Assignment 5

Q23: Naming in Distributed Systems

a. Enumerate and explain the three essential types of names.

b. Access points are tightly associated with entities. However, using the address of an access point as the regular name for the associated entity is rarely done. Why?

c. In order to access an entity given its name, the name must be resolved into the entity’s address. Discuss pros and cons of *centralized* and *distributed* name services.

d. Depict the structure of a hierarchical location service. How is a name resolved to an entity? What is the advantage of this solution compared to a single, centralized name server?

e. Give examples where addresses need to be resolved further.

Q24: Namespaces

a. What is a namespace? How are *flat* and *hierarchical* namespaces related?

b. Given two (hierarchical) namespaces, which mechanism(s) exist(s) to combine them so that the elements from both namespaces are uniformly accessible?

c. Compare iterative (client-based) name resolution with recursive (server-based) name resolution. What are the respective advantages and drawbacks? How can the two approaches be combined?

d. What layers can be distinguished in a distributed, hierarchical namespace, according to Cheriton and Mann? To what extent do they differ?

Q25: Distributed Hash Tables

a. Explain the concept of *Chord*. What is the relation between a (search) key and a node id? How are requests routed? What routing information is required at each node?

b. Compare *Chord* and *Pastry* (according to the “basic” implementations that were introduced in the lecture). Which potential advantage does *Pastry* have, compared to *Chord*?

Q26: Synchronization of Local Clocks

a. What makes clock synchronization hard to achieve?

b. Depict the general approach to physical clock synchronization as taken by Cristian’s algorithm and the Berkeley algorithm. What are the key differences?

c. What is the advantage in using relative time values in messages to specify necessary clock adjustments?

d. When adjusting clocks, why is it undesirable to reset the clock to a previous time? What can be done instead?