Department of Computer Science, Institute of System Architecture, Operating Systems Group

Distributed Operating Systems

Exercise 1: Domain Name System

In the tutorial, all solutions will be presented by students. Please be prepared for all questions as the exercise will focus on discussion.

Scalability

1) Explain the significance of Amdahl's law for scalability.

2) Which sources of execution time jitter can cause delays in HPC applications?

3) What strategies can be applied to reduce or mitigate such jitter?

DNS

4) What is an Internet Standard, and which document defines the DNS protocol?

5) Which design strategies enable the DNS to scale?

6) Demonstrate the interaction of the resolver library with the DNS servers:

   a) Using `dig`, manually replay all name-server requests emitted by the resolver library and its primary name server when searching for an A record for the name `unknown.tu-dresden.de`.

   b) Hint: Use the `dig` option `+norecurse` to replay search steps individually.

   c) Did one of the DNS answers come from a name server's cache? If yes: How would the request-answer sequence have differed, if all of the participating name servers' caches would have been empty?

7) Besides translating names to IP addresses, what other information is stored in DNS?