Prof. Dr. Burkhard Stiller, University of Zurich, Binzmühlestrasse 14, CH-8050 Zürich
Telephone: +41 44 635 6710, Fax: +41 44 635 6809, stiller@ifi.uzh.ch
Patrick Poullie, Telephone: +41 44 635 4337, poullie@ifi.uzh.ch

Exercises in PMMC

Exercise 3

Hand out date: Wednesday Oct 12, 2016
Submission until and discussion: Oct 19, 2016 9:45

1) Specific Protocols

1.1) SIP ...

a) ... allows to determine the location/IP address for a given user ID.
☐ true ☐ false

b) ... is a session description protocol.
☐ true ☐ false

c) ... allows to negotiate parameters for the session that is being setup.
☐ true ☐ false

d) ... is a mechanism for call management - for example adding, dropping, or transferring participants.
☐ true ☐ false

e) ... is a resource reservation protocol.
☐ true ☐ false

1.2) Calls of an E.164 number are terminated based on a preference list given by the callee.
☐ true ☐ false

1.3) E.164 numbers that begin with +41 belong to the Top Level Domain .ch, while E.164 numbers that begin with +49 belong to the Top Level Domain .de.
☐ true ☐ false

1.4) When an E.164 number has been mapped, the call may be established by use of the SIP protocol.
☐ true ☐ false

2) High-Speed Networks

2.1) Name and describe different delay types that occur in packet switched networks.

2.2) Why do high-speed networks have low bit error rates but high packet loss rates?

2.3) Calculate the path capacity for ethernet, fast ethernet, and gigabit ethernet for a segment length of 1.5 km and for a segment length of 10 km.

2.4) How much percent of a 1 kbit file are at most on a 3 km {ethernet, fast ethernet, gigabit ethernet} segment.

3) Packet Timing

3.1) Compare the three service categories synchronous service, asynchronous service and isochronous service with respect to their temporal distribution.

3.2) Describe the difference between synchronous and plesiochronous transmission.

3.3) What are possible causes of Jitter and by what methods can jitter be compensated.

3.4) RFC 1889 specifies RTCP and defines “interarrival jitter” as “the mean deviation (smoothed absolute value) of the difference D in packet spacing at the receiver compared to the sender for a pair of packets”. Therefore, jitter is the variance of packet travel times which can be expressed mathematical by:
D(i,j) = (Rj-Ri)-(Sj-Si) = (Rj-Sj)-(Ri-Si), whereat:
Ri (Rj) = Arrival time of packet i (j) and
Si (Sj) = sending time of packet i (j).
Jitter is recalculated for the reception of every packet:
J(i) = J(i-1) + (|D(i-1,i)| - J(i-1)) / 16
For an audio stream with 50 packets per second the arrival times of the fist five packets be 25ms, 47ms, 66ms, 88ms, and 109ms. Calculate the jitter for these five packets.

4) Switching

4.1) What is the difference between circuit- and packet switching?

4.2) Argue if it is possible to implement circuit- and packet switching simultaneously in the same physical channel.

4.3) Compare the two transmission methods FDM (Frequency Division Multiplexing) and TDM (Time Division Multiplexing) with respect to advantages and drawbacks.

4.4) Describe how cell switching works.

4.5) Which benefits offer small cell sizes.