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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

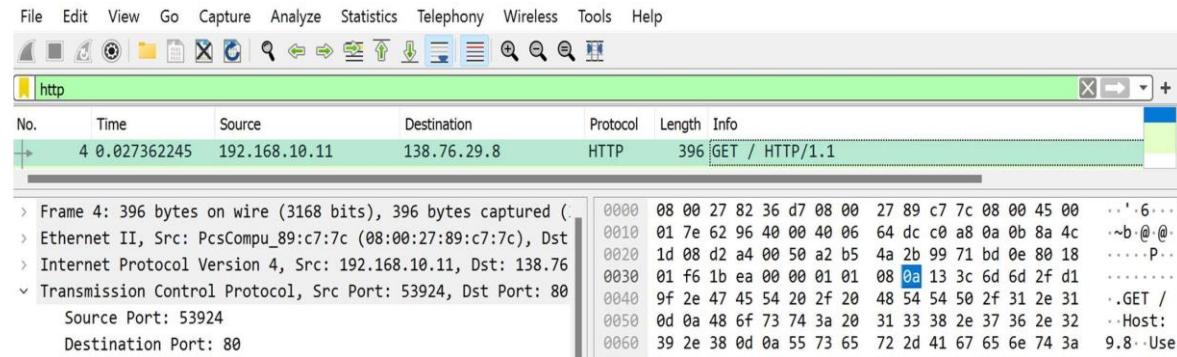
Q.1 What is the IP address of the client that sends the HTTP GET request in the nat-inside-wiresharktrace1-1.pcapng trace? What is the source port number of the TCP segment in this datagram containing the HTTP GET request? What is the destination IP address of this HTTP GET request? What is the destination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



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http

No.	Time	Source	Destination	Protocol	Length	Info
4	0.027362245	192.168.10.11	138.76.29.8	HTTP	396	GET / HTTP/1.1

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> Frame 4: 396 bytes on wire (3168 bits), 396 bytes captured (3168 bits)
> Ethernet II, Src: PcsCompu_89:c7:7c (08:00:27:89:c7:7c), Dst: 
> Internet Protocol Version 4, Src: 192.168.10.11, Dst: 138.76.29.8
> Transmission Control Protocol, Src Port: 53924, Dst Port: 80
    Source Port: 53924
    Destination Port: 80
0000  08 00 27 82 36 d7 08 00  27 89 c7 7c 08 00 45 00  ..'6...
0010  01 7e 62 96 40 00 40 06  64 dc c0 a8 0a 0b 8a 4c  ~b:@@
0020  1d 08 d2 a4 00 50 a2 b5  4a 2b 99 71 bd 0e 80 18  ....P...
0030  01 f6 1b ea 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 31  .GET /
0050  0d 0a 48 6f 73 74 3a 20  31 33 38 2e 37 36 2e 32  .Host:
0060  39 2e 38 0d 0a 55 73 65  72 2d 41 67 65 6e 74 3a  9.8.Used

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.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) o				
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, Ack: 1				
Source Port: 80				
Destination Port: 53924				
0000 08 00 27 89 c7 7c 08 00 27 82 36 d7 08 00 45 01 0010 02 57 6c 7c 40 00 3e 06 5c 1d 8a 4c 1d 08 c0 a1 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) o						
Section number: 1						
> Interface id: 0 (eth0)						
Encapsulation type: Ethernet (1)						
Arrival Time: Mar 29, 2021 09:20:27.771391145 India Standard Time						
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
> Frame 4: 396 bytes on wire (3168 bits), 396 bytes captured (3168 bits) o						
> Ethernet II, Src: PcsCompu_43:65:cd (08:00:27:43:65:cd), Dst: PcsCompu_2						
> 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, Ac						
Source Port: 53924						
Destination Port: 80						
0000 08 00 27 22 fd 74 08 00 27 43 65 cd 08 00 45 0						
0010 01 7e 62 96 40 00 3f 06 24 92 0a 00 01 fe 8a 4						
0020 1d 08 d2 a4 00 50 a2 b5 4a 2b 99 71 bd 0e 80 1						
0030 01 f6 da 9f 00 00 01 01 08 0a 13 3c 6d 6d 2f d						
0040 9f 2e 47 45 54 20 2f 20 48 54 54 50 2f 31 2e 3						
0050 0d 0a 48 6f 73 74 3a 20 31 33 38 2e 37 36 2e 3						
0060 39 2e 38 0d 0a 55 73 65 72 2d 41 67 65 6e 74 3						

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)
> Frame 6: 613 bytes on wire (4904 bits), 613 bytes captured (4904 bits) o						
Section number: 1						
> Interface id: 0 (eth0)						
Encapsulation type: Ethernet (1)						
Arrival Time: Mar 29, 2021 09:20:27.774660820 India Standard Time						
0000 08 00 27 43 65 cd 08 00 27 22						
0010 02 57 6c 7c 40 00 3f 06 19 d3						
0020 01 fe 00 50 d2 a4 99 71 bd 0e						
0030 01 fb eb 0d 00 00 01 01 08 0a						
0040 6d 6d 48 54 54 50 2f 31 2e 31						
0050 4b 0d 0a 44 61 74 65 3a 20 4d						

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) o				
>	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				
0000	08 00 27 43 65 cd 08 00	27 22 fd 7			
0010	02 57 6c 7c 40 00 3f 06	19 d3 8a 4			
0020	01 fe 00 50 d2 a4 99 71	bd 0e a2 b			
0030	01 fb eb 0d 00 00 01 01	08 0a 2f c			
0040	6d 6d 48 54 54 50 2f 31	2e 31 20 3			
0050	4b 0d 0a 44 61 74 65 3a	20 4d 6f 6			
0060	20 4d 61 72 20 32 30 32	31 20 30 3			

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) o				
>	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				
0000	08 00 27 89 c7 7c 08 00	27 82 36 d7 0			
0010	02 57 6c 7c 40 00 3e 06	5c 1d 8a 4c 1			
0020	0a 0b 00 50 d2 a4 99 71	bd 0e a2 b5 4			
0030	01 fb 2c 58 00 00 01 01	08 0a 2f d1 9			
0040	6d 6d 48 54 54 50 2f 31	2e 31 20 32 3			
0050	4b 0d 0a 44 61 74 65 3a	20 4d 6f 6e 2			
0060	20 4d 61 72 20 32 30 32	31 20 30 33 3			