

S-38.3152 Networked Multimedia Protocols and Services
Exam 30 August 2011

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Please write readably and answer in English.

There are three classes of questions: (a) expecting (relatively) short answers, (b) expecting more elaborate answers, and (c) a small design task. The questions are marked accordingly.

Questions:

1. [6p, a] Which functions does RTCP provide?
2. [6p, b] a) Assume you receive an offer containing the following SDP fragment. What are the semantics of this offer?

```
s=some call
a=group:ANAT 1 3
a=group:ANAT 2 4
m=audio 22332 RTP/AVP 0
c=IN IP6 2001:DB8::1
a=mid:1
m=video 25000 RTP/AVP 32
a=mid:2
c=IN IP6 2001:DB8::1
m=audio 22334 RTP/AVP 0
c=IN IP4 192.0.2.1
a=mid:3
m=video 25002 RTP/AVP 32
c=IN IP4 192.0.2.1
a=mid:4
```

 - b) How do you respond if your local address is 130.233.238.69 and your device only supports audio calls?
 - c) What happens if your implementation does not support the grouping framework?
3. [6p, a] a) What is the purpose of an RTSP SETUP message? Which are its most important parameters?
 - b) How can RTSP and RTP be multiplexed in the same TCP connection?
4. [6p, a] What (three) different semantics can be associated with a SIP URI? Give an example each.
5. [6p, a] Briefly sketch two broadcasting schemes (no return channel) that allow users better access to media streams than traditional TV. What are their pros and cons with respect to each other?
6. [6p, b] What is the purpose of TURN? Outline its operation.
7. [6p, a] Describe conceptually how *adaptive* media streaming using HTTP works.
8. [12p, c] Which components would you use to build a—of course standardized—virtual karaoke bar that shall serve some ten or more SIP users and allow for arbitrary “karaoke video on demand servers” to be connected? Sketch a possible sequence of protocol interactions for a group of four karaoke fans with one being the host and organizing everything. How would you deal with peak times where the demand for virtual karaoke exceeds the available capacity?

(Note: there are many possible solutions).