

LUND UNIVERSITY

Department of Electrical and Information Technology

ETSF10 Exam Part B 2013-12-20 08.00 – 13.00

There are 15 questions in this exam, giving a total of 67 points. Minimum 35 points are needed to pass and get mark +1. You get part of the points for a question if your answer is only partially correct.

Use all the time given to you. Answer briefly and clearly. Choose your words carefully in order not to write answers too long. *Keep in mind that none of the questions requires an answer longer than 100 words.* Always motivate your answers. Unclear, confused, and too generic answers, containing irrelevant information, will decrease your points!

Make sure that your handwriting is clear and readable. Unreadable answers cannot be marked!

If you want, you may use a pocket calculator and a notes page (one side of an A4-size paper, handwritten, which must be handed in with your answer sheets).

Network Layer, Mobile IP

1 Mobile IP uses two agents. Which? What are the objectives of these agents? One of the agents can be collocated with the mobile host. Which? Why is this beneficial? *5p*

2 Data transfer in Mobile IP might not work. I has to do with which address the mobile host uses as source address when sending packets to the remote host and the visited networks’s security policy. Explain in short words. *3p*

Stream Control Transmission Protocol (SCTP)

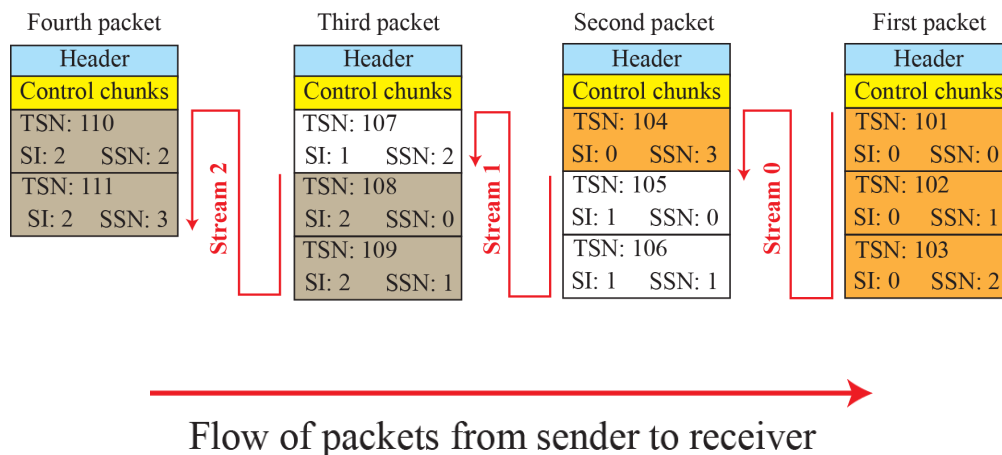


Figure 1: Packets in a SCTP association.

3 a) Discuss briefly the concepts association, packets, streams and chunks found in SCTP. Compare with TCP.

b) Figure 1 show packets, chunks and streams in a SCTP *association*. What are the objectives of the identifiers TSN, SI and SSN. *10p*

4 The handshaking mechanism in SCTP fixes a problem with TCP: the vulnerability for SYN floods. A TCP SYN allocates buffers and the process expects a continuation of the handshake. How is the SCTP process altered to avoid this problem? Tip: Cookies are involved. *3p*

QoS: IntServ and DiffServ

5 IntServ suffers from a scalability issue and a limitation problem. Describe these briefly. How does DiffServ cope with these problems? *5p*

6 RSVP use Path messages and Resv messages, among others. What is the objective of these messages? Who sends them and who is the receiver? How do routers act upon these messages? Also describe briefly the concept of reservation merging. *5p*

Electronic mail, FTP, TELNET

7 What is the objective of Mail Transfer Agents (MTA)? And what is the objective Mail Access Agents (MAA)? *3p*

8 An MTA client uses these SMTP commands for sending a mail: DATA, HELO, MAIL FROM, RCPT TO and period (.). Show in which order and how the client would use these commands for sending one full mail. *3p*

9 An FTP session builds on two connections, one for data and one for control. Why this scenario? Isn't it enough with one connection for both data and control? *3p*

10 FTP has three different transmission modes, stream mode, block mode and compression mode. Describe briefly these modes. *6p*

11 TELNET rely on a Virtual Terminal concept. Why is this beneficial? *3p*

Network Management

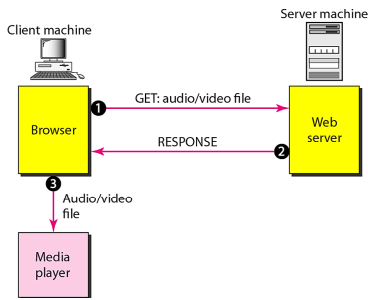
12 Discuss why SNMP messages are transported with UDP and not with TCP. Shouldn't such important messages be transferred more reliable than best-effort? *3p*

13 Discuss shortly the pros and cons of proactive and reactive fault management. *4p*

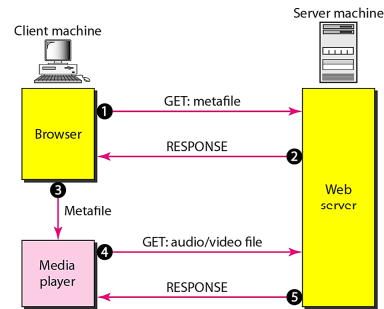
14 SNMP is a simple protocol with only three message types: SET, GET and TRAP. Describe the objective of each in maximum one sentence per message type. *3p*

Streaming Multimedia

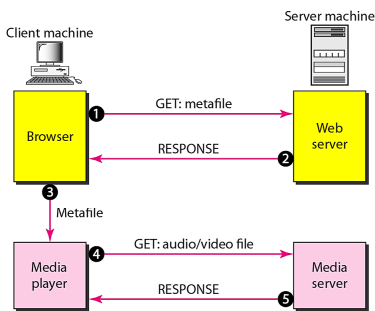
15 Use the figures 2 – 5 to describe the four approaches to media streaming. Keep the answer short, only two or three sentences needed! 8p



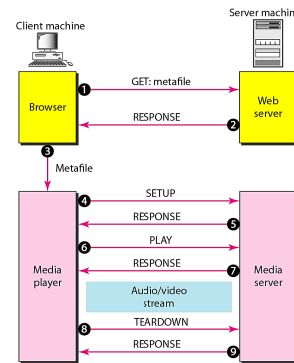
Figur 2:



Figur 3:



Figur 4:



Figur 5:

Best of success/Lycka till!

Answers to exam ETSF10 Part B 2013-12-20

1 Home Agent: Receives packets destined for the mobile host and forwards them to the foreign agent. Must keep track of location/foreign agent of each mobile host not in own home net. Foreign host: Receives packets from home agent destined to mobile host. Registers mobile host/foreign agent with home agent. Can be collocated with the mobile host, thus making the mobile host independent of a foreign agent i visited networks.

2 The mobile host must use its home network address as source. This source address can be seen as a spoofed address in the visited network and therefore dropped by outgoing filters.

3 a) Associations are the STCP version of a TCP session, two applications connect. Packets are the same in TCP and STCP. STCP put chunks into packets, TCP put bytes into packets. TCP can only have two streams per session, one in each direction. STCP supports multiple streams in the same association. Chunks contain messages. If a message is too big for a chunk it is fragmented over several chunks. Neither messages nor chunks are found in TCP, TCP works with streams of bytes.

b) TSN: Transmission Sequence Number identifies a chunk and is used in flow and error control. SI: Stream Identifier identifies each stream. SSN Stream Sequence Number is used to order chunks in each stream.

4 The TCP SYN is the very first packet in a TCP connection. In STCP client send INIT chunk and server answers with an INIT ACK chunk containing a cookie. Client sends COOKIE ECHO chunk. Now resources in the server are allocated, that is two packets from the initiator are needed before this happens. Server answers with COOKIE ECHO chunk. INIT and INIT ACK must not contain data.

5 Intserv defines flows. Each router must keep information about all flows that it has to handle. With a growing number of flows this is not possible in the long run. In Diffserv routers does not have to handle flows. Instead the application marks packets in a flow with appropriate service class and the router acts upon these per packet, not per flow. IntServ define only two service types or services classes. Diffserv can define several.

6 Path msgs are sent by the sender and it follows the multicast tree to all receivers in the group. The receivers answer with a Resv msg, which is sent upstream towards the sender. The routers reserves resources accordingly. The routers only reserves the largest bandwidth needed in the group, not the sum of all resource reservations.

7 MTAs stores and forwards messages until they reach the MTA/server that holds the recipient's mailbox. An MAA is the user's mail application and it is used to collect the mails from the mailbox.

8 HELO <MTA client ip address>
MAIL FROM: sender.full@mail.address
RCPT TO: receiver.full@mail.address
DATA:
Subject: test
From: some address text
To: Some address text
<some text>

9 Control messages are short and follow simple rules. Only small buffers needed. Data messages are long; need many segments/packets for sending, large buffers. Data is more complex and need complex rules.

10 Stream mode, default, FTP delivers stream of bytes (file structure, no EOF needed) or records (record structure, EOR and EOF needed) to TCP. Block mode, FTP delivers blocks of bytes to TCP: Each block has a header telling how many bytes the block consist of. Compression mode, run length coding, spaces and/or null bytes are usually compressed.

11 The virtual terminal provides a common interface or API to which the real terminal's as well as the server's command syntax and control commands can be interfaced.

12 A TCP-session takes time to setup and tear down. Memory buffers have to allocated and released. In critical situations there might not be time for that. Also, the messages are typically small, one datagram. Just setup up and tear down of a TCP session requires seven packets.

13 Proactive tries to prevent faults, minimizing acute outages. This means costs for exchanging fully working equipment. Planned service windows makes users aware of outage beforehand. Reactive means fault localiztion and correction when there is an outage. Users are experience unplanned loss of service.

14 SET: set a variable or parameter. GET: GET request request a parameters value and a GET response returns the answer. TRAP: Send an alarm.

15 1st approach: The web browser retrieves a file that is played in a media player. Not really streaming.

2nd approach: The web browser retrieves a meta file, send this to the media player who retrieves the stream from the webserver. Both meta file and media file uses http/tcp.

3rd approach: The media streaming is performed by a media server, not by the web server. The media transfer can now use any transport protocol (like UDP, RTP).

4th approach: Adding RTSP functionality makes it possible for the media player and the media server to better control the streaming process.