



6th Assignment: Network Protocols and Architectures, WS 14/15

Question 1: (15 + 10 + 10 + 15 + 20 + 10 = 80 points) *Traffic Analysis*

You are now going to analyze real traffic using the traffic analysis tool Wireshark¹. To begin with, open `u06-trace.pcap`² using Wireshark. Wireshark provides a huge set of analyzers that are useful for various analysis tasks. However, for the sake of understanding the core concepts, start using them once you understand how they work and you know how to get the same result manually using pure display filters.

The following analyzers will be very useful for this exercise:

- Select a single flow: right click on a packet and select *Follow TCP Stream* in the context menu
- Plot sequence diagrams: Statistics → Flow Graph → TCP flow → OK

This list is not exhaustive and much more analyzers can be applied when solving this assignment—although they do not need to. Moreover, you will need to define display filters. Please find an introduction in the Wireshark manual³.

Important note: The journey is the reward; just stating the solution to the questions posed below is *not* a sufficient answer. You must include a description on how the results were obtained in your solution. For instance, when you used display filters, copy them into your solution. This description should also reflect the methodology you were using, e.g., how and why different filters were combined.

- (a) How many TCP connections are contained in the trace? When do the connections start, when are they terminated? How do you detect the start / end of a TCP connection? Are there any parallel connections? Are there any UDP flows?

Solve this problem for one flow using display filters only (Hint: filter by connection flags). For the others, you *can* use automatic analyzers.

- (b) Do you observe packet losses in TCP flows? Give one example.
- (c) Which hosts exist in the trace? Which services does each host provide? Which application layer protocols are used? What are the servers and what are the clients?
- (d) Obtain the DNS names of the observed hosts only by information contained in the trace. Show for one host how analyzing DNS traffic reveals the answer. Describe how you infer this information from the DNS traffic. Automatic analyzers of Wireshark can be used to resolve the names of the remaining hosts. Which hosts do not have a DNS name?
- (e) For each connection you observe, answer the following questions: i) What is the user doing / what is requested? ii) Which information is disclosed (passwords, etc.)? This is not possible for all flows. If you cannot reveal this information, justify why this is not possible.
- (f) Analyze packets 18 to 20. Which application layer protocol is used here? What is the semantic of those packets? Do they influence the remainder of the connection?

Please turn!

¹<http://www.wireshark.org/>

²<https://www.isis.tu-berlin.de/2.0/mod/resource/view.php?id=127001>

³http://www.wireshark.org/docs/wsug_html_chunked/ChWorkDisplayFilterSection.html

Question 2: (10 + 10 = 20 points) *TCP Connections*

Assume a large file transfer between two hosts. What are the implications if the user decides to open $n > 1$ parallel TCP connections for the transfer.

- (a) Discuss an advantage and a disadvantage for the user of the two hosts.
- (b) Briefly discuss the implications on the other users in the network.

Due Date: Wednesday, December, 3rd 2014 only until 14:00 h s. t.

- **As PDF files (no MS Office or OpenOffice files):** Uploaded via ISIS (<https://www.isis.tu-berlin.de/2.0/course/view.php?id=2560>)
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