

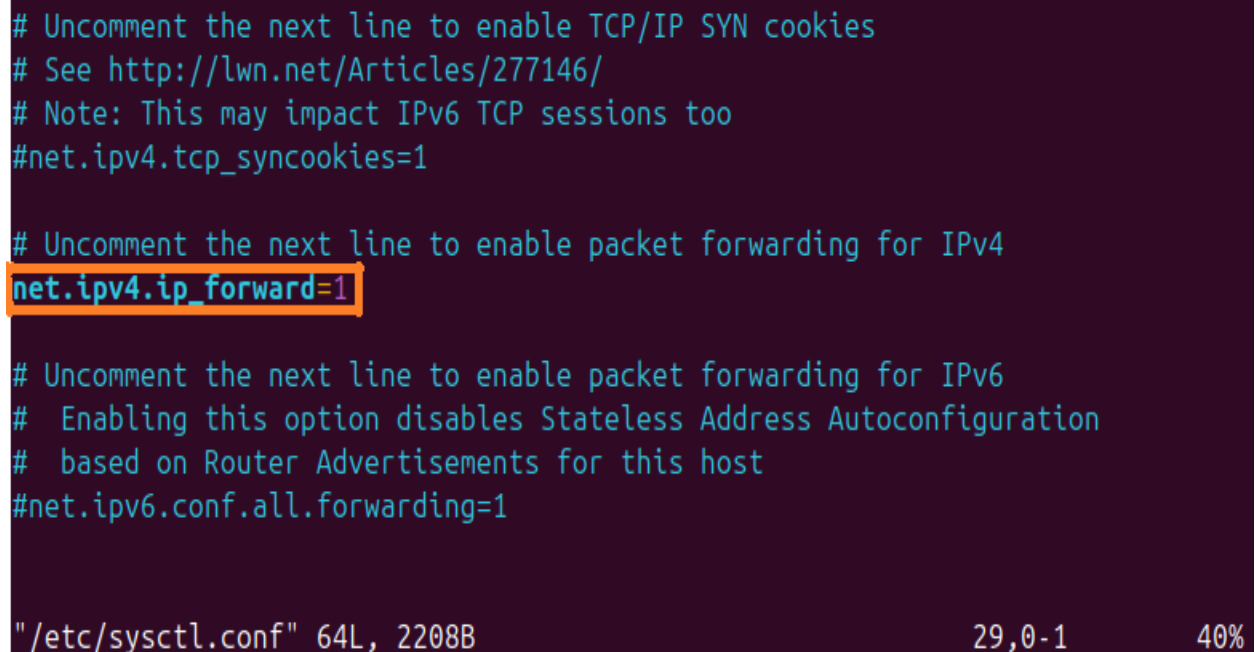
Procedure to enable internet over USB when the USB interface is not showing up.

1.Host Settings.

1.1. Open the file in the host terminal using the following command:

sudo vi /etc/sysctl.conf

Inside this file, uncomment the following line. If the line does not exist, add it: **net.ipv4.ip_forward=1**



```
# Uncomment the next line to enable TCP/IP SYN cookies
# See http://lwn.net/Articles/277146/
# Note: This may impact IPv6 TCP sessions too
#net.ipv4.tcp_syncookies=1

# Uncomment the next line to enable packet forwarding for IPv4
net.ipv4.ip_forward=1

# Uncomment the next line to enable packet forwarding for IPv6
# Enabling this option disables Stateless Address Autoconfiguration
# based on Router Advertisements for this host
#net.ipv6.conf.all.forwarding=1

"/etc/sysctl.conf" 64L, 2208B                               29,0-1           40%
```

Figure 1.1. sudo vi /etc/sysctl.conf(Host)

2.Target settings

2.1. Login into the target using username:debian Pwd:temppwd

2.2. In the target terminal also open the file **sudo vi /etc/sysctl.conf**
inside this file uncomment this line/ if this line will not exists add this line.
net.ipv4.ip_forward=1

```
# Uncomment the next line to enable TCP/IP SYN cookies
# See http://lwn.net/Articles/277146/
# Note: This may impact IPv6 TCP sessions too
#net.ipv4.tcp_syncookies=1

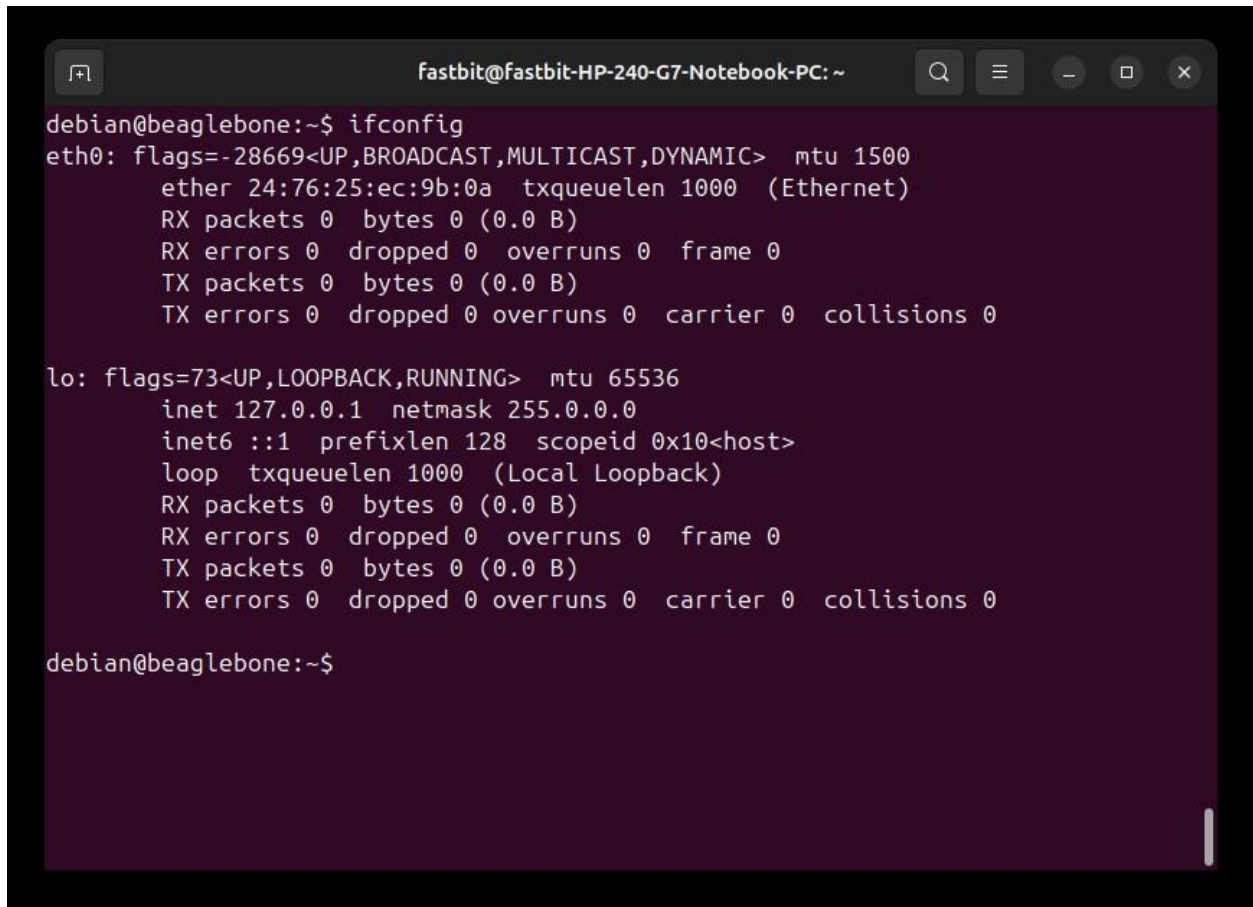
# Uncomment the next line to enable packet forwarding for IPv4
net.ipv4.ip_forward=1

# Uncomment the next line to enable packet forwarding for IPv6
# Enabling this option disables Stateless Address Autoconfiguration
# based on Router Advertisements for this host
#net.ipv6.conf.all.forwarding=1

"/etc/sysctl.conf" 64L, 2208B                29,0-1                40%
```

Figure 2.1. sudo vi /etc/sysctl.conf(target)

2.3. then execute the command **ifconfig** (as shown in the Figure 3). in the target.

A terminal window titled 'fastbit@fastbit-HP-240-G7-Notebook-PC: ~' with standard window controls. The terminal shows the output of the 'ifconfig' command on a 'debian@beaglebone:~\$' prompt. The output details the configuration for the 'eth0' (Ethernet) and 'lo' (Local Loopback) interfaces, including flags, MTU, MAC address, IP address, netmask, and various statistics like RX/TX packets, errors, and collisions.

```
fastbit@fastbit-HP-240-G7-Notebook-PC: ~
debian@beaglebone:~$ ifconfig
eth0: flags=-28669<UP,BROADCAST,MULTICAST,DYNAMIC>  mtu 1500
        ether 24:76:25:ec:9b:0a  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

debian@beaglebone:~$
```

Figure 2.3. ifconfig

2.4. Execute the following commands. After executing them, the usb0 interface will be displayed.

- **sudo -s**
- **modprobe g_ether**
- **ifconfig usb0 192.168.7.2 up**
- **ifconfig**

```
fastbit@fastbit-HP-240-G7-Notebook-PC: ~  
root@beaglebone:/home/debian# modprobe g_ether  
[ 376.316236] using random self ethernet address  
[ 376.316261] using random host ethernet address  
root@beaglebone:/home/debian# [ 376.348893] usb0: HOST MAC 9e:0e:c6:22:ac:60  
[ 376.348923] usb0: MAC 76:a0:45:16:94:ac  
[ 376.349095] using random self ethernet address  
[ 376.349105] using random host ethernet address  
[ 376.349241] g_ether gadget: Ethernet Gadget, version: Memorial Day 2008  
[ 376.349254] g_ether gadget: g_ether ready  
  
root@beaglebone:/home/debian# ifconfig usb0 192.168.7.2 up  
root@beaglebone:/home/debian#
```

```
fastbit@fastbit-HP-240-G7-Notebook-PC: ~  
root@beaglebone:/home/debian# ifconfig  
eth0: flags=-28669<UP,BROADCAST,MULTICAST,DYNAMIC> mtu 1500  
    ether 24:76:25:ec:9b:0a txqueuelen 1000 (Ethernet)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 0 bytes 0 (0.0 B)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
    inet 127.0.0.1 netmask 255.0.0.0  
    inet6 ::1 prefixlen 128 scopeid 0x10<host>  
    loop txqueuelen 1000 (Local Loopback)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 0 bytes 0 (0.0 B)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
usb0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 192.168.7.2 netmask 255.255.255.0 broadcast 192.168.7.255  
    inet6 fe80::74a0:45ff:fe16:94ac prefixlen 64 scopeid 0x20<link>  
    ether 76:a0:45:16:94:ac txqueuelen 1000 (Ethernet)  
    RX packets 1 bytes 335 (335.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 45 bytes 8076 (7.8 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
root@beaglebone:/home/debian#
```

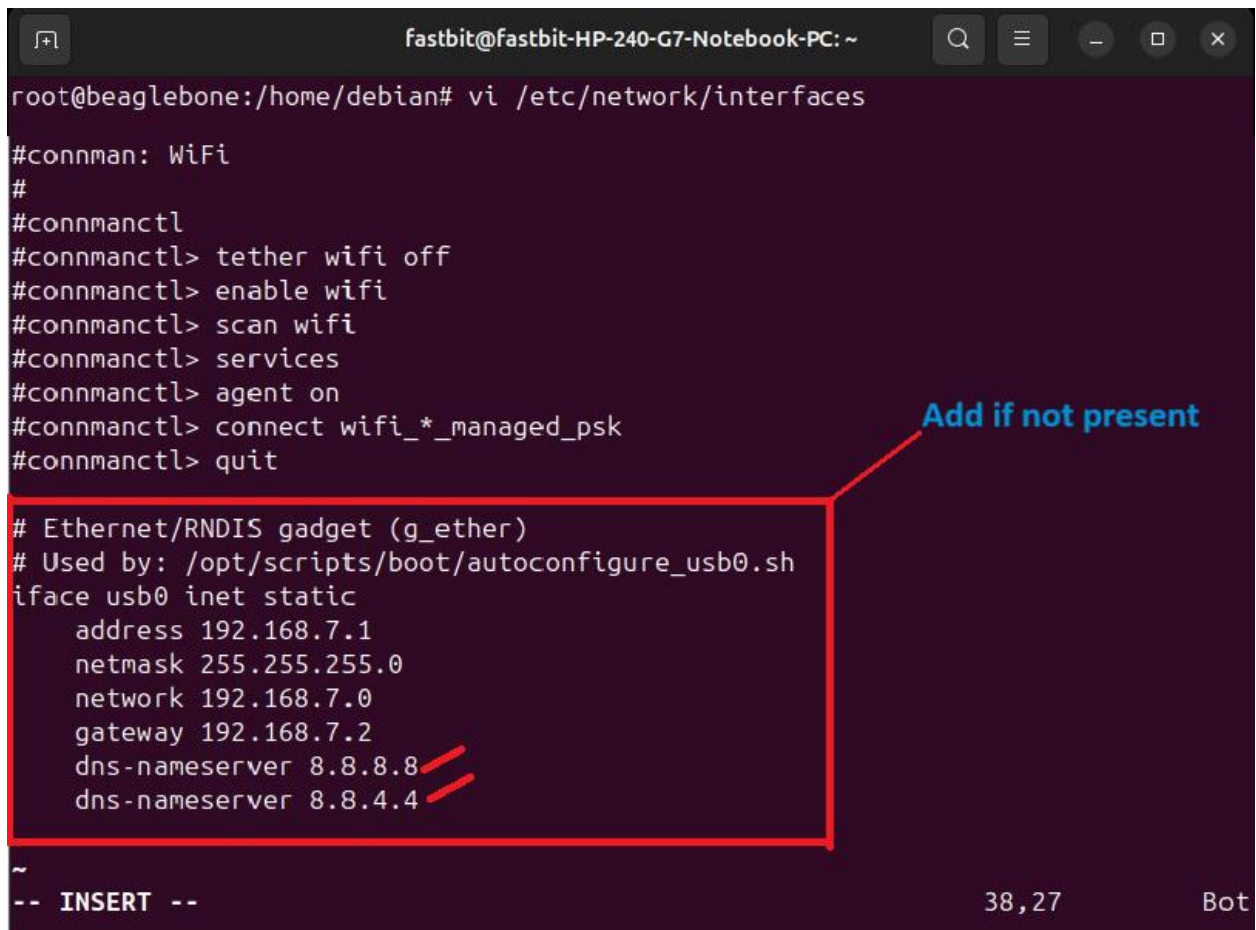
Figure 2.4. usb0 interface enumeration

save and exit.

Figure 2.5. resolv.conf entry

2.6. Edit vi /etc/network/interfaces file and add as shown in the Figure 4, save and exit
Text:

```
# Ethernet/RNDIS gadget (g_ether)
# Used by: /opt/scripts/boot/autoconfigure_usb0.sh
iface usb0 inet static
    address 192.168.7.2
    netmask 255.255.255.0
    network 192.168.7.0
    gateway 192.168.7.1
    dns-nameservers 8.8.8.8
    dns-nameservers 8.8.4.4
```



```
fastbit@fastbit-HP-240-G7-Notebook-PC: ~
root@beaglebone:/home/debian# vi /etc/network/interfaces

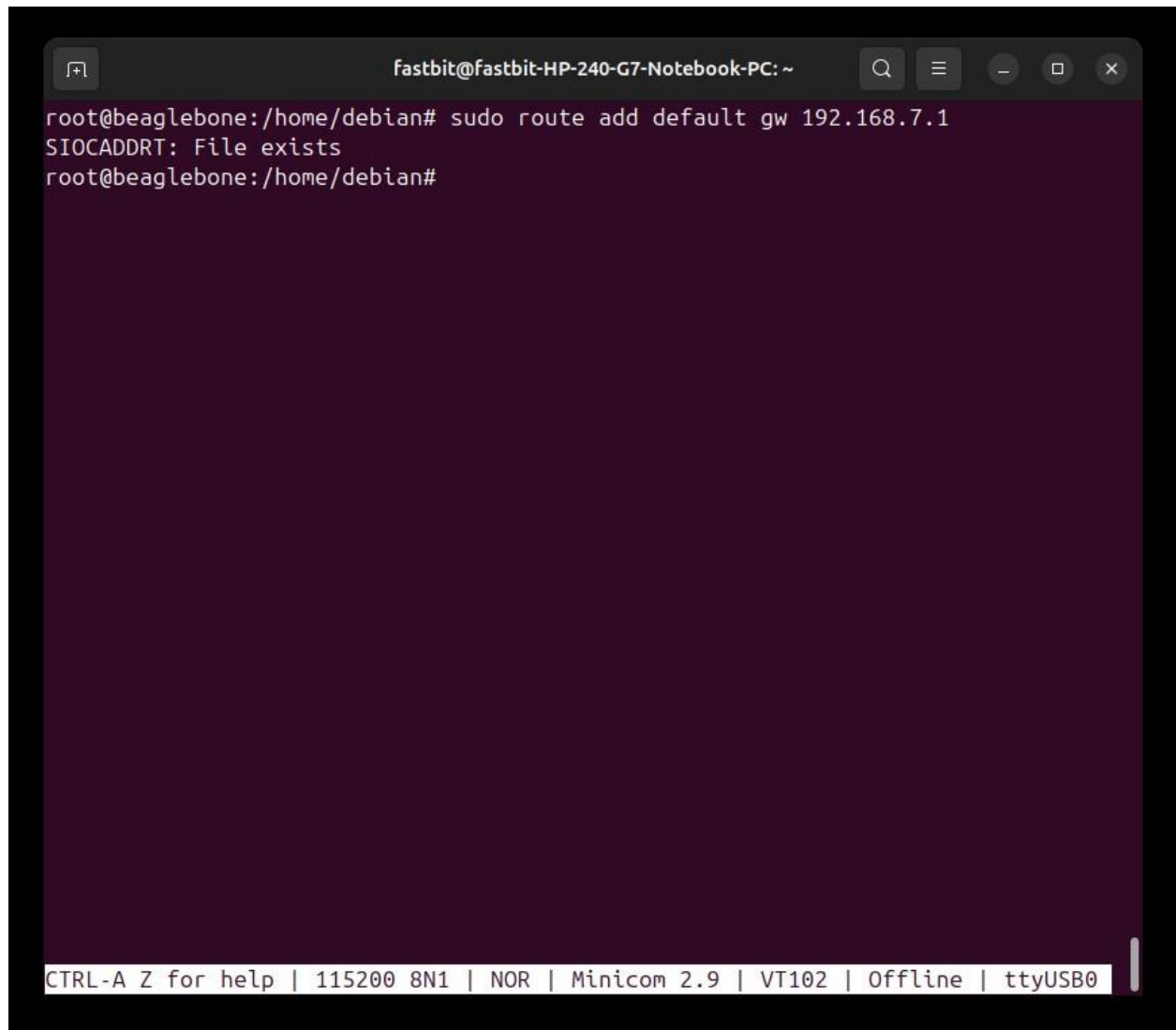
#connman: WiFi
#
#connmanctl
#connmanctl> tether wifi off
#connmanctl> enable wifi
#connmanctl> scan wifi
#connmanctl> services
#connmanctl> agent on
#connmanctl> connect wifi_*_managed_psk
#connmanctl> quit

# Ethernet/RNDIS gadget (g_ether)
# Used by: /opt/scripts/boot/autoconfigure_usb0.sh
iface usb0 inet static
    address 192.168.7.1
    netmask 255.255.255.0
    network 192.168.7.0
    gateway 192.168.7.2
    dns-nameserver 8.8.8.8
    dns-nameserver 8.8.4.4

~
-- INSERT --                                     38,27      Bot
```

Figure 2.6. Adding contents inside /etc/network/interfaces

2.7. Add default gateway address by running the command as shown in Figure 5.
route add default gw 192.168.7.1(Using PC as default gateway).

A terminal window titled 'fastbit@fastbit-HP-240-G7-Notebook-PC: ~' with standard window controls. The terminal shows a root prompt at '/home/debian#'. The command 'sudo route add default gw 192.168.7.1' is entered and executed, resulting in the output 'SIOCADDRT: File exists'. The prompt returns to 'root@beaglebone:/home/debian#'. At the bottom, a status bar displays 'CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.9 | VT102 | Offline | ttyUSB0'.

```
fastbit@fastbit-HP-240-G7-Notebook-PC: ~
root@beaglebone:/home/debian# sudo route add default gw 192.168.7.1
SIOCADDRT: File exists
root@beaglebone:/home/debian#
CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.9 | VT102 | Offline | ttyUSB0
```

Figure 2.7. Adding the default gateway address

3. Host Settings

3.1. Run below commands.

```
sudo iptables --table nat --append POSTROUTING --out-  
interface wlan0 -j MASQUERADE  
sudo iptables --append FORWARD --in-interface wlan0 -j  
ACCEPT  
sudo echo 1 > /proc/sys/net/ipv4/ip_forward
```

If you reboot your machine, again you must run these commands

So, it's better if you create a small script and execute when your machine reboots.

Download Script from this link:

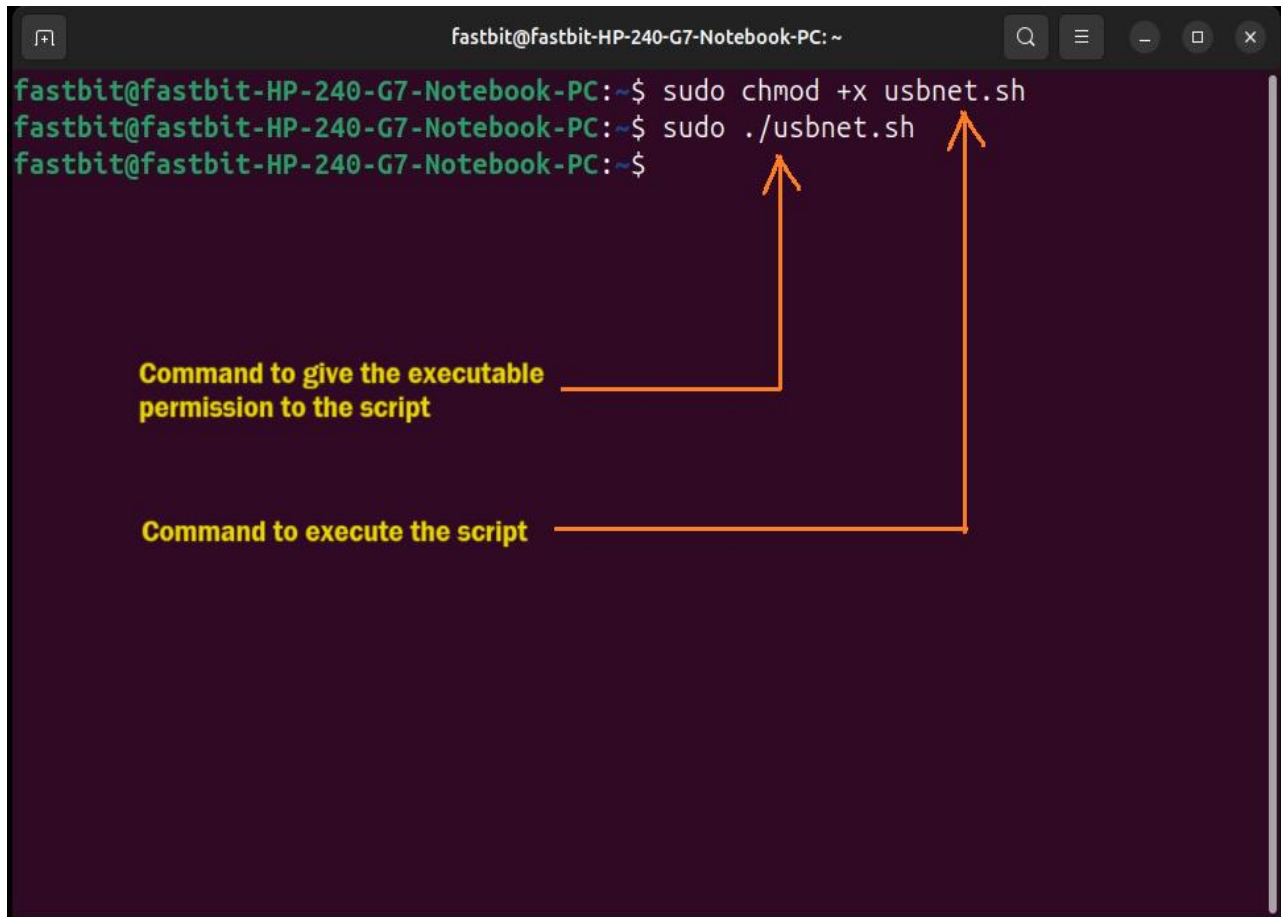
https://drive.google.com/file/d/1dsdw2nxKUWLWSpIwpvMh_054odBXmq40/view?usp=sharing


```
fastbit@fastbit-HP-240-G7-Notebook-PC: ~  
#!/bin/bash  
##To run this script do  
##1. chmod +x usbnet.sh  
##2. ./usbnet.sh  
iptables --table nat --append POSTROUTING --out-interface wlp2s0 -j MASQUERADE  
iptables --append FORWARD --in-interface wlp2s0 -j ACCEPT  
echo 1 > /proc/sys/net/ipv4/ip_forward  
~  
fastbit@fastbit-HP-240-G7-Notebook-PC: $ ifconfig  
docker0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500  
    inet 172.17.0.1 netmask 255.255.0.0 broadcast 172.17.255.255  
    ether 02:42:2e:84:66:37 txqueuelen 0 (Ethernet)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 0 bytes 0 (0.0 B)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
enp1s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500  
    ether 04:0e:3c:cb:99:13 txqueuelen 1000 (Ethernet)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 0 bytes 0 (0.0 B)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
enx9e0ec622ac60: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet6 fe80::7704:a79f:5643:c4fc prefixlen 64 scopeid 0x20<link>  
    ether 9e:0e:c6:22:ac:60 txqueuelen 1000 (Ethernet)  
    RX packets 1703 bytes 54066 (54.0 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 2 bytes 459 (459.0 B)  
    TX errors 600 dropped 0 overruns 0 carrier 0 collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
    inet 127.0.0.1 netmask 255.0.0.0  
    inet6 ::1 prefixlen 128 scopeid 0x10<host>  
    loop txqueuelen 1000 (Local Loopback)  
    RX packets 7961 bytes 1049911 (1.0 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 7961 bytes 1049911 (1.0 MB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 192.168.0.8 netmask 255.255.255.0 broadcast 192.168.0.255  
    inet6 fe80::27f5:54d4:5e0f:7b54 prefixlen 64 scopeid 0x20<link>  
    ether ac:d5:64:6f:30:17 txqueuelen 1000 (Ethernet)  
    RX packets 246980 bytes 278427514 (278.4 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 141980 bytes 34501817 (34.5 MB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Note: Here my system is connected to the wifi network. So my primary interface is wlp2s0. It may be different in your system.

Figure 3.1. usbnet.sh

3.2. Give executable permission and run the script as shown in Figure 8.



A terminal window with a dark purple background and green text. The window title is "fastbit@fastbit-HP-240-G7-Notebook-PC: ~". The terminal shows three lines of commands and their prompts. The first line is "fastbit@fastbit-HP-240-G7-Notebook-PC:~\$ sudo chmod +x usbnet.sh". The second line is "fastbit@fastbit-HP-240-G7-Notebook-PC:~\$ sudo ./usbnet.sh". The third line is "fastbit@fastbit-HP-240-G7-Notebook-PC:~\$". Two orange arrows point from text labels to the commands. The first arrow points from "Command to give the executable permission to the script" to "sudo chmod +x usbnet.sh". The second arrow points from "Command to execute the script" to "sudo ./usbnet.sh".

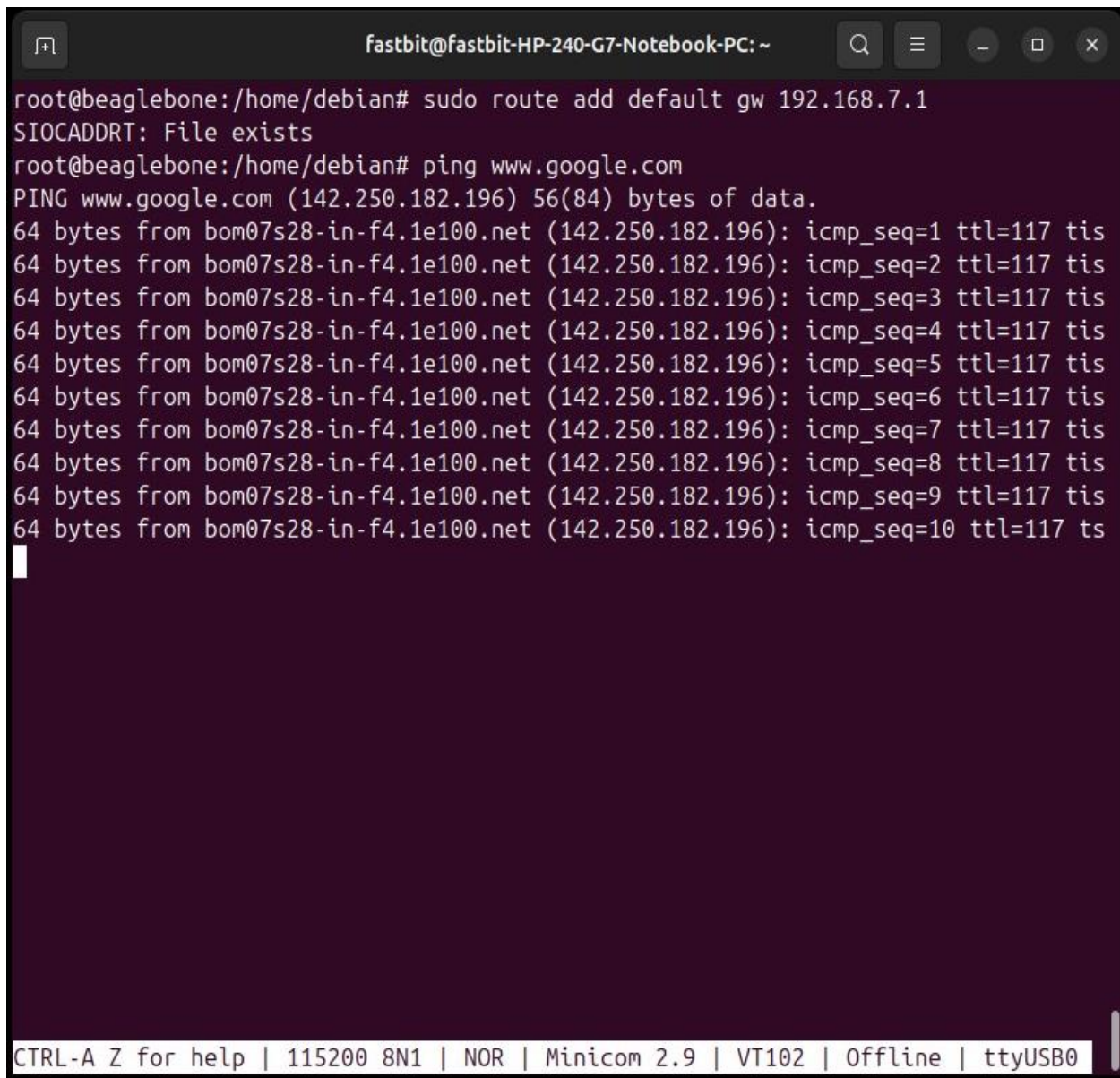
```
fastbit@fastbit-HP-240-G7-Notebook-PC:~$ sudo chmod +x usbnet.sh
fastbit@fastbit-HP-240-G7-Notebook-PC:~$ sudo ./usbnet.sh
fastbit@fastbit-HP-240-G7-Notebook-PC:~$
```

Command to give the executable permission to the script

Command to execute the script

Figure 3.2. Giving executable permission and running the script

3.3. Goto the target and ping www.google.com as shown in the Figure 8.

A terminal window titled 'fastbit@fastbit-HP-240-G7-Notebook-PC: ~' with standard window controls. The terminal shows a user at the 'root@beaglebone:/home/debian#' prompt. They enter 'sudo route add default gw 192.168.7.1', which returns 'SIOCADDRT: File exists'. Then they enter 'ping www.google.com', which returns 'PING www.google.com (142.250.182.196) 56(84) bytes of data.' followed by ten lines of ping results, each showing '64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=1-10 ttl=117 tis'. The terminal status bar at the bottom reads 'CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.9 | VT102 | Offline | ttyUSB0'.

```
fastbit@fastbit-HP-240-G7-Notebook-PC: ~
root@beaglebone:/home/debian# sudo route add default gw 192.168.7.1
SIOCADDRT: File exists
root@beaglebone:/home/debian# ping www.google.com
PING www.google.com (142.250.182.196) 56(84) bytes of data.
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=1 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=2 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=3 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=4 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=5 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=6 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=7 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=8 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=9 ttl=117 tis
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=10 ttl=117 ts
CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.9 | VT102 | Offline | ttyUSB0
```

Figure 3.3. Ping to www.google.com