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School of Technology
Department of ICT
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20IC306P

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Experiment-9

Aim: To understand the working of NAT by using Wire-shark.

Software Tools required: Wire-shark.

NAT Measurement Scenario

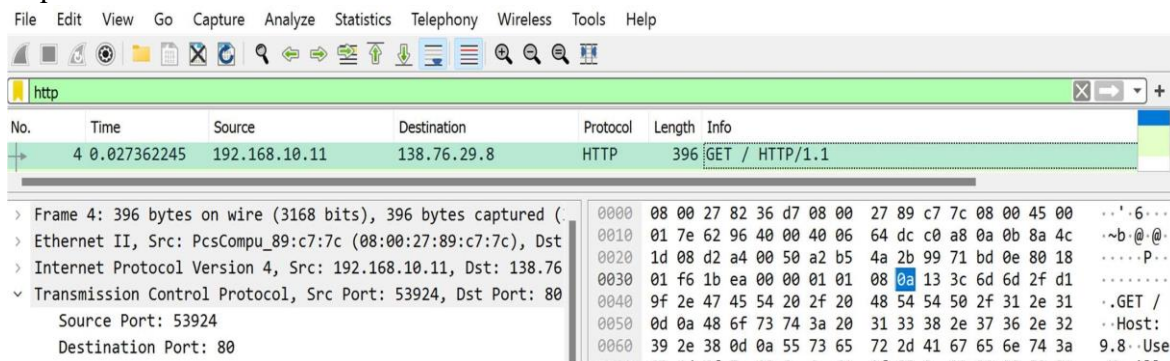
Q.1 What is the IP address of the client that sends the HTTP GET request in the nat-inside-wiresharktrace1-1.pcapng trace? What is the source port number of the TCP segment in this datagram containing the HTTP GET request? What is the destination IP address of this HTTP GET request? What is the destination port number of the TCP segment in this datagram containing the HTTP GET request?

Ans: IP address of the client :192.168.10.11,

Source port number of the TCP segment in this datagram containing the HTTP GET request:53924,

Destination IP address of this HTTP GET request :138.76.29.8,

Destination port number of the TCP segment in this datagram containing the HTTP GET request :80.



.2 At what time is the corresponding HTTP 200 OK message from the webserver forwarded by the NAT router to the client on the router's LAN side?

Ans: Time the OK message is forwarded: 09:20:27.774683377 IST.

6	0.030672101	138.76.29.8	192.168.10.11	HTTP	613	HTTP/1.1 200 OK (text/html)
▼ Frame 6: 613 bytes on wire (4904 bits), 613 bytes captured (4904 bits) on						
Section number: 1						
Interface id: 0 (eth1)						
Encapsulation type: Ethernet (1)						
Arrival Time: Mar 29, 2021 09:20:27.774683377 India Standard Time						
0000	08 00 27 89 c7 7c 08 00	27 82 36 d7				
0010	02 57 6c 7c 40 00 3e 06	5c 1d 8a 4c				
0020	0a 0b 00 50 d2 a4 99 71	bd 0e a2 b5				
0030	01 fb 2c 58 00 00 01 01	08 0a 2f d1				
0040	6d 6d 48 54 54 50 2f 31	2e 31 20 32				
0050	4b 0d 0a 44 61 74 65 3a	20 4d 6f 6e				

Q.3 What are the source and destination IP addresses and TCP source and destination ports on the IP datagram carrying this HTTP 200 OK message?

Ans: IP address :138.76.29.8,

Source port number of the TCP segment in this datagram carrying HTTP 200 OK message: 80, Destination IP address: 192.168.10.11,

Destination port number of the TCP segment in this datagram carrying HTTP 200 OK message :53924.

6	0.030672101	138.76.29.8	192.168.10.11	HTTP	613	HTTP/1.1 200 OK (text/html)
▼ Transmission Control Protocol, Src Port: 80, Dst Port: 53924, Seq: 1, Ac						
Source Port: 80						
Destination Port: 53924						
0000	08 00 27 89 c7 7c 08 00	27 82 36 d7 08 00 45 0				
0010	02 57 6c 7c 40 00 3e 06	5c 1d 8a 4c 1d 08 c0 a				
0020	0a 0b 00 50 d2 a4 99 71	bd 0e a2 b5 4b 75 80 1				
0030	01 fb 2c 58 00 00 01 01	08 0a 2f d1 9f 4b 13 3				

Q.4 At what time does this HTTP GET message appear in the nat-outside-wireshark-trace1-1.pcapng trace file?

Ans: Time when the HTTP Get message appears: 09:20:27.771391145 IST.

No.	Time	Source	Destination	Protocol	Length	Info
4	0.027356291	10.0.1.254	138.76.29.8	HTTP	396	GET / HTTP/1.1
▼ Frame 4: 396 bytes on wire (3168 bits), 396 bytes captured (3168 bits) on						
Section number: 1						
Interface id: 0 (eth0)						
Encapsulation type: Ethernet (1)						
Arrival Time: Mar 29, 2021 09:20:27.771391145 India Standard Time						
[Time shift for this packet: 0.000000000 seconds]						
0000	08 00 27 22 fd 74 08 00	27 43				
0010	01 7e 62 96 40 00 3f 06	24 92				
0020	1d 08 d2 a4 00 50 a2 b5	4a 2b				
0030	01 f6 da 9f 00 00 01 01	08 0a				
0040	9f 2e 47 45 54 20 2f 20	48 54				
0050	0d 0a 48 6f 73 74 3a 20	31 33				
0060	39 2e 38 0d 0a 55 73 65	72 2d				

Q.5 What are the source and destination IP addresses and TCP source and destination port numbers on the IP datagram carrying this HTTP GET (as recorded in the nat-outside-wireshark-trace1-1.pcapng trace file)?

Ans: IP address :10.0.1.254,

Source port number of the TCP segment in this datagram carrying HTTP GET message: 53924,

Destination IP address: 138.76.29.8,

Destination port number of the TCP segment in this datagram carrying HTTP GET message :80.

No.	Time	Source	Destination	Protocol	Length	Info
4	0.027356291	10.0.1.254	138.76.29.8	HTTP	396	GET / HTTP/1.1

<ul style="list-style-type: none"> > Frame 4: 396 bytes on wire (3168 bits), 396 bytes captured (3168 bits) on interface 0 > Ethernet II, Src: PcsCompu_43:65:cd (08:00:27:43:65:cd), Dst: PcsCompu_27:43:65:cd (08:00:27:43:65:cd) > Internet Protocol Version 4, Src: 10.0.1.254, Dst: 138.76.29.8 ▼ Transmission Control Protocol, Src Port: 53924, Dst Port: 80, Seq: 1, Ack: 396, Win: 0, Len: 0 <ul style="list-style-type: none"> Source Port: 53924 Destination Port: 80 	<pre> 0000 08 00 27 22 fd 74 08 00 27 43 65 cd 08 00 45 00 0010 01 7e 62 96 40 00 3f 06 24 92 0a 00 01 fe 8a 40 0020 1d 08 d2 a4 00 50 a2 b5 4a 2b 99 71 bd 0e 80 11 0030 01 f6 da 9f 00 00 01 01 08 0a 13 3c 6d 6d 2f d1 0040 9f 2e 47 45 54 20 2f 20 48 54 54 50 2f 31 2e 33 0050 0d 0a 48 6f 73 74 3a 20 31 33 38 2e 37 36 2e 33 0060 39 2e 38 0d 0a 55 73 65 72 2d 41 67 65 6e 74 33 </pre>
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Q.6 Which of these four fields are different than in your answer to question 1 above? Ans: Source IP Address differ over here.

Q.7 Are any fields in the HTTP GET message changed?
Ans: Yes, header and header checksum for the HTTP GET message changes.

Q.8 Which of the following fields in the IP datagram carrying the HTTP GET are changed from the datagram received on the local area network (inside) to the corresponding datagram forwarded on the Internet side (outside) of the NAT router: Version, Header Length, Flags, Checksum?
Ans: As the Source IP Address changes, the value of the checksum changes but the other fields version, header length and flags remains the same.

Q.9 At what time does this message appear in the nat-outside-wireshark-trace1-1.pcapng trace file?

Ans: Time when the HTTP OK message appears: 09:20:27.774660820 IST.

No.	Time	Source	Destination	Protocol	Length	Info
4	0.027356291	10.0.1.254	138.76.29.8	HTTP	396	GET / HTTP/1.1
6	0.030625966	138.76.29.8	10.0.1.254	HTTP	613	HTTP/1.1 200 OK (text/html)

<ul style="list-style-type: none"> ▼ Frame 6: 613 bytes on wire (4904 bits), 613 bytes captured (4904 bits) on interface 0 Section number: 1 > Interface id: 0 (eth0) Encapsulation type: Ethernet (1) Arrival Time: Mar 29, 2021 09:20:27.774660820 India Standard Time 	<pre> 0000 08 00 27 43 65 cd 08 00 27 22 fd 74 08 00 27 43 65 cd 0010 02 57 6c 7c 40 00 3f 06 19 d3 02 57 6c 7c 40 00 3f 06 0020 01 fe 00 50 d2 a4 99 71 bd 0e 01 fe 00 50 d2 a4 99 71 0030 01 fb eb 0d 00 00 01 01 08 0a 6d 6d 48 54 54 50 2f 31 0040 6d 6d 48 54 54 50 2f 31 2e 33 4b 0d 0a 44 61 74 65 3a 0050 20 4d </pre>
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Q.10 What are the source and destination IP addresses and TCP source and destination port numbers on the IP datagram carrying this HTTP reply (“200 OK”) message (as recorded in the nat-outside-wireshark-trace1-1.pcapng trace file)?

Ans: IP address :138.76.29.8,
Source port number of the TCP segment in this datagram carrying HTTP reply (200 OK) message: 80, Destination IP address: 10.0.1.254,
Destination port number of the TCP segment in this datagram carrying HTTP reply (200 OK) message :53924.

6	0.030625966	138.76.29.8	10.0.1.254	HTTP	613 HTTP/1.1 200 OK (text/html)
>	Frame 6: 613 bytes on wire (4904 bits), 613 bytes captured (4904 bits) on				
>	Ethernet II, Src: PcsCompu_22:fd:74 (08:00:27:22:fd:74), Dst: PcsCompu_4				
>	Internet Protocol Version 4, Src: 138.76.29.8, Dst: 10.0.1.254				
▼	Transmission Control Protocol, Src Port: 80, Dst Port: 53924, Seq: 1, Ac				
	Source Port: 80				
	Destination Port: 53924				

Q.11 What are the source and destination IP addresses and TCP source and destination port numbers on the IP datagram carrying the HTTP reply (“200 OK”) that is forwarded from the router to the destination host in the right of Figure 1?

Ans: IP address :138.76.29.8,

Source port number of the TCP segment in this datagram carrying HTTP reply (200 OK) message that is forwarded from the router to the destination host: 80,

Destination IP address: 192.168.10.11,

Destination port number of the TCP segment in this datagram carrying HTTP reply (200 OK) message that is forwarded from the router to the destination host:53924.

6	0.030672101	138.76.29.8	192.168.10.11	HTTP	613 HTTP/1.1 200 OK (text/html)
>	Frame 6: 613 bytes on wire (4904 bits), 613 bytes captured (4904 bits) on				
>	Ethernet II, Src: PcsCompu_82:36:d7 (08:00:27:82:36:d7), Dst: PcsCompu_8				
>	Internet Protocol Version 4, Src: 138.76.29.8, Dst: 192.168.10.11				
▼	Transmission Control Protocol, Src Port: 80, Dst Port: 53924, Seq: 1, Ac				
	Source Port: 80				
	Destination Port: 53924				