

Computer Networks Assignment 3

SCS2205- Computer Network 1

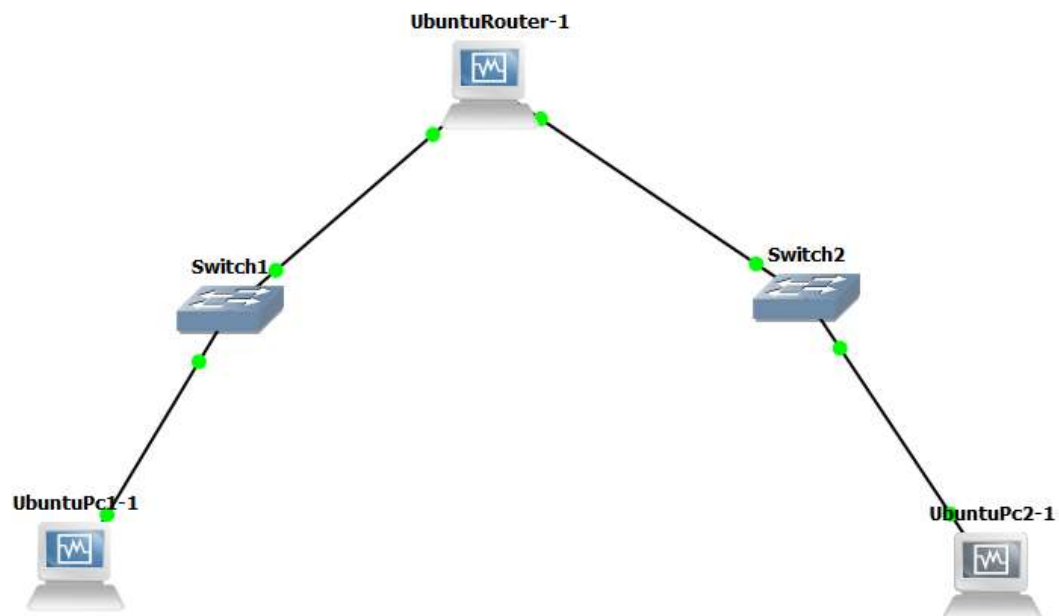
Practical Assignment –

2018cs015 – 18000152

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Part 1

1. Device configurations



Configure the network by assigning IP addresses to relevant interfaces.

Editing Wired connection 1

Connection name: **Wired connection 1**

General | Ethernet | 802.1x Security | DCB | IPv4 Settings | IPv6 Settings

Method: **Manual**

Addresses

Address	Netmask	Gateway
192.168.10.2	24	192.168.10.1

DNS servers:

Search domains:

DHCP client ID:

☐ Require IPv4 addressing for this connection to complete

Routes...

Cancel **Save**

Editing Wired connection 1

Connection name: **Wired connection 1**

General | Ethernet | 802.1x Security | DCB | IPv4 Settings | IPv6 Settings

Device: **enp0s3 (08:00:27:ED:CC:2F)**

Cloned MAC address:

MTU: **automatic** - + bytes

Wake on LAN: ☒ Default ☐ Phy ☐ Unicast ☐ Multicast
☐ Ignore ☐ Broadcast ☐ Arp ☐ Magic

Wake on LAN password:

Cancel Save

Editing Wired connection 1

Connection name: **Wired connection 1**

General | Ethernet | 802.1x Security | DCB | IPv4 Settings | IPv6 Settings

Method: **Manual**

Addresses

Address	Netmask	Gateway
192.168.20.2	24	192.168.20.1

Add Delete

DNS servers:

Search domains:

DHCP client ID:

☐ Require IPv4 addressing for this connection to complete

Routes...

Cancel Save

Editing Wired connection 1

Connection name: **Wired connection 1**

General | Ethernet | 802.1x Security | DCB | IPv4 Settings | IPv6 Settings

Device: **enp0s3 (08:00:27:9D:85:1D)**

Cloned MAC address:

MTU: **automatic** bytes

Wake on LAN: ☒ **Default** ☐ **Phy** ☐ **Unicast** ☐ **Multicast**
☐ **Ignore** ☐ **Broadcast** ☐ **Arp** ☐ **Magic**

Wake on LAN password:

Editing Wired connection 1

Connection name: **Wired connection 1**

General | Ethernet | 802.1x Security | DCB | IPv4 Settings | IPv6 Settings

Method: **Manual**

Addresses

Address	Netmask	Gateway
192.168.20.1	24	192.168.20.1

DNS servers:

Search domains:

DHCP client ID:

☐ Require IPv4 addressing for this connection to complete

✕

⌵

🔒

Editing Wired connection 1

Connection name:

Wired connection 1

General

Ethernet

802.1x Security

DCB

IPv4 Settings

IPv6 Settings

Device:

enp0s8 (08:00:27:5B:80:44)

⌵

Cloned MAC address:

MTU:

automatic

–

+

bytes

Wake on LAN:

☒ Default
 ☐ Phy
 ☐ Unicast
 ☐ Multicast
 ☐ Ignore
 ☐ Broadcast
 ☐ Arp
 ☐ Magic

Wake on LAN password:

Cancel

Save

✕

⌵

🔒

Editing Wired connection 2

Connection name:

Wired connection 2

General

Ethernet

802.1x Security

DCB

IPv4 Settings

IPv6 Settings

Method:

Manual

⌵

Addresses

Address	Netmask	Gateway	
192.168.10.1	24	192.168.10.1	<div>Add</div> <div>Delete</div>

DNS servers:

Search domains:

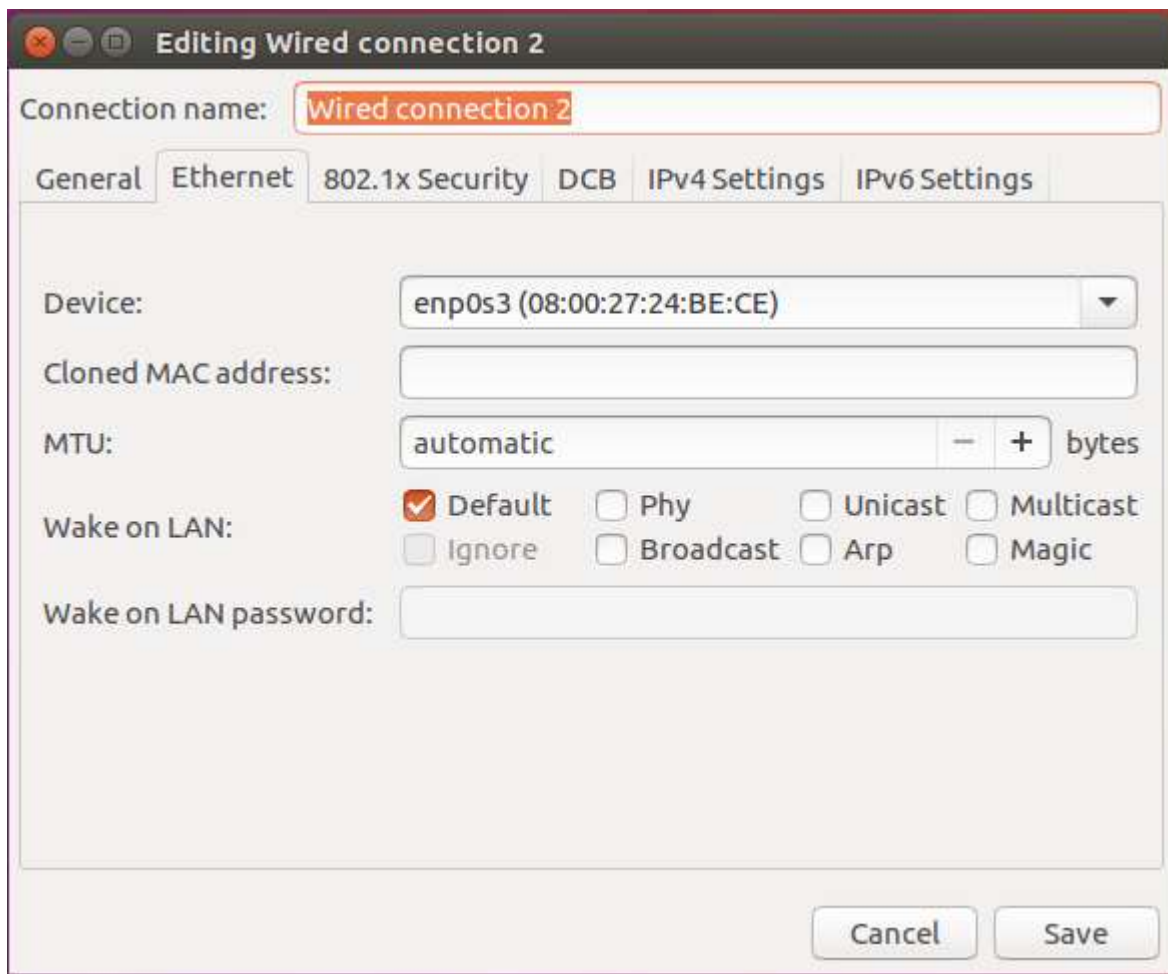
DHCP client ID:

☐ Require IPv4 addressing for this connection to complete

Routes...

Cancel

Save



Check whether the Connection is established between UbuntuPc1 and UbuntuPc2.

```
ubuntupc1@ubuntupc1-VirtualBox: ~  
ubuntupc1@ubuntupc1-VirtualBox:~$ ping 192.168.20.2  
PING 192.168.20.2 (192.168.20.2) 56(84) bytes of data.  
64 bytes from 192.168.20.2: icmp_seq=1 ttl=63 time=3.62 ms  
64 bytes from 192.168.20.2: icmp_seq=2 ttl=63 time=2.96 ms  
64 bytes from 192.168.20.2: icmp_seq=3 ttl=63 time=4.40 ms  
64 bytes from 192.168.20.2: icmp_seq=4 ttl=63 time=1.95 ms  
64 bytes from 192.168.20.2: icmp_seq=5 ttl=63 time=3.17 ms  
64 bytes from 192.168.20.2: icmp_seq=6 ttl=63 time=3.22 ms  
64 bytes from 192.168.20.2: icmp_seq=7 ttl=63 time=2.14 ms  
64 bytes from 192.168.20.2: icmp_seq=8 ttl=63 time=5.33 ms  
64 bytes from 192.168.20.2: icmp_seq=9 ttl=63 time=5.21 ms  
^Z  
[1]+  Stopped                  ping 192.168.20.2  
ubuntupc1@ubuntupc1-VirtualBox:~$
```

```
ubuntupc1@ubuntupc1-VirtualBox: ~  
ubuntupc1@ubuntupc1-VirtualBox:~$ iperf -c 192.168.20.2  
connect failed: Connection refused  
ubuntupc1@ubuntupc1-VirtualBox:~$ iperf -c 192.168.20.2  
connect failed: Connection refused  
ubuntupc1@ubuntupc1-VirtualBox:~$ ifconfig  
enp0s3      Link encap:Ethernet  HWaddr 08:00:27:ed:cc:2f  
            inet addr:192.168.10.2  Bcast:192.168.10.255  Mask:255.255.255.0  
            inet6 addr: fe80::1d78:9dbb:a01c:3cb9/64 Scope:Link  
            UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
            RX packets:128 errors:0 dropped:0 overruns:0 frame:0  
            TX packets:100 errors:0 dropped:0 overruns:0 carrier:0  
            collisions:0 txqueuelen:1000  
            RX bytes:14835 (14.8 KB)  TX bytes:10241 (10.2 KB)  
  
lo          Link encap:Local Loopback  
            inet addr:127.0.0.1  Mask:255.0.0.0  
            inet6 addr: ::1/128 Scope:Host  
            UP LOOPBACK RUNNING  MTU:65536  Metric:1  
            RX packets:14580 errors:0 dropped:0 overruns:0 frame:0  
            TX packets:14580 errors:0 dropped:0 overruns:0 carrier:0  
            collisions:0 txqueuelen:1000  
            RX bytes:1078896 (1.0 MB)  TX bytes:1078896 (1.0 MB)
```



```

ubuntu@ubuntu2-VirtualBox: ~
64 bytes from 192.168.10.2: icmp_seq=2 ttl=63 time=3.36 ms
64 bytes from 192.168.10.2: icmp_seq=3 ttl=63 time=2.89 ms
^Z
[1]+  Stopped                  ping 192.168.10.2
ubuntu@ubuntu2-VirtualBox:~$ ifconfig
enp0s3      Link encap:Ethernet  HWaddr 08:00:27:9d:85:1d
            inet addr:192.168.20.2  Bcast:192.168.20.255  Mask:255.255.255.0
            inet6 addr: fe80::8412:2e51:636c:e9a7/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
            RX packets:133 errors:0 dropped:0 overruns:0 frame:0
            TX packets:190 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:15267 (15.2 KB)  TX bytes:23705 (23.7 KB)

lo          Link encap:Local Loopback
            inet addr:127.0.0.1  Mask:255.0.0.0
            inet6 addr: ::1/128 Scope:Host
            UP LOOPBACK RUNNING  MTU:65536  Metric:1
            RX packets:15060 errors:0 dropped:0 overruns:0 frame:0
            TX packets:15060 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:1114400 (1.1 MB)  TX bytes:1114400 (1.1 MB)

```

```

ubuntu@ubunturouter-VirtualBox:~$ ifconfig
enp0s3      Link encap:Ethernet  HWaddr 08:00:27:24:be:ce
            inet addr:192.168.10.1  Bcast:192.168.10.255  Mask:255.255.255.0
            inet6 addr: fe80::fc7:5197:bf0e:1c57/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
            RX packets:51 errors:0 dropped:0 overruns:0 frame:0
            TX packets:138 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:4135 (4.1 KB)  TX bytes:15663 (15.6 KB)

enp0s8      Link encap:Ethernet  HWaddr 08:00:27:5b:80:44
            inet addr:192.168.20.1  Bcast:192.168.20.255  Mask:255.255.255.0
            inet6 addr: fe80::36fa:3f0d:6a91:9dcc/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
            RX packets:126 errors:0 dropped:0 overruns:0 frame:0
            TX packets:143 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:16290 (16.2 KB)  TX bytes:16095 (16.0 KB)

lo          Link encap:Local Loopback
            inet addr:127.0.0.1  Mask:255.0.0.0
            inet6 addr: ::1/128 Scope:Host
            UP LOOPBACK RUNNING  MTU:65536  Metric:1
            RX packets:15140 errors:0 dropped:0 overruns:0 frame:0
            TX packets:15140 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:1123360 (1.1 MB)  TX bytes:1123360 (1.1 MB)

```


2. Capture the Network packets on ubunturouter while checking the connection between UbuntuPc1 UbuntuPc2.

Capturing from - [Switch2 Ethernet1 to UbuntuRouter-1 Ethernet1]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter: <Ctrl>F

No.	Time	Source	Destination	Protocol	Length	Info
10	4.000444	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) reply id=0x006a, seq=5/1200, ttl=64 (request in 9)
11	5.012031	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) request id=0x006a, seq=6/1536, ttl=63 (reply in 12)
12	5.013003	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) reply id=0x006a, seq=6/1536, ttl=64 (request in 11)
13	5.131611	PcsCompu_5b:80:44	PcsCompu_9d:85:1d	ARP	60	Who has 192.168.20.2? Tell 192.168.20.1
14	5.132720	PcsCompu_9d:85:1d	PcsCompu_5b:80:44	ARP	60	192.168.20.2 is at 00:00:27:9d:85:1d
15	5.170053	PcsCompu_9d:85:1d	PcsCompu_5b:80:44	ARP	60	Who has 192.168.20.1? Tell 192.168.20.2
16	5.170053	PcsCompu_5b:80:44	PcsCompu_9d:85:1d	ARP	60	192.168.20.1 is at 00:00:27:5b:80:44
17	6.013739	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) request id=0x006a, seq=7/1792, ttl=63 (reply in 18)
18	6.014145	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) reply id=0x006a, seq=7/1792, ttl=64 (request in 17)
19	24.006454	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) request id=0x0009, seq=1/256, ttl=64 (reply in 20)
20	24.008623	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) reply id=0x0009, seq=1/256, ttl=63 (request in 19)
21	25.009613	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) request id=0x0009, seq=2/512, ttl=64 (reply in 22)
22	25.010558	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) reply id=0x0009, seq=2/512, ttl=63 (request in 21)
23	26.012636	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) request id=0x0009, seq=3/768, ttl=64 (reply in 24)
24	26.014035	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) reply id=0x0009, seq=3/768, ttl=63 (request in 23)
25	27.012986	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) request id=0x0009, seq=4/1024, ttl=64 (reply in 26)
26	27.014691	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) reply id=0x0009, seq=4/1024, ttl=63 (request in 25)
27	28.015131	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) request id=0x0009, seq=5/1280, ttl=64 (reply in 28)
28	28.017938	192.168.20.2	192.168.20.2	ICMP	90	Echo (ping) reply id=0x0009, seq=5/1280, ttl=63 (request in 27)
29	54.921859	192.168.20.1	192.168.20.2	ICMP	90	Echo (ping) request id=0x0064, seq=1/256, ttl=64 (reply in 30)
30	54.922008	192.168.20.2	192.168.20.1	ICMP	90	Echo (ping) reply id=0x0064, seq=1/256, ttl=64 (request in 29)
31	55.923023	192.168.20.1	192.168.20.2	ICMP	90	Echo (ping) request id=0x0064, seq=2/512, ttl=64 (reply in 32)
32	55.923023	192.168.20.2	192.168.20.1	ICMP	90	Echo (ping) reply id=0x0064, seq=2/512, ttl=64 (request in 31)
33	56.925901	192.168.20.1	192.168.20.2	ICMP	90	Echo (ping) request id=0x0064, seq=3/768, ttl=64 (reply in 34)
34	56.926962	192.168.20.2	192.168.20.1	ICMP	90	Echo (ping) reply id=0x0064, seq=3/768, ttl=64 (request in 33)
35	57.927292	192.168.20.1	192.168.20.2	ICMP	90	Echo (ping) request id=0x0064, seq=4/1024, ttl=64 (reply in 36)
36	57.929109	192.168.20.2	192.168.20.1	ICMP	90	Echo (ping) reply id=0x0064, seq=4/1024, ttl=64 (request in 35)

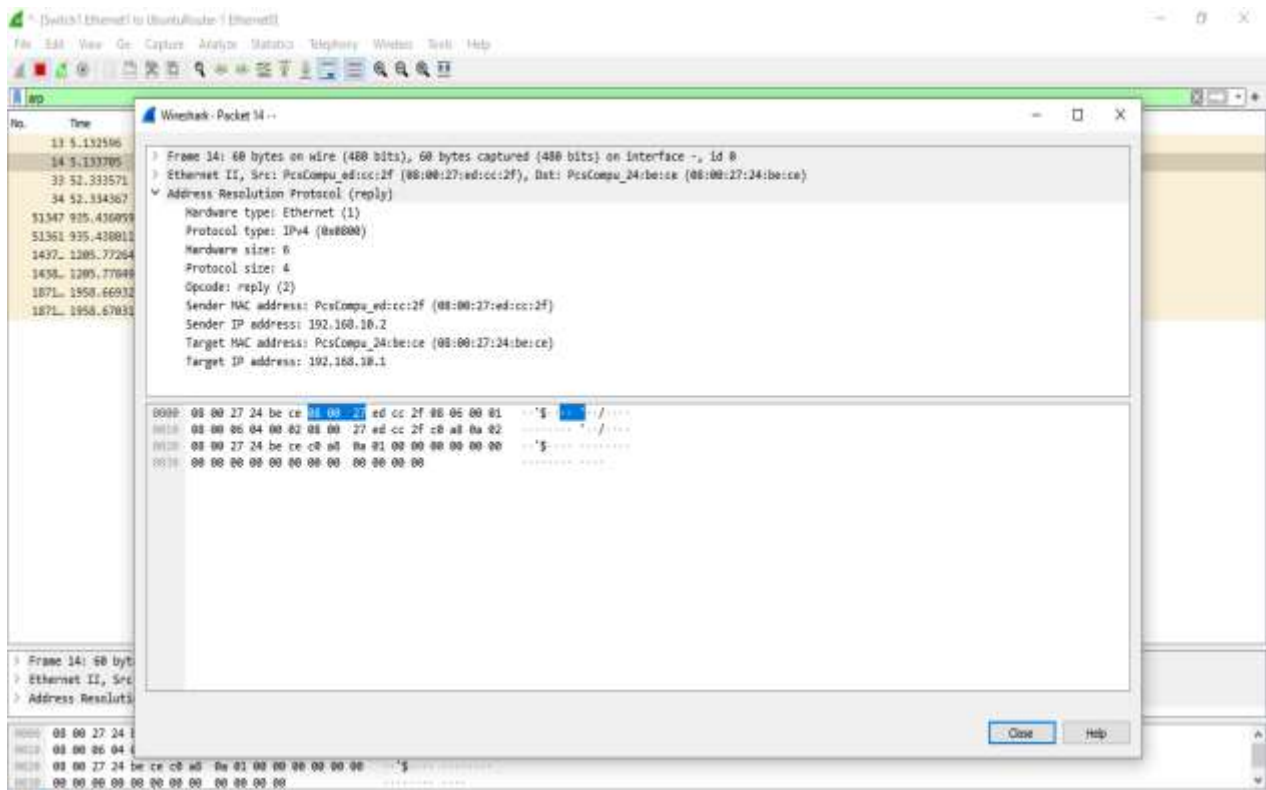
3. Filter the ARP packets and identify the sender and destination, IP addresses and MAC addresses.

*: [Switch1 Ethernet1 to UbuntuRouter-1 Ethernet1]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

arp

No.	Time	Source	Destination	Protocol	Length	Info
13	5.132596	PcsCompu_24:b6:ce	PcsCompu_ed:cc:2f	ARP	60	Who has 192.168.10.2? Tell 192.168.10.1
14	5.133705	PcsCompu_ed:cc:2f	PcsCompu_24:b6:ce	ARP	60	192.168.10.2 is at 00:00:27:ed:cc:2f
33	52.333571	PcsCompu_ed:cc:2f	PcsCompu_24:b6:ce	ARP	60	Who has 192.168.10.1? Tell 192.168.10.2
34	52.334367	PcsCompu_24:b6:ce	PcsCompu_ed:cc:2f	ARP	60	192.168.10.1 is at 00:00:27:24:b6:ce



Sender MAC address: 08:00:27:ed:cc:2f

Sender IP address: 192.168.10.2

Receiver MAC address: 08:00:27:24:be:ce

Receiver IP address: 192.168.10.1

The ping is done between UbuntuPc1 and UbunduPc2. The packet capture is done between the UbuntuPc1 and UbuntuRouter.

So the sender IP is 192.168.10.2(UbuntuPc1) and the receiver IP address is 192.168.10.1(UbuntuRouter).

Part 2

1. Install iperf on UbuntuPC2.

```
ubuntupc2@ubuntupc2-VirtualBox:~$ iperf
Usage: iperf [-s|-c host] [options]
Try `iperf --help' for more information.
```

I also iperf install to the UbuntuPc1.

```
ubuntupc1@ubuntupc1-VirtualBox:~$ sudo apt install iperf
[sudo] password for ubuntupc1:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  iperf
0 upgraded, 1 newly installed, 0 to remove and 9 not upgraded.
Need to get 50.5 kB of archives.
After this operation, 156 kB of additional disk space will be used.
Get:1 http://lk.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 iperf am
d64 2.0.5+dfsg1-2ubuntu0.1 [50.5 kB]
      LibreOffice Writer n 1s (31.1 kB/s)
Selecting previously unselected package iperf.
(Reading database ... 177094 files and directories currently installed.)
Preparing to unpack .../iperf_2.0.5+dfsg1-2ubuntu0.1_amd64.deb ...
Unpacking iperf (2.0.5+dfsg1-2ubuntu0.1) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for doc-base (0.10.7) ...
Processing 1 added doc-base file...
Setting up iperf (2.0.5+dfsg1-2ubuntu0.1) ...
ubuntupc1@ubuntupc1-VirtualBox:~$ sudo apt-get update
Hit:1 http://lk.archive.ubuntu.com/ubuntu xenial InRelease
Hit:2 http://security.ubuntu.com/ubuntu xenial-security InRelease
Hit:3 http://lk.archive.ubuntu.com/ubuntu xenial-updates InRelease
Hit:4 http://lk.archive.ubuntu.com/ubuntu xenial-backports InRelease
Reading package lists... Done
ubuntupc1@ubuntupc1-VirtualBox:~$
```

2. Run the iperf service and try to connect to it by using the UbuntuPC1.

```
ubuntupc2@ubuntupc2-VirtualBox: ~
ubuntupc2@ubuntupc2-VirtualBox:~$ iperf -s
-----
Server listening on TCP port 5001
TCP window size: 128 KByte (default)
-----
```



```

ubuntupc1@ubuntupc1-VirtualBox: ~
64 bytes from 192.168.20.2: icmp_seq=6 ttl=63 time=4.79 ms
64 bytes from 192.168.20.2: icmp_seq=7 ttl=63 time=3.41 ms
^Z
[1]+  Stopped                  ping 192.168.20.2
ubuntupc1@ubuntupc1-VirtualBox:~$ iperf
Usage: iperf [-s|-c host] [options]
Try 'iperf --help' for more information.
ubuntupc1@ubuntupc1-VirtualBox:~$ iperf -c 192.168.20.2

-----
Client connecting to 192.168.20.2, TCP port 5001
TCP window size: 85.0 KByte (default)
-----
[ 3] local 192.168.10.2 port 33004 connected with 192.168.20.2 port 5001
[ ID] Interval           Transfer     Bandwidth
[ 3]  0.0-10.0 sec   93.0 MBytes  77.8 Mbits/sec
ubuntupc1@ubuntupc1-VirtualBox:~$ iperf -c 192.168.20.2

-----
Client connecting to 192.168.20.2, TCP port 5001
TCP window size: 85.0 KByte (default)
-----
[ 3] local 192.168.10.2 port 33006 connected with 192.168.20.2 port 5001
[ ID] Interval           Transfer     Bandwidth
[ 3]  0.0-10.0 sec   79.1 MBytes  66.3 Mbits/sec
ubuntupc1@ubuntupc1-VirtualBox:~$

```

3. Capture network packets on UbuntuRouter.

No.	Time	Source	Destination	Protocol	Length	Info
48	930.417562	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=11889 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555340
49	930.417562	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=1473 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
50	930.417562	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=13957 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
51	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=2021 Win=3488 Len=0 TSeq=146555345 TSecr=236409038
52	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=14585 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555340
53	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=13953 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
54	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=17481 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
55	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=4389 Win=62336 Len=0 TSeq=146555345 TSecr=236409038
56	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=18849 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
57	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=5817 Win=81312 Len=0 TSeq=146555345 TSecr=236409038
58	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=20297 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
59	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=7285 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
60	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=21745 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
61	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=8713 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
62	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=23193 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
63	930.419533	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=24041 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
64	930.419533	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=18161 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
65	930.419533	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=26889 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
66	930.419533	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=11809 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
67	930.419533	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=27537 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
68	930.419533	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=13857 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
69	930.419533	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=28985 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
70	930.419533	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=14585 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
71	930.419533	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=30413 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
72	930.419599	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=15553 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
73	930.419599	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=31881 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
74	930.419599	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=17481 Win=64128 Len=0 TSeq=146555345 TSecr=236409038

4. Filter the packets and identify the TCP packets related to the iperf connection.

No.	Time	Source	Destination	Protocol	Length	Info
48	930.417562	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=11889 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555340
49	930.417562	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=1473 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
50	930.417562	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=13957 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
51	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=2021 Win=3488 Len=0 TSeq=146555345 TSecr=236409038
52	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=14585 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555340
53	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=13953 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
54	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=17481 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
55	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=4389 Win=62336 Len=0 TSeq=146555345 TSecr=236409038
56	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=18849 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
57	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=5817 Win=81312 Len=0 TSeq=146555345 TSecr=236409038
58	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=20297 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
59	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=7285 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
60	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=21745 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
61	930.418570	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=8713 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
62	930.418570	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=23193 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
63	930.419533	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=24041 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345
64	930.419533	192.168.20.2	192.168.10.2	TCP	66	5001 → 33004 [ACK] Seq=1 Ack=18161 Win=64128 Len=0 TSeq=146555345 TSecr=236409038
65	930.419599	192.168.10.2	192.168.20.2	TCP	5114	33004 → 5001 [ACK] Seq=26889 Ack=1 Win=64256 Len=0 TSeq=236409038 TSecr=146555345

5. Mention the information you can extract from the packets captured from the UbuntuRouter.

Frame number

Sender's MAC address and receiver's MAC address

IP addresses of source and destination

Internet protocol

TCP port numbers of the source and destination.

Data inside the packets can also be analyzed through the TCP stream but it shows a stream of numbers because the iperf transfers random data to analyze the network performance.