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DATE:14.10.25

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EXERCISE 16

TO CAPTURE, SAVE AND ANALYZE NETWORK TRAFFIC ON TCP/UDP/IP/HTTP/ARP/DHCP/ICMP/DNS USING WIRESHARK TOOL

AIM:

To capture, save, and analyse network traffic using Wireshark to understand protocol packet structures and develop competency in network analysis, troubleshooting, and security assessment.

ALGORITHM:

1. Launch Wireshark - Open the application and verify the network interfaces available
2. Select Network Interface - Choose active interface (Ethernet/Wi-Fi) and enable promiscuous mode
3. Start Packet Capture - Click the Start button to begin capturing packets
4. Generate Network Traffic - Open browser, ping hosts, browse websites to create TCP/UDP/ICMP/DNS traffic
5. Stop Capture - Click the Stop button after collecting sufficient packets (50-200 packets typical)
6. Apply Protocol Filters - Filter traffic using:
 - tcp for TCP packets
 - udp for UDP packets
 - icmp for ICMP ping traffic
 - dns for DNS queries
 - arp for ARP requests/replies
 - dhcp for DHCP messages
 - http for HTTP traffic
7. Analyze Individual Packets - Select packet, examine headers (Ethernet, IP, TCP/UDP), view payload data
8. Examine Protocol Layers - Review encapsulation from Layer 2 (Ethernet) → Layer 3 (IP) → Layer 4 (TCP/UDP) → Layer 7 (Application)
9. Save Capture File - File → Save As, choose format (pcapng or pcap), save with descriptive filename

10. Generate Statistics - Use Statistics menu to view protocol hierarchy, conversations, and endpoints
11. Document Findings - Record observations about protocol behavior, connections, and traffic patterns
12. Create Analysis Report - Compile results with conclusions about network communication

OUTPUT:

i. CAPTURE THE PACKET

2 0.000000	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=2 Win=8355 Len=0
3 0.000037	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=2 Ack=1 Win=8442 Len=1
4 0.000077	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=3 Win=8351 Len=0
5 0.000141	127.0.0.1	127.0.0.1	TCP	123 51615 → 51652 [PSH, ACK] Seq=1 Ack=1 Win=8374 Len=79
6 0.000148	127.0.0.1	127.0.0.1	TCP	44 51652 → 51615 [ACK] Seq=1 Ack=80 Win=8356 Len=0
7 0.003778	127.0.0.1	127.0.0.1	TCP	123 51615 → 51652 [PSH, ACK] Seq=80 Ack=1 Win=8374 Len=79
8 0.003882	127.0.0.1	127.0.0.1	TCP	44 51652 → 51615 [ACK] Seq=1 Ack=159 Win=8374 Len=0
9 0.003907	127.0.0.1	127.0.0.1	TCP	201 51615 → 51652 [PSH, ACK] Seq=159 Ack=1 Win=8374 Len=237
10 0.003906	127.0.0.1	127.0.0.1	TCP	44 51652 → 51615 [ACK] Seq=1 Ack=395 Win=8355 Len=0
11 0.110626	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=3 Ack=1 Win=8442 Len=1
12 0.110655	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=8 Win=8442 Len=0
13 0.150482	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=4 Ack=1 Win=8442 Len=1
14 0.150489	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=5 Win=8435 Len=0
15 0.187275	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=5 Ack=1 Win=8442 Len=1
16 0.187300	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=6 Win=8435 Len=0
17 0.187485	127.0.0.1	127.0.0.1	TCP	123 51615 → 51652 [PSH, ACK] Seq=395 Ack=1 Win=8374 Len=79
18 0.187506	127.0.0.1	127.0.0.1	TCP	44 51652 → 51615 [ACK] Seq=1 Ack=475 Win=8355 Len=0
19 0.217730	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=6 Ack=1 Win=8442 Len=1
20 0.217735	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=7 Win=8435 Len=0
21 0.220428	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=7 Ack=1 Win=8442 Len=1
22 0.220428	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=8 Win=8435 Len=0
23 0.297821	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=8 Ack=1 Win=8442 Len=1
24 0.297837	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=9 Win=8435 Len=0
25 0.297965	127.0.0.1	127.0.0.1	TCP	123 51615 → 51652 [PSH, ACK] Seq=475 Ack=1 Win=8374 Len=79

> Frame 17: Packet, 45 bytes on wire (360 bits), 45 bytes captured (360 bits) on interface Device\NPF_{...} Loopback, Id 0

> Null/loopback

> Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1

> Transmission Control Protocol, Src Port: 51611, Dst Port: 51610, Seq: 1, Ack: 1, Len: 1

> Data (1 byte)

0000 02 00 00 00 45 00 00 20 55 de 40 00 00 00 00 00U@....

0010 7f 00 00 01 7f 00 00 01 c9 9b c9 9a 6c 58 4e 001@....

0020 06 19 e4 09 10 18 20 fa a0 bc 00 00 00 00 00 00P.....

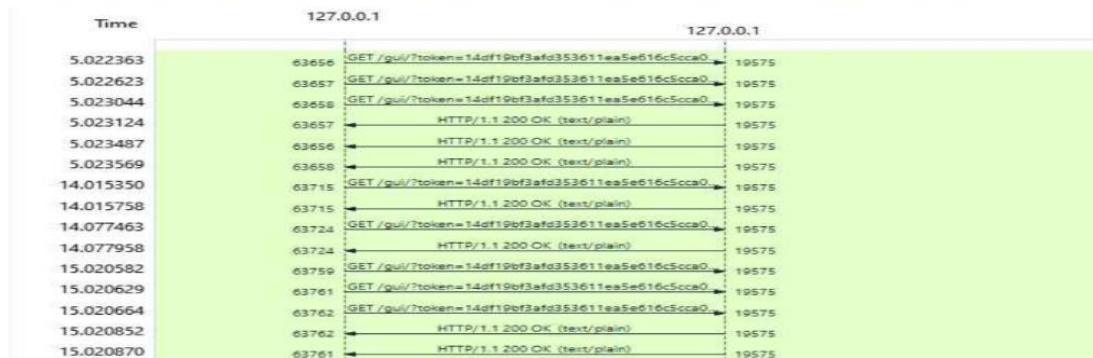
ii. CAPTURE THE TCP/UDP PACKETS

1 0.000000	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=1 Ack=1 Win=8442 Len=1
2 0.000010	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=2 Win=8351 Len=0
3 0.102600	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=2 Ack=1 Win=8442 Len=1
4 0.102627	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=3 Win=8351 Len=0
5 0.103105	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=3 Ack=1 Win=8442 Len=1
6 0.103129	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=4 Win=8351 Len=0
7 0.103679	127.0.0.1	127.0.0.1	TCP	123 51615 → 51652 [PSH, ACK] Seq=1 Ack=1 Win=8356 Len=79
8 0.103709	127.0.0.1	127.0.0.1	TCP	44 51652 → 51615 [ACK] Seq=1 Ack=80 Win=8198 Len=0
9 0.145169	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=4 Ack=1 Win=8442 Len=1
10 0.145193	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=5 Win=8351 Len=0
11 0.164356	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=5 Ack=1 Win=8442 Len=1
12 0.164379	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=6 Win=8351 Len=0
13 0.165479	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=6 Ack=1 Win=8442 Len=1
14 0.165502	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=7 Win=8351 Len=0
15 0.172615	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=7 Ack=1 Win=8442 Len=1
16 0.172634	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=8 Win=8351 Len=0
17 0.176466	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=8 Ack=1 Win=8442 Len=1
18 0.176479	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=9 Win=8351 Len=0
19 0.196283	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=9 Ack=1 Win=8442 Len=1
20 0.196296	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=10 Win=8351 Len=0
21 0.206330	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=10 Ack=1 Win=8442 Len=1
22 0.206341	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=11 Win=8351 Len=0
23 0.206357	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=11 Ack=1 Win=8442 Len=1
24 0.206362	127.0.0.1	127.0.0.1	TCP	44 51610 → 51611 [ACK] Seq=1 Ack=12 Win=8351 Len=0
25 0.207050	127.0.0.1	127.0.0.1	TCP	45 51611 → 51610 [PSH, ACK] Seq=12 Ack=1 Win=8442 Len=1



iii. CAPTURE ARP PACKET

map3 http3	22363	127.0.0.1	127.0.0.1	HTTP	806	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
	22623	127.0.0.1	127.0.0.1	HTTP	812	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
497	5.023044	127.0.0.1	127.0.0.1	HTTP	813	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
508	5.023124	127.0.0.1	127.0.0.1	HTTP	875	HTTP/1.1 200 OK (text/plain)
524	5.023487	127.0.0.1	127.0.0.1	HTTP	10922	HTTP/1.1 200 OK (text/plain)
534	5.023569	127.0.0.1	127.0.0.1	HTTP	115	HTTP/1.1 200 OK (text/plain)
1873	14.015350	127.0.0.1	127.0.0.1	HTTP	806	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
1885	14.015758	127.0.0.1	127.0.0.1	HTTP	10922	HTTP/1.1 200 OK (text/plain)
1902	14.077463	127.0.0.1	127.0.0.1	HTTP	812	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
1914	14.077958	127.0.0.1	127.0.0.1	HTTP	875	HTTP/1.1 200 OK (text/plain)
2127	15.020582	127.0.0.1	127.0.0.1	HTTP	806	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
2129	15.020629	127.0.0.1	127.0.0.1	HTTP	812	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
2131	15.020664	127.0.0.1	127.0.0.1	HTTP	813	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
2149	15.020852	127.0.0.1	127.0.0.1	HTTP	115	HTTP/1.1 200 OK (text/plain)
2157	15.020870	127.0.0.1	127.0.0.1	HTTP	875	HTTP/1.1 200 OK (text/plain)
2175	15.021317	127.0.0.1	127.0.0.1	HTTP	10922	HTTP/1.1 200 OK (text/plain)
2424	17.010262	127.0.0.1	127.0.0.1	HTTP	806	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
2429	17.010628	127.0.0.1	127.0.0.1	HTTP	812	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
2441	17.010941	127.0.0.1	127.0.0.1	HTTP	875	HTTP/1.1 200 OK (text/plain)
2455	17.011123	127.0.0.1	127.0.0.1	HTTP	10922	HTTP/1.1 200 OK (text/plain)
2807	19.011958	127.0.0.1	127.0.0.1	HTTP	806	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
2819	19.013327	127.0.0.1	127.0.0.1	HTTP	10922	HTTP/1.1 200 OK (text/plain)
2826	19.014433	127.0.0.1	127.0.0.1	HTTP	812	GET /gui/?token=14df19bf3afd353611ea5e616c5cca0a24cad
2840	19.014730	127.0.0.1	127.0.0.1	HTTP	875	HTTP/1.1 200 OK (text/plain)



iv. CAPTURE IP/ICMP PACKETS

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=1 Ack=1 Win=8442 Len=1
2	0.000010	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=2 Win=8351 Len=0
3	0.102600	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=2 Ack=1 Win=8442 Len=1
4	0.102627	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=3 Win=8351 Len=0
5	0.103105	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=3 Ack=1 Win=8442 Len=1
6	0.103129	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=4 Win=8351 Len=0
7	0.103679	127.0.0.1	127.0.0.1	TCP	123	51615 → 51652 [PSH, ACK] Seq=1 Ack=1 Win=8356 Len=79
8	0.103709	127.0.0.1	127.0.0.1	TCP	44	51652 → 51615 [ACK] Seq=1 Ack=80 Win=8198 Len=0
9	0.145169	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=4 Ack=1 Win=8442 Len=1
10	0.145193	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=5 Win=8351 Len=0
11	0.164356	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=5 Ack=1 Win=8442 Len=1
12	0.164379	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=6 Win=8351 Len=0
13	0.165479	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=6 Ack=1 Win=8442 Len=1
14	0.165502	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=7 Win=8351 Len=0
15	0.172615	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=7 Ack=1 Win=8442 Len=1
16	0.172634	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=8 Win=8351 Len=0
17	0.176466	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=8 Ack=1 Win=8442 Len=1
18	0.176479	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=9 Win=8351 Len=0
19	0.196283	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=9 Ack=1 Win=8442 Len=1
20	0.196296	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=10 Win=8351 Len=0
21	0.206330	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=10 Ack=1 Win=8442 Len=1
22	0.206341	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=11 Win=8351 Len=0
23	0.206357	127.0.0.1	127.0.0.1	TCP	45	51611 → 51610 [PSH, ACK] Seq=11 Ack=1 Win=8442 Len=1
24	0.206362	127.0.0.1	127.0.0.1	TCP	44	51610 → 51611 [ACK] Seq=1 Ack=12 Win=8351 Len=0

RESULT:

Wireshark captures and displays packets for all major protocols, enabling analysis of handshake sequences, address mappings, and network statistics across TCP, UDP, ICMP, ARP, DHCP, DNS, and HTTP.