

## S-38.115 Signaling Protocols, SIP Exercise

**Deadline:** 28.4.2005. All late answers will be disregarded. Please adhere to the deadline.

**Return:** The course mail box is marked with the course code (S-38.115 Signaling Protocols). The Networking Laboratory's mail boxes are situated in the G-wing on the second floor of the Electrical and Communications Engineering department. Remember to include your name and your student number *at the beginning of the document*. Handwritten documents will be discarded.

**Instructions:** Give short and precise answers. The exercise should be done in group of **four students**. The language of the exercise is English.

There are two ways to accomplish this exercise:

- download software listed in the appendix and do the exercise at home.
- use the computers in the room G212. Those computers have all of required software preinstalled. They are marked with the course code. Those students who prefer this option have to reserve a time. The reservation list can be found on the door of G212 room. Each group can reserve only one two-hours slot. The second slot can be reserved only if there are any slots left after 8<sup>th</sup> of April.

Information how to use and install software can be found in the appendix.

**Recommendations:** Please get familiar with software before you start doing the exercise. If you decided to do the exercise in the room G212, in order to finish measurements during one timeslot, capture traces, save them on the floppy disk and do analysis at home.

**Grading:** The value of each task is given in the brackets below. Student can get maximum 1.5 points from this exercise.

### Tasks:

#### 1. Voice conversation

##### 1.1 SIP analysis

###### 1.1.1 Call – Reject (15%)

Task: Caller originates a call, callee rejects the call

- Capture packet traces (using Ethereal).
- Present SIP messages in your report (in the table format; see the example later).
- Draw the MSC (Message Sequence Chart) for the SIP signaling messages.
- Compare CSeq and Call-ID fields' value in the Invite and Decline messages. Give the explanation.
- What is the meaning of the Record-Route field?

###### 1.1.2 Call – Answer – Hang up (25%)

Task: Make a voice call between two computers.

- Capture packet traces (using Ethereal).
- Compare traces from both parties.

- Draw the MSC (Message Sequence Chart) for the SIP signaling messages taking into account the caller, the proxy and the callee.
- What audio codecs are available (caller and callee)? How are they indicated (see SDP)? Which one of them is used in the voice conversation (refer to RTP packets)?
- What can you say about the To and From fields?
- What is a purpose of the tag field? How is its value changing?
- Compare the CSeq fields in messages exchanged between parties. How is its value changing?

## **1.2 RTP analysis (30%)**

- Make a call between two computers.
- Capture packet traces (using Ethereal).

### **1.2.1 RTP**

- Compare the Timestamp and Sequence Number fields in two consecutive RTP packets (present those packets in the report). What is the purpose of Timestamp field? Answer this question based on two chosen RTP packets.
- Does the proxy take part in RTP packets exchange?
- Using Ethereal's RTP statistical tool present values of the following parameters (menu Statistics->RTP->Show all streams...->choose one stream and press Analyze button):
  - Max delay
  - Max jitter
  - Total RTP packets
  - Lost RTP packets

In order to realize that your conversation can be eavesdropped, you can save RTP payload into .au file (press Save payload... button) and play it in one of the media players.

### **1.2.2 RTCP**

- Analyze the Receiver Report (201) packet.
- Based on the Fraction Lost and Interarrival Jitter fields, present the fraction of lost packets since the last Receiver Report and the interarrival jitter value.

## **2. Presence Service (15%)**

- Explain briefly what is meant by "Presence Service" in SIP.
- Change your status e.g. from Online to Away and from Away to Busy. Capture packet traces and draw MSC.
- Logout from the service and login once again. Explain reason behind sending SUBSCRIBE message.

## **3. Instant Messaging (15%)**

- Explain briefly what is meant by "Instant Messaging" in SIP.
- Exchange some messages. Capture packet traces and draw MSC.
- Present SIP messages in your report (in the table format).

Explanation:

The table representation should look similar to the following example:

Message Type	Message Content
REGISTER	REGISTER sip:set.netlab.hut.fi SIP/2.0 Via: SIP/2.0/UDP 130.233.163.74:16319 Max-Forwards: 70 From: <sip:12345H@set.netlab.hut.fi>;tag=faf8ea439e4e4258a269b22f9e02de6f;epid=4d58569578 To: <sip:12345H@set.netlab.hut.fi> Call-ID: 31611d838ad54e42b7d16e119cd9f95f@130.233.163.74 CSeq: 2 REGISTER Contact: <sip:130.233.163.74:16319>;methods="INVITE, MESSAGE, INFO, SUBSCRIBE, OPTIONS, BYE, CANCEL, NOTIFY, ACK, REFER" User-Agent: RTC/1.2.4949 (Messenger 5.0.0482) Authorization: Digest username="12345H", realm="sx6.netlab.hut.fi", algorithm=md5, uri="sip:set.netlab.hut.fi", nonce="a4dedfbc8699f6dc4abc4196b201b8b0", response="54f8d4fb5974e6d474526101057f1385" Event: registration Allow-Events: presence Content-Length: 0
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