SharkFest ’17 US

Command Line Review of Wireshark CLI Tools, tshark & more

Christian Landström

Senior IT Security Consultant | Airbus Defence and Space CyberSecurity

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About / Outline

- Basics on Wireshark CLI Tools
- Useful situations for switching to CLI
- Batch Jobbing
- „Data“ / Field extraction

Tshark basics

```
C:\Users\Landi\> tshark -h
```

- Tshark is the command line equivalent of Wireshark with access to nearly all features available for everyday use

- Sticks to the “Default” Profile if no other one is specified

- Dumps output to CLI which is useful for further processing e.g. using *grep/findstr, cut, (g)awk, sed*

Tshark basics

```
C:\Users\Landi\> tshark -D
```

- Interface listing useful for local live capture on installed machine

- *Specify Capture interface with –i <interface number>*

tshark -D
1. \Device\NPF_{xxx} (Onboard)
2. \Device\NPF_{xxx} (VMware Network Adapter VMnet8)
3. \Device\NPF_{xxx} (VMware Network Adapter VMnet1)
4. \Device\NPF_{xxx} (VPN)

Batch Jobbing

- When capturing big amounts of data, ring buffer with multiple files recommended for ease of analysis
- In most cases hundreds of files – each around 50-250 Mbytes
- Need for scripted, automated task offload of common or specific analysis objects for each and every trace file

- Target: Have smaller trace data to be able to load whole selection or time ranges into Wireshark without having too many packets overhead

- Typical example: Selection of all files containing packets from a certain host and filtering for that particular IP address

Batch Jobbing

```
tshark –r <infile> -Y <filter> -w <outfile>
```

- Uses Default Profile -> beware if settings e.g. Reassembly are set
- Profile can be set by using –C <profile> flag
- Recommended: Have a specific “CLI” profile with all unneeded features and dissectors turned off for additional speed e.g. turn off GeoIP lookups if not needed

Batch Jobbing

```
tshark –r <infile> -Y <displayfilter>
-o tcp.relative_sequence_numbers:FALSE
```

- Can be used to write or overwrite specific values into settings from the profile preferences for the particular tshark run

- E.g. **`-o tcp.relative_sequence_numbers:FALSE`**

Batch Jobbing

```
for %a in (*.pcap) DO tshark -r %a
-Y ip.addr==192.168.0.1 -w filtered\filter1_%a
```

- Used for automated working on multiple capture files for static content filtering e.g. source IP or VLAN filtering
- Remember to set “%%” in front of variable when using Windows .bat files

Field extraction

```
tshark -r %a -Y ip.addr==192.168.0.1
-Tfields -e ip.src -e ip.dst
```

- Dump values supplied by the “-e” flags instead of the whole packet list line
- Can be used to access all data which can be described by a display filter
- Can have multiple results per flag e.g. when having inner and outer IP headers or IP addresses within ICMP quotes etc.

Demo Time

Example: Building a DNS domain list from the trace file

```
# tshark -r „trace.pcap" -Y “dns.flags.response==1 and dns.resp.type==1”
  -Tfields -e dns.qry.name –e dns.a
```

OR

```
# tshark -r „trace.pcap" –q –z hosts
```

Demo Time

Example: Extracting the TTL values from DNS responses

```
# tshark -r „trace.pcap" -Y dns.flags.response==1 -Tfields -e
  dns.resp.ttl | sed s/,/\r\n/g | sort -nr
80441
64022
52194
50364
49143
[…]
```

Demo Time

Example: Extracting information about MTU problems from fragmentation needed packets

```
# tshark -r trace.pcap -Y "icmp.type==3 && icmp.code==4"
  -Tfields -e ip.src -e icmp.mtu -e ip.dst
```

```
172.16.31.10,172.16.31.55      800     172.16.31.55,192.168.1.1
```

Src IP from IP header and ICMP quote   MTU   Dst IP from IP header and quote

Demo Time

Example: Extracting the HTTP response codes and times** since request

```
# tshark -r „trace.pcap" -Y http.response -Tfields -e frame.number -e
  http.response.code -e http.time
2       200     0.001896000
5       200     0.001051000
8       200     0.001849000
11      200     0.003594000
14      200     0.002530000
17      200     0.003147000
27      302     0.000431000
43      200     0.212918000
48      302     0.000003000
```

** beware the TCP stream reassembly setting

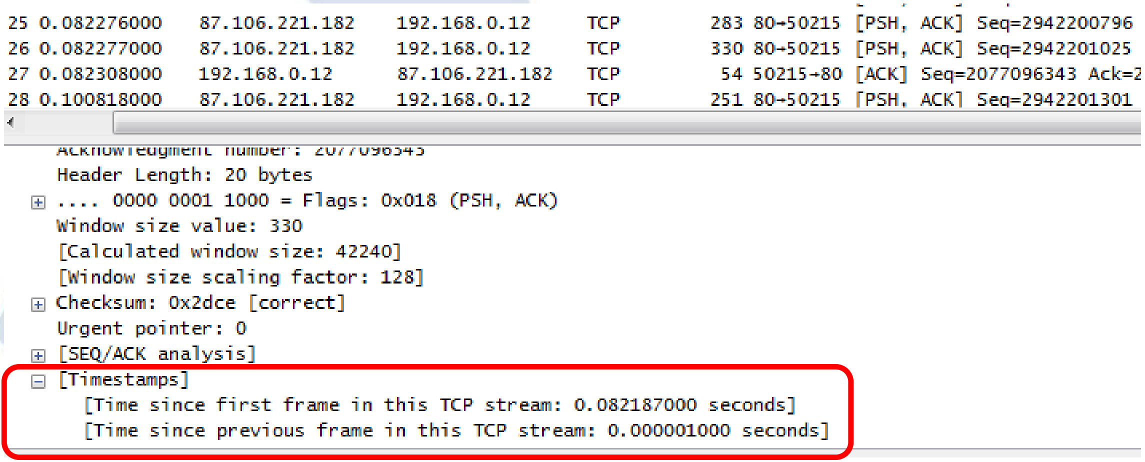
Demo Time

Example: Finding (possible) delays inside encrypted sessions

```
# tshark -r „trace.pcap" -Y „tcp.time_delta > 1“  -Tfields -e tcp.stream -e frame.number
```

```
16        1256
25        2137
30        3116
```

Think of the required setting inside the TCP prefs to make delta conv. work



```
25 0.082276000   87.106.221.182   192.168.0.12     TCP       283 80→50215 [PSH, ACK] Seq=2942200796
26 0.082277000   87.106.221.182   192.168.0.12     TCP       330 80→50215 [PSH, ACK] Seq=2942201025
27 0.082308000   192.168.0.12     87.106.221.182   TCP        54 50215→80 [ACK] Seq=2077096343 Ack=2
28 0.100818000   87.106.221.182   192.168.0.12     TCP       251 80→50215 [PSH, ACK] Seq=2942201301
```

```
  Acknowledgment number: 2077096343
  Header Length: 20 bytes
⊞ .... 0000 0001 1000 = Flags: 0x018 (PSH, ACK)
  Window size value: 330
  [Calculated window size: 42240]
  [Window size scaling factor: 128]
⊞ Checksum: 0x2dce [correct]
  Urgent pointer: 0
⊞ [SEQ/ACK analysis]
⊟ [Timestamps]
    [Time since first frame in this TCP stream: 0.082187000 seconds]
    [Time since previous frame in this TCP stream: 0.000001000 seconds]
```

2-stage batch jobs

```
for %a in (*.pcap) DO tshark -r %a -Y
tcp.analysis.retransmission -Tfields -e tcp.stream >
streams_with_retransmissions_%a.txt
```

- Typically used for conditional filtering of sessions containing a certain marker, due to conditional filtering based on one item not possible within Wireshark
-
- *e.g.* → *“Give me all TCP sessions containing packet loss”*

- Can be eased by supplying the TCP Session ID (stream number) instead of IP / Port pairs

Exercise Time ;)

Open and analyze the trace file “exercise1.pcapng”
Download trace files at
www.packet-foo.com/SF17/08.zip

Check with GUI and/or CLI for the following issues:

1. Web server response times (request to response code packet time delay after RTT)
2. Errors in HTTP communication (return codes 400s, 500s)
3. Give a guess where that trace file was captured to explain what you have seen

Capture Setup

!! Thank you for attending !!

Questions?

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eMail: landi@packet-foo.com
Web: www.packet-foo.com
Twitter: @packetfoo