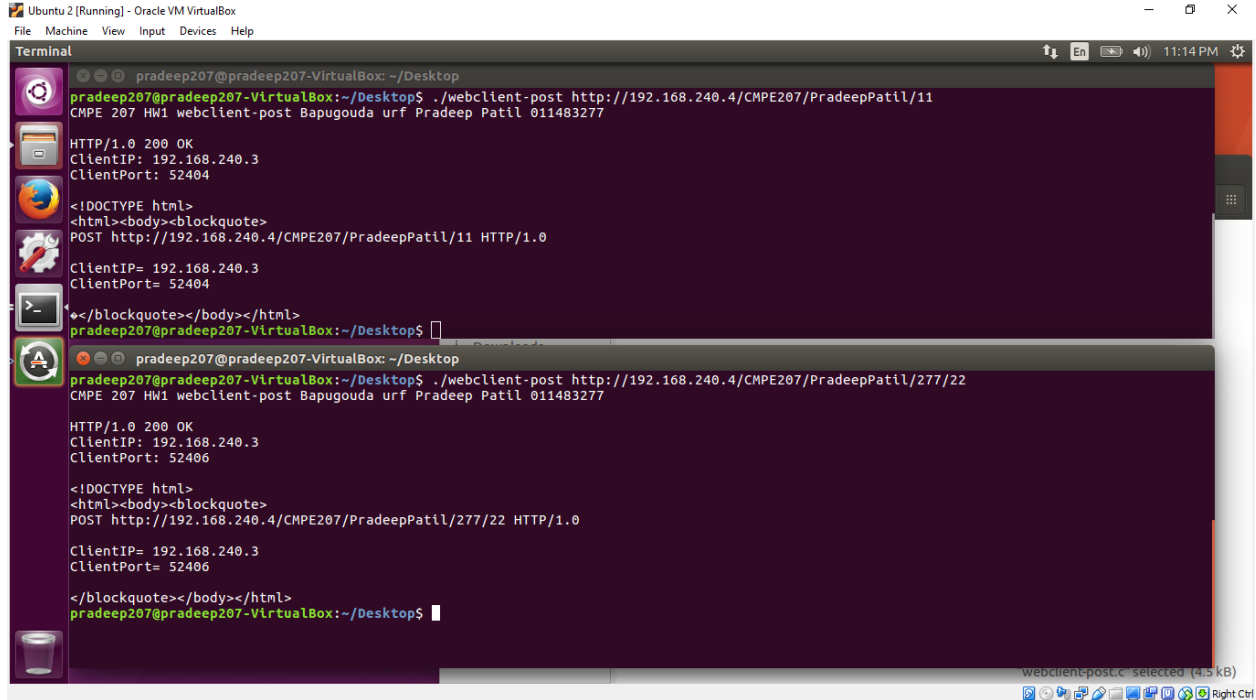
2) The stdout of the shell executing netstat/ps/ip on VM1 after step c – which should show http connections, multiple instances of mpwebsvr, and ip address of VM1.



```
pradeep@pradeep-VirtualBox:~$ sudo netstat --inet
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
pradeep@pradeep-VirtualBox:~$ sudo netstat --inet -an
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:80             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:22             0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.1:631          0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:37             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:7              0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:13            0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:5353          0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:7              0.0.0.0:*
udp        0      0 0.0.0.0:13            0.0.0.0:*
udp        0      0 0.0.0.0:37            0.0.0.0:*
udp        0      0 0.0.0.0:68            0.0.0.0:*
udp        0      0 0.0.0.0:49245         0.0.0.0:*
udp        0      0 0.0.0.0:631          0.0.0.0:*
pradeep@pradeep-VirtualBox:~$ ps -ef | grep "mpwebsvr"
root      2338    2176    0 23:11 pts/2    00:00:00 sudo ./mpwebsvr
root      2339    2338    0 23:11 pts/2    00:00:00 ./mpwebsvr
root      2342    2339    0 23:11 pts/2    00:00:00 ./mpwebsvr
root      2343    2339    0 23:11 pts/2    00:00:00 ./mpwebsvr
pradeep   2351    2196    0 23:12 pts/4    00:00:00 grep --color=auto mpwebsvr
pradeep@pradeep-VirtualBox:~$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:30:92:b2 brd ff:ff:ff:ff:ff:ff
    inet 192.168.240.4/24 brd 192.168.240.255 scope global dynamic enp0s3
        valid_lft 749sec preferred_lft 749sec
    inet6 fe80::1d03:e511:1f08:3630/64 scope link
        valid_lft forever preferred_lft forever
pradeep@pradeep-VirtualBox:~$
```

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2) The stdout of both shells on VM2 after step b



```
pradeep207@pradeep207-VirtualBox: ~/Desktop
pradeep207@pradeep207-VirtualBox:~/Desktop$ ./webclient-post http://192.168.240.4/CMPE207/PradeepPatil/11
CMPE 207 HW1 webclient-post Bapugouda urf Pradeep Patil 011483277

HTTP/1.0 200 OK
ClientIP: 192.168.240.3
ClientPort: 52404

<!DOCTYPE html>
<html><body><blockquote>
POST http://192.168.240.4/CMPE207/PradeepPatil/11 HTTP/1.0

ClientIP= 192.168.240.3
ClientPort= 52404

</blockquote></body></html>
pradeep207@pradeep207-VirtualBox:~/Desktop$

pradeep207@pradeep207-VirtualBox: ~/Desktop
pradeep207@pradeep207-VirtualBox:~/Desktop$ ./webclient-post http://192.168.240.4/CMPE207/PradeepPatil/277/22
CMPE 207 HW1 webclient-post Bapugouda urf Pradeep Patil 011483277

HTTP/1.0 200 OK
ClientIP: 192.168.240.3
ClientPort: 52406

<!DOCTYPE html>
<html><body><blockquote>
POST http://192.168.240.4/CMPE207/PradeepPatil/277/22 HTTP/1.0

ClientIP= 192.168.240.3
ClientPort= 52406

</blockquote></body></html>
pradeep207@pradeep207-VirtualBox:~/Desktop$
```

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4. (10 pts) Include server-side code snippet, and describe how the server retrieves the client request via TCP which is a streaming protocol.

Answer:

//code Snippet

// Read the client request.

```
printf("Client request is: \n");
while (1){
    int rd;
    rd = read(SocketID,Buffer,sizeof(Buffer)-1);
    if (rd==0)break;
    strcat(ReadData,Buffer);
    Buffer[rd]='\0';
    printf("%s",Buffer);
    //bzero(Buffer,sizeof(Buffer));
}
```

Description: Since TCP is streaming service we read the socket in loop until end of file. The read function returns zero when the client sends Shutdown(); indicating the end of transmission and the while loop breaks. This how how the server retrieves the client request via TCP.