Measurement laboratory 4

Investigating the application layer

How to prepare

You shall recall the Computer Network course on the following topics:

- Ethernet bridges and switches (operation, learning the topology, what is the difference between bridges and switches, manageable switches)
- Some IP related topics: ARP (Address Resolution Protocol), NAT (Network Address Translation), private IP addresses
- DHCP (aim of this protocol, way of operation, what kind of data can be acquired using DHCP, what are the role of the DHCP messages: *discover, offer, request, ack*)
- Network Time Protocol (NTP), Spanning Tree Protocol (STP)
- HTTP related topics like the structure of HTTP requests and responses, methods to send data back to the server, typical HTTP header information, frequently used HTTP status codes, HTTP authentication methods, HTTPS)
- get familiar with the CLI documentation of the switch (you do not have to know commands by head, but it is worth to have a look at the CLI documentation before the measurement

Some possible test questions:

- Consider an Ethernet switch having multiple ports. The switch gets a broadcast frame into one of its ports. To what other port(s) will be the frame relayed?
- Consider an Ethernet switch having multiple ports. The switch gets a unicast frame into one of its ports. The destination MAC address is not yet known to the switch. To what other port(s) will be the frame relayed?
- Consider an Ethernet switch having multiple ports. The switch gets a unicast frame into one of its ports. The destination MAC address is known to the switch. To what other port(s) will be the frame relayed?
- Despite the fact that Ethernet switches are layer 2 devices, some switches have IP address. Why could it be useful?
- What is the purpose of ARP? (In other words if a network node make an ARP request what is the information that can be considered as already known to the node and what information is requested?)
- What is the difference between private and public IP addresses?
- What is the purpose of NAT?
- What is the purpose of NTP?

- Usually having loops in the network is unwanted. However sometimes it is useful. Could you give an example to this latter case?
- What is the purpose of STP?
- What is the purpose of DHCP?
- What are the most typical parameters a node can acquire via DHCP?
- What are the most typical DHCP messages? What are their functions?
- HTTP is used by clients mainly to request data from a server. However it is also possible to send some data back to the server. What are the two main HTTP methods to accomplish that?
- Name three HTTP status codes and their meaning!
- What is the difference between HTTP and HTTPS?