CN 2019 Problem Sheet #6

Problem 6.1: *domain name system*   (2+2+1+2+1 = 8 points)

a) Explain how the fully qualified domain name `grader.eecs.jacobs-university.de.` is re-solved to an IPv6 address. Provide a trace (using `dig`) of the name resolution process. Explain what the trace means.

b) The `SRV` resource record was introduced in the mid 1990s. What exactly is the format and the function of the `SRV` resource record and where is it defined? Provide an example for a `SRV` resource record. What is the difference between priority and weight and how are these fields used together?

c) Does it make sense to use the `SRV` resource record for HTTP? Provide arguments in favor of using `SRV` resource records for HTTP and arguments against using `SRV` resource records for HTTP.

d) Read about EDNS0. Which problem is EDNS0 solving and where is EDNS0 defined? What is the meaning of the CLASS field and the TTL field in an OPT resource record?

e) There are a number of public DNS resolvers, some well-known public resolvers are shown below:

IPv4 address	Decription
1.1.1.1	Cloudflare's DNS resolver
8.8.8.8	Google's DNS resolver
9.9.9.9	Quad9's DNS resolver

Lookup `A` and `AAAA` records using these servers for some well-known names (e.g., `amazon.com`). Do they always return the same answer? What do you observe?

Problem 6.2: *multicast DNS (mDNS) and DNS Service Discovery (DNS-SD)*   (1+1 = 2 points)

a) What is multicast DNS (mDNS) and where is it defined? How does mDNS depart from regular DNS protocol semantics?

b) What is DNS-based service discovery (DNS-SD) and where is it defined? Provide an overview how different DNS records are used to provide service discovery functionality.