# Wireshark

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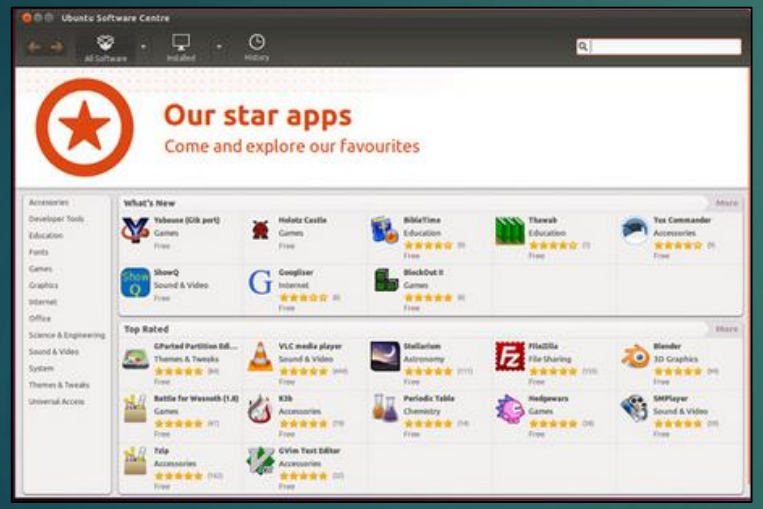
# Un poco de historia

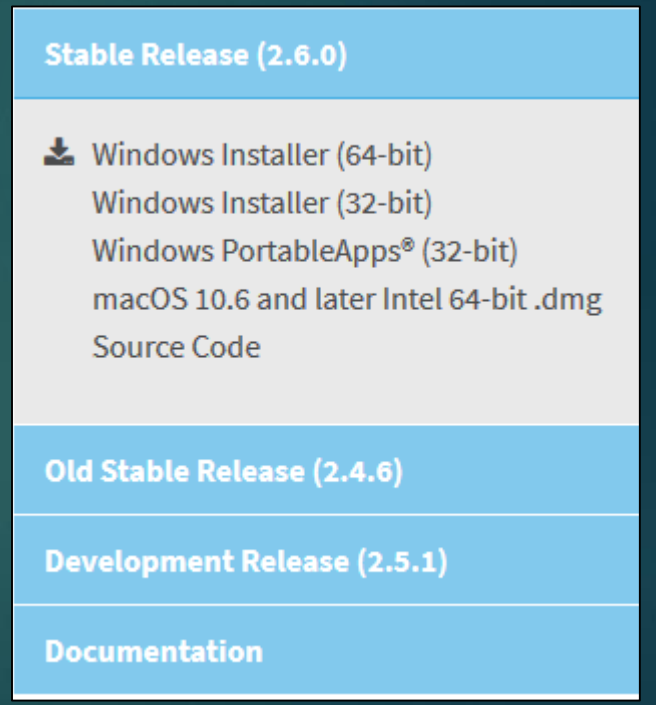
- Lanzado en 1999 como Ethereal y mas tarde renombrado como Wireshark por su creador, Gerald Combs.
- No tiene fines lucrativos.
- Su código libre y multiplataforma.
- Programado en C y C++.
- Es uno de los sniffers mas conocidos en la actualidad, ofreciendo múltiples funcionalidades y una extensa variedad de protocolos.
- Licencia GPL.
- La mayor ventaja que ofrece respecto a los demás analizadores es su GUI y su gran capacidad para organizar y filtrar la información capturada.

# Instalación de Wireshark

- En su pagina oficial dispone de instaladores gráficos para Windows, tanto de 32 como de 64 bits, para macOS y del código fuente.



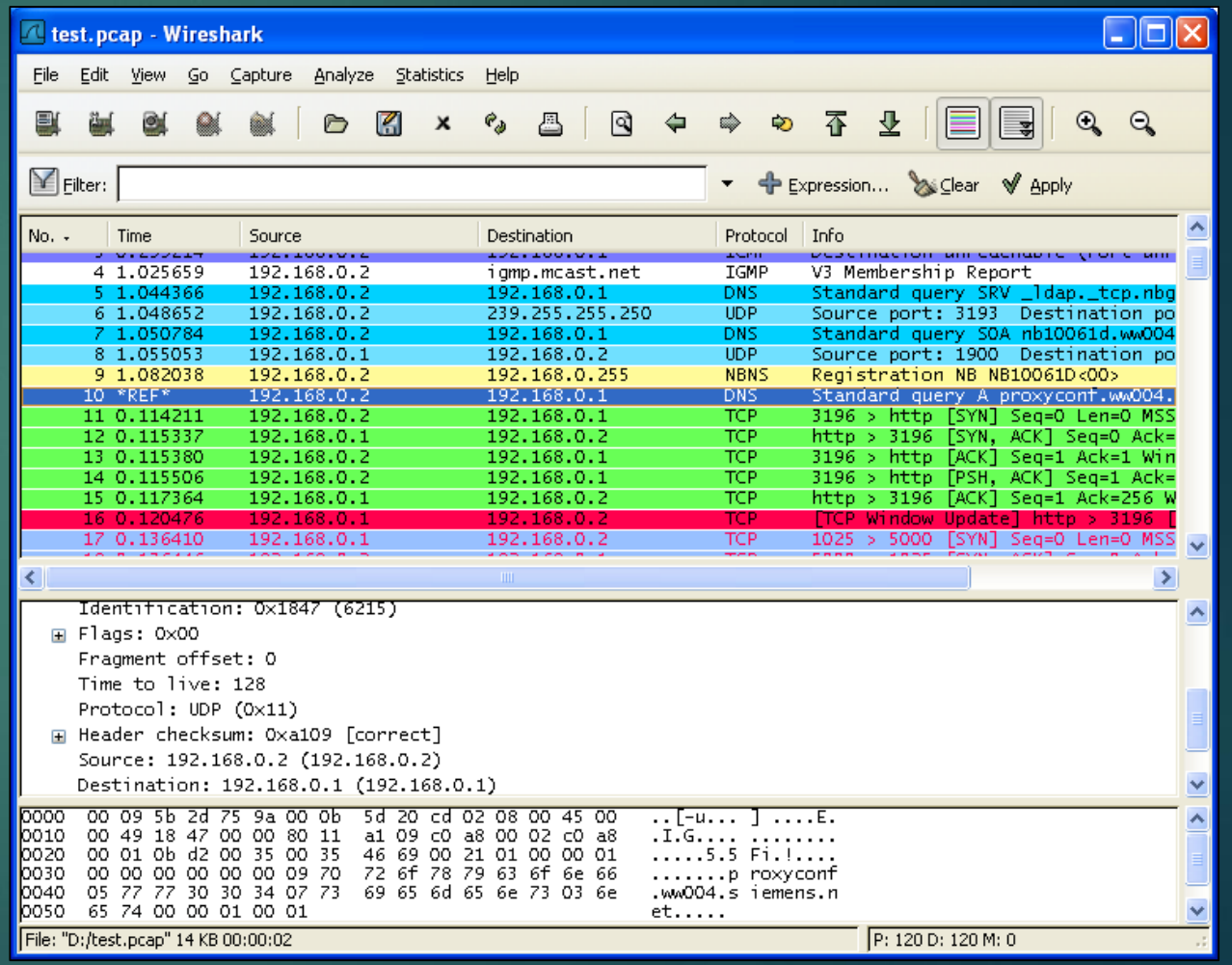

```
sudo apt install wireshark
```



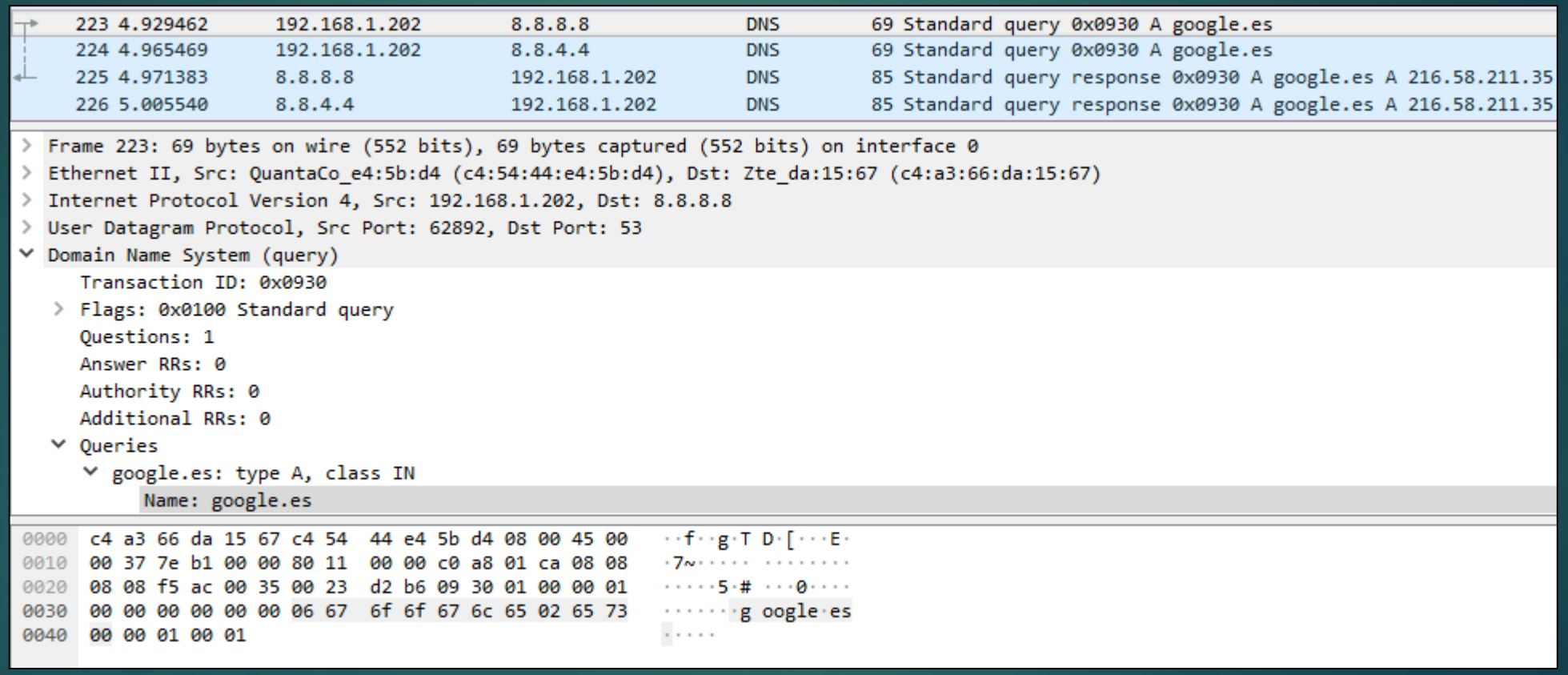

- Para distribuciones Linux, se puede instalar desde el código fuente, desde los repositorios oficiales de Linux o el centro de software.

# Como es Wireshark

- Filtrado de protocolos.
- Diferenciación por colores según el protocolo.
- Cuadro con información de cada conexión.
- Información de forma hexadecimal del paquete tal cual se envía por la red.

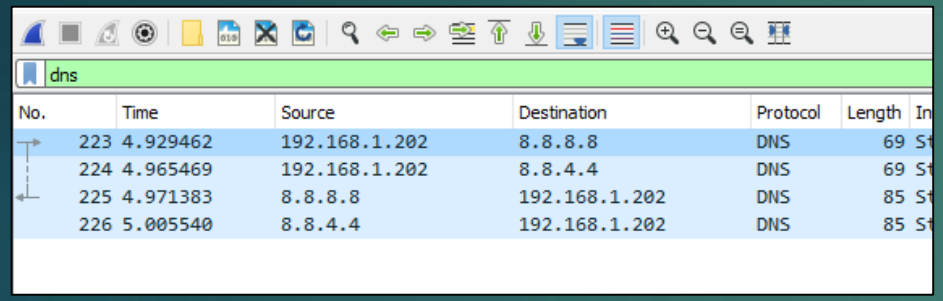


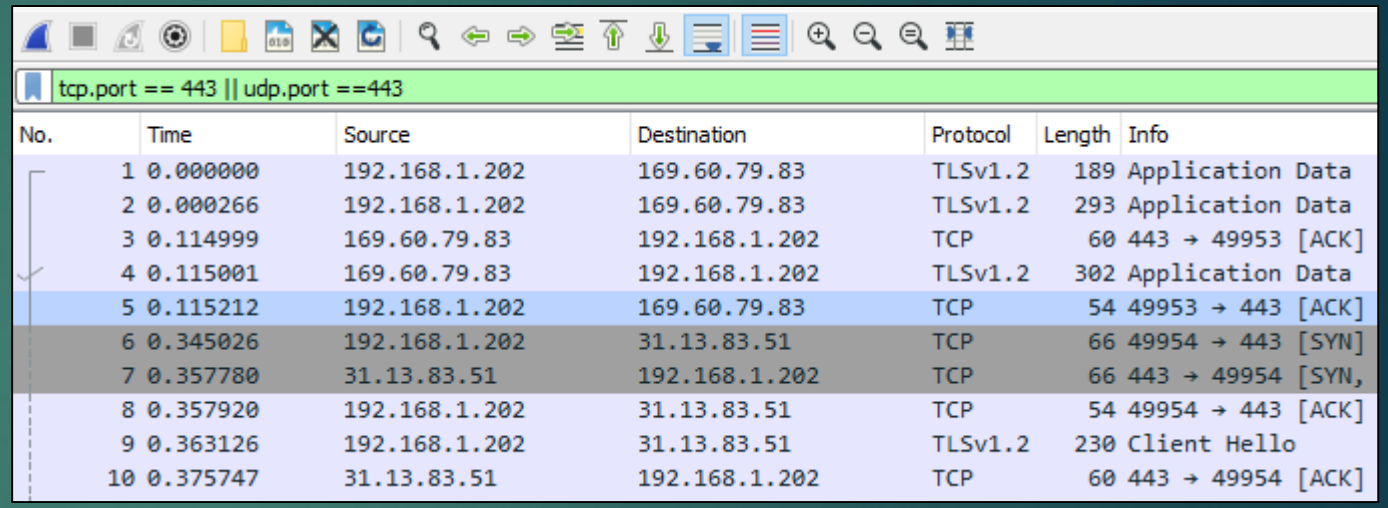
# Como es Wireshark

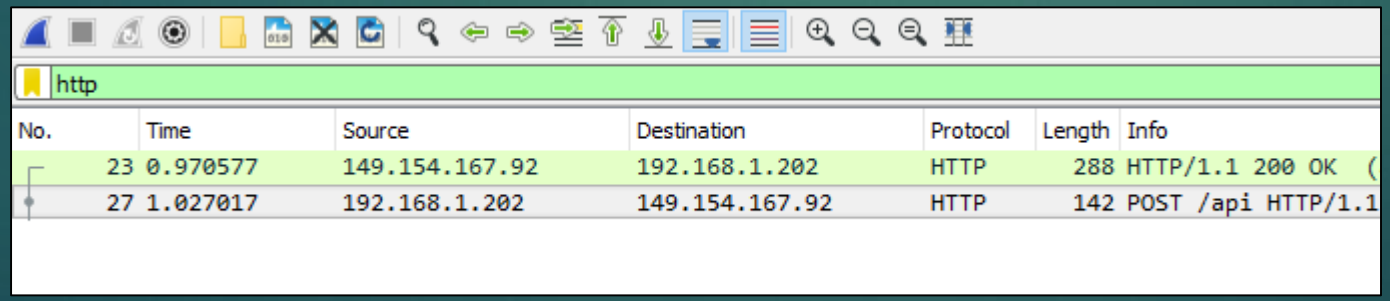


# Como es Wireshark

## Filtrado de protocolos

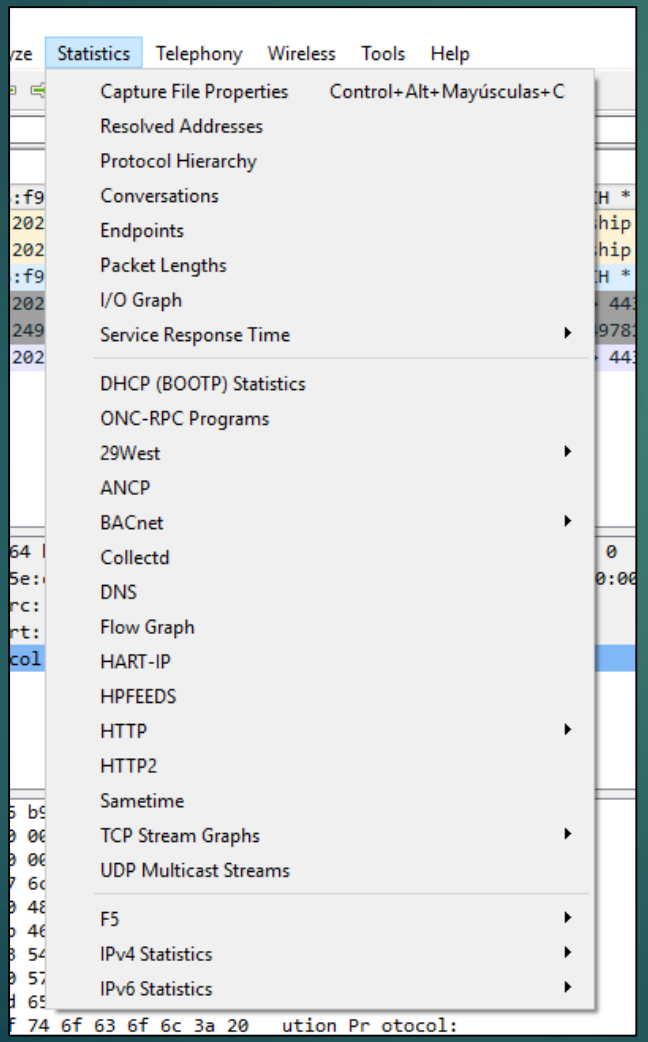


# Como es Wireshark

## Pestaña Stadistic

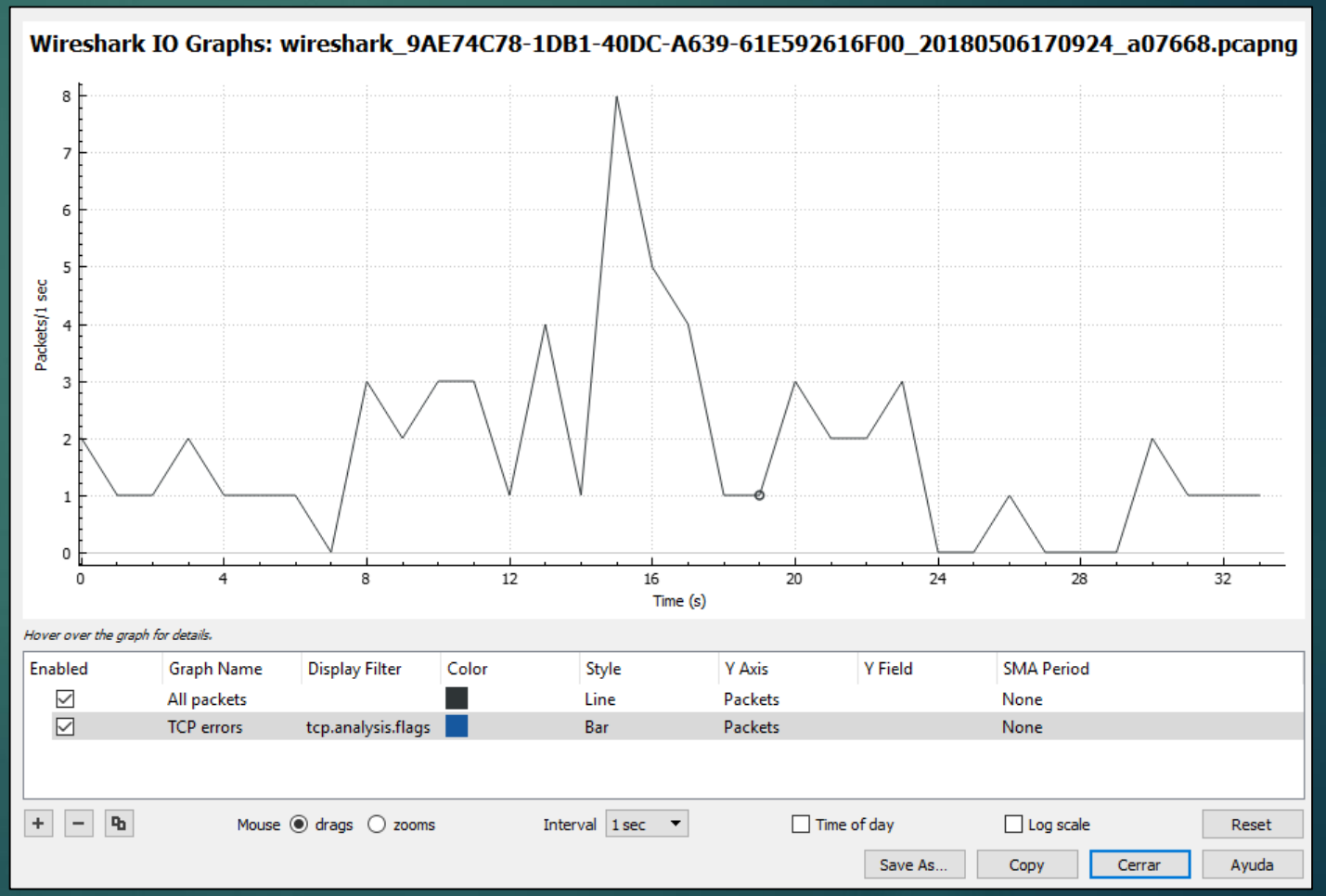



- Multitud de opciones
  - I/O Graph
  - Flow Graph
  - Endpoints
  - HTTP
  - IPv4 / IPv6

# Como es Wireshark

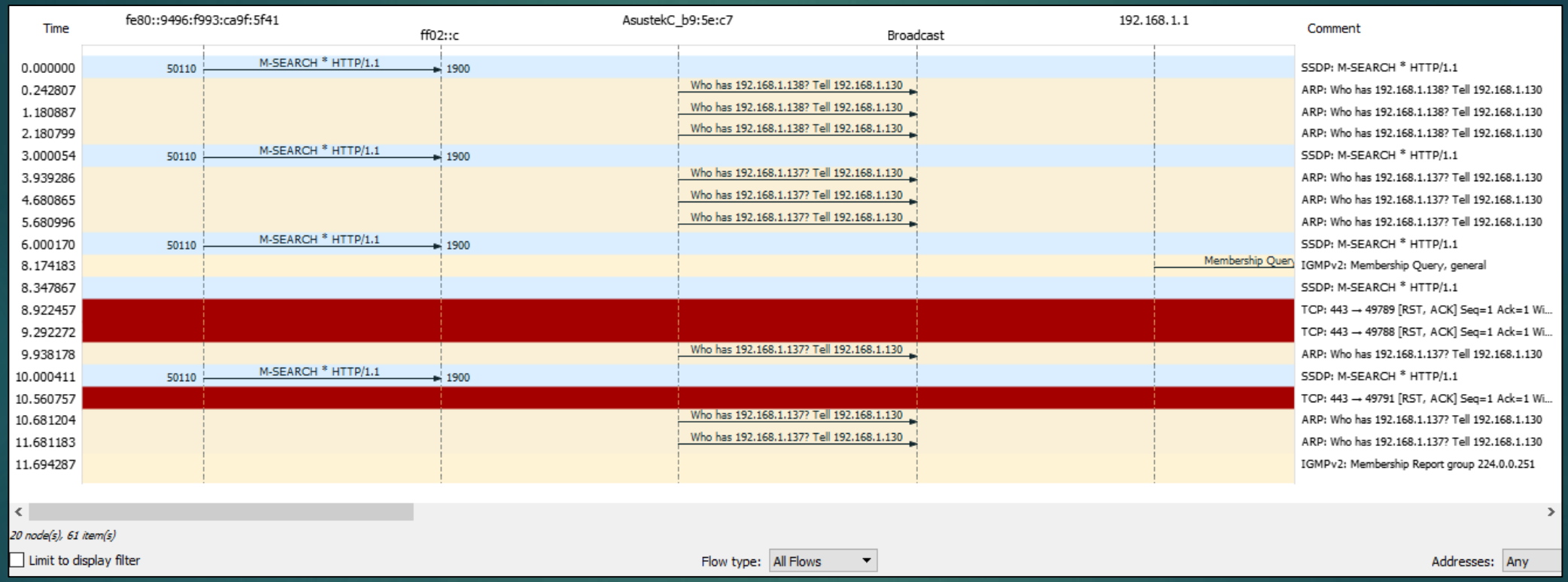
## I/O Graph

- Muestra la cantidad de paquetes por segundo a lo largo en el tiempo.



# Como es Wireshark

## Flow Graph

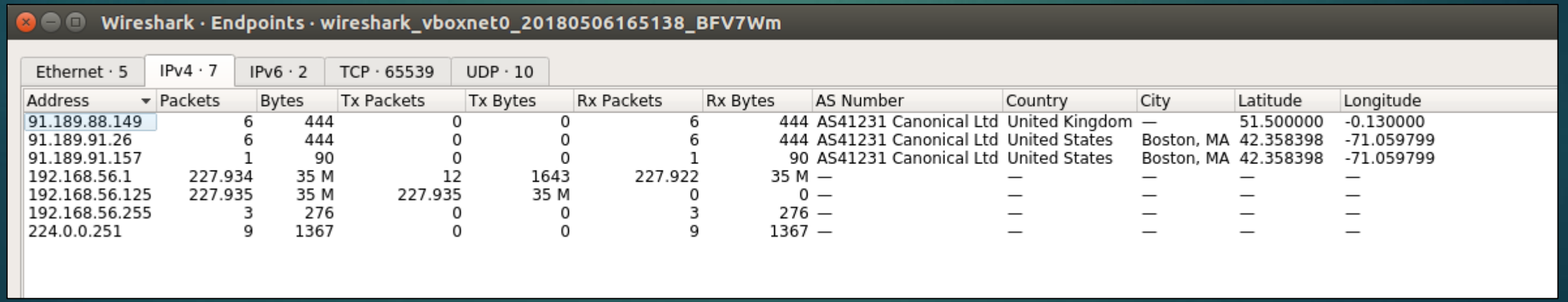



- Muestra un diagrama de flujo donde podemos ver los protocolos involucrados.

# Como es Wireshark

## Endpoints

- Muestra los paquetes por cada IP, proporcionando información sobre el peso total de los paquetes o la localización de dicha ip.




| Address | Packets | Bytes | Tx Packets | Tx Bytes | Rx Packets | Rx Bytes | AS Number | Country | City | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 91.189.88.149 | 6 | 444 | 0 | 0 | 6 | 444 | AS41231 Canonical Ltd | United Kingdom | — | 51.500000 | -0.130000 |
| 91.189.91.26 | 6 | 444 | 0 | 0 | 6 | 444 | AS41231 Canonical Ltd | United States | Boston, MA | 42.358398 | -71.059799 |
| 91.189.91.157 | 1 | 90 | 0 | 0 | 1 | 90 | AS41231 Canonical Ltd | United States | Boston, MA | 42.358398 | -71.059799 |
| 192.168.56.1 | 227.934 | 35 M | 12 | 1643 | 227.922 | 35 M | — | — | — | — | — |
| 192.168.56.125 | 227.935 | 35 M | 227.935 | 35 M | 0 | 0 | — | — | — | — | — |
| 192.168.56.255 | 3 | 276 | 0 | 0 | 3 | 276 | — | — | — | — | — |
| 224.0.0.251 | 9 | 1367 | 0 | 0 | 9 | 1367 | — | — | — | — | — |

# Para que podemos usar Wireshark

- Analizar el trafico de red (protocolos, puertos ...)
- Detectar ataques (DDoS, MITM ...)
- Testear la seguridad de una red informática (puertos abiertos, IP, encriptación …)
- Averiguar información (IP, Dominios, contraseñas, emails, imágenes …)

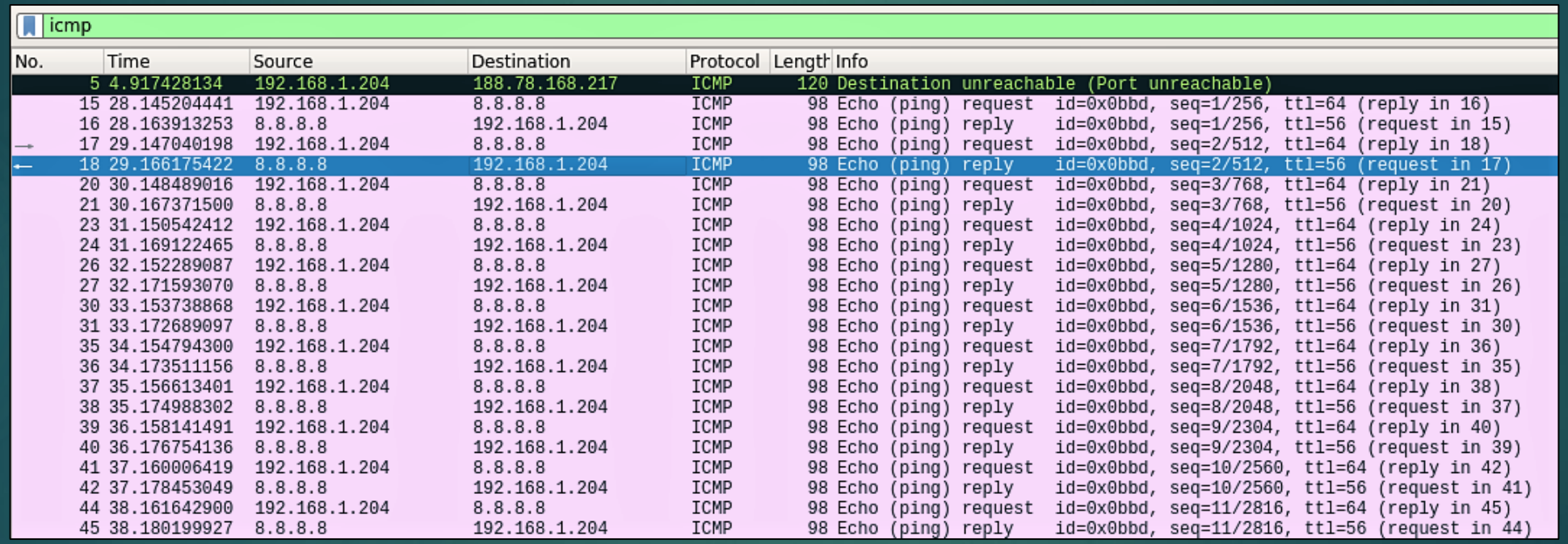

# Algunos ejemplos

## Demos

- Ping.
- Detección ataque DDoS.
- Comprobar el funcionamiento de nuestro servidor.
- Ver la transferencia de archivos.
- Peligros de no usar el protocolo https en paginas con login.

# Algunos ejemplos

## Ping

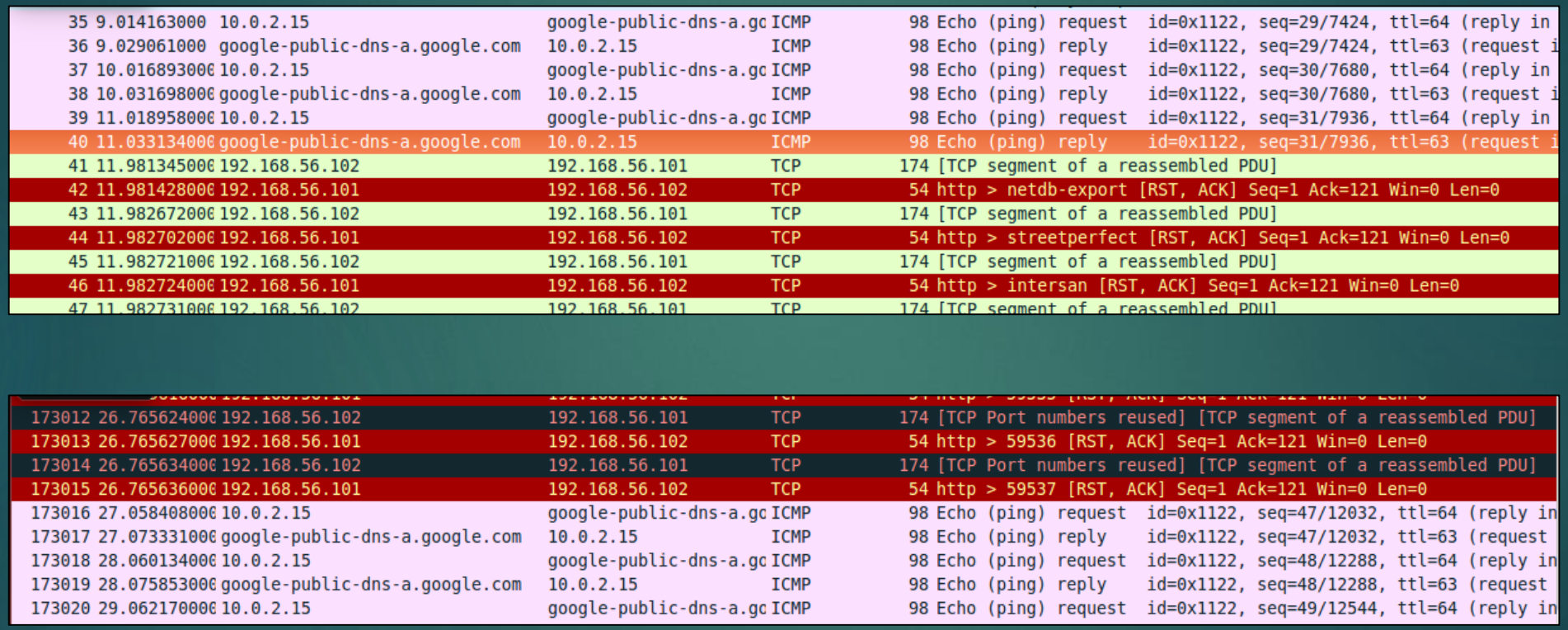


icmp

| No. | Time | Source | Destination | Protocol | Length | Info |
|---|---|---|---|---|---|---|
| 5 | 4.917428134 | 192.168.1.204 | 188.78.168.217 | ICMP | 120 | Destination unreachable (Port unreachable) |
| 15 | 28.145204441 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=1/256, ttl=64 (reply in 16) |
| 16 | 28.163913253 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=1/256, ttl=56 (request in 15) |
| 17 | 29.147040198 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=2/512, ttl=64 (reply in 18) |
| 18 | 29.166175422 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=2/512, ttl=56 (request in 17) |
| 20 | 30.148489016 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=3/768, ttl=64 (reply in 21) |
| 21 | 30.167371500 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=3/768, ttl=56 (request in 20) |
| 23 | 31.150542412 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=4/1024, ttl=64 (reply in 24) |
| 24 | 31.169122465 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=4/1024, ttl=56 (request in 23) |
| 26 | 32.152289087 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=5/1280, ttl=64 (reply in 27) |
| 27 | 32.171593070 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=5/1280, ttl=56 (request in 26) |
| 30 | 33.153738868 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=6/1536, ttl=64 (reply in 31) |
| 31 | 33.172689097 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=6/1536, ttl=56 (request in 30) |
| 35 | 34.154794300 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=7/1792, ttl=64 (reply in 36) |
| 36 | 34.173511156 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=7/1792, ttl=56 (request in 35) |
| 37 | 35.156613401 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=8/2048, ttl=64 (reply in 38) |
| 38 | 35.174988302 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=8/2048, ttl=56 (request in 37) |
| 39 | 36.158141491 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=9/2304, ttl=64 (reply in 40) |
| 40 | 36.176754136 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=9/2304, ttl=56 (request in 39) |
| 41 | 37.160006419 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=10/2560, ttl=64 (reply in 42) |
| 42 | 37.178453049 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=10/2560, ttl=56 (request in 41) |
| 44 | 38.161642900 | 192.168.1.204 | 8.8.8.8 | ICMP | 98 | Echo (ping) request id=0x0bbd, seq=11/2816, ttl=64 (reply in 45) |
| 45 | 38.180199927 | 8.8.8.8 | 192.168.1.204 | ICMP | 98 | Echo (ping) reply id=0x0bbd, seq=11/2816, ttl=56 (request in 44) |

# Algunos ejemplos

## Detección ataque DDoS mediante hping3



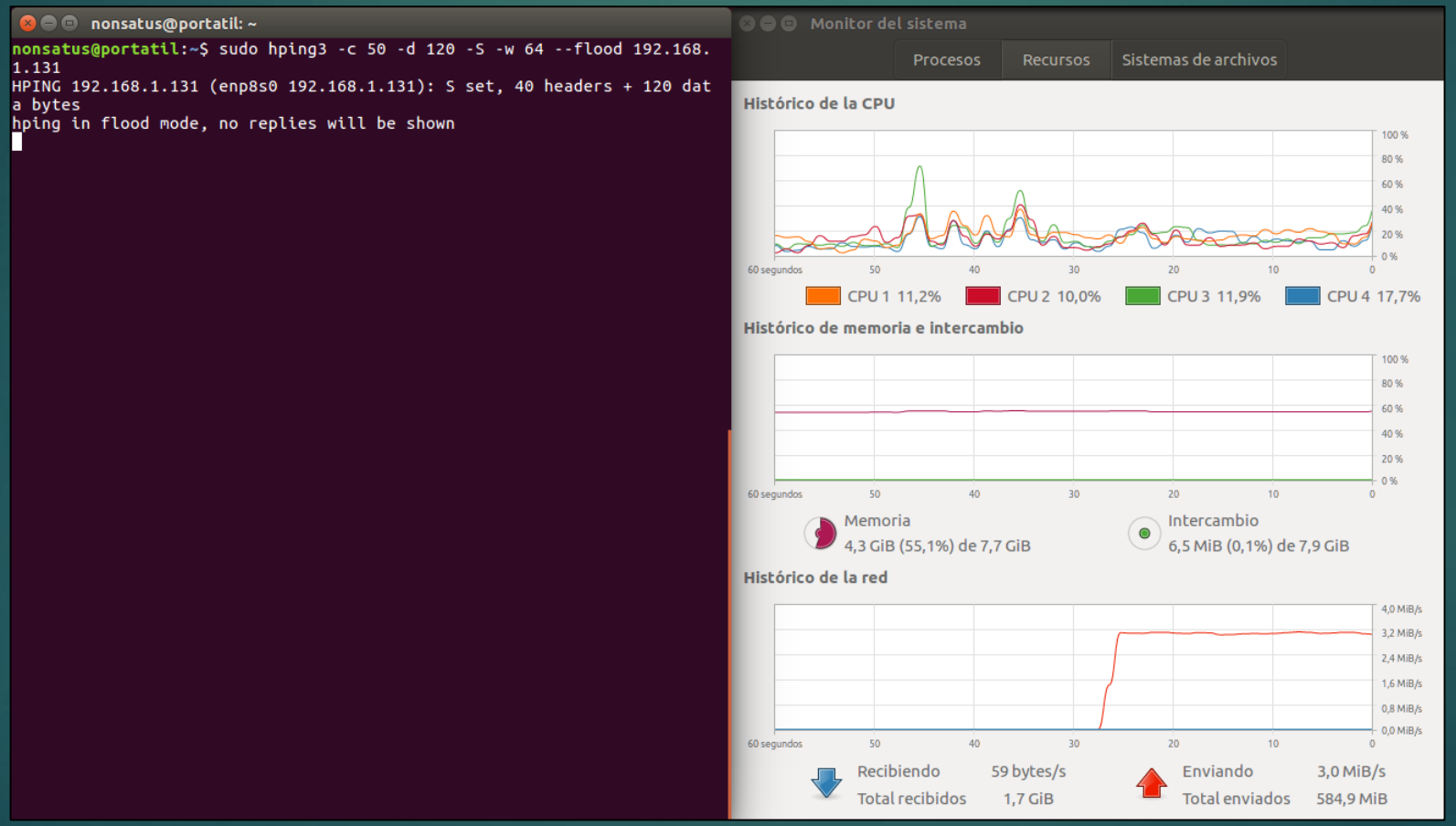
| | | | | | | |
|---|---|---|---|---|---|---|
| 35 | 9.014163000 | 10.0.2.15 | google-public-dns-a.gc | ICMP | 98 | Echo (ping) request id=0x1122, seq=29/7424, ttl=64 (reply in |
| 36 | 9.029061000 | google-public-dns-a.google.com | 10.0.2.15 | ICMP | 98 | Echo (ping) reply id=0x1122, seq=29/7424, ttl=63 (request i |
| 37 | 10.016893006 | 10.0.2.15 | google-public-dns-a.gc | ICMP | 98 | Echo (ping) request id=0x1122, seq=30/7680, ttl=64 (reply in |
| 38 | 10.031698006 | google-public-dns-a.google.com | 10.0.2.15 | ICMP | 98 | Echo (ping) reply id=0x1122, seq=30/7680, ttl=63 (request i |
| 39 | 11.018958006 | 10.0.2.15 | google-public-dns-a.gc | ICMP | 98 | Echo (ping) request id=0x1122, seq=31/7936, ttl=64 (reply in |
| 40 | 11.033134006 | google-public-dns-a.google.com | 10.0.2.15 | ICMP | 98 | Echo (ping) reply id=0x1122, seq=31/7936, ttl=63 (request i |
| 41 | 11.981345006 | 192.168.56.102 | 192.168.56.101 | TCP | 174 | [TCP segment of a reassembled PDU] |
| 42 | 11.981428006 | 192.168.56.101 | 192.168.56.102 | TCP | 54 | http > netdb-export [RST, ACK] Seq=1 Ack=121 Win=0 Len=0 |
| 43 | 11.982672006 | 192.168.56.102 | 192.168.56.101 | TCP | 174 | [TCP segment of a reassembled PDU] |
| 44 | 11.982702006 | 192.168.56.101 | 192.168.56.102 | TCP | 54 | http > streetperfect [RST, ACK] Seq=1 Ack=121 Win=0 Len=0 |
| 45 | 11.982721006 | 192.168.56.102 | 192.168.56.101 | TCP | 174 | [TCP segment of a reassembled PDU] |
| 46 | 11.982724006 | 192.168.56.101 | 192.168.56.102 | TCP | 54 | http > intersan [RST, ACK] Seq=1 Ack=121 Win=0 Len=0 |
| 47 | 11.982731006 | 192.168.56.102 | 192.168.56.101 | TCP | 174 | [TCP segment of a reassembled PDU] |



| | | | | | | |
|---|---|---|---|---|---|---|
| 173012 | 26.765624006 | 192.168.56.102 | 192.168.56.101 | TCP | 174 | [TCP Port numbers reused] [TCP segment of a reassembled PDU] |
| 173013 | 26.765627006 | 192.168.56.101 | 192.168.56.102 | TCP | 54 | http > 59536 [RST, ACK] Seq=1 Ack=121 Win=0 Len=0 |
| 173014 | 26.765634006 | 192.168.56.102 | 192.168.56.101 | TCP | 174 | [TCP Port numbers reused] [TCP segment of a reassembled PDU] |
| 173015 | 26.765636006 | 192.168.56.101 | 192.168.56.102 | TCP | 54 | http > 59537 [RST, ACK] Seq=1 Ack=121 Win=0 Len=0 |
| 173016 | 27.058408006 | 10.0.2.15 | google-public-dns-a.gc | ICMP | 98 | Echo (ping) request id=0x1122, seq=47/12032, ttl=64 (reply in |
| 173017 | 27.073331006 | google-public-dns-a.google.com | 10.0.2.15 | ICMP | 98 | Echo (ping) reply id=0x1122, seq=47/12032, ttl=63 (request |
| 173018 | 28.060134006 | 10.0.2.15 | google-public-dns-a.gc | ICMP | 98 | Echo (ping) request id=0x1122, seq=48/12288, ttl=64 (reply in |
| 173019 | 28.075853006 | google-public-dns-a.google.com | 10.0.2.15 | ICMP | 98 | Echo (ping) reply id=0x1122, seq=48/12288, ttl=63 (request |
| 173020 | 29.062170006 | 10.0.2.15 | google-public-dns-a.gc | ICMP | 98 | Echo (ping) request id=0x1122, seq=49/12544, ttl=64 (reply in |

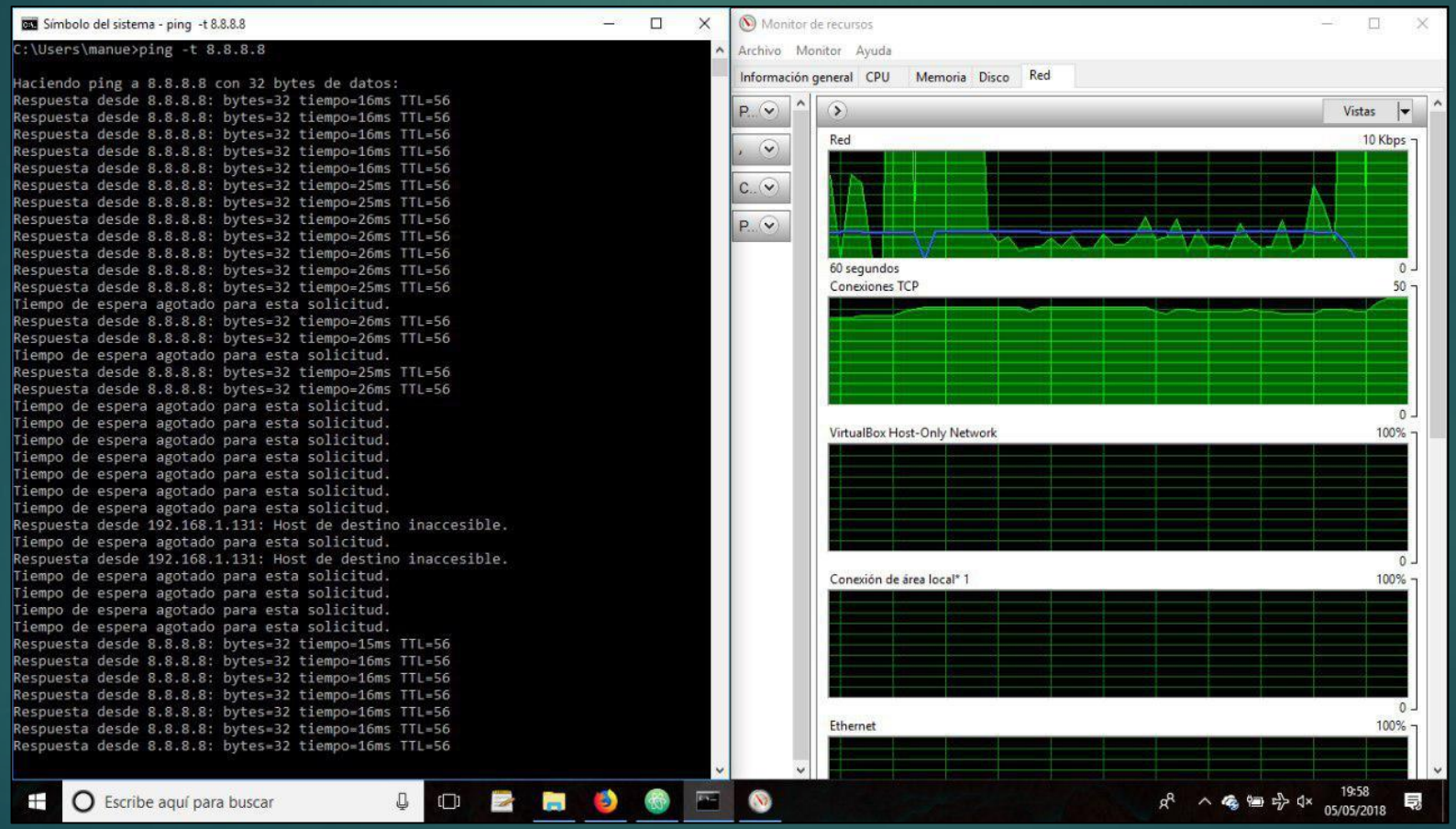
# Algunos ejemplos

## Detección ataque DDoS mediante hping3



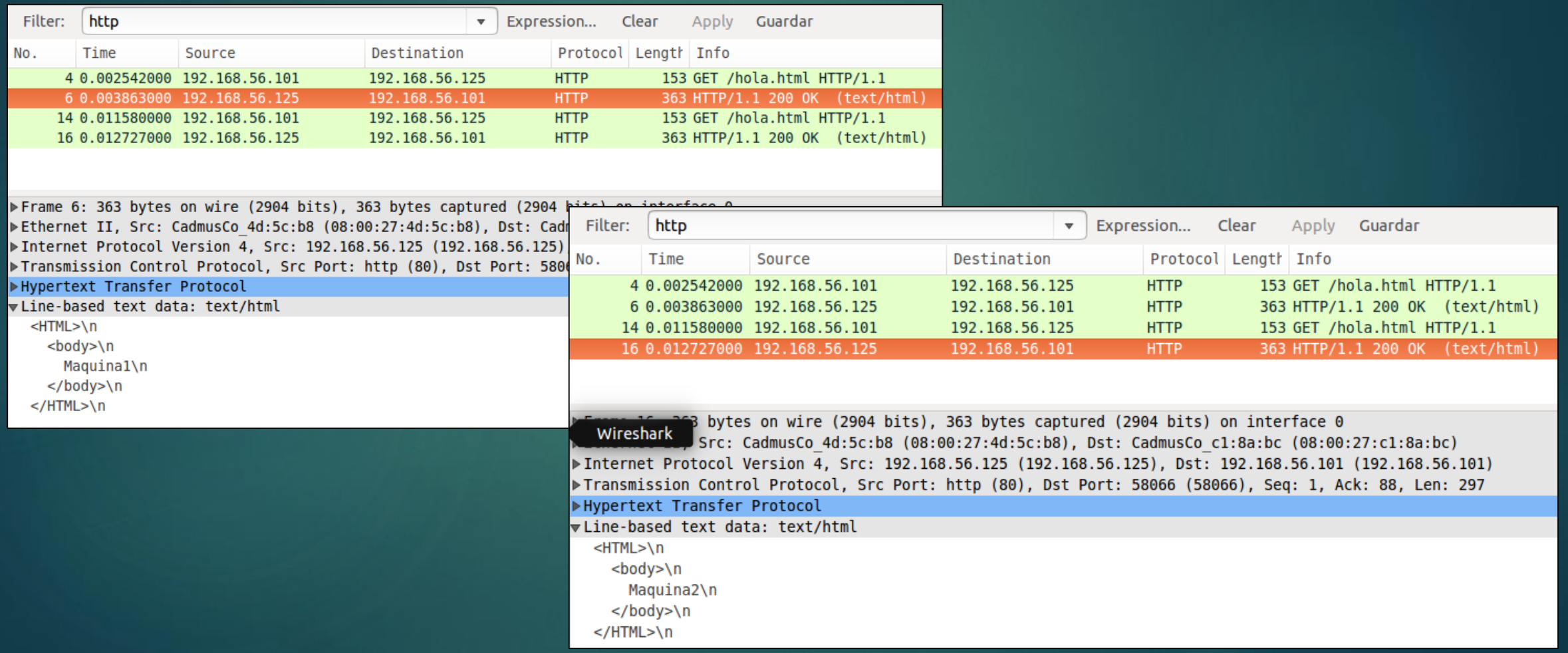
# Algunos ejemplos

## Detección ataque DDoS mediante hping3



# Algunos ejemplos

## Funcionamiento balanceador



# Algunos ejemplos

## Funcionamiento balanceador

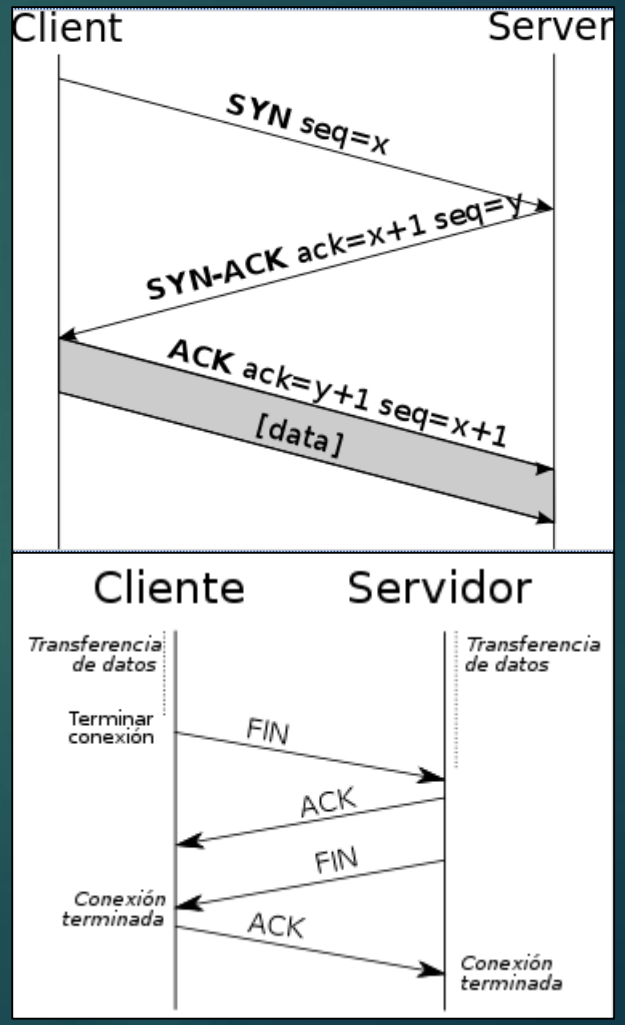
Filter: Expression... Clear Apply Guardar

| No. | Time | Source | Destination | Protocol | Length | Info |
|---|---|---|---|---|---|---|
| 1 | 0.000000000 | 192.168.56.101 | 192.168.56.105 | TCP | 74 | 57034 > http [SYN] Seq=0 Win= |
| 2 | 0.000251000 | 192.168.56.105 | 192.168.56.101 | TCP | 74 | http > 57034 [SYN, ACK] Seq=0 |
| 3 | 0.000266000 | 192.168.56.101 | 192.168.56.105 | TCP | 66 | 57034 > http [ACK] Seq=1 Ack= |
| 4 | 0.000542000 | 192.168.56.101 | 192.168.56.105 | HTTP | 153 | GET /hola.html HTTP/1.1 |
| 5 | 0.000692000 | 192.168.56.105 | 192.168.56.101 | TCP | 66 | http > 57034 [ACK] Seq=1 Ack= |
| 6 | 0.000943000 | 192.168.56.105 | 192.168.56.101 | HTTP | 340 | HTTP/1.1 200 OK (text/html) |
| 7 | 0.000949000 | 192.168.56.101 | 192.168.56.105 | TCP | 66 | 57034 > http [ACK] Seq=88 Ack |
| 8 | 0.001231000 | 192.168.56.101 | 192.168.56.105 | TCP | 66 | 57034 > http [FIN, ACK] Seq=8 |
| 9 | 0.001397000 | 192.168.56.105 | 192.168.56.101 | TCP | 66 | http > 57034 [FIN, ACK] Seq=2 |
| 10 | 0.001403000 | 192.168.56.101 | 192.168.56.105 | TCP | 66 | 57034 > http [ACK] Seq=89 Ack |
| 11 | 5.010198000 | CadmusCo_48:d4:71 | CadmusCo_c1:8a:bc | ARP | 60 | Who has 192.168.56.101? Tell |
| 12 | 5.010216000 | CadmusCo_c1:8a:bc | CadmusCo_48:d4:71 | ARP | 42 | 192.168.56.101 is at 08:00:27 |

▶ Frame 6: 340 bytes on wire (2720 bits), 340 bytes captured (2720 bits) on interface 0
▶ Ethernet II, Src: CadmusCo_48:d4:71 (08:00:27:48:d4:71), Dst: CadmusCo_c1:8a:bc (08:00:27:c1:8a:bc)
▶ Internet Protocol Version 4, Src: 192.168.56.105 (192.168.56.105), Dst: 192.168.56.101 (192.168.56.101)
▶ Transmission Control Protocol, Src Port: http (80), Dst Port: 57034 (57034), Seq: 1, Ack: 88, Len: 274
▶ Hypertext Transfer Protocol
▼ Line-based text data: text/html

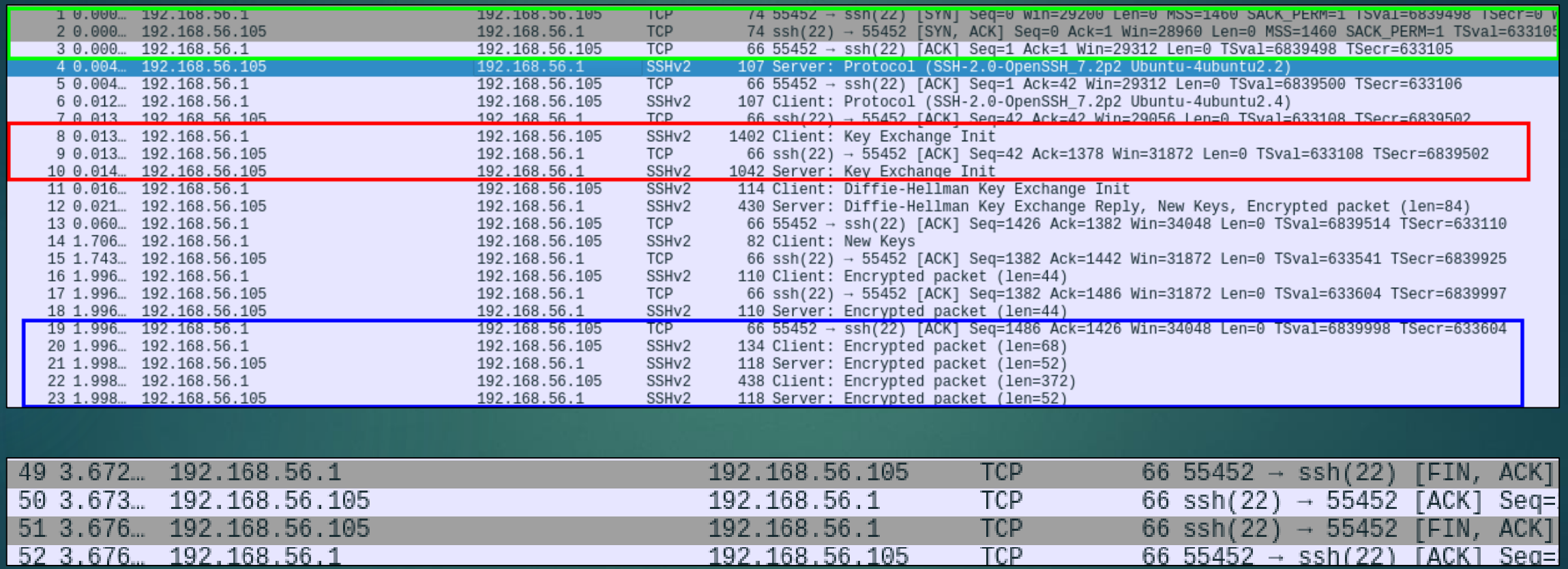
```
<HTML>\n
  <body>\n
    Maquina1\n
  </body>\n
</HTML>\n
```

0000 08 00 27 c1 8a bc 08 00 27 48 d4 71 08 00 45 00 ..'..... 'H.q..E.



# Algunos ejemplos

## Transferencia archivo



| | | | | | |
|---|---|---|---|---|---|
| 1 | 0.000… | 192.168.56.1 | 192.168.56.105 | TCP | 74 55452 → ssh(22) [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=6839498 TSecr=0 W |
| 2 | 0.000… | 192.168.56.105 | 192.168.56.1 | TCP | 74 ssh(22) → 55452 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=633105 |
| 3 | 0.000… | 192.168.56.1 | 192.168.56.105 | TCP | 66 55452 → ssh(22) [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=6839498 TSecr=633105 |
| 4 | 0.004… | 192.168.56.105 | 192.168.56.1 | SSHv2 | 107 Server: Protocol (SSH-2.0-OpenSSH_7.2p2 Ubuntu-4ubuntu2.2) |
| 5 | 0.004… | 192.168.56.1 | 192.168.56.105 | TCP | 66 55452 → ssh(22) [ACK] Seq=1 Ack=42 Win=29312 Len=0 TSval=6839500 TSecr=633106 |
| 6 | 0.012… | 192.168.56.1 | 192.168.56.105 | SSHv2 | 107 Client: Protocol (SSH-2.0-OpenSSH_7.2p2 Ubuntu-4ubuntu2.4) |
| 7 | 0.013… | 192.168.56.105 | 192.168.56.1 | TCP | 66 ssh(22) → 55452 [ACK] Seq=42 Ack=42 Win=29056 Len=0 TSval=633108 TSecr=6839502 |
| 8 | 0.013… | 192.168.56.1 | 192.168.56.105 | SSHv2 | 1402 Client: Key Exchange Init |
| 9 | 0.013… | 192.168.56.105 | 192.168.56.1 | TCP | 66 ssh(22) → 55452 [ACK] Seq=42 Ack=1378 Win=31872 Len=0 TSval=633108 TSecr=6839502 |
| 10 | 0.014… | 192.168.56.105 | 192.168.56.1 | SSHv2 | 1042 Server: Key Exchange Init |
| 11 | 0.016… | 192.168.56.1 | 192.168.56.105 | SSHv2 | 114 Client: Diffie-Hellman Key Exchange Init |
| 12 | 0.021… | 192.168.56.105 | 192.168.56.1 | SSHv2 | 430 Server: Diffie-Hellman Key Exchange Reply, New Keys, Encrypted packet (len=84) |
| 13 | 0.060… | 192.168.56.1 | 192.168.56.105 | TCP | 66 55452 → ssh(22) [ACK] Seq=1426 Ack=1382 Win=34048 Len=0 TSval=6839514 TSecr=633110 |
| 14 | 1.706… | 192.168.56.1 | 192.168.56.105 | SSHv2 | 82 Client: New Keys |
| 15 | 1.743… | 192.168.56.105 | 192.168.56.1 | TCP | 66 ssh(22) → 55452 [ACK] Seq=1382 Ack=1442 Win=31872 Len=0 TSval=633541 TSecr=6839925 |
| 16 | 1.996… | 192.168.56.1 | 192.168.56.105 | SSHv2 | 110 Client: Encrypted packet (len=44) |
| 17 | 1.996… | 192.168.56.105 | 192.168.56.1 | TCP | 66 ssh(22) → 55452 [ACK] Seq=1382 Ack=1486 Win=31872 Len=0 TSval=633604 TSecr=6839997 |
| 18 | 1.996… | 192.168.56.105 | 192.168.56.1 | SSHv2 | 110 Server: Encrypted packet (len=44) |
| 19 | 1.996… | 192.168.56.1 | 192.168.56.105 | TCP | 66 55452 → ssh(22) [ACK] Seq=1486 Ack=1426 Win=34048 Len=0 TSval=6839998 TSecr=633604 |
| 20 | 1.996… | 192.168.56.1 | 192.168.56.105 | SSHv2 | 134 Client: Encrypted packet (len=68) |
| 21 | 1.998… | 192.168.56.105 | 192.168.56.1 | SSHv2 | 118 Server: Encrypted packet (len=52) |
| 22 | 1.998… | 192.168.56.1 | 192.168.56.105 | SSHv2 | 438 Client: Encrypted packet (len=372) |
| 23 | 1.998… | 192.168.56.105 | 192.168.56.1 | SSHv2 | 118 Server: Encrypted packet (len=52) |

| | | | | | |
|---|---|---|---|---|---|
| 49 | 3.672… | 192.168.56.1 | 192.168.56.105 | TCP | 66 55452 → ssh(22) [FIN, ACK] |
| 50 | 3.673… | 192.168.56.105 | 192.168.56.1 | TCP | 66 ssh(22) → 55452 [ACK] Seq= |
| 51 | 3.676… | 192.168.56.105 | 192.168.56.1 | TCP | 66 ssh(22) → 55452 [FIN, ACK] |
| 52 | 3.676… | 192.168.56.1 | 192.168.56.105 | TCP | 66 55452 → ssh(22) [ACK] Seq= |

# Algunos ejemplos

## Seguridad web HTTP