

## Computer Networks and Security Lab Practical Assignment 1

**Problem Definition:** Setup a wired LAN using Layer 2 Switch. It includes preparation of cable, testing of cable using line tester configuration machine using IP addresses, testing using PING utility and demonstrating the PING packets captured traces using Wireshark Packet Analyser Tool.

**Student Roll Number:** 7315

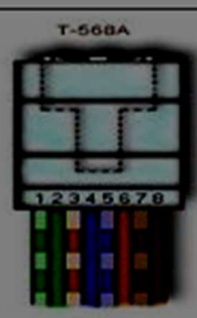
**Name:** Ashish Kumar

**Date of Assignment:** 16-7-25

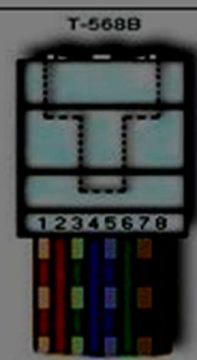
### Demo I: Connect Two Computer in LAN using Crossover Cable

**Step1:** Prepare Crossover Cable using Cabling Standard 568A and 568B

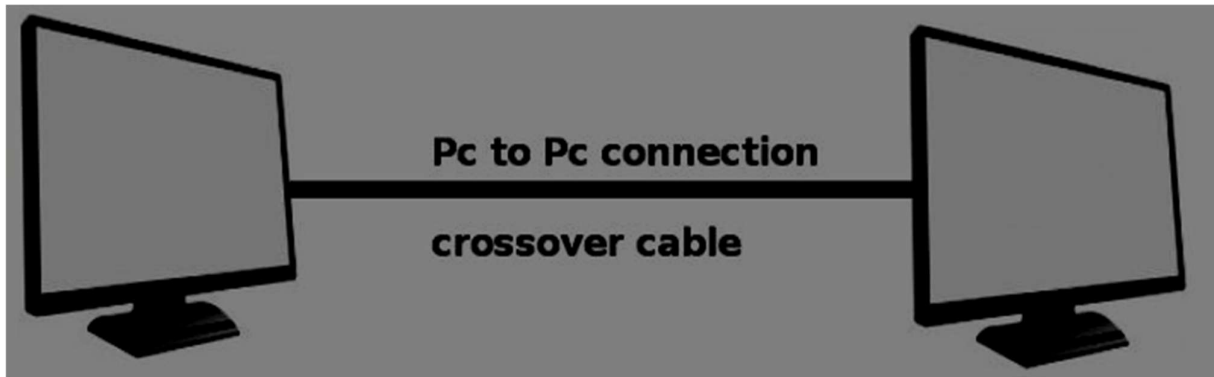
### Pin Diagram TIA/EIA 568-A

PIN	F()	Pair	Polarity	COLOR	A	
1	Rx	3	Rx+	Green/White	G	
2	Rx	3	RX-	Green	G	
3	<u>Tx</u>	2	<u>Tx+</u>	Orange/White	O	
4	-	1	Not Used	Blue	B	
5	-	1	Not Used	Blue/White	B	
6	<u>Tx</u>	2	<u>Tx-</u>	Orange	O	
7	-	4	Not Used	Brown/White	B	
8	-	4	Not Used	Brown	B	

### Pin Diagram TIA/EIA 568-B

PIN	F()	Pair	Polarity	COLOR	A	
1	<u>Tx</u>	2	<u>Tx+</u>	Orange/White	O	
2	<u>Tx</u>	2	<u>Tx-</u>	Orange	O	
3	Rx	3	Rx+	Green/White	G	
4	-	1	Not Used	Blue	B	
5	-	1	Not Used	Blue/White	B	
6	Rx	3	Rx-	Green	G	
7	-	4	Not Used	Brown/White	B	
8	-	4	Not Used	Brown	B	

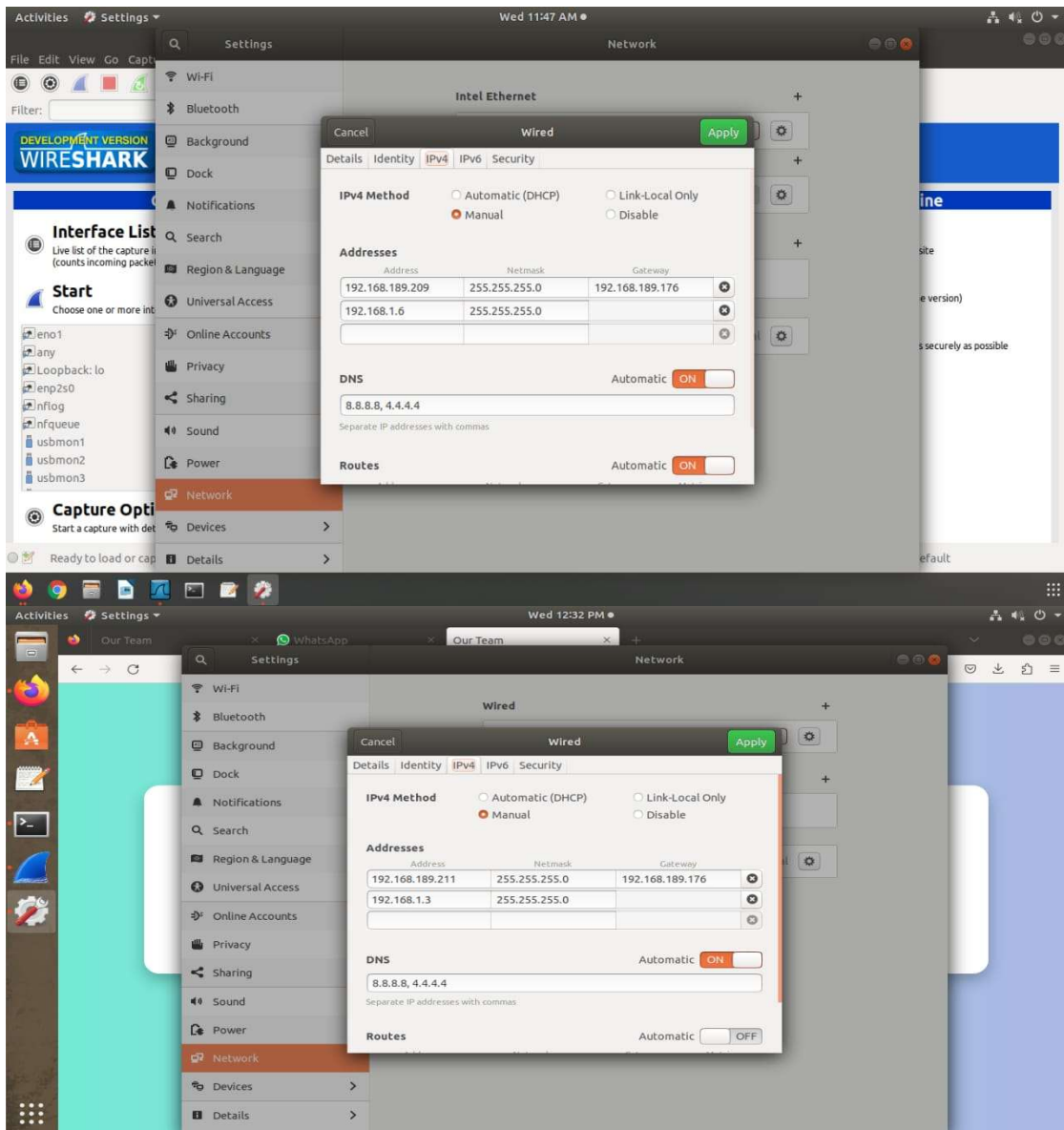
**Step 2:** Connect two Computer using Crossover Cable as shown in Figure below



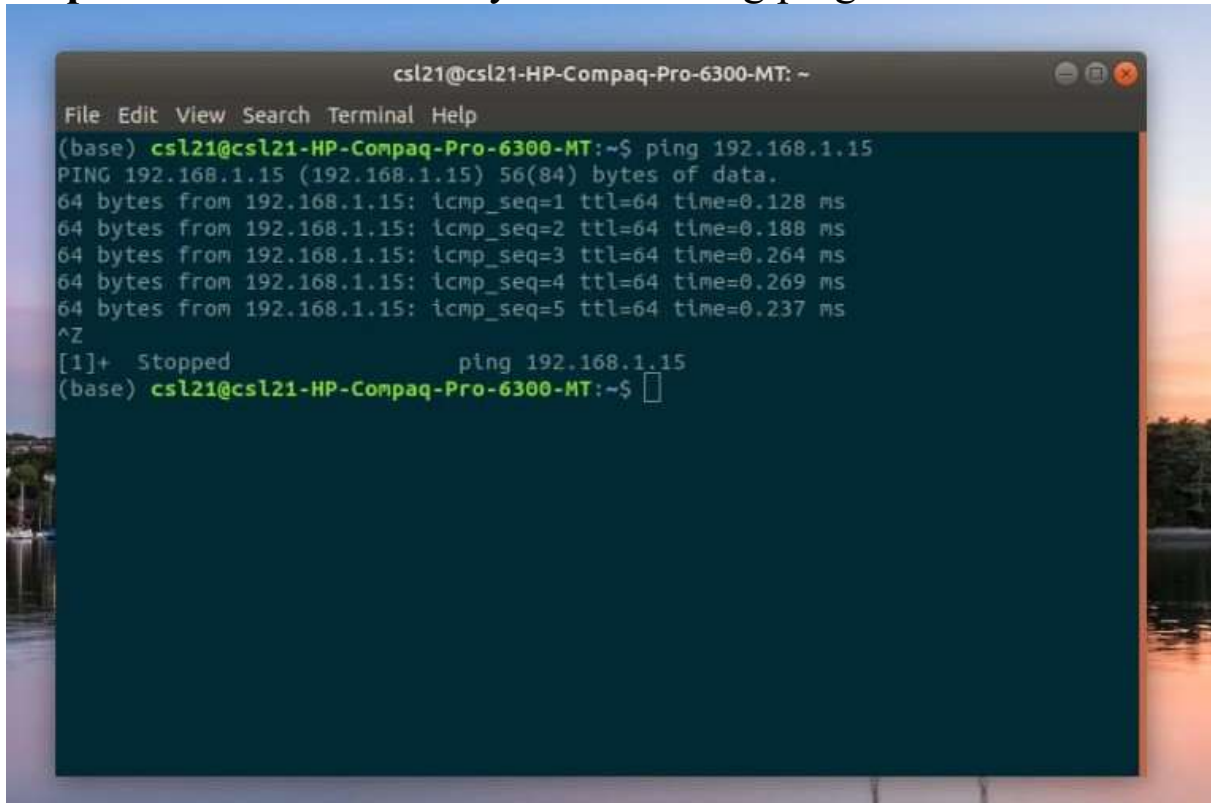
Configure IP Address

IP Address: 192.168.1.3  
Subnet Mask: 255.255.255.0

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Subnet Mask: 255.255.255.0

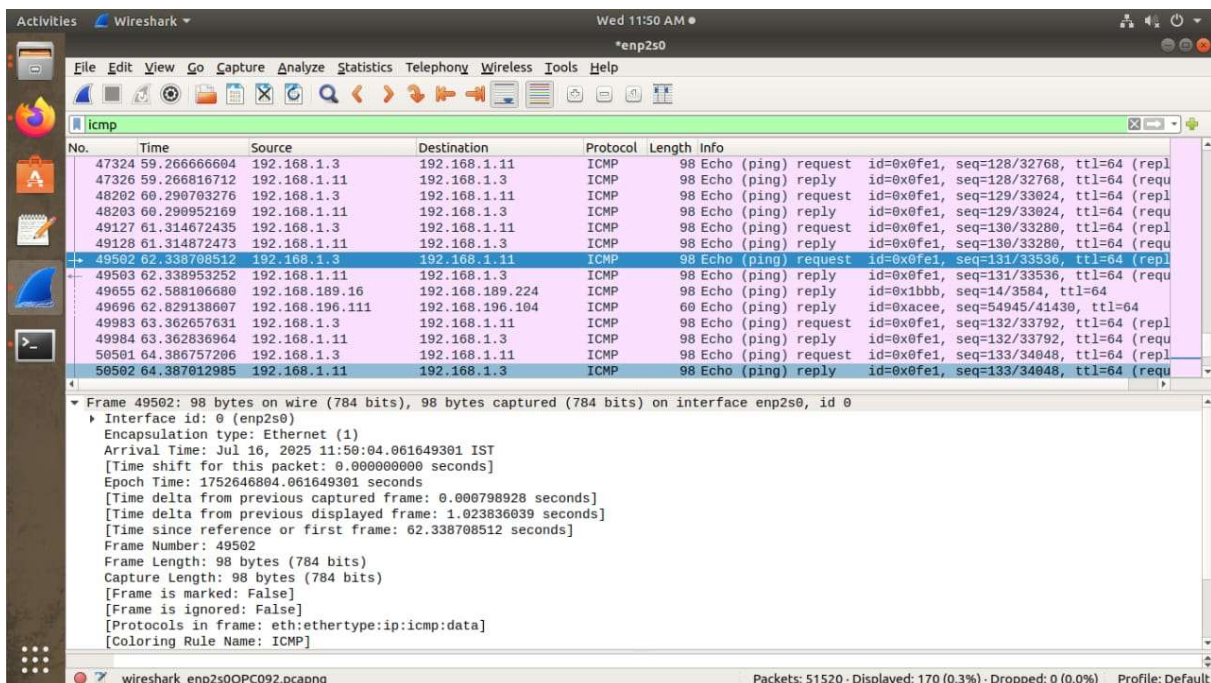


### Step3: Test the connectivity of Host using ping command



```
csl21@csl21-HP-Compaq-Pro-6300-MT: ~  
File Edit View Search Terminal Help  
(base) csl21@csl21-HP-Compaq-Pro-6300-MT:~$ ping 192.168.1.15  
PING 192.168.1.15 (192.168.1.15) 56(84) bytes of data.  
64 bytes from 192.168.1.15: icmp_seq=1 ttl=64 time=0.128 ms  
64 bytes from 192.168.1.15: icmp_seq=2 ttl=64 time=0.188 ms  
64 bytes from 192.168.1.15: icmp_seq=3 ttl=64 time=0.264 ms  
64 bytes from 192.168.1.15: icmp_seq=4 ttl=64 time=0.269 ms  
64 bytes from 192.168.1.15: icmp_seq=5 ttl=64 time=0.237 ms  
^Z  
[1]+  Stopped                  ping 192.168.1.15  
(base) csl21@csl21-HP-Compaq-Pro-6300-MT:~$
```

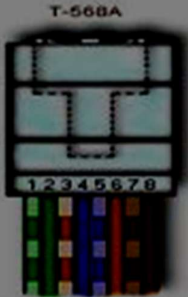
### Step4: Capture the traces of ping using Wireshark Protocol Analyzer




## Demo II: Connect Four Computer in LAN using straight through twisted pair Cable and switch

**Step1:** Prepare Straight through twisted pair Cable using Cabling Standard 568A or 568B

### Pin Diagram TIA/EIA 568-A

PIN	F()	Pair	Polarity	COLOR	A	
1	Rx	3	Rx+	Green/White	G	
2	Rx	3	RX-	Green	G	
3	<u>Tx</u>	2	<u>Tx+</u>	Orange/White	O	
4	-	1	Not Used	Blue	B	
5	-	1	Not Used	Blue/White	B	
6	<u>Tx</u>	2	<u>Tx-</u>	Orange	O	
7	-	4	Not Used	Brown/White	B	
8	-	4	Not Used	Brown	B	

### Pin Diagram TIA/EIA 568-B

PIN	F()	Pair	Polarity	COLOR	A	
1	<u>Tx</u>	2	<u>Tx+</u>	Orange/White	O	
2	<u>Tx</u>	2	<u>Tx-</u>	Orange	O	
3	Rx	3	Rx+	Green/White	G	
4	-	1	Not Used	Blue	B	
5	-	1	Not Used	Blue/White	B	
6	Rx	3	Rx-	Green	G	
7	-	4	Not Used	Brown/White	B	
8	-	4	Not Used	Brown	B	



**Step2:** Connect Four Computer in LAN using Straight through twisted pair Cable and switch as shown in figure below

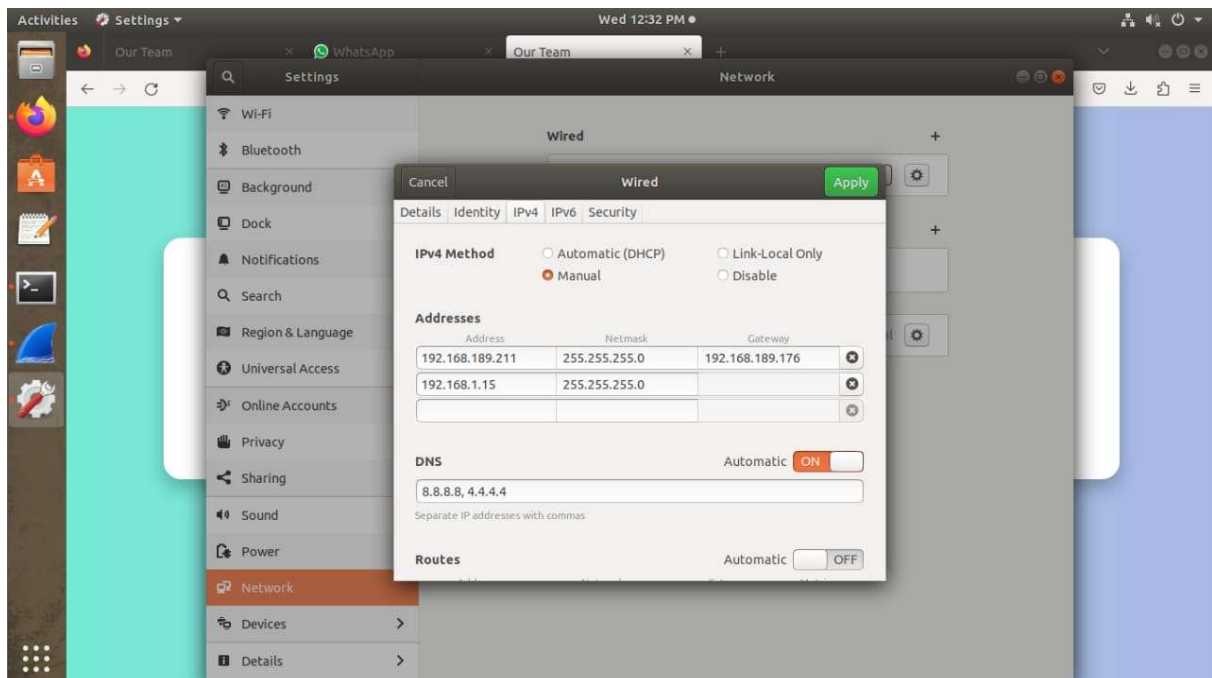
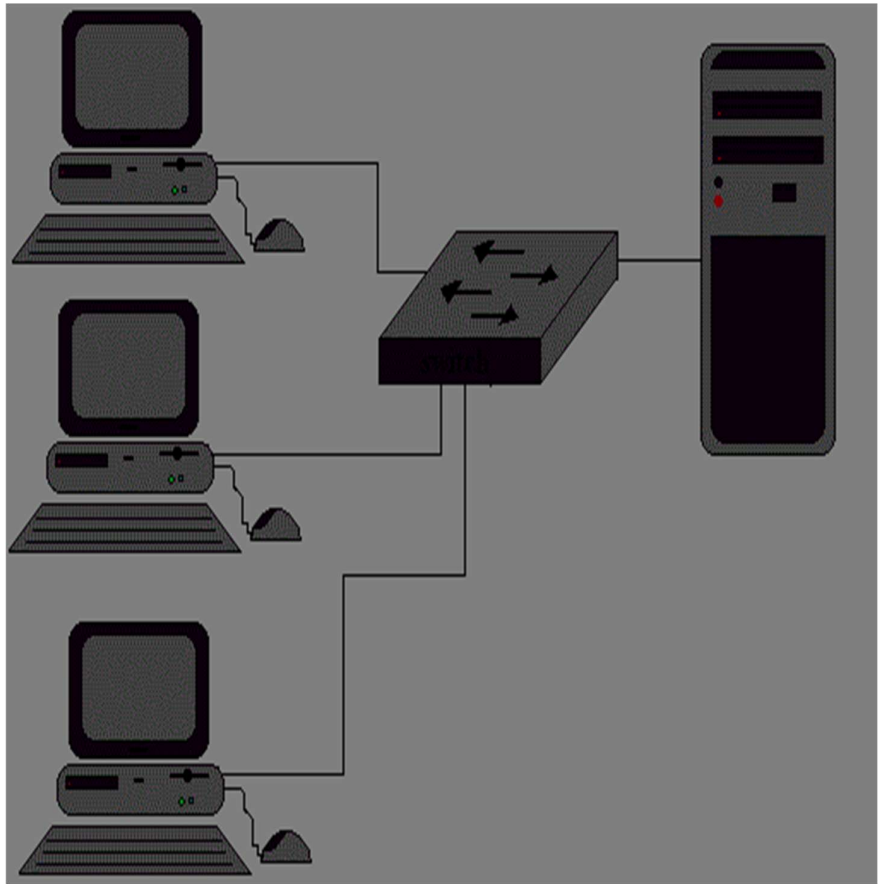
Configure IP Address

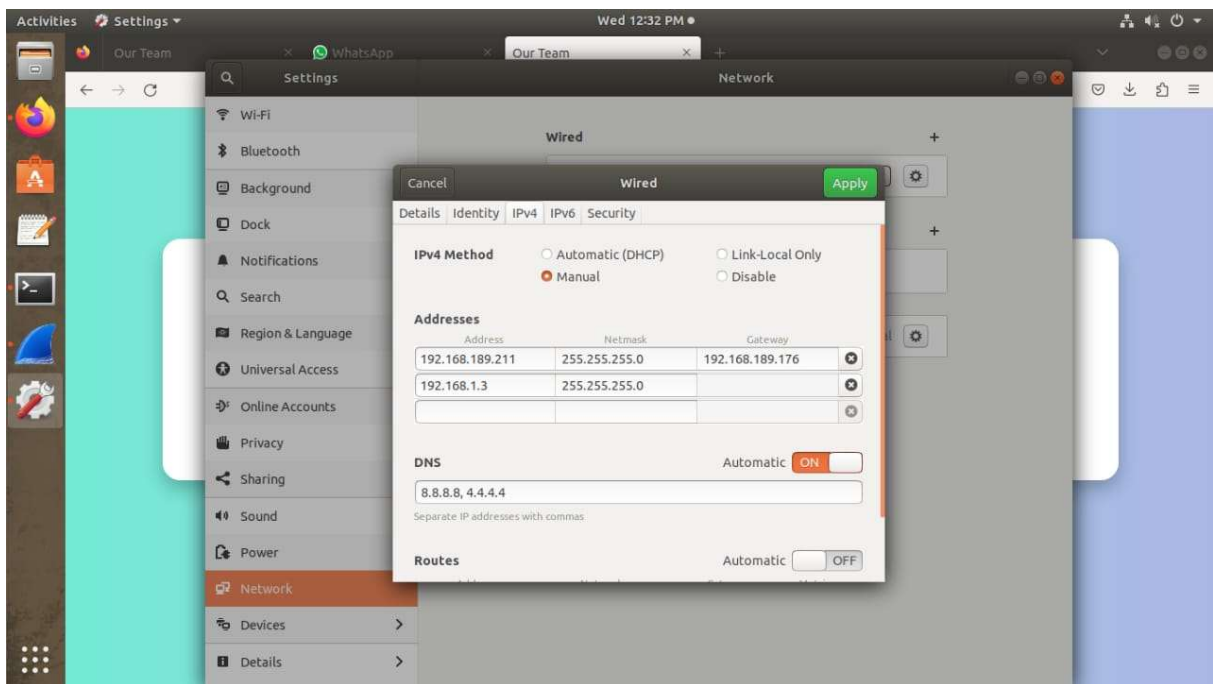
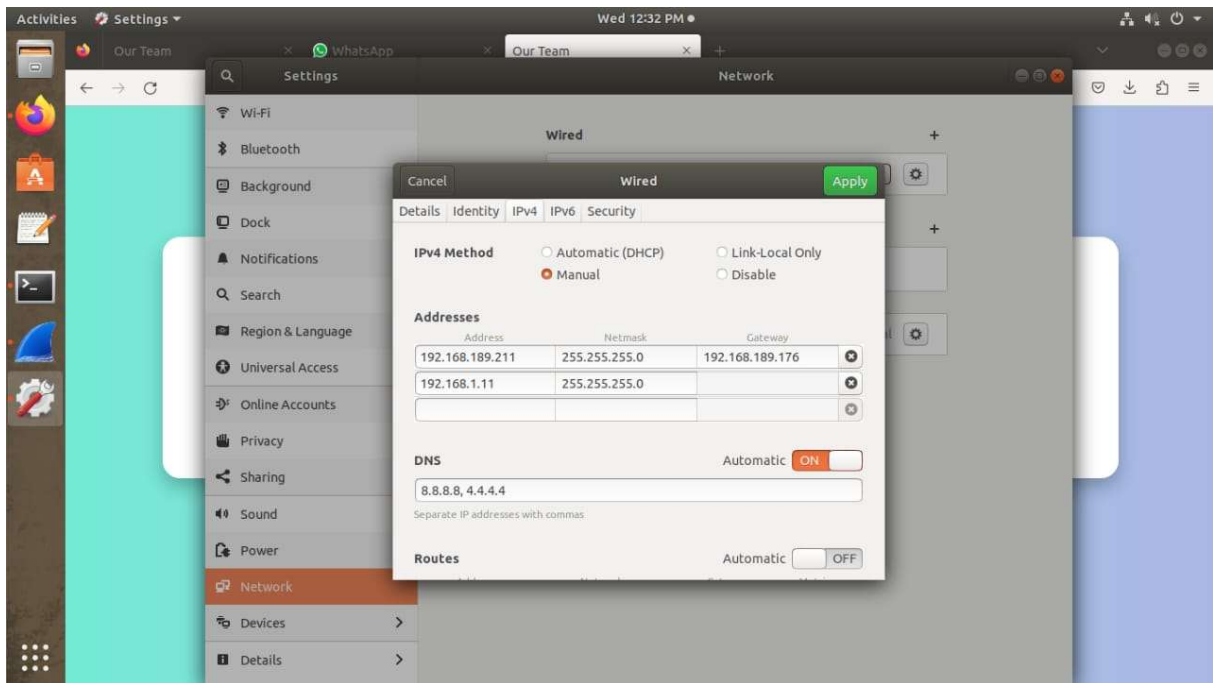
IP Address: 192.168.1.11 (**Server**)  
Subnet Mask: 255.255.255.0

IP Address: 192.168.1.15  
Subnet Mask: 255.255.255.0

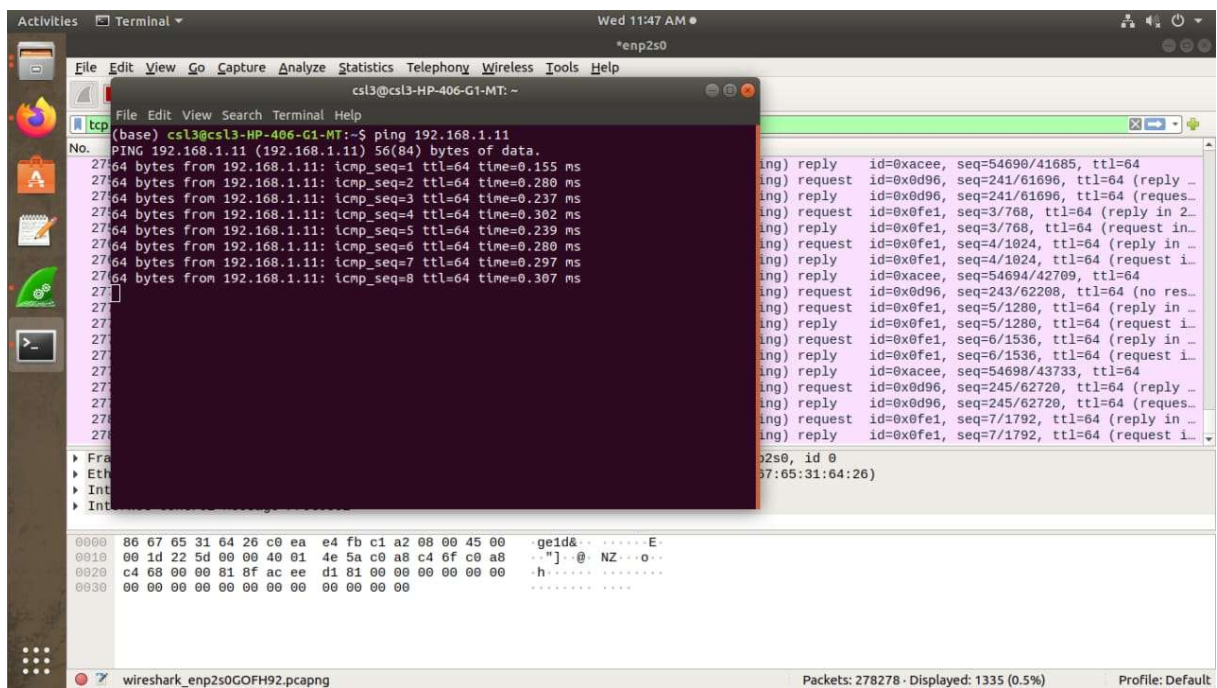
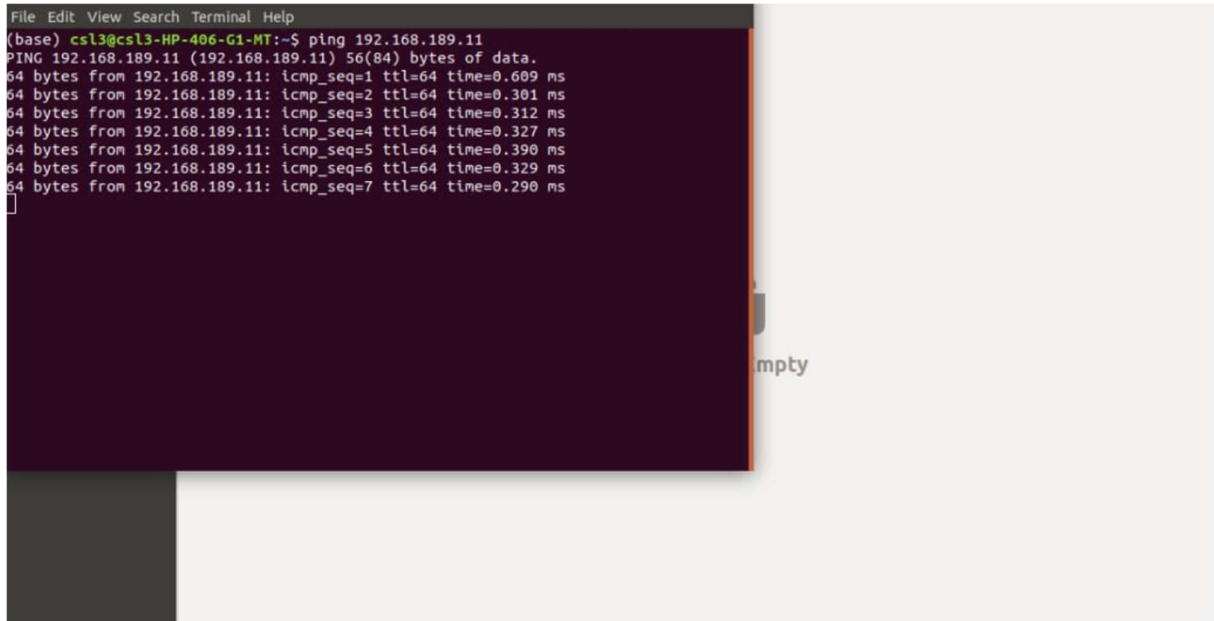
IP Address: 192.168.1.3  
Subnet Mask: 255.255.255.0

IP Address: 192.168.1.6  
Subnet Mask: 255.255.255.0











#### Step4: Capture the traces of ping using Wireshark Protocol Analyzer

The image shows a Wireshark network traffic capture window. The top menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. The main display area shows a list of captured packets, with the 'icmp' filter applied. The packet list table is as follows:

No.	Time	Source	Destination	Protocol	Length	Info
47324	59.2666666684	192.168.1.3	192.168.1.11	ICMP	98	Echo (ping) request id=0x0fe1, seq=128/32768, ttl=64 (repl
47326	59.266816712	192.168.1.11	192.168.1.3	ICMP	98	Echo (ping) reply id=0x0fe1, seq=128/32768, ttl=64 (requ
48202	60.290703276	192.168.1.3	192.168.1.11	ICMP	98	Echo (ping) request id=0x0fe1, seq=129/33024, ttl=64 (repl
48203	60.290952169	192.168.1.11	192.168.1.3	ICMP	98	Echo (ping) reply id=0x0fe1, seq=129/33024, ttl=64 (requ
49127	61.314672435	192.168.1.3	192.168.1.11	ICMP	98	Echo (ping) request id=0x0fe1, seq=130/33280, ttl=64 (repl
49128	61.314872473	192.168.1.11	192.168.1.3	ICMP	98	Echo (ping) reply id=0x0fe1, seq=130/33280, ttl=64 (requ
49502	62.338708512	192.168.1.3	192.168.1.11	ICMP	98	Echo (ping) request id=0x0fe1, seq=131/33536, ttl=64 (repl
49503	62.338953252	192.168.1.11	192.168.1.3	ICMP	98	Echo (ping) reply id=0x0fe1, seq=131/33536, ttl=64 (requ
49655	62.588106680	192.168.189.16	192.168.189.224	ICMP	98	Echo (ping) reply id=0x1bbb, seq=14/3584, ttl=64
49696	62.829138607	192.168.196.111	192.168.196.104	ICMP	60	Echo (ping) reply id=0xacee, seq=54945/41430, ttl=64
49983	63.362657631	192.168.1.3	192.168.1.11	ICMP	98	Echo (ping) request id=0x0fe1, seq=132/33792, ttl=64 (repl
49984	63.362836964	192.168.1.11	192.168.1.3	ICMP	98	Echo (ping) reply id=0x0fe1, seq=132/33792, ttl=64 (requ
50501	64.386757206	192.168.1.3	192.168.1.11	ICMP	98	Echo (ping) request id=0x0fe1, seq=133/34048, ttl=64 (repl
50502	64.387012985	192.168.1.11	192.168.1.3	ICMP	98	Echo (ping) reply id=0x0fe1, seq=133/34048, ttl=64 (requ

The packet details pane for frame 49502 shows the following information:

- Frame 49502: 98 bytes on wire (784 bits), 98 bytes captured (784 bits) on interface enp2s0, id 0
- Interface id: 0 (enp2s0)
- Encapsulation type: Ethernet (1)
- Arrival Time: Jul 16, 2025 11:50:04.061649301 IST
- [Time shift for this packet: 0.000000000 seconds]
- Epoch Time: 1752646804.061649301 seconds
- [Time delta from previous captured frame: 0.000798928 seconds]
- [Time delta from previous displayed frame: 1.023836039 seconds]
- [Time since reference or first frame: 62.338708512 seconds]
- Frame Number: 49502
- Frame Length: 98 bytes (784 bits)
- Capture Length: 98 bytes (784 bits)
- [Frame is marked: False]
- [Frame is ignored: False]
- [Protocols in frame: eth:ethertype:ip:icmp:data]
- [Coloring Rule Name: ICMP]

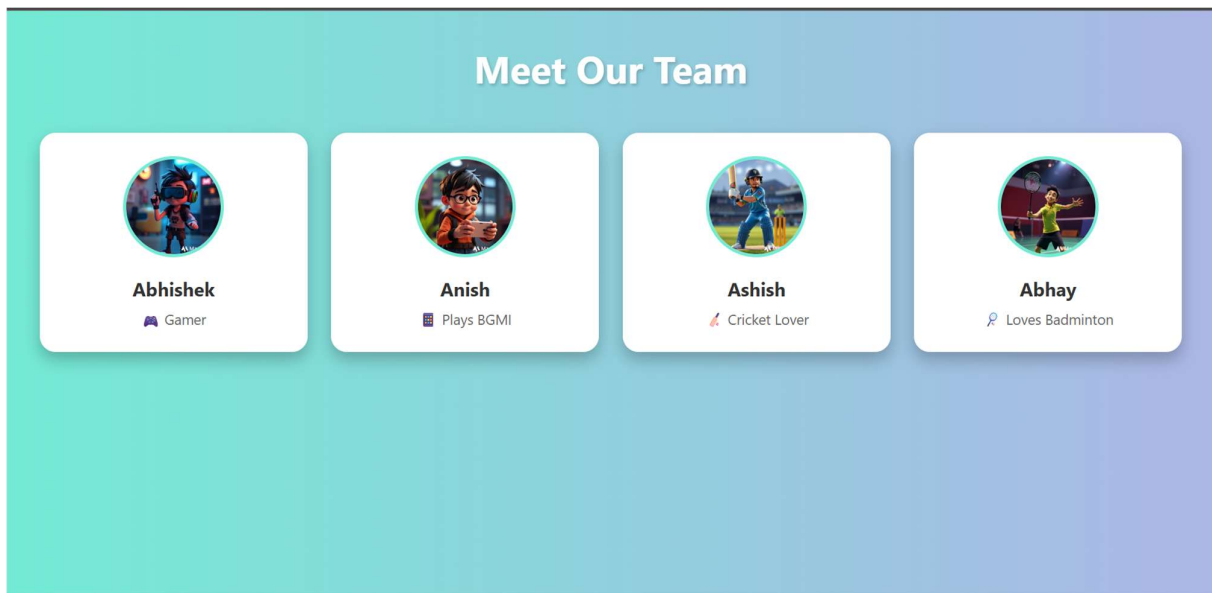
The status bar at the bottom indicates: wireshark\_enp2s0QPC092.pcapng, Packets: 51520 - Displayed: 170 (0.3%) - Dropped: 0 (0.0%) Profile: Default.

## Demo III: Testing of Web Server Over LAN Set in DemoII

### Follow following Steps

1. Installation of Web Server on one Computer – Apache2 or Tomcat7
2. Install the server – `sudo apt-get install apache2`
3. Start web server - `/etc/init.d/apache2 start`
4. Create the web page and store in `/var/www/html`
5. Access the web pages from client machines 1/2/3
- 6.

**Access Web Page:** `http://192.168.1.44/index.html`



Test the web server by accessing web pages stored on server and capture the traces of http, tcp, ip and Ethernet-II using Wireshark

The image shows a Wireshark network traffic capture. The top menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. The status bar at the top indicates 'Capturing from enp2s0' and 'Fri 12:42 PM'. The filter bar shows 'tcp && ip.addr==192.168.1.62'. The packet list table displays the following data:

No.	Time	Source	Destination	Protocol	Length	Info
883	1.835552802	192.168.1.62	192.168.1.58	TCP	66	80 → 47764 [FIN, ACK] Seq=1 Ack=1 Win=504 Len=0 TSval=306849413...
884	1.835621941	192.168.1.62	192.168.1.58	TCP	66	80 → 47782 [FIN, ACK] Seq=1 Ack=1 Win=504 Len=0 TSval=306849413...
885	1.835930508	192.168.1.58	192.168.1.62	TCP	66	47782 → 80 [FIN, ACK] Seq=1 Ack=2 Win=7794 Len=0 TSval=10261342...
886	1.835931166	192.168.1.58	192.168.1.62	TCP	66	47764 → 80 [FIN, ACK] Seq=1 Ack=2 Win=5937 Len=0 TSval=10261342...
887	1.835965581	192.168.1.62	192.168.1.58	TCP	66	80 → 47782 [ACK] Seq=2 Ack=2 Win=504 Len=0 TSval=3068494138 TSe...
888	1.835980887	192.168.1.62	192.168.1.58	TCP	66	80 → 47764 [ACK] Seq=2 Ack=2 Win=501 Len=0 TSval=3068494138 TSe...
889	1.838776056	192.168.1.62	192.168.1.58	TCP	66	80 → 47748 [FIN, ACK] Seq=1 Ack=1 Win=504 Len=0 TSval=306849414...
890	1.838819395	192.168.1.62	192.168.1.58	TCP	66	80 → 47766 [FIN, ACK] Seq=1 Ack=1 Win=504 Len=0 TSval=306849414...
892	1.839053801	192.168.1.58	192.168.1.62	TCP	66	47766 → 80 [FIN, ACK] Seq=1 Ack=2 Win=2852 Len=0 TSval=10261342...
893	1.839070869	192.168.1.62	192.168.1.58	TCP	66	80 → 47766 [ACK] Seq=2 Ack=2 Win=504 Len=0 TSval=3068494141 TSe...
894	1.839086645	192.168.1.58	192.168.1.62	TCP	66	47748 → 80 [FIN, ACK] Seq=1 Ack=2 Win=2719 Len=0 TSval=10261342...
895	1.839092446	192.168.1.62	192.168.1.58	TCP	66	80 → 47748 [ACK] Seq=2 Ack=2 Win=504 Len=0 TSval=3068494141 TSe...

The packet details pane for packet 883 shows the following structure:

- Frame 883: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface enp2s0, id 0
- Ethernet II, Src: HewlettP\_43:e3:b7 (48:0f:cf:43:e3:b7), Dst: HewlettP\_27:be:7b (2c:27:d7:27:be:7b)
- Internet Protocol Version 4, Src: 192.168.1.62, Dst: 192.168.1.58
- Transmission Control Protocol, Src Port: 80, Dst Port: 47764, Seq: 1, Ack: 1, Len: 0

The packet bytes pane shows the raw data in hexadecimal and ASCII:

```
0000 2c 27 d7 27 be 7b 48 0f cf 43 e3 b7 08 00 45 00 ,.'.{H..C...E-
0010 00 34 c1 c1 40 00 40 06 f5 39 c0 a8 01 3e c0 a8 .4..@..:9...>..
0020 01 3a 00 50 ba 94 f9 89 7c 3a dd 85 36 5b 08 11 .:P....[:6[...
0030 01 f5 83 ef 00 00 01 01 08 0a b6 e5 81 3a 3d 29 .....(=)
0040 7d 95 }-
```

The status bar at the bottom indicates 'enp2s0: <live capture in progress>', 'Packets: 16081 - Displayed: 12 (0.1%)', and 'Profile: Default'.