S-38.115 Signaling Protocols, Exercise 5

Deadline: Wed. 23.4.2004 at 8:45. All late answers will be disregarded. Please adhere to the deadline.

Return: via mail **s38115@netlab.hut.fi** or to the box with the course code (s-38.115 Signaling Protocols) marked under the laboratory notice board. The subject of the message should be "Exercise 5". Remember to include your name and your student number *in the beginning of the message or the document*. Handwritten documents will automatically be discarded.

Instructions: Give short and precise answers. Exercise should be done in pairs, however each student has to submit his/her own solution.

There are two ways to accomplish this exercise:

- Students can download software listed in the appendix and do the exercise at home or
- use the computers s-mikro-74 and s-mikro-85 in the computer hall F402.

Information how to configure and run software can be found in the appendix. Language of the exercise is English.

Grading: One point will be graded if min 70% of the exercise is correctly solved (the value of each task is given in brackets).

SIP analysis

1. Register Denied (**10%**)
   - Try to register to the SIP proxy server using a wrong password.
   - Capture packet traces (using Ethereal).
   - Present SIP messages in your report (in the table format).
   - Draw the MSC (Message Sequence Chart) for the SIP signaling messages.

2. Register Accepted (**10%**)
   - Register to the SIP proxy server.
   - Capture packet traces (using Ethereal).
   - Present SIP messages in your report (in the table format).
   - Draw the MSC (Message Sequence Chart) for the SIP signaling messages.
   - What do the Contact and Methods fields represent?
   - What can you say about the To and From fields?

3. Call – Reject (**10%**)
   - Caller originates a call, callee rejects a call
   - Capture packet traces (using Ethereal).
   - Present SIP messages in your report (in the table format).
   - 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?

4. Call – Answer – Hang up (**30%**)
   - Make a call.
   - 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 (see lecture slide 13-42 as a reference).
- What audio codecs are available (caller and callee)? How are they indicated (see SDP)? Which one of them is used in the phone call (refer to RTP packets)?
- 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?

RTP analysis (20%)
- Make a call.
- Capture packet traces (using Ethereal).

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 RTP statistic functionality present following values (menu Statistics->RTP->Show all steams…->choose one stream and press Analyze button):
    o Max delay
    o Max jitter
    o Total RTP packets
    o 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.

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

Additional task (20%):
Please choose only one of the following tasks (1 or 2):

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

2. Make a call through WLAN network. Take a note of perceived quality (MOS scale), signal level, max delay, RTP packet lost. Perform measurement for three different signal levels: low, medium, high.

Explanation:

Table format eg.:

No.	Message Type	Message Content
1	NOTIFY	….
2	200	….