FIT9137 Applied Session

Week 10

Topics

- Application Layer
  - HTTP web services
  - Email services
  - ACTIVITY: Application Layer & Transport Layer Protocols & Port numbers

Covered Learning Outcomes:

- Analyse and formulate the functions of communication architectures of local area networks, wide area networks and the Internet.
- Examine networks using the underlying fundamental theories, models, and protocols for data transmission.

Instructions

- One of the main purposes of an applied session is to build the learning community, create connections and include the learners. The other goal is to give and receive feedback from your peers and or your tutors.
- Form groups of 2 students (peers) to work through the exercises. If you meet a problem, try to solve it by asking direct questions to your peers. If the issue was not solved within peers, ask your tutor. If you did not get a chance to solve the problem during your applied session with your peer or tutor, jump into one of many consultation hours and ask any of the tutors to help you. Please visit the "Teaching Team and Unit Resources" tile in the FIT9137 Moodle site.

Application layer Protocols

1. Explain the two main technologies of the World Wide Web (WWW).
2. Explain these email protocols: SMTP, POP & IMAPS.

Activity 1 - Application & Transport Layer Protocols & Port numbers

With the help of your research and knowledge, explain how Application Layer utilizing web, DNS, and email protocols (HTTP, DNS, and SMTP) interact with transport layer protocols and port numbers.

Activity 2 - DNS & HTTP Protocol: Name resolution & web service

In this hand-on exercise we will communicate directly with a web server using command line and we will send HTTP protocol requests directly to the server and receive the server

responses. But in this scenario, we would like to **examine the transport layer protocols** and **transport layer port addresses** used by the **client** and the **server** while using the DNS, Web & Email services.

Find the file "fit9137_w10.imn" in the Moodle in Week 10 and save it on your VM. Open the core in VM and open this file (fit9137_w10.imn) using the File tab. Perform the following tasks.

Step 1. First: Start the emulation.

Step 2. Second: We need to capture the frames originating from the client `selene`, please right-click on the `phoenix` router interface eth0 and capture the frames with Wireshark on the interface `eth0` of the phoenix router.

Step 3. Second open a `LXterminal` on the node `selene` and issue the following command: `lynx www.argos.edu`

Step 4. Once the client `selene` is able to connect to the web server, stop the frames capture in the Wireshark and examine the following information: -

1. Identify the transport layer protocol and the port numbers used by the client and the server used for name resolution of the domain name www.argos.edu

2. Next Identify the transport layer protocol and the port numbers used by the client and the server used for connecting to the Web server www.argos.edu

Finally stop the simulation and reflect upon the port numbers used by the client PC and the Server PC. What can you say about the transport protocol used and the port numbers used by the devices?

Activity 3 - DNS & SMTP Protocol: Name resolution & email service

In this next activity we will communicate directly with a mail server using the command line and we will send SMTP protocol messages directly to the server to send an email.

Step 1. First: Start the emulation.

Step 2. Second: We need to capture the frames originating from the client `selene`, please right-click on the `phoenix` router interface eth0 and capture the frames with Wireshark on the interface `eth0` of the phoenix router.

Step 3. In the terminal on the node `selene` enter the following command to connect to the mail server:

```
telnet mail.argos.edu 25
```

Since the email application is using the SMTP protocol it's a text-based protocol, so we can use the `telnet` program to communicate with the server. This time we specify port 25 which is reserved for SMTP protocol. As soon as we connect we should see a prompt as follows:

```
Trying 10.1.1.72...
Connected to mail.argos.edu.
Escape character is '^]'.
220 mail ESMTP Postfix (Ubuntu)
```

The line `220 mail ESMTP Postfix (Ubuntu)` is the greeting sent by the mail server. And the mail server is ready for sending or checking for emails now!

STEP 4. Once the client `selene` is able to connect to the email server, stop the frames capture in the Wireshark and examine the following information: -

1. Identify the transport layer protocol and the port numbers used by the client and the DNS server used for name resolution of the domain name mail argos.edu

2. Next Identify the transport layer protocol and the port numbers used by the client and the email server used for connecting to the Mail server mail.argos.edu

Finally stop the simulation and reflect upon the type of transport layer protocols used, transport layers port numbers used by the client PC and the Server PC. What can you say about the transport protocol used and the port numbers used by the devices?