LTAT.06.007 Distributed Systems
Practical Seminar 8

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Recap

• To Understand Election Algorithms Need for Vector Clocks
  ▪ Basic Assumptions in Election Algorithms
  ▪ Need for Election Algorithms
  ▪ Types of Election Algorithms
  ▪ Bully Algorithm
  ▪ Bully Algorithm Explained
Agenda

• **Goal:** Explore the Hierarchy of DNS Servers using DIG Tool

• **Content:**
  - To use the functionality of DIG Tool in exploring the hierarchy of DNS Servers
  - Use DIG tool's *trace* functionality to create iterative queries.

• **Quiz**

After this lecture, you should be able to:

• Understand how to use DIG Tool
Session Content

Description

• To understand how to use DIG Tool
• Explore the Hierarchy of DNS Servers using DIG Tool
• Use DIG Tool’s trace functionality to create iterative queries

Observation

Instructions to complete this practical session can be found in the course website: https://https://courses.cs.ut.ee/2021/ds/spring/Main/Instructions4
DIG Tool

- DIG (Domain Information Groper) is a robust command-line tool for querying DNS nameservers.
- It can identify IP address records, record the query route as it obtains answers from an authoritative nameserver and diagnose other DNS problems.
- It performs DNS lookups and displays the answers that are returned from the name server(s) that were queried.
- Most DNS administrators use dig to troubleshoot DNS problems because of its flexibility, ease of use and clarity of output. Other lookup tools tend to have less functionality than dig.
INSTALL DIG

Given on Course Instructions page

- https://courses.cs.ut.ee/2021/ds/spring/Main/Instructions4
ANATOMY OF A HOSTNAME

http://www.google.com

- node/label
- domain/zone
- TLD
- hostname
HOW TO USE DIG

• Open Terminal (Mac and Linux) or Command Prompt (Windows).

• Type in dig (any hostname) and press enter.
  • $ dig google.com

• Several pieces of information will be returned.
**DIG USAGE**

**QUESTION SECTION:** Query made to the DNS. In this example, we asked for the first available A record for the hostname, google.com.

**ANSWER SECTION:** The first available answer for the query made to the DNS. In this example, we received the A record for the IP address 142.250.185.78.
DIG USAGE

AUTHORITY SECTION: The authoritative nameservers from which the answer to the query was received. These nameservers house the zones for a domain.

ADDITIONAL SECTION: Additional information the resolver may need but not the answer to the query.
## Some DIG commands

<table>
<thead>
<tr>
<th>COMMAND</th>
<th>DESCRIPTION</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>dig [hostname]</td>
<td>Returns any A record found within the queried hostname’s zone.</td>
<td>dig google.com</td>
</tr>
<tr>
<td>dig [hostname] [record type]</td>
<td>Returns the records of that type found within the queried hostname’s zone.</td>
<td>dig google.com MX</td>
</tr>
<tr>
<td>dig [hostname] +short</td>
<td>Provides a terse answer, usually just an IP address.</td>
<td>dig google.com +short</td>
</tr>
<tr>
<td>dig @[nameserver address] [hostname]</td>
<td>Queries the nameserver directly instead of your ISP’s resolver.</td>
<td>dig @ns2.ut.ee cs.ut.ee</td>
</tr>
<tr>
<td>dig [hostname] +trace</td>
<td>Adding +trace instructs dig to resolve the query from the root nameserver downwards and to report the results from each query step.</td>
<td>dig google.com +trace</td>
</tr>
<tr>
<td>dig -X [IP address]</td>
<td>Reverse lookup for IP addresses.</td>
<td>dig -X 204.13.248.106</td>
</tr>
<tr>
<td>dig [hostname] any</td>
<td>Returns all records for a hostname.</td>
<td>dig google.com any</td>
</tr>
</tbody>
</table>
Query Options

dig provides a number of query options which affect the way in which lookups are made and the results displayed.

- **+[no]trace** - Toggle tracing of the delegation path from the root name servers for the name being looked up. Tracing is disabled by default. When tracing is enabled, dig makes iterative queries to resolve the name being looked up. It will follow referrals from the root servers, showing the answer from each server that was used to resolve the lookup.

- **+[no]all** - Set or clear all display flags.
Session Instructions at Course Page
Quiz

Content

• Lecture 8 (Naming, identifiers and addresses)
• Two attempts
  ▪ One in Seminar Session
  ▪ Next available until Monday 23:59 (Deadline)
• Open Quiz in Moodle
• Total Quiz Points = 100

Observation

Quiz review is available after the quiz is closed
Questions?

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