

Computer Networks and Distributed Systems

Exercise Sheet 4

Publication: November 7, **Discussion:** November 15 — November 18, **submission not mandatory**

Quiz questions

1. What is the difference between network architecture and application architecture?
2. In a communication session between two processes, which one is the client and which one is the server?
3. What information is used by a process running on a host to identify another process on a different host?
4. Why does it make sense for DNS servers in the upper tiers of the name server hierarchy to answer DNS requests with the address of the next DNS server and not with the address of the requested host?

Exercise 4.1

- (a) It is Halloween and A. Nonymous would like to read from the occult book *Necrotelecomnicon* to his unicorns. This could fail due to the unavailability of the book; hence, A. decides to download a copy from BitTorrent. The file is 15 GB large, the link to each of his peers has a bandwidth of 5 MBit/s, and the maximal bandwidth of A.'s link is 25 MBit/s. For $N = 3, 5, 10$ peers, how fast can the *Necrotelecomnicon* be downloaded?
- (b) Consider an e-commerce site, that wants to track the activity of its users. Describe how this can be realized using cookies.
- (c) Identify possible flaws of the SMTP protocol. How would you fix them?

Exercise 4.2 Describe the Java classes `Socket` and `ServerSocket` with focus on the functions `(Server-)Socket.bind()`, `(Server-)Socket.close()`, `Socket.connect()`, `ServerSocket.accept()`. Give brief code examples to explain their usage.

Hint: Use the Java API.

Exercise 4.3

What is the difference between P2P nets and client-server architectures? Give four examples for P2P systems.