

Communication Networks 2

Exercise 6 - E-Mail



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Problem 1 MIME

What does the abbreviation “MIME” stand for?

- ☐ (A) Multiple Internet Mail Extensions
- ☐ (B) Multipurpose Internet Mail Extensions
- ☐ (C) Mail in Mail Encapsulation
- ☐ (D) Mail Internet Message Extension
- ☐ (E) Mandatory Internet Mail Encryption

Problem 2 MIME-Cont.

Which of the following is *not* a MIME extension?

- ☐ (A) Model
- ☐ (B) Text
- ☐ (C) Application
- ☐ (D) Segment
- ☐ (E) Message

Problem 3 Mailservers

Which protocol is used for the communication between mailservers (MTAs)?

- ☐ (A) POP3 and HTTP
- ☐ (B) IMAP and SMTP
- ☐ (C) HTTP
- ☐ (D) SMTP
- ☐ (E) SMTP and ESMTP

Problem 4 Email Address

Which of the following is *not* a valid email address?

- ☐ (A) user@example.net
- ☐ (B) > ^ „ ^ < @meow.example.org
- ☐ (C) ^ _ _ ^ @example.com
- ☐ (D) user@äöüß.example.org
- ☐ (D) "> ^ „ ^ <"@purrrr.example.org
- ☐ (E) user@[127.0.0.1]

Problem 5 Email Message

You receive a message with a Subject:-header of “=?utf-8?b?4piD?=". Which season is it?

- ☐ (A) Spring
☐ (B) Summer
☐ (C) Autumn
☐ (D) Winter

Problem 6 Email Message-Cont.

A binary file is 3072 bytes long. How long will it be if encoded using base64 encoding, with a CR+LF pair inserted after every 80 bytes sent and at the end?

Problem 7 SMTP

How does SMTP mark the end of a message body?

Hint: See RFC5321

Problem 8 Email Delivery process

Perform all steps necessary to manually send a minimal email to `kn2_practical_task@kom.tu-darmstadt.de` from outside the TUD network. Which mailservers are involved in the delivery process? What steps do you need to take? Which command line programs can you use? Can you choose arbitrary senders?

Problem 9 Email Threats

A mail is sent from your laptop via SMTP to your ISP and from there on to a friend who uses Google Mail on the web. Someone is really interested to read the contents of that email. Which mechanisms can prevent that and against which threats are they effective?

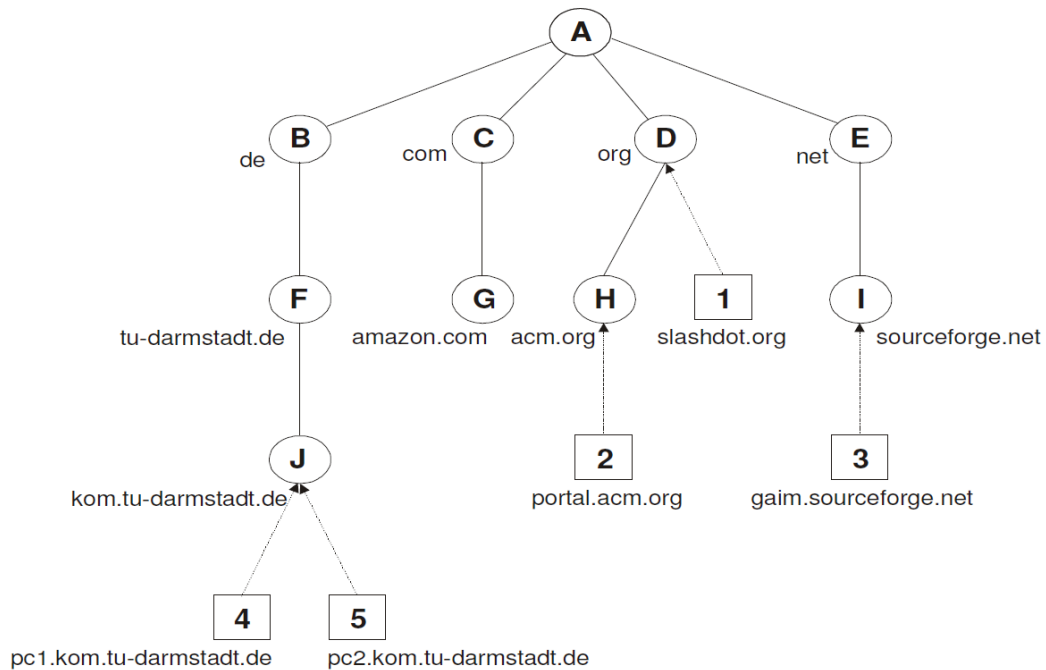
Problem 10 Email Inline Image

You want to send a HTML mail with an inline image. What are different ways to do this? What are advantages and disadvantages?

Problem 11 DNS Addressing

Assume the scenario depicted below. The scenario consists of a hierarchy of 10 name servers (**A-J**) and 5 hosts (**1-5**), which want to resolve names. Server **A** is the root server in this scenario. In addition, server **B** is the only server in this scenario that is able to cache names. It has already cached all names of the `net-domain`. The other servers are not able to cache names and, therefore, normally forward non-authoritative requests (requesting resolution of addresses which are not within their own domain) directly to the root if not explicitly configured in another way. In this scenario, Server **H** forwards all non-authoritative requests to name server **D**. All name servers in the domain `tu-darmstadt.de` (and its subdomains) are configured to forward all non-authoritative requests directly to server **B**.

The requests are executed in temporal sequence. The dashed lines show which name server is used by a host for name resolution.



Please name all DNS servers used for the following name resolution requests of the 5 hosts (1-5):

Host 1 → www.amazon.com

Host 2 → gaim.sourceforge.net

Host 3 → e-technik.tu-darmstadt.de

Host 4 → info.net

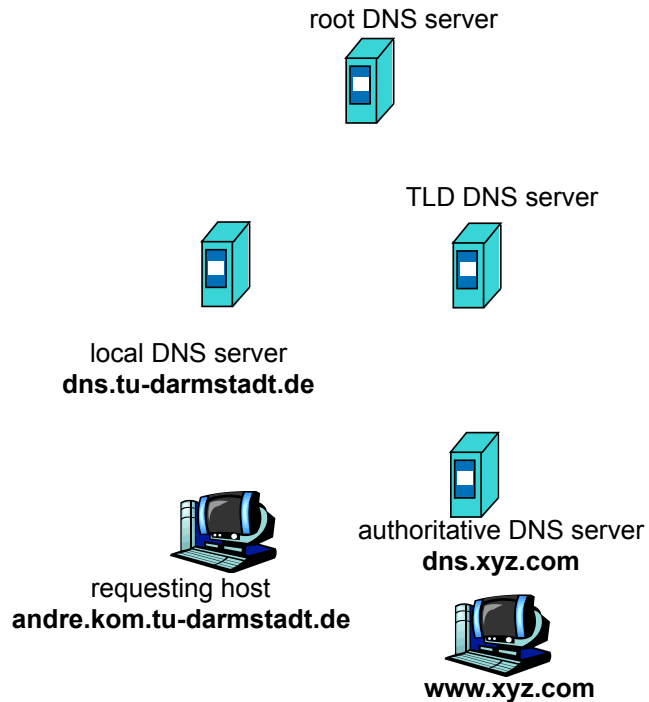
Host 5 → informatik.tu-darmstadt.de

Problem 12 DNS Hierarchy

What are the four different typical levels of a DNS hierarchy? Explain the tasks at each level.

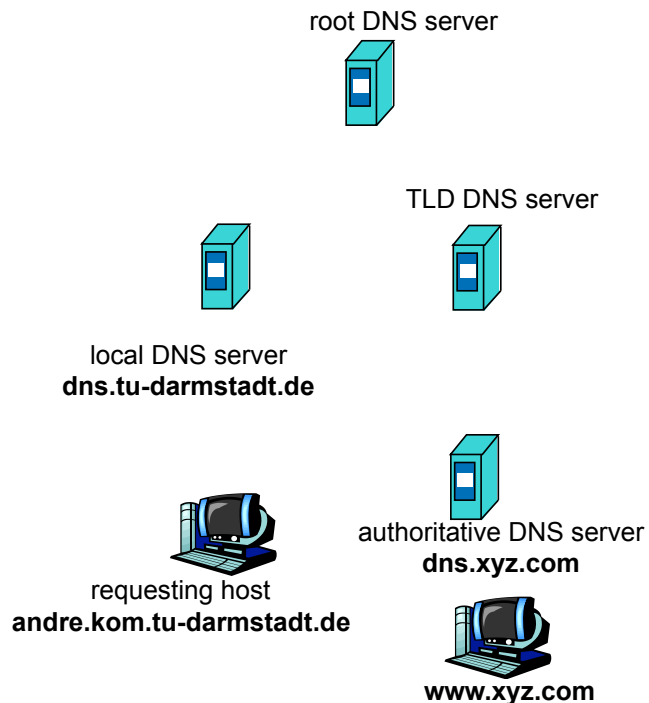
Problem 13 DNS Name Resolution Process

Show the name resolution process of the host andre.kom.tu-darmstadt.de asking for www.xyz.com in the figure below. Assume that name resolution is performed fully recursive.



Problem 14 DNS Name Resolution Process- Cont.

Show the name resolution process of the host **andre.kom.tu-darmstadt.de** asking for **www.xyz.com** in the figure below. Assume that name resolution is performed iteratively starting from the local name server.



Problem 15 DNS Nslookup

Use nslookup to perform the address resolution of a Web site of your choice. Start from one of the root name servers [a-m].root-servers.net and perform an iterative query as your local name server would do.

Problem 16 DNS Nslookup-Cont1.

Use nslookup on your local host to send DNS queries to three DNS servers: your local DNS server and the two DNS servers you found in the previous task. Try querying for Type A, NS, and MX records. Summarize your findings.

Problem 17 DNS Nslookup- Cont.2

Use nslookup to find a Web server that has multiple IP addresses. Does the Web server of TU Darmstadt have multiple IP addresses?

Problem 18 DNS Whois Database

Use various whois databases on the Internet to obtain the names of two DNS servers. Indicate which whois databases you used.

Problem 19 DNS Whois Database- Cont.1

Use the appropriate whois database to determine the IP address range of TU Darmstadt.