Computer networking – H3

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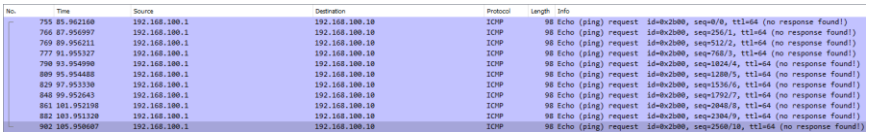
1. For this exercise, there are screenshots of the traffic gotten in Wireshark. In both cases, filters are used to look for specific information of the activities done.

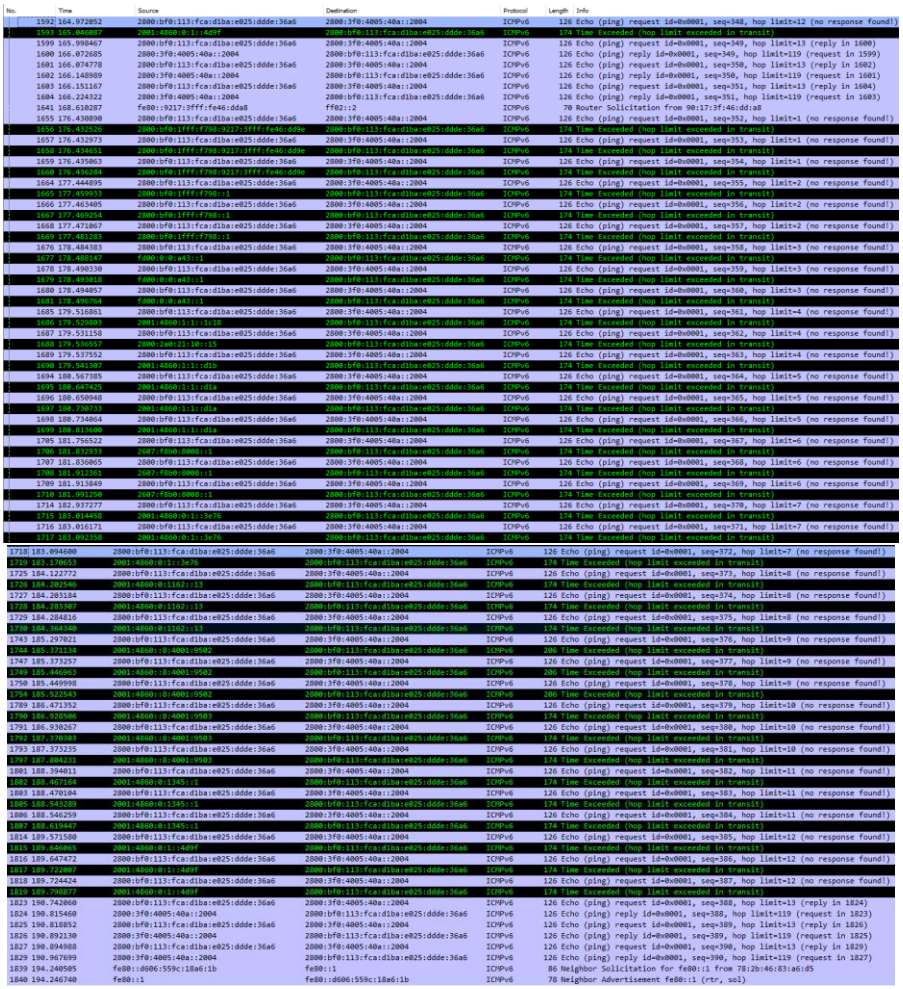
    a. For the results in the traceroute case, the results gotten were applied for the filters: icmp, icmpv6 and ssdp.

    ICMP: applied to look for the messages between devices and its connection to the network, although the results for this were not enough considering the presence of IPv6.



No.	Time	Source	Destination	Protocol	Length	Info
755	85.962160	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=0/0, ttl=64 (no response found!)
766	87.956997	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=256/1, ttl=64 (no response found!)
769	89.956211	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=512/2, ttl=64 (no response found!)
777	91.955327	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=768/3, ttl=64 (no response found!)
790	93.954990	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=1024/4, ttl=64 (no response found!)
809	95.954488	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=1280/5, ttl=64 (no response found!)
829	97.953330	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=1536/6, ttl=64 (no response found!)
848	99.952643	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=1792/7, ttl=64 (no response found!)
861	101.952198	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=2048/8, ttl=64 (no response found!)
882	103.951320	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=2304/9, ttl=64 (no response found!)
902	105.950607	192.168.100.1	192.168.100.10	ICMP	98	Echo (ping) request id=0x2b00, seq=2560/10, ttl=64 (no response found!)

    ICMPv6: as the traceroute activities were done; the implementation of a different IP type was present. As 10 traceroute executions were done, here the last one section will be shown.



No.	Time	Source	Destination	Protocol	Length	Info
1592	164.972852	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=348, hop limit=12 (no response found!)
1593	165.046087	2001:4860:0:1::4d9f	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1599	165.998467	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=349, hop limit=13 (reply in 1600)
1600	166.072685	2800:3f0:4005:40a::2004	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	126	Echo (ping) reply id=0x0001, seq=349, hop limit=119 (request in 1599)
1601	166.074778	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=350, hop limit=13 (reply in 1602)
1602	166.148989	2800:3f0:4005:40a::2004	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	126	Echo (ping) reply id=0x0001, seq=350, hop limit=119 (request in 1601)
1603	166.151167	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=351, hop limit=13 (reply in 1604)
1604	166.224322	2800:3f0:4005:40a::2004	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	126	Echo (ping) reply id=0x0001, seq=351, hop limit=119 (request in 1603)
1641	168.610287	fe80::9217:3fff:fe46:dda8	ff02::2	ICMPv6	70	Router Solicitation from 90:17:3f:46:dd:a8
1655	176.430890	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=352, hop limit=1 (no response found!)
1656	176.432526	2800:bf0:1fff:f798:9217:3fff:fe46:dd9e	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1657	176.432973	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=353, hop limit=1 (no response found!)
1658	176.434451	2800:bf0:1fff:f798:9217:3fff:fe46:dd9e	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1659	176.435083	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=354, hop limit=1 (no response found!)
1660	176.436234	2800:bf0:1fff:f798:9217:3fff:fe46:dd9e	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1664	177.444895	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=355, hop limit=2 (no response found!)
1665	177.459913	2800:bf0:1fff:f798::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1666	177.463405	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=356, hop limit=2 (no response found!)
1667	177.465754	2800:bf0:1fff:f798::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1668	177.471867	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=357, hop limit=2 (no response found!)
1669	177.481283	2800:bf0:1fff:f798::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1676	178.484383	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=358, hop limit=3 (no response found!)
1677	178.485147	fd00:0:0:a43::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1678	178.490330	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=359, hop limit=3 (no response found!)
1679	178.493018	fd00:0:0:a43::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1680	178.494857	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=360, hop limit=3 (no response found!)
1681	178.496764	fd00:0:0:a43::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1685	179.516861	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=361, hop limit=4 (no response found!)
1686	179.529803	2001:4860:1:1::1c18	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1687	179.531158	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=362, hop limit=4 (no response found!)
1688	179.536557	2800:1a0:f1:130::13	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1689	179.537552	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=363, hop limit=4 (no response found!)
1690	179.541307	2001:4860:1:1::d1b	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1694	180.567385	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=364, hop limit=5 (no response found!)
1695	180.647425	2001:4860:1:1::da1a	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1696	180.650948	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=365, hop limit=5 (no response found!)
1697	180.730733	2001:4860:1:1::d1a	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1698	180.734064	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=366, hop limit=5 (no response found!)
1699	180.813600	2001:4860:1:1::da1a	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1705	181.756522	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=367, hop limit=6 (no response found!)
1706	181.832933	2607:f8b0:8000::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1707	181.836065	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=368, hop limit=6 (no response found!)
1708	181.912361	2607:f8b0:8000::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1709	181.913849	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=369, hop limit=6 (no response found!)
1710	181.991250	2607:f8b0:8000::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1714	182.937277	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=370, hop limit=7 (no response found!)
1715	183.014458	2001:4860:0:1::5e76	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1716	183.016171	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=371, hop limit=7 (no response found!)
1717	183.092370	2001:4860:0:1::5e76	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1718	183.094680	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=372, hop limit=7 (no response found!)
1719	183.170653	2001:4860:0:1::3e76	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1725	184.122772	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=373, hop limit=8 (no response found!)
1726	184.202546	2001:4860:0:1162::13	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1727	184.203184	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=374, hop limit=8 (no response found!)
1728	184.283707	2001:4860:0:1162::13	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1729	184.284816	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=375, hop limit=8 (no response found!)
1730	184.364340	2001:4860:0:1162::13	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1743	185.297021	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=376, hop limit=9 (no response found!)
1744	185.371174	2001:4860:0:4001:9502	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	206	Time Exceeded (hop limit exceeded in transit)
1747	185.373257	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=377, hop limit=9 (no response found!)
1749	185.446963	2001:4860:8:4001:9502	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	206	Time Exceeded (hop limit exceeded in transit)
1750	185.449998	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=378, hop limit=9 (no response found!)
1754	185.525543	2001:4860:8:4001:9502	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	206	Time Exceeded (hop limit exceeded in transit)
1789	186.471352	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=379, hop limit=10 (no response found!)
1790	186.928586	2001:4860:8:4001:9503	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1791	186.930267	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=380, hop limit=10 (no response found!)
1792	187.370383	2001:4860:8:4001:9503	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1793	187.373235	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=381, hop limit=10 (no response found!)
1797	187.804231	2001:4860:0:4001:9503	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1801	188.394011	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=382, hop limit=11 (no response found!)
1802	188.467164	2001:4860:0:1345::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1803	188.470104	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=383, hop limit=11 (no response found!)
1805	188.543203	2001:4860:0:1345::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1806	188.546259	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=384, hop limit=11 (no response found!)
1807	188.619447	2001:4860:0:1345::1	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1814	189.571580	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=385, hop limit=12 (no response found!)
1815	189.644015	2001:4860:0:1:4d9f	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1816	189.647472	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=386, hop limit=12 (no response found!)
1817	189.722087	2001:4860:0:1::4d9f	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1818	189.724424	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=387, hop limit=12 (no response found!)
1819	189.799877	2001:4860:0:1::4d9f	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	174	Time Exceeded (hop limit exceeded in transit)
1823	190.742860	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=388, hop limit=13 (reply in 1824)
1824	190.815460	2800:3f0:4005:40a::2004	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	126	Echo (ping) reply id=0x0001, seq=388, hop limit=119 (request in 1823)
1825	190.818852	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=389, hop limit=13 (reply in 1826)
1826	190.892130	2800:3f0:4005:40a::2004	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	126	Echo (ping) reply id=0x0001, seq=389, hop limit=119 (request in 1825)
1827	190.894908	2800:bf0:113:fca:d1ba:e025:ddde:36a6	2800:3f0:4005:40a::2004	ICMPv6	126	Echo (ping) request id=0x0001, seq=390, hop limit=13 (reply in 1829)
1829	190.967699	2800:3f0:4005:40a::2004	2800:bf0:113:fca:d1ba:e025:ddde:36a6	ICMPv6	126	Echo (ping) reply id=0x0001, seq=390, hop limit=119 (request in 1827)
1839	194.240505	fe80::d606:559c:18a6:1b	fe80::1	ICMPv6	86	Neighbor Solicitation for fe80::1 from 78:2b:46:83:a6:d5
1840	194.246740	fe80::1	fe80::d606:559c:18a6:1b	ICMPv6	78	Neighbor Advertisement fe80::1 (rtr, sol)

SSDP: applied to look for the devices connected to the network, just to get the information of the devices mainly.

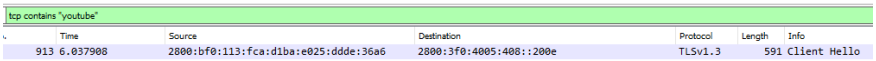
No.	Time	Source	Destination	Protocol	Length	Info
23	1.412579	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
24	1.537171	192.168.100.1	239.255.255.250	SSDP	174	M-SEARCH * HTTP/1.1
25	1.721906	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
26	1.796532	192.168.100.1	239.255.255.250	SSDP	174	M-SEARCH * HTTP/1.1
27	2.013998	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
28	2.056173	192.168.100.1	239.255.255.250	SSDP	175	M-SEARCH * HTTP/1.1
39	2.316066	192.168.100.1	239.255.255.250	SSDP	175	M-SEARCH * HTTP/1.1
125	11.414772	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
129	11.731026	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
133	12.023421	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
203	21.418414	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
212	21.716664	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
213	22.016860	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
297	31.430713	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
298	31.715900	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
301	32.015275	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
372	41.415019	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
374	41.736515	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
382	42.015207	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
454	51.418696	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
455	51.724745	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
457	52.019252	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
539	61.446955	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
545	61.722061	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
546	62.021486	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
548	62.595619	192.168.100.1	239.255.255.250	SSDP	174	M-SEARCH * HTTP/1.1
551	62.856048	192.168.100.1	239.255.255.250	SSDP	174	M-SEARCH * HTTP/1.1
557	63.115471	192.168.100.1	239.255.255.250	SSDP	175	M-SEARCH * HTTP/1.1
559	63.376362	192.168.100.1	239.255.255.250	SSDP	175	M-SEARCH * HTTP/1.1
581	65.446023	192.168.100.10	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
590	66.456694	192.168.100.10	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
596	67.471302	192.168.100.10	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
598	68.474288	192.168.100.10	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
614	71.420797	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
616	71.721014	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
620	72.021127	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
711	81.420830	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
717	81.721902	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
718	82.022023	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
774	91.433808	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
775	91.722226	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
778	92.019226	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
859	101.423199	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
860	101.734108	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
863	102.024100	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
955	111.425950	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
964	111.756971	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
966	112.026497	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1047	121.421587	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1048	121.721526	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1049	122.021463	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1060	123.655340	192.168.100.1	239.255.255.250	SSDP	174	M-SEARCH * HTTP/1.1
1062	123.916003	192.168.100.1	239.255.255.250	SSDP	174	M-SEARCH * HTTP/1.1
1063	124.175689	192.168.100.1	239.255.255.250	SSDP	175	M-SEARCH * HTTP/1.1
1064	124.434859	192.168.100.1	239.255.255.250	SSDP	175	M-SEARCH * HTTP/1.1
1076	131.425495	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1077	131.726044	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1079	132.027782	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1206	141.428122	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1212	141.730067	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1213	142.030016	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1294	151.427525	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1295	151.731939	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1297	152.027755	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1566	161.428248	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1567	161.728598	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1568	162.028865	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1645	171.430757	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1646	171.750607	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1648	172.032062	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1703	181.430943	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1704	181.733724	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1713	182.047479	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1733	184.714927	192.168.100.1	239.255.255.250	SSDP	174	M-SEARCH * HTTP/1.1
1734	184.975282	192.168.100.1	239.255.255.250	SSDP	174	M-SEARCH * HTTP/1.1
1742	185.236087	192.168.100.1	239.255.255.250	SSDP	175	M-SEARCH * HTTP/1.1
1751	185.451665	192.168.100.10	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
1753	185.494554	192.168.100.1	239.255.255.250	SSDP	175	M-SEARCH * HTTP/1.1
1788	186.469193	192.168.100.10	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
1794	187.494565	192.168.100.10	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
1804	188.511094	192.168.100.10	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
1832	191.434262	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1833	191.734133	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1
1835	192.035580	192.168.100.86	239.255.255.250	SSDP	167	M-SEARCH * HTTP/1.1

In the same way, the traceroute was done in cmd, here is the first tracert and the last one.

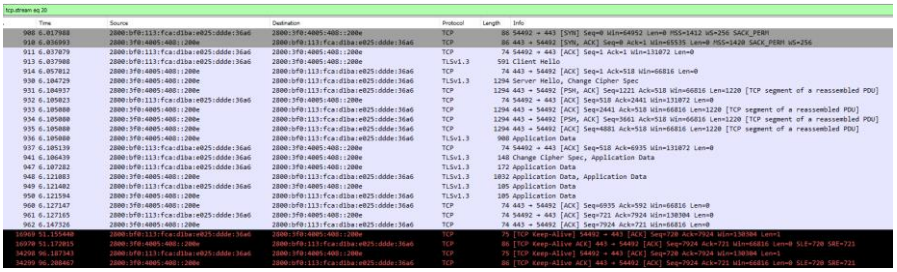
```
C:\Users\gapas>tracert www.google.com

Traza a la dirección www.google.com [2800:3f0:4005:40a::2004]
sobre un máximo de 30 saltos:

  1     2 ms     3 ms     3 ms  2800:bf0:1fff:f798:9217:3fff:fe46:dd9e
  2    10 ms     6 ms     5 ms  2800:bf0:1fff:f798::1
  3     3 ms     2 ms     4 ms  fd00:0:0:a43::1
  4     8 ms     3 ms     3 ms  2001:4860:1:1::d1b
  5    83 ms    81 ms    80 ms  2001:4860:1:1::d1a
  6    78 ms    77 ms    77 ms  2607:f8b0:8008::1
  7    76 ms    77 ms    76 ms  2001:4860:0:1::3e76
  8    79 ms    80 ms    86 ms  2001:4860:0:1162::13
  9    75 ms    73 ms    75 ms  2001:4860::8:4001:9502
 10   348 ms   351 ms   378 ms  2001:4860::8:4001:9503
 11    77 ms    73 ms    73 ms  2001:4860:0:1345::1
 12    75 ms    75 ms    75 ms  2001:4860:0:1::4d9f
 13    76 ms    75 ms    74 ms  2800:3f0:4005:40a::2004

Traza completa.
```

```
C:\Users\gapas>tracert www.google.com

Traza a la dirección www.google.com [2800:3f0:4005:40a::2004]
sobre un máximo de 30 saltos:

  1     1 ms     1 ms     1 ms  2800:bf0:1fff:f798:9217:3fff:fe46:dd9e
  2    15 ms     6 ms    10 ms  2800:bf0:1fff:f798::1
  3     4 ms     2 ms     2 ms  fd00:0:0:a43::1
  4    13 ms     5 ms     3 ms  2001:4860:1:1::d1b
  5    81 ms    80 ms    79 ms  2001:4860:1:1::d1a
  6    76 ms    76 ms    77 ms  2607:f8b0:8008::1
  7    77 ms    76 ms    76 ms  2001:4860:0:1::3e76
  8    80 ms    80 ms    79 ms  2001:4860:0:1162::13
  9    74 ms    74 ms    72 ms  2001:4860::8:4001:9502
 10   457 ms   440 ms   431 ms  2001:4860::8:4001:9503
 11    73 ms    73 ms    73 ms  2001:4860:0:1345::1
 12    74 ms    74 ms    74 ms  2001:4860:0:1::4d9f
 13    74 ms    73 ms    73 ms  2800:3f0:4005:40a::2004
```

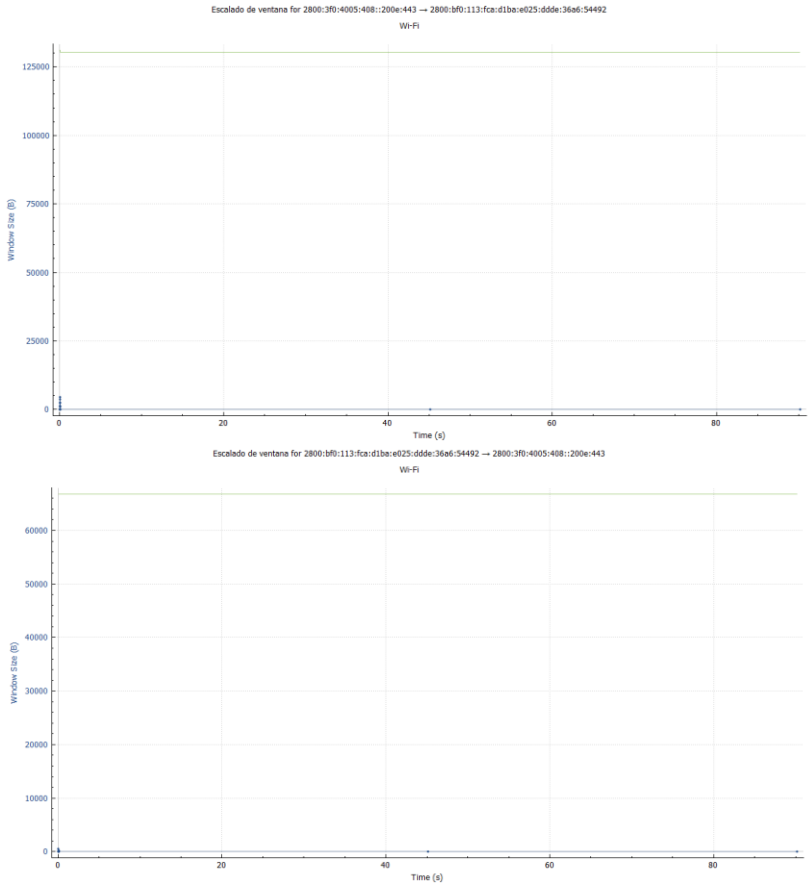
b. For this case, the filter was applied to look for an IP address, which was confirmed by containing “youtube” with the TLS protocol. IN this case was the next one.



In that way, we could have the next handshake, on TCP.



Next to that, the congestion window is defined as follows.

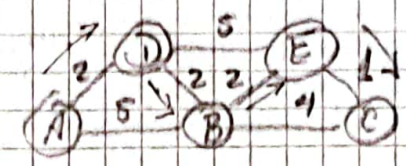


NOTE: Although I capture traffic being on YouTube, it was impossible it all the records to find one that could give the IP of that website, so in that case the implementation before was done.

The rest of the exercises were done and presented in the next pages.

2. In these cases, we need to consider three different source nodes

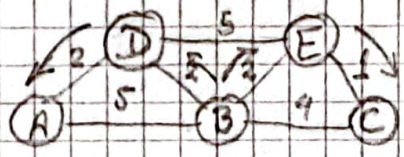
A: Looking for shortest paths



A	Conf.	Tent.
1		(D,2,D) (B,5,B)
2	(D,2,D)	(B,5,B)
3	(D,2,D)	(B,4,D) (E,7,D)
4	(D,2,D) (B,4,D)	(E,7,D)
5	(D,2,D) (B,4,D)	(E,6,D) (C,7,D)
6	(D,2,D) (B,4,D) (E,6,D)	(C,7,D)
7	(D,2,D) (B,4,D) (E,6,D) (C,7,D)	→ Routing table will be in A

Dest.	Next.	Cost.
A	A	0
B	D	4
C	D	7
D	D	2
E	D	6

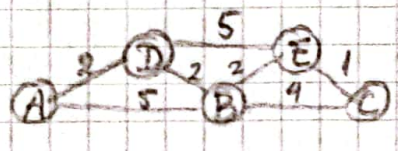
B: Looking for shortest paths



B	Conf.	Tent
1		(D,2,D) (A,5,A) (E,2,E) (C,4,C)
2	(D,2,D)	(A,5,A) (E,2,E) (C,4,C)
3	(D,2,D)	(A,4,D) (E,2,E) (C,3,E)
4	(D,2,D) (E,2,E)	(A,4,D) (C,3,E)
5	(D,2,D) (E,2,E) (C,3,E)	(A,4,D)
6	(D,2,D) (E,2,E) (C,3,E) (A,4,D)	→ Routing table will be in B

Dest	Next.	Cost
B	B	0
A	D	4
C	E	3
D	D	2
E	E	2

E: looking for shortest paths



E	Conf.	Tent.
1		(D,5,D) (C,1,C) (B,2,B)
2	(C,1,C).	(D,5,D) (B,2,B)
3	(C,1,C)	(D,4,B) (B,2,B) (A,7,B)
4	(C,1,C) (B,2,B)	(D,4,B) (A,7,B)
5	(C,1,C) (B,2,B)	(D,4,B) (A,6,B)
6	(C,1,C) (B,2,B) (D,4,B)	(A,6,B)
7	(C,1,C) (B,2,B) (D,4,B) (A,6,B)	→ Routing table in E

Dest E	Next E	Cost
A	B	6
B	B	2
C	C	1
D	B	4

3. Considering the case of a host that establishes a link to another host.

→ reliability is required for the connection, although on TCP it has difficulties in the nature of the protocol itself.

It could occurr that over a connection on TCP:

→ TCP has mechanism to detect and recover from packet loss, but it is impossible to confirm that a packet arrived on the first attempt.

→ Retransmition appears when a packet is lost, considering it as a mechanism of detection of a packet lost in TCP, also applied in a packet with time out.

→ Reliability on the reciever echo back immediately appears, as TCP relies on recieving ACKs from the receiver to confirm succesful delivery of a packet. But when an ACK is not sent, the host measuring reliability could consider it as a packet lost, even though TCP is trying to recover it.

→ Berkeley-derived implementations apply for this, but with smaller timeouts. Many of them of 0.5 of granularity and RTTs being in that way enough or too much without loss for a single link.

However, the difficulties mentioned before apply to these implementations. The implementations provide a standarized interface for apps to interact with TCP, helping to maintain reliability guarantees and congestion control mechanisms.

→ The case of congestion control mechanisms is that, when a packet loss occurs on congestion, the sending rate is reduced and being a problem to reliable in the process and link applied.

4) For the exercise we have the next elements.

a) Considering the congestion window (cwnd) starting with 1 packet

→ When a packet is sent, by the cwnd, it waits for an ACK

→ When an ACK is received, the cwnd increased by 1.

→ For an ACK of a duplicate packet nothing happens

→ When the ACK is of a packet considered lost, on timeout applied, the cwnd is reduced to half of it's current value.

b) This case implies a different structure, being an ACK per group of packets will imply changes on the amount of them to be sent by each RTT.

Considering the case of a packet lost, it affects to the group, treating it as lost, affecting then de cwnd reducing it to half.

Example!

			3 lost ↑		5 lost ↑		
RTT	1	2	3	4	5	6	
Sent	1	2-3	3	4-5	5	6-7	...
cwnd	1	2	1	2	1	2	

c) The answer for this case could be considered in this way:

If we consider the elements sent in groups, and the amount of packets is related with the cwnd value we have something next:

RTT	1	2	3	4	5	6	7	8
sent p.	1	2-3	4-6	7-10	9-10	11-13	14-17	18-22
cwnd	1	2	3	4	2	3	4	5

↓
8 lost

... →	9	10	11	12	13	14
	23-28	25-27	28-31	30-31	32-34	35-38
	6	3	4	2	3	4
	↓		↓			↓
	25 lost		30 lost			38 lost

... →	15	16	17	18	19
	38-39	40-42	44-47	48-52	50-51
	2	3	4	5	2
				↓	
				50 lost	

Given that result, the plot is defined