CMP-4005 -- Homework 3

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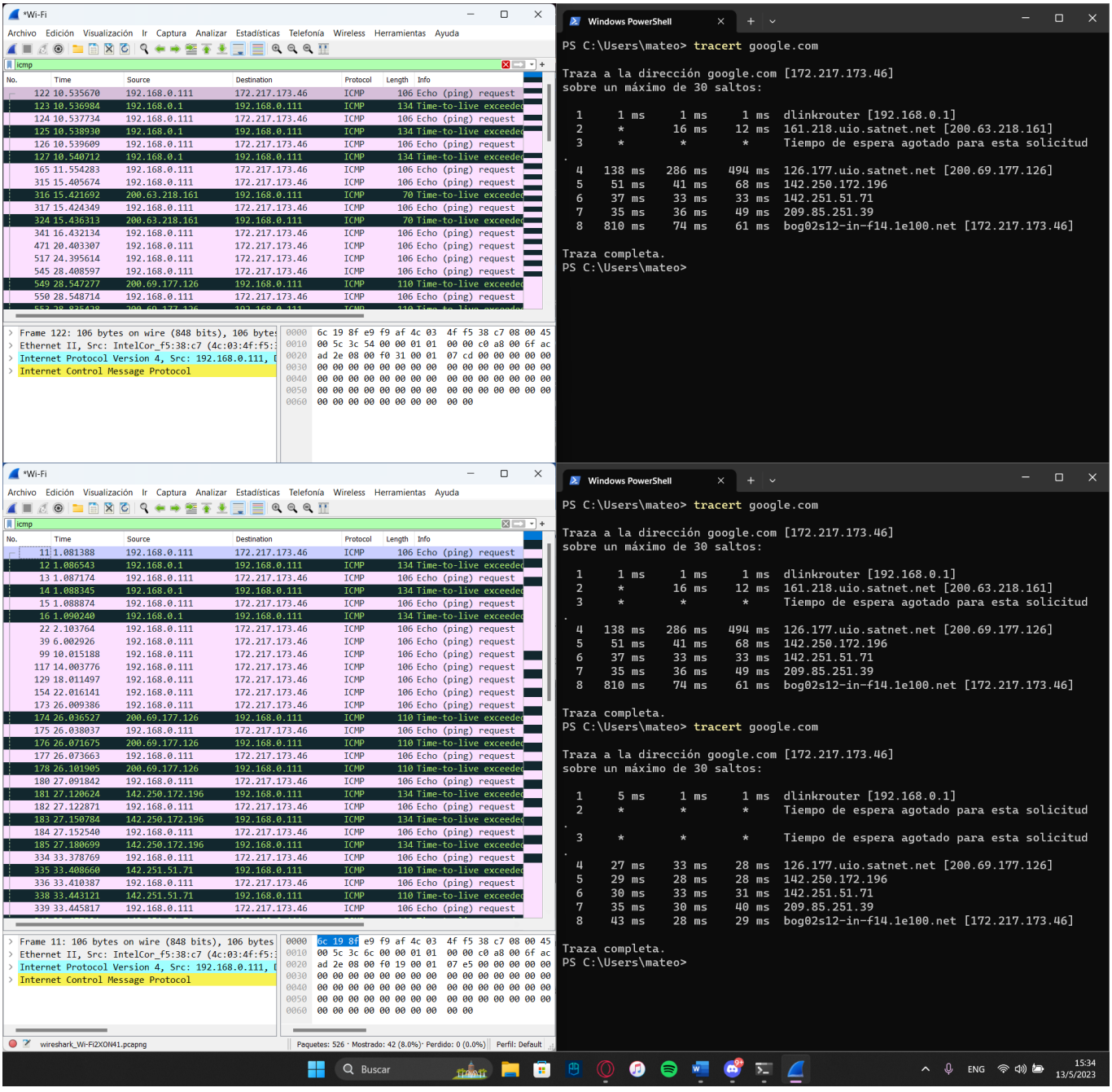
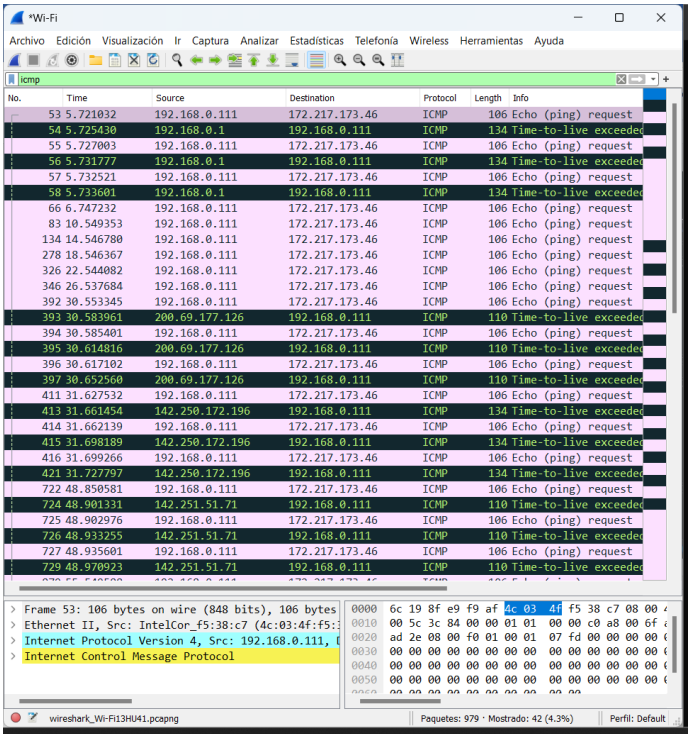
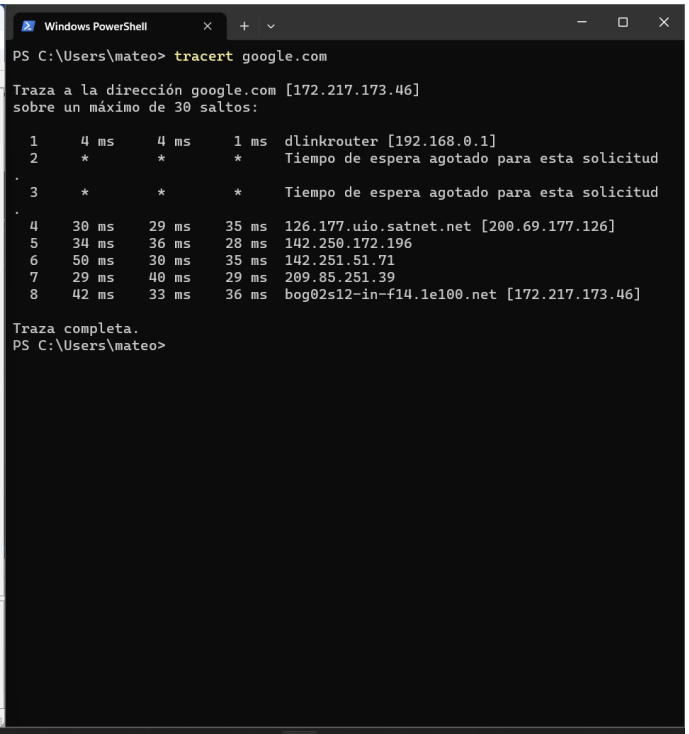
Answer the following questions.

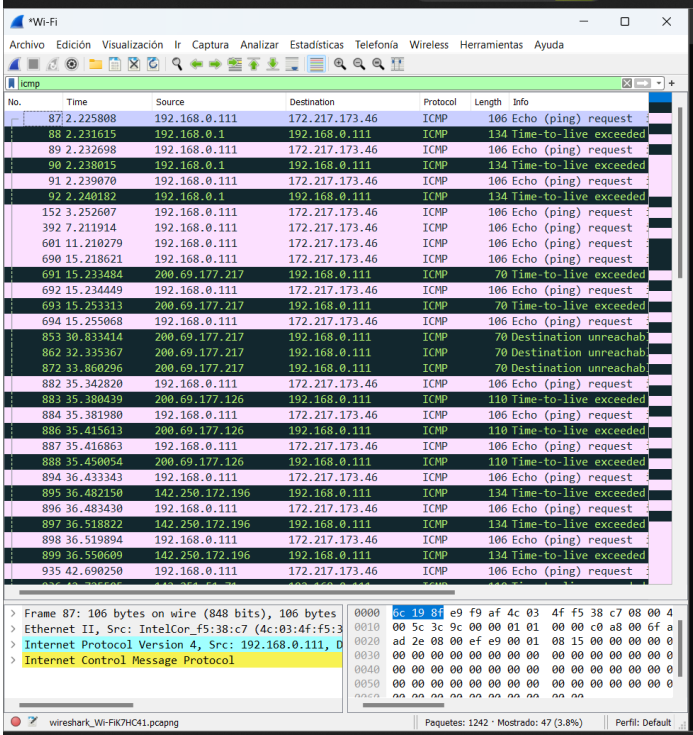
1) Read the following Wireshark tutorial, and use it to capture traffic from the following scenarios. Use screenshots to show your results.

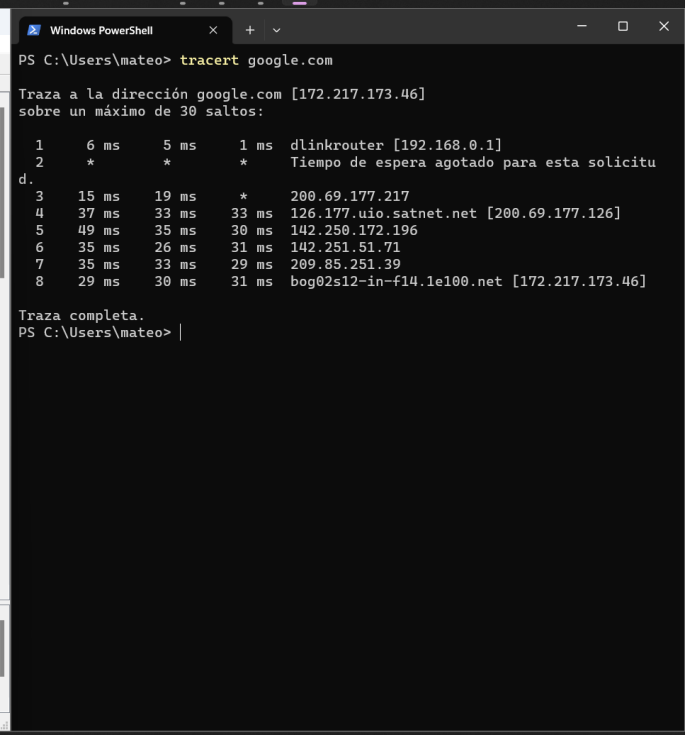
   a) Run 10 traceroute commands against google.com

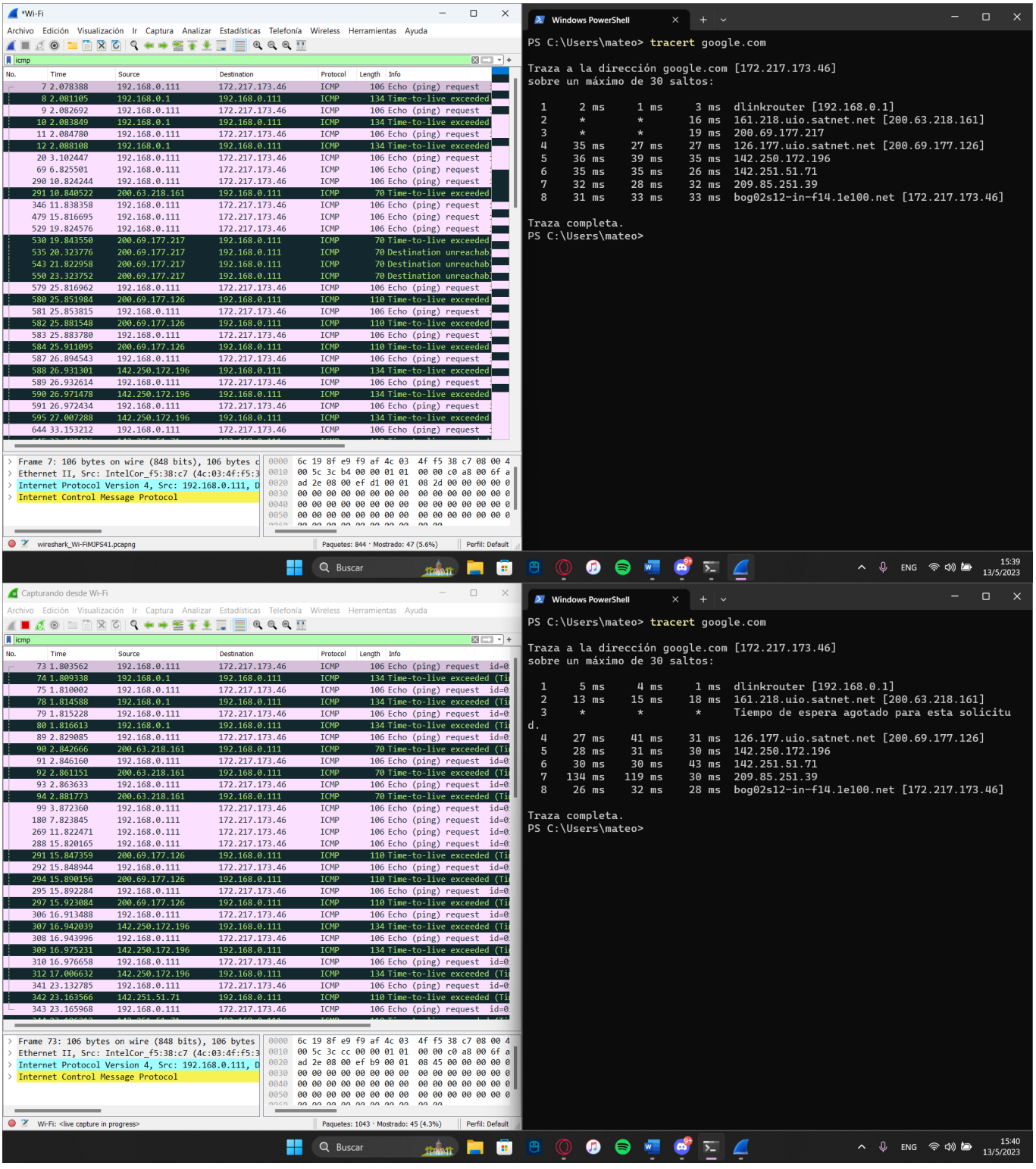


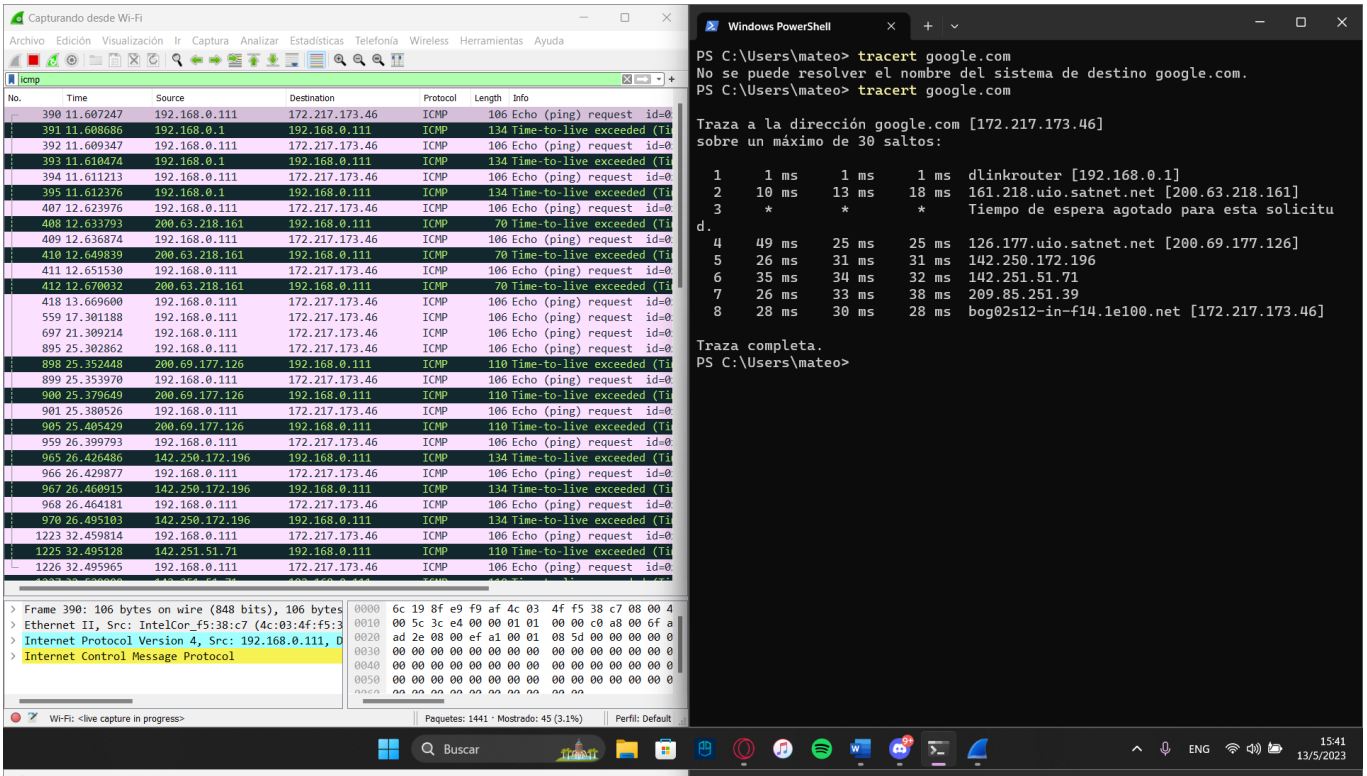

*Wi-Fi
Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda
icmp
No. Time Source Destination Protocol Length Info
53 5.721032 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
54 5.725430 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
55 5.727003 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
56 5.731777 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
57 5.732521 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
58 5.733601 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
66 6.747232 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
83 10.549353 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
134 14.546780 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
278 18.546367 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
326 22.544082 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
346 26.537684 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
392 30.553345 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
393 30.583961 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
394 30.585401 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
395 30.614816 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
396 30.617102 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
397 30.652560 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
411 31.627532 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
413 31.661454 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
414 31.662139 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
415 31.698189 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
416 31.699266 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
421 31.727797 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
722 48.850581 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
724 48.901331 142.251.51.71 192.168.0.111 ICMP 110 Time-to-live exceeded
725 48.902976 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
726 48.933255 142.251.51.71 192.168.0.111 ICMP 110 Time-to-live exceeded
727 48.935601 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
729 48.970923 142.251.51.71 192.168.0.111 ICMP 110 Time-to-live exceeded
Frame 53: 106 bytes on wire (848 bits), 106 bytes
Ethernet II, Src: IntelCor_f5:38:c7 (4c:03:4f:f5:
Internet Protocol Version 4, Src: 192.168.0.111,
Internet Control Message Protocol
0000 6c 19 8f e9 f9 af 4c 03 4f f5 38 c7 08 00
0010 00 5c 3c 84 00 00 01 01 00 00 c0 a8 00 6f
0020 ad 2e 08 00 f0 01 00 01 07 fd 00 00 00 00
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00
wireshark_Wi-Fi13HU41.pcapng
Paquetes: 979 · Mostrado: 42 (4.3%)
Perfil: Default

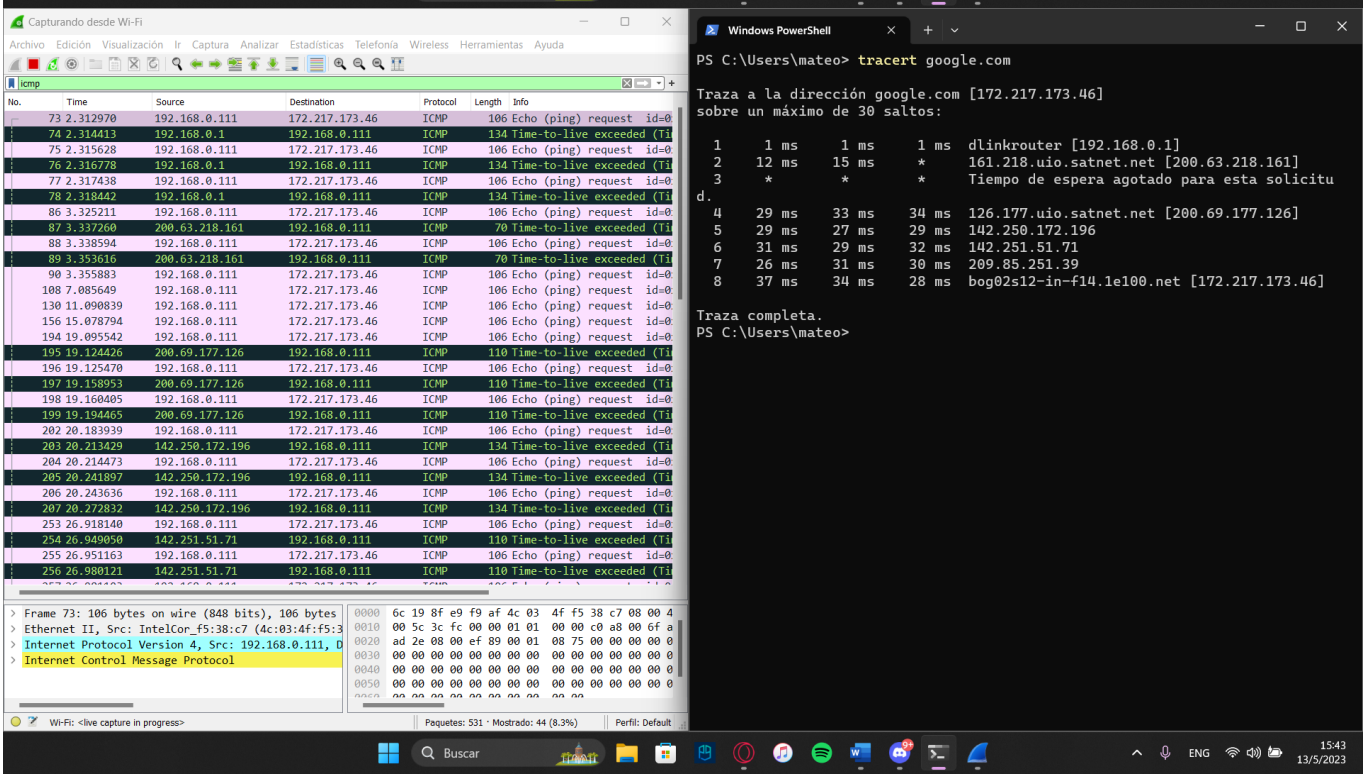

Windows PowerShell
PS C:\Users\mateo> tracert google.com
Traza a la dirección google.com [172.217.173.46]
sobre un máximo de 30 saltos:
1 4 ms 4 ms 1 ms dlinkrouter [192.168.0.1]
2 * * * Tiempo de espera agotado para esta solicitud
.
3 * * * Tiempo de espera agotado para esta solicitud
.
4 30 ms 29 ms 35 ms 126.177.uio.satnet.net [200.69.177.126]
5 34 ms 36 ms 28 ms 142.250.172.196
6 50 ms 30 ms 35 ms 142.251.51.71
7 29 ms 40 ms 29 ms 209.85.251.39
8 42 ms 33 ms 36 ms bog02s12-in-f14.1e100.net [172.217.173.46]
Traza completa.
PS C:\Users\mateo>

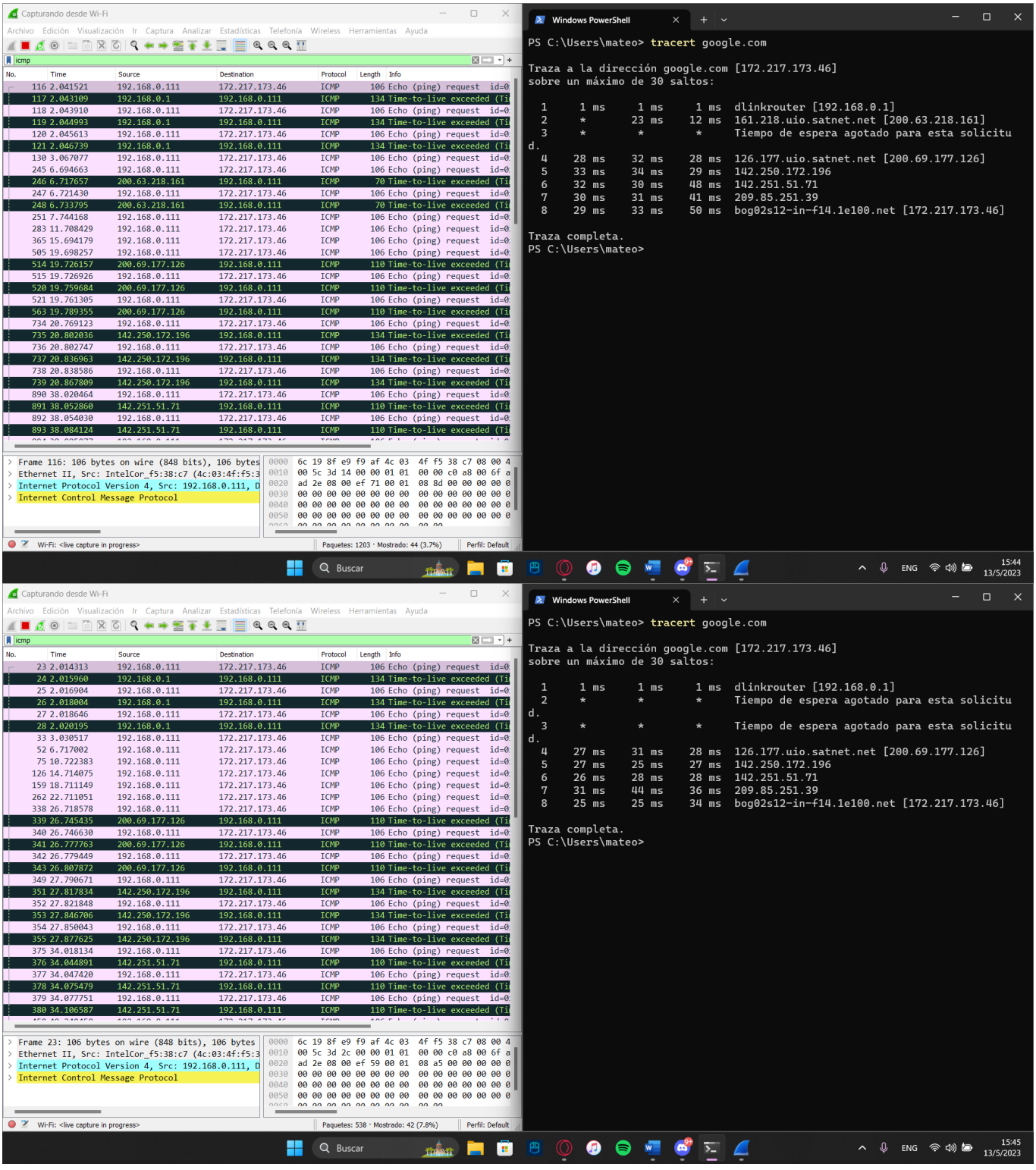

*Wi-Fi
Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda
icmp
No. Time Source Destination Protocol Length Info
87 2.225808 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
88 2.231615 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
89 2.232698 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
90 2.238015 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
91 2.239070 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
92 2.240182 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
152 3.252607 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
392 7.211914 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
601 11.210279 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
690 15.218621 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
691 15.233484 200.69.177.217 192.168.0.111 ICMP 70 Time-to-live exceeded
692 15.234449 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
693 15.253313 200.69.177.217 192.168.0.111 ICMP 70 Time-to-live exceeded
694 15.255068 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
853 30.833414 200.69.177.217 192.168.0.111 ICMP 70 Destination unreachab
862 32.335367 200.69.177.217 192.168.0.111 ICMP 70 Destination unreachab
872 33.860296 200.69.177.217 192.168.0.111 ICMP 70 Destination unreachab
882 35.342820 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
883 35.380439 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
884 35.381980 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
886 35.415613 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
887 35.416863 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
888 35.450054 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
894 36.433343 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
895 36.482150 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
896 36.483430 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
897 36.518822 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
898 36.519894 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
899 36.550609 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
935 42.690250 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
Frame 87: 106 bytes on wire (848 bits), 106 bytes
Ethernet II, Src: IntelCor_f5:38:c7 (4c:03:4f:f5:3
Internet Protocol Version 4, Src: 192.168.0.111, D
Internet Control Message Protocol
0000 6c 19 8f e9 f9 af 4c 03 4f f5 38 c7 08 00 4
0010 00 5c 3c 9c 00 00 01 01 00 00 c0 a8 00 6f a
0020 ad 2e 08 00 ef e9 00 01 08 15 00 00 00 00 0
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
wireshark_Wi-FiK7HC41.pcapng
Paquetes: 1242 · Mostrado: 47 (3.8%)
Perfil: Default


Windows PowerShell
PS C:\Users\mateo> tracert google.com
Traza a la dirección google.com [172.217.173.46]
sobre un máximo de 30 saltos:
1 6 ms 5 ms 1 ms dlinkrouter [192.168.0.1]
2 * * * Tiempo de espera agotado para esta solicitu
d.
3 15 ms 19 ms * 200.69.177.217
4 37 ms 33 ms 33 ms 126.177.uio.satnet.net [200.69.177.126]
5 49 ms 35 ms 30 ms 142.250.172.196
6 35 ms 26 ms 31 ms 142.251.51.71
7 35 ms 33 ms 29 ms 209.85.251.39
8 29 ms 30 ms 31 ms bog02s12-in-f14.1e100.net [172.217.173.46]
Traza completa.
PS C:\Users\mateo>

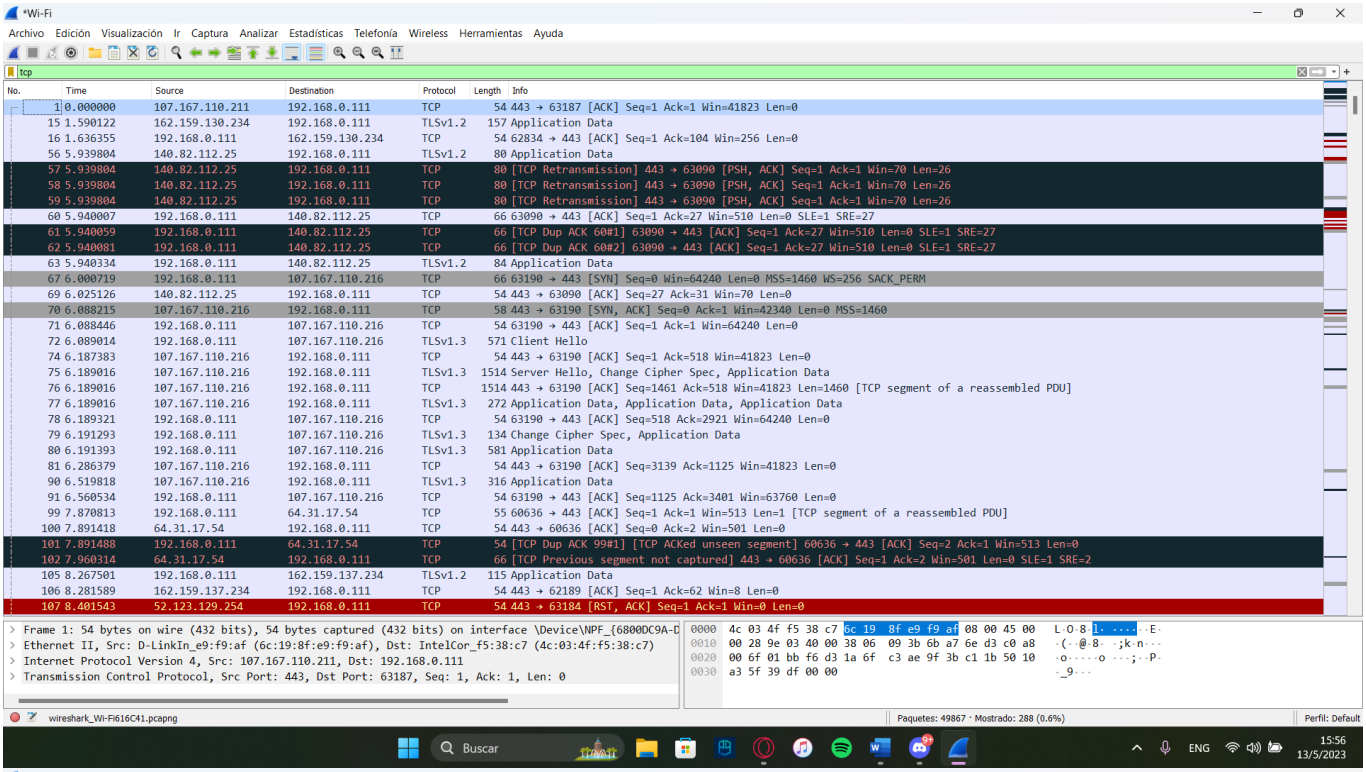

*Wi-Fi
Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda
icmp
No. Time Source Destination Protocol Length Info
7 2.078388 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
8 2.081105 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
9 2.082692 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
10 2.083849 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
11 2.084780 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
12 2.088108 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded
20 3.102447 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
69 6.825501 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
290 10.824244 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
291 10.840522 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded
346 11.838358 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
479 15.816695 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
529 19.824576 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
530 19.843550 200.69.177.217 192.168.0.111 ICMP 70 Time-to-live exceeded
535 20.323776 200.69.177.217 192.168.0.111 ICMP 70 Destination unreachabl
543 21.822958 200.69.177.217 192.168.0.111 ICMP 70 Destination unreachabl
550 23.323752 200.69.177.217 192.168.0.111 ICMP 70 Destination unreachabl
579 25.816962 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
580 25.851984 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
581 25.853815 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
582 25.881548 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
583 25.883780 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
584 25.911095 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded
587 26.894543 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
588 26.931301 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
589 26.932614 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
590 26.971478 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
591 26.972434 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
595 27.007288 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded
644 33.153212 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request
Frame 7: 106 bytes on wire (848 bits), 106 bytes c
Ethernet II, Src: IntelCor_f5:38:c7 (4c:03:4f:f5:3
Internet Protocol Version 4, Src: 192.168.0.111, D
Internet Control Message Protocol
0000 6c 19 8f e9 f9 af 4c 03 4f f5 38 c7 08 00 4
0010 00 5c 3c b4 00 00 01 01 00 00 c0 a8 00 6f a
0020 ad 2e 08 00 ef d1 00 01 08 2d 00 00 00 00 0
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
wireshark_Wi-FiMJPS41.pcapng
Paquetes: 844 · Mostrado: 47 (5.6%)
Perfil: Default
Windows PowerShell
PS C:\Users\mateo> tracert google.com
Traza a la dirección google.com [172.217.173.46]
sobre un máximo de 30 saltos:
1 2 ms 1 ms 3 ms dlinkrouter [192.168.0.1]
2 * * 16 ms 161.218.uio.satnet.net [200.63.218.161]
3 * * 19 ms 200.69.177.217
4 35 ms 27 ms 27 ms 126.177.uio.satnet.net [200.69.177.126]
5 36 ms 39 ms 35 ms 142.250.172.196
6 35 ms 35 ms 26 ms 142.251.51.71
7 32 ms 28 ms 32 ms 209.85.251.39
8 31 ms 33 ms 33 ms bog02s12-in-f14.1e100.net [172.217.173.46]
Traza completa.
PS C:\Users\mateo>
Buscar
ENG
15:39
13/5/2023
Capturando desde Wi-Fi
Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda
icmp
No. Time Source Destination Protocol Length Info
73 1.803562 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
74 1.809338 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
75 1.810002 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
78 1.814588 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
79 1.815228 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
80 1.816613 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
89 2.829085 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
90 2.842666 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded (Ti
91 2.846160 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
92 2.861151 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded (Ti
93 2.863633 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
94 2.881773 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded (Ti
99 3.872360 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
180 7.823845 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
269 11.822471 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
288 15.820165 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
291 15.847359 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
292 15.848944 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
294 15.890156 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
295 15.892284 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
297 15.923084 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
306 16.913488 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
307 16.942039 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
308 16.943996 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
309 16.975231 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
310 16.976658 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
312 17.006632 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
341 23.132785 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
342 23.163566 142.251.51.71 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
343 23.165968 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
Frame 73: 106 bytes on wire (848 bits), 106 bytes
Ethernet II, Src: IntelCor_f5:38:c7 (4c:03:4f:f5:3
Internet Protocol Version 4, Src: 192.168.0.111, D
Internet Control Message Protocol
0000 6c 19 8f e9 f9 af 4c 03 4f f5 38 c7 08 00 4
0010 00 5c 3c cc 00 00 01 01 00 00 c0 a8 00 6f a
0020 ad 2e 08 00 ef b9 00 01 08 45 00 00 00 00 0
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
Wi-Fi: <live capture in progress>
Paquetes: 1043 · Mostrado: 45 (4.3%)
Perfil: Default
Windows PowerShell
PS C:\Users\mateo> tracert google.com
Traza a la dirección google.com [172.217.173.46]
sobre un máximo de 30 saltos:
1 5 ms 4 ms 1 ms dlinkrouter [192.168.0.1]
2 13 ms 15 ms 18 ms 161.218.uio.satnet.net [200.63.218.161]
3 * * * Tiempo de espera agotado para esta solicitu
d.
4 27 ms 41 ms 31 ms 126.177.uio.satnet.net [200.69.177.126]
5 28 ms 31 ms 30 ms 142.250.172.196
6 30 ms 30 ms 43 ms 142.251.51.71
7 134 ms 119 ms 30 ms 209.85.251.39
8 26 ms 32 ms 28 ms bog02s12-in-f14.1e100.net [172.217.173.46]
Traza completa.
PS C:\Users\mateo>
Buscar
ENG
15:40
13/5/2023

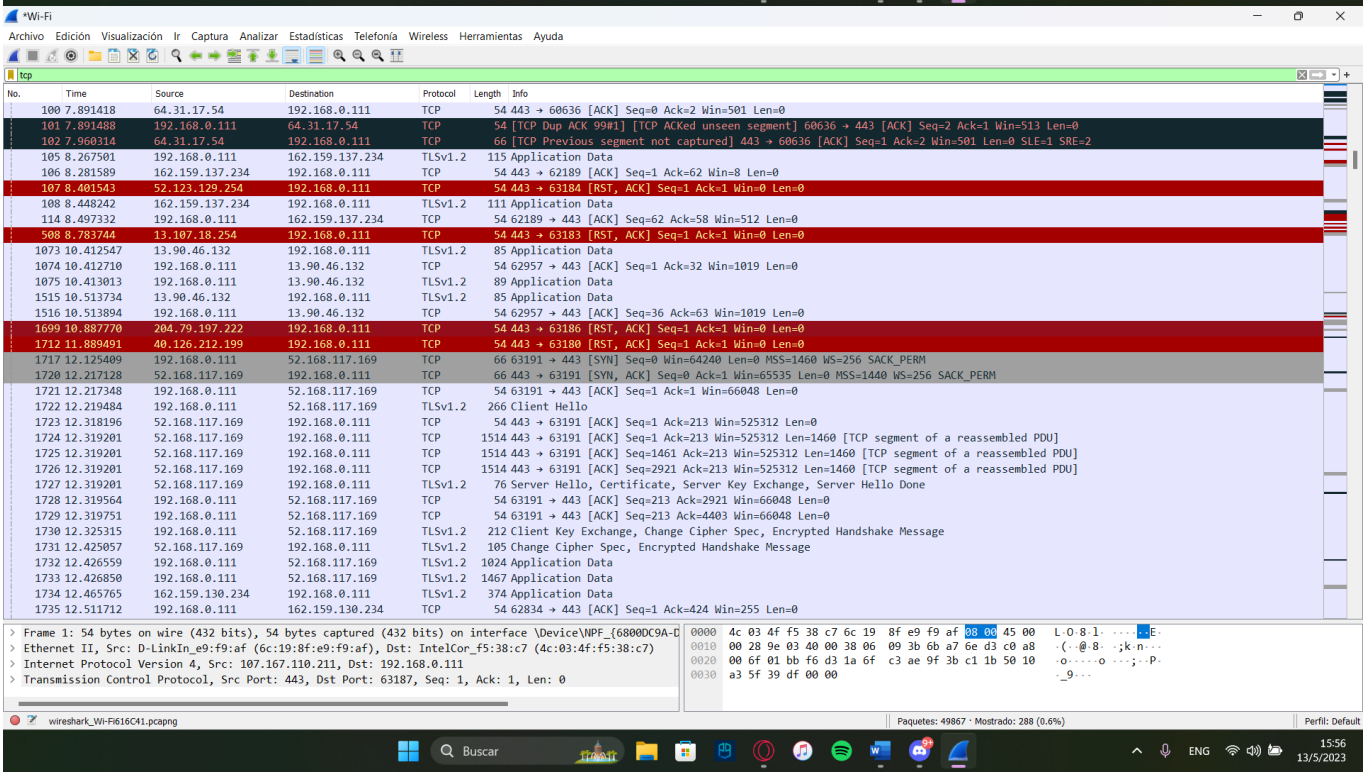

Capturando desde Wi-Fi
Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda
icmp
No. Time Source Destination Protocol Length Info
390 11.607247 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
391 11.608686 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
392 11.609347 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
393 11.610474 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
394 11.611213 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
395 11.612376 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
407 12.623976 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
408 12.633793 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded (Ti
409 12.636874 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
410 12.649839 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded (Ti
411 12.651530 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
412 12.670032 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded (Ti
418 13.669600 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
559 17.301188 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
697 21.309214 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
895 25.302862 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
898 25.352448 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
899 25.353970 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
900 25.379649 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
901 25.380526 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
905 25.405429 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
959 26.399793 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
965 26.426486 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
966 26.429877 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
967 26.460915 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
968 26.464181 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
970 26.495103 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
1223 32.459814 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
1225 32.495128 142.251.51.71 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
1226 32.495965 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
Frame 390: 106 bytes on wire (848 bits), 106 bytes
Ethernet II, Src: IntelCor_f5:38:c7 (4c:03:4f:f5:3
Internet Protocol Version 4, Src: 192.168.0.111, D
Internet Control Message Protocol
0000 6c 19 8f e9 f9 af 4c 03 4f f5 38 c7 08 00 4
0010 00 5c 3c e4 00 00 01 01 00 00 c0 a8 00 6f a
0020 ad 2e 08 00 ef a1 00 01 08 5d 00 00 00 00 0
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
Wi-Fi: <live capture in progress>
Paquetes: 1441 · Mostrado: 45 (3.1%)
Perfil: Default
Windows PowerShell
PS C:\Users\mateo> tracert google.com
No se puede resolver el nombre del sistema de destino google.com.
PS C:\Users\mateo> tracert google.com
Traza a la dirección google.com [172.217.173.46]
sobre un máximo de 30 saltos:
1 1 ms 1 ms 1 ms dlinkrouter [192.168.0.1]
2 10 ms 13 ms 18 ms 161.218.uio.satnet.net [200.63.218.161]
3 * * * Tiempo de espera agotado para esta solicitu
d.
4 49 ms 25 ms 25 ms 126.177.uio.satnet.net [200.69.177.126]
5 26 ms 31 ms 31 ms 142.250.172.196
6 35 ms 34 ms 32 ms 142.251.51.71
7 26 ms 33 ms 38 ms 209.85.251.39
8 28 ms 30 ms 28 ms bog02s12-in-f14.1e100.net [172.217.173.46]
Traza completa.
PS C:\Users\mateo>
Buscar
ENG
15:41
13/5/2023

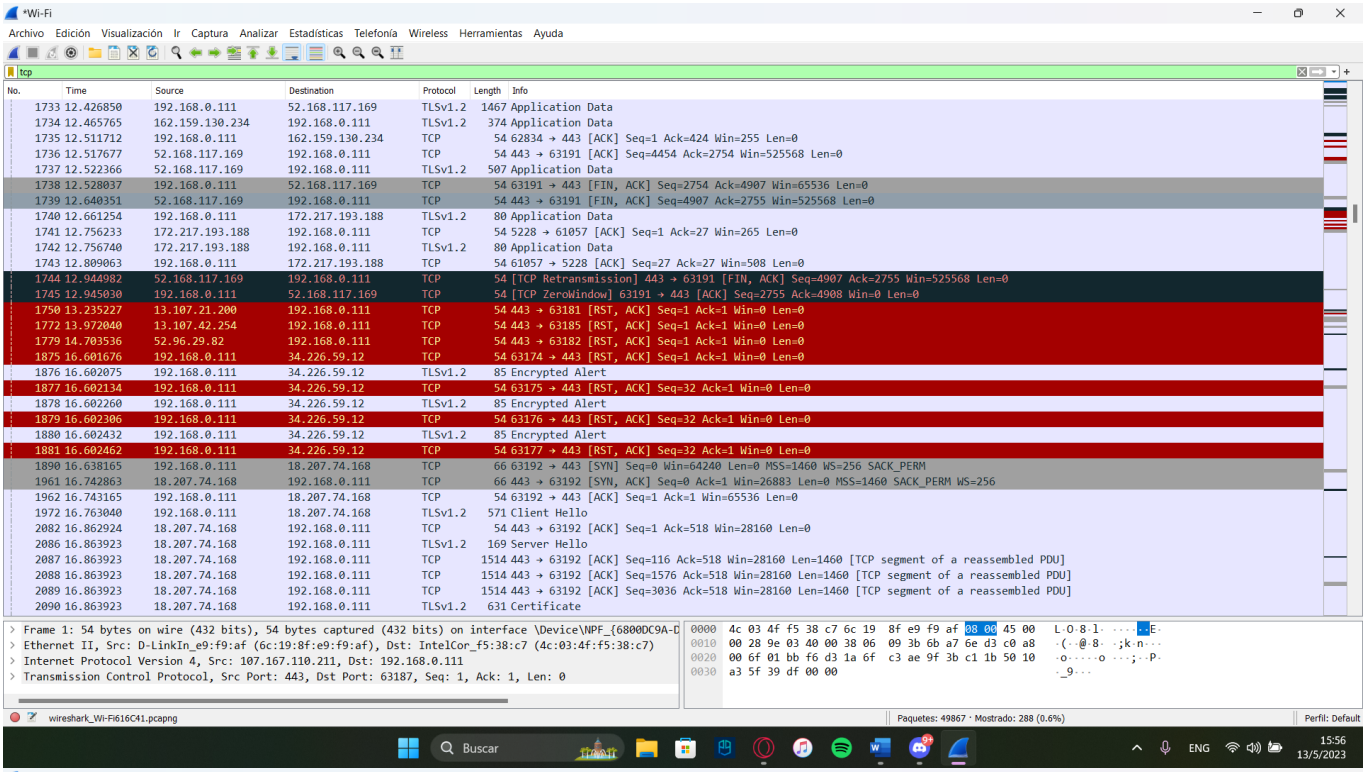

Capturando desde Wi-Fi
Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda
icmp
No. Time Source Destination Protocol Length Info
73 2.312970 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
74 2.314413 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
75 2.315628 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
76 2.316778 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
77 2.317438 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
78 2.318442 192.168.0.1 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
86 3.325211 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
87 3.337260 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded (Ti
88 3.338594 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
89 3.353616 200.63.218.161 192.168.0.111 ICMP 70 Time-to-live exceeded (Ti
90 3.355883 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
108 7.085649 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
130 11.090839 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
156 15.078794 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
194 19.095542 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
195 19.124426 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
196 19.125470 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
197 19.158953 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
198 19.160405 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
199 19.194465 200.69.177.126 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
202 20.183939 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
203 20.213429 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
204 20.214473 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
205 20.241897 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
206 20.243636 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
207 20.272832 142.250.172.196 192.168.0.111 ICMP 134 Time-to-live exceeded (Ti
253 26.918140 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
254 26.949050 142.251.51.71 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
255 26.951163 192.168.0.111 172.217.173.46 ICMP 106 Echo (ping) request id=0
256 26.980121 142.251.51.71 192.168.0.111 ICMP 110 Time-to-live exceeded (Ti
Frame 73: 106 bytes on wire (848 bits), 106 bytes
Ethernet II, Src: IntelCor_f5:38:c7 (4c:03:4f:f5:3
Internet Protocol Version 4, Src: 192.168.0.111, D
Internet Control Message Protocol
0000 6c 19 8f e9 f9 af 4c 03 4f f5 38 c7 08 00 4
0010 00 5c 3c fc 00 00 01 01 00 00 c0 a8 00 6f a
0020 ad 2e 08 00 ef 89 00 01 08 75 00 00 00 00 0
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0
Wi-Fi: <live capture in progress>
Paquetes: 531 · Mostrado: 44 (8.3%)
Perfil: Default
Windows PowerShell
PS C:\Users\mateo> tracert google.com
Traza a la dirección google.com [172.217.173.46]
sobre un máximo de 30 saltos:
1 1 ms 1 ms 1 ms dlinkrouter [192.168.0.1]
2 12 ms 15 ms * 161.218.uio.satnet.net [200.63.218.161]
3 * * * Tiempo de espera agotado para esta solicitu
d.
4 29 ms 33 ms 34 ms 126.177.uio.satnet.net [200.69.177.126]
5 29 ms 27 ms 29 ms 142.250.172.196
6 31 ms 29 ms 32 ms 142.251.51.71
7 26 ms 31 ms 30 ms 209.85.251.39
8 37 ms 34 ms 28 ms bog02s12-in-f14.1e100.net [172.217.173.46]
Traza completa.
PS C:\Users\mateo>
Buscar
ENG
15:43
13/5/2023

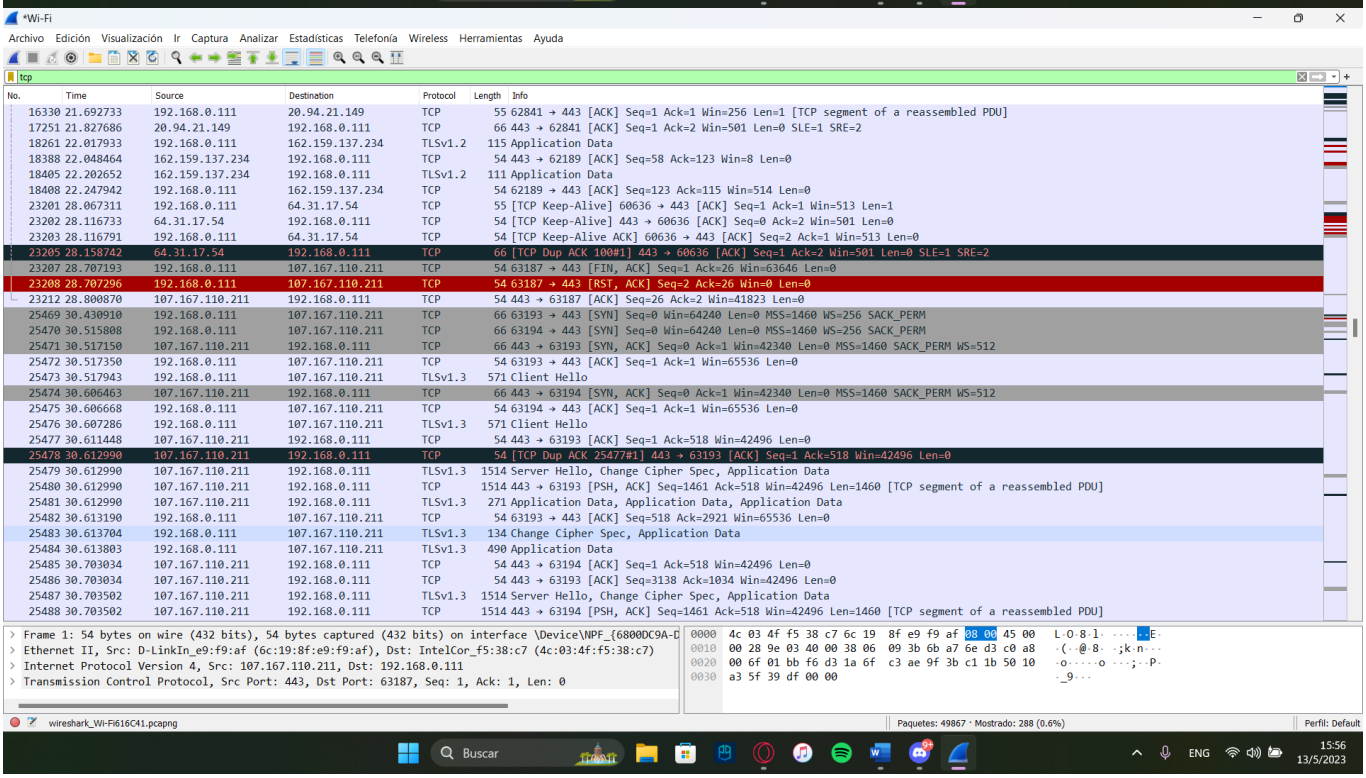


b) Watch a video from youtube.com. Capture the TCP handshake, and the congestion window.


*Wi-Fi
Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda
tcp
No. Time Source Destination Protocol Length Info
1 0.000000 107.167.110.211 192.168.0.111 TCP 54 443 → 63187 [ACK] Seq=1 Ack=1 Win=41823 Len=0
15 1.590122 162.159.130.234 192.168.0.111 TLSv1.2 157 Application Data
16 1.636355 192.168.0.111 162.159.130.234 TCP 54 62834 → 443 [ACK] Seq=1 Ack=104 Win=256 Len=0
56 5.939804 140.82.112.25 192.168.0.111 TLSv1.2 80 Application Data
57 5.939804 140.82.112.25 192.168.0.111 TCP 80 [TCP Retransmission] 443 → 63090 [PSH, ACK] Seq=1 Ack=1 Win=70 Len=26
58 5.939804 140.82.112.25 192.168.0.111 TCP 80 [TCP Retransmission] 443 → 63090 [PSH, ACK] Seq=1 Ack=1 Win=70 Len=26
59 5.939804 140.82.112.25 192.168.0.111 TCP 80 [TCP Retransmission] 443 → 63090 [PSH, ACK] Seq=1 Ack=1 Win=70 Len=26
60 5.940007 192.168.0.111 140.82.112.25 TCP 66 63090 → 443 [ACK] Seq=1 Ack=27 Win=510 Len=0 SLE=1 SRE=27
61 5.940059 192.168.0.111 140.82.112.25 TCP 66 [TCP Dup ACK 60#1] 63090 → 443 [ACK] Seq=1 Ack=27 Win=510 Len=0 SLE=1 SRE=27
62 5.940081 192.168.0.111 140.82.112.25 TCP 66 [TCP Dup ACK 60#2] 63090 → 443 [ACK] Seq=1 Ack=27 Win=510 Len=0 SLE=1 SRE=27
63 5.940334 192.168.0.111 140.82.112.25 TLSv1.2 84 Application Data
67 6.000719 192.168.0.111 107.167.110.216 TCP 66 63190 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
69 6.025126 140.82.112.25 192.168.0.111 TCP 54 443 → 63090 [ACK] Seq=27 Ack=31 Win=70 Len=0
70 6.088215 107.167.110.216 192.168.0.111 TCP 58 443 → 63190 [SYN, ACK] Seq=0 Ack=1 Win=42340 Len=0 MSS=1460
71 6.088446 192.168.0.111 107.167.110.216 TCP 54 63190 → 443 [ACK] Seq=1 Ack=1 Win=64240 Len=0
72 6.089014 192.168.0.111 107.167.110.216 TLSv1.3 571 Client Hello
74 6.187383 107.167.110.216 192.168.0.111 TCP 54 443 → 63190 [ACK] Seq=1 Ack=518 Win=41823 Len=0
75 6.189016 107.167.110.216 192.168.0.111 TLSv1.3 1514 Server Hello, Change Cipher Spec, Application Data
76 6.189016 107.167.110.216 192.168.0.111 TCP 1514 443 → 63190 [ACK] Seq=1461 Ack=518 Win=41823 Len=1460 [TCP segment of a reassembled PDU]
77 6.189016 107.167.110.216 192.168.0.111 TLSv1.3 272 Application Data, Application Data, Application Data
78 6.189321 192.168.0.111 107.167.110.216 TCP 54 63190 → 443 [ACK] Seq=518 Ack=2921 Win=64240 Len=0
79 6.191293 192.168.0.111 107.167.110.216 TLSv1.3 134 Change Cipher Spec, Application Data
80 6.191393 192.168.0.111 107.167.110.216 TLSv1.3 581 Application Data
81 6.286379 107.167.110.216 192.168.0.111 TCP 54 443 → 63190 [ACK] Seq=3139 Ack=1125 Win=41823 Len=0
90 6.519818 107.167.110.216 192.168.0.111 TLSv1.3 316 Application Data
91 6.560534 192.168.0.111 107.167.110.216 TCP 54 63190 → 443 [ACK] Seq=1125 Ack=3401 Win=63760 Len=0
99 7.870813 192.168.0.111 64.31.17.54 TCP 55 60636 → 443 [ACK] Seq=1 Ack=1 Win=513 Len=1 [TCP segment of a reassembled PDU]
100 7.891418 64.31.17.54 192.168.0.111 TCP 54 443 → 60636 [ACK] Seq=0 Ack=2 Win=501 Len=0
101 7.891488 192.168.0.111 64.31.17.54 TCP 54 [TCP Dup ACK 99#1] [TCP ACKed unseen segment] 60636 → 443 [ACK] Seq=2 Ack=1 Win=513 Len=0
102 7.960314 64.31.17.54 192.168.0.111 TCP 66 [TCP Previous segment not captured] 443 → 60636 [ACK] Seq=1 Ack=2 Win=501 Len=0 SLE=1 SRE=2
105 8.267501 192.168.0.111 162.159.137.234 TLSv1.2 115 Application Data
106 8.281589 162.159.137.234 192.168.0.111 TCP 54 443 → 62189 [ACK] Seq=1 Ack=62 Win=8 Len=0
107 8.401543 52.123.129.254 192.168.0.111 TCP 54 443 → 63184 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
Frame 1: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface \Device\NPF_{6800DC9A-D
Ethernet II, Src: D-LinkIn_e9:f9:af (6c:19:8f:e9:f9:af), Dst: IntelCor_f5:38:c7 (4c:03:4f:f5:38:c7)
Internet Protocol Version 4, Src: 107.167.110.211, Dst: 192.168.0.111
Transmission Control Protocol, Src Port: 443, Dst Port: 63187, Seq: 1, Ack: 1, Len: 0
0000 4c 03 4f f5 38 c7 6c 19 8f e9 f9 af 08 00 45 00
0010 00 28 9e 03 40 00 38 06 09 3b 6b a7 6e d3 c0 a8
0020 00 6f 01 bb f6 d3 1a 6f c3 ae 9f 3b c1 1b 50 10
0030 a3 5f 39 df 00 00
wireshark_Wi-Fi616C41.pcapng
Paquetes: 49867 · Mostrado: 288 (0.6%)
Perfil: Default
Buscar
ENG
15:56
13/5/2023


*Wi-Fi
Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda
tcp
No. Time Source Destination Protocol Length Info
100 7.891418 64.31.17.54 192.168.0.111 TCP 54 443 → 60636 [ACK] Seq=0 Ack=2 Win=501 Len=0
101 7.891488 192.168.0.111 64.31.17.54 TCP 54 [TCP Dup ACK 99#1] [TCP ACKed unseen segment] 60636 → 443 [ACK] Seq=2 Ack=1 Win=513 Len=0
102 7.960314 64.31.17.54 192.168.0.111 TCP 66 [TCP Previous segment not captured] 443 → 60636 [ACK] Seq=1 Ack=2 Win=501 Len=0 SLE=1 SRE=2
105 8.267501 192.168.0.111 162.159.137.234 TLSv1.2 115 Application Data
106 8.281589 162.159.137.234 192.168.0.111 TCP 54 443 → 62189 [ACK] Seq=1 Ack=62 Win=8 Len=0
107 8.401543 52.123.129.254 192.168.0.111 TCP 54 443 → 63184 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
108 8.448242 162.159.137.234 192.168.0.111 TLSv1.2 111 Application Data
114 8.497332 192.168.0.111 162.159.137.234 TCP 54 62189 → 443 [ACK] Seq=62 Ack=58 Win=512 Len=0
508 8.783744 13.107.18.254 192.168.0.111 TCP 54 443 → 63183 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
1073 10.412547 13.90.46.132 192.168.0.111 TLSv1.2 85 Application Data
1074 10.412710 192.168.0.111 13.90.46.132 TCP 54 62957 → 443 [ACK] Seq=1 Ack=32 Win=1019 Len=0
1075 10.413013 192.168.0.111 13.90.46.132 TLSv1.2 89 Application Data
1515 10.513734 13.90.46.132 192.168.0.111 TLSv1.2 85 Application Data
1516 10.513894 192.168.0.111 13.90.46.132 TCP 54 62957 → 443 [ACK] Seq=36 Ack=63 Win=1019 Len=0
1699 10.887770 204.79.197.222 192.168.0.111 TCP 54 443 → 63186 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
1712 11.889491 40.126.212.199 192.168.0.111 TCP 54 443 → 63180 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
1717 12.125409 192.168.0.111 52.168.117.169 TCP 66 63191 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
1720 12.217128 52.168.117.169 192.168.0.111 TCP 66 443 → 63191 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1440 WS=256 SACK_PERM
1721 12.217348 192.168.0.111 52.168.117.169 TCP 54 63191 → 443 [ACK] Seq=1 Ack=1 Win=66048 Len=0
1722 12.219484 192.168.0.111 52.168.117.169 TLSv1.2 266 Client Hello
1723 12.318196 52.168.117.169 192.168.0.111 TCP 54 443 → 63191 [ACK] Seq=1 Ack=213 Win=525312 Len=0
1724 12.319201 52.168.117.169 192.168.0.111 TCP 1514 443 → 63191 [ACK] Seq=1 Ack=213 Win=525312 Len=1460 [TCP segment of a reassembled PDU]
1725 12.319201 52.168.117.169 192.168.0.111 TCP 1514 443 → 63191 [ACK] Seq=1461 Ack=213 Win=525312 Len=1460 [TCP segment of a reassembled PDU]
1726 12.319201 52.168.117.169 192.168.0.111 TCP 1514 443 → 63191 [ACK] Seq=2921 Ack=213 Win=525312 Len=1460 [TCP segment of a reassembled PDU]
1727 12.319201 52.168.117.169 192.168.0.111 TLSv1.2 76 Server Hello, Certificate, Server Key Exchange, Server Hello Done
1728 12.319564 192.168.0.111 52.168.117.169 TCP 54 63191 → 443 [ACK] Seq=213 Ack=2921 Win=66048 Len=0
1729 12.319751 192.168.0.111 52.168.117.169 TCP 54 63191 → 443 [ACK] Seq=213 Ack=4403 Win=66048 Len=0
1730 12.325315 192.168.0.111 52.168.117.169 TLSv1.2 212 Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
1731 12.425057 52.168.117.169 192.168.0.111 TLSv1.2 105 Change Cipher Spec, Encrypted Handshake Message
1732 12.426559 192.168.0.111 52.168.117.169 TLSv1.2 1024 Application Data
1733 12.426850 192.168.0.111 52.168.117.169 TLSv1.2 1467 Application Data
1734 12.465765 162.159.130.234 192.168.0.111 TLSv1.2 374 Application Data
1735 12.511712 192.168.0.111 162.159.130.234 TCP 54 62834 → 443 [ACK] Seq=1 Ack=424 Win=255 Len=0
Frame 1: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface \Device\NPF_{6800DC9A-D
Ethernet II, Src: D-LinkIn_e9:f9:af (6c:19:8f:e9:f9:af), Dst: IntelCor_f5:38:c7 (4c:03:4f:f5:38:c7)
Internet Protocol Version 4, Src: 107.167.110.211, Dst: 192.168.0.111
Transmission Control Protocol, Src Port: 443, Dst Port: 63187, Seq: 1, Ack: 1, Len: 0
0000 4c 03 4f f5 38 c7 6c 19 8f e9 f9 af 08 00 45 00
0010 00 28 9e 03 40 00 38 06 09 3b 6b a7 6e d3 c0 a8
0020 00 6f 01 bb f6 d3 1a 6f c3 ae 9f 3b c1 1b 50 10
0030 a3 5f 39 df 00 00
wireshark_Wi-Fi616C41.pcapng
Paquetes: 49867 · Mostrado: 288 (0.6%)
Perfil: Default
Buscar
ENG
15:56
13/5/2023





2) Use Dijkstra's to get the routing tables for nodes A, B and E.

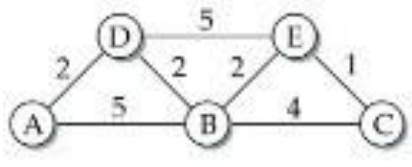


Tabla de enrutamiento para el nodo A:

Destino	Siguiente salto	Distancia
A	Null	0
B	D	4
C	B	8
D	A	2
E	D	7

Tabla de enrutamiento para el nodo B:

Destino	Siguiente salto	Distancia
A	D	4
B	Null	0
C	B	4
D	B	2
E	C	5

Tabla de enrutamiento para el nodo E:

Destino	Siguiente salto	Distancia
A	D	7
B	C	5
C	E	1
D	E	5
E	Null	0

Código utilizado:

```python
import sys

def dijkstra(graph, start_node):
    distances = {node: float('inf') for node in graph}
    distances[start_node] = 0

    next_hops = {node: None for node in graph}

    visited = set()

    while len(visited) < len(graph):
        current_node = min(
            (node for node in graph if node not in visited),
            key=lambda node: distances[node]
        )
        visited.add(current_node)

        for neighbor, weight in graph[current_node].items():
            distance = distances[current_node] + weight
            if distance < distances[neighbor]:
                distances[neighbor] = distance
                next_hops[neighbor] = current_node

    return distances, next_hops



graph = {
    'A': {'B': 5, 'D': 2},
    'B': {'A': 5, 'D': 2, 'C': 4, 'E': 4 },
    'C': {'B': 4, 'E': 1},
    'D': {'A': 2, 'B': 2, 'E': 5},
    'E': {'C': 1, 'D': 5}
}
```

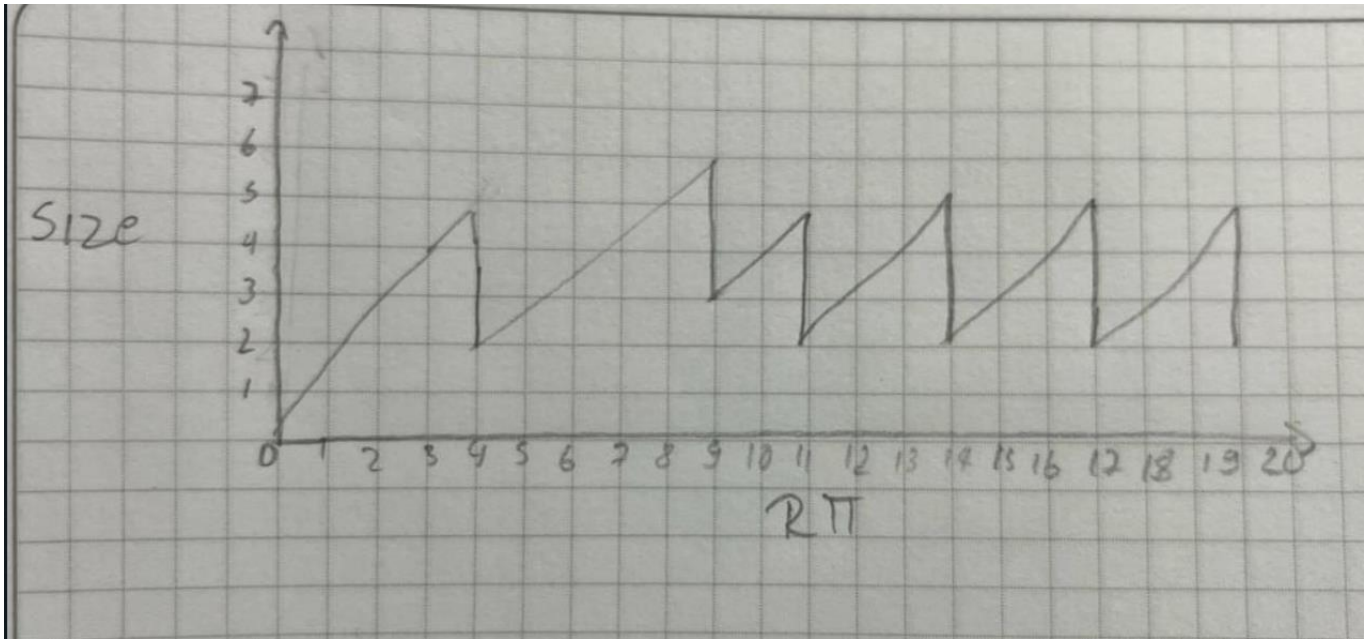
3) Suppose a host wants to establish the reliability of a link by sending packets and measuringthe percentage that are received; routers, for example, do this. Explain the difficulty of doing this over a TCP connection.

Intentar establecer la confiabilidad de una conexión red mediante el envió de paquetes puede ser un tanto complicada en una conexión TCP en comparación a otras conexiones. Esto se debe a que el mecanismo de control de flujo y control de congestión implementado en el protocolo TCP, puesto que el TCP utiliza algoritmos que garantizan una entrega confiable de datos. En este caso el TCP tiene mecanismos de retransmisiones automáticas, el cual, cuando detecta una perdida de paquetes en la conexión TCP, el protocolo lo volverá a retransmitir de forma automática, ocasionando que los paquetes perdidos puedan llegara su destino tarde, de igual manera también tenemos el control de congestión, mecanismo que usa algoritmos para regular el flujo de datos para evitar una posible congestión en la red ocasionando que la velocidad de envío de paquetes varie dinámicamente. Estos mecanismos aumentan la complejidad al momento de medir la confiabilidad, por lo que la dificultad también es alta.

4) Consider a simple congestion control algorithm that uses linear increase and multiplicative decrease (no slow start). Assume the congestion window size is in units of packets rather than bytes, and it is one packet initially.

   a) Give a detailed sketch of this algorithm.
   b) Assume the delay is latency only, and that when a group of packets is sent, only a single ACK is returned.
   c) Plot the congestion window as a function of RTT for the situation in which the following packets are lost: 9, 25, 30, 38 and 50. For simplicity, assume a perfect timeout mechanism that detects a lost packet exactly 1 RTT after it is transmitted.

Suponiendo que el tamaño del remitente es de 1 paquete, este envía una ventana completa en un lote. Eso significa que por cada ACK de una ventana que el remitente recibe, aumenta su ventana efectiva en uno. Sin embargo, esta se reduce a la mitad del numero de paquetes cuando pasa el timeout. Si tomamos en cuenta la situación en la que se nos indica la existencia de paquetes perdido, el tamaño de la ventana inicialmente es 1 y cuando se obtiene el primer ACK este crece a 2. Cuando inicia el segundo RTT enviamos paquetes 2 y 3, y cuando estos obtienen sus ACK la ventana incrementa a 3 y enviamos los paquetes 4,5 y 6, que, con su llegada el tamaño de la ventana pasa a ser 4. Prosiguiendo, cuando llegamos al cuarto RTT, se envían los paquetes 7,8,9,10, donde el paquete 9 se pierde, por tanto, después del timeout el tamaño de la ventana se reduce a 2. Finalmente, la ventana de congestión aumenta hasta perder al paquete 25, reduciendo su tamaño a la mitad el cual vendría a hacer el valor de 3 cuando acaba el noveno RTT.


Size
7
6
5
4
3
2
1
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
RTT