

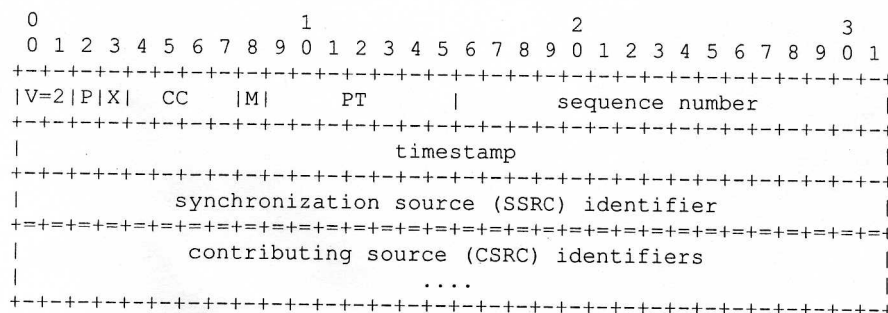
Exam 13 May 2009

Please write readably.

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] Outline how a NACK-based reliability protocol works. Name two issues arising from using NACKs for this purpose.
2. [6p, a] What is a *long fat pipe*? Give an example of what a protocol design needs to consider to work under such conditions.
3. [6p, b] What is congestion control? Describe two mechanisms for realizing congestion control in a protocol design.
4. [6p, a] Discuss the differences between conformance and interoperability. Why aren't the two the same? Where do you see the two intersect?
5. [6p, a] Using multicast makes data authentication harder than it is with a unicast protocol. Why?
6. [6p, b] Explain why protocol encoding may be seen as a "religion". Give some guidance when to choose a structured binary encoding (such as ASN.1 or XDR) vs. a simple encoding (e.g., using the box notation).
7. [6p, b] (a) What functions does an IP address fulfill (from a naming perspective)?
(b) Explain two problems that arise from this today.
(c) Can HIP help here? If so, how?
8. [12p, c] The following figure shows the RTP header defined in RFC 3550:



- (a) Describe one scalability issues you see with the RTP header. How would you fix it?
- (b) Sketch which additional fields and corresponding protocol mechanisms (local algorithms and packet flow rules) would be needed to add a minimum of congestion control to RTP. How would you add these in a "backwards-compatible" manner and which procedures would you use to infer that your peer understands these mechanisms as well?
- (c) Can RTCP (the Real-time Transport Control Protocol used for providing feedback about the flow and media reception quality at a minimum interval of 5s) help? Why or why not?