582615: Overlay and peer-to-peer Networks, Fall 2010

Assignment/Exercise 2

Instructions:

- Group work allowed, groups of up to 3 people allowed
- Due date: 6.10. 4pm
- What to return: Your answers as plain text e-mail, PDF, DOC, RTF, ODT. Please do not use DOCX.
  1. Email title: `overlay-ex2`
  2. File name: `overlay-ex2 - marion member, william writer.<suffix>`
  3. example: `overlay-ex2 – eemil lagerspetz, sasu tarkoma.pdf`
- Please include all the names and student numbers in the document.
- Submission address: eemil.lagerspetz(at)hiit.fi
- This exercise accounts for maximum +6% bonus (extra, added) points to the exam.

Question 1

Compare the performance of the BitTorrent protocol with a centralized content delivery server. Let us assume that there is a single initial seed and n clients in the system.

a) How does the arrival and departure rate affect BitTorrent performance compared with a centralized server? You can model this using a parameter for the average number of nodes in the system (steady state). Please discuss the relevant issues and optionally present simple analytical models (with uniform distributions).
-Discussion maximum 500 words. Analysis + model can be shorter.

b) Describe the differences of uniform and exponential client arrival rate.
--Description maximum 250 words.

c) Describe ideal and worst-case scenarios for BitTorrent compared with a centralized server.
--Description maximum 250 words.

Question 2

How would you implement video-on-demand with BitTorrent? Please sketch a suitable piece selection strategy.
--Implementation description as a step-by-step list (1. 2. 3. ...), maximum 500 words.

Question 3

Consider unstructured networks such as Gnutella and Freenet. How have their more recent versions addressed the high cost of flooding based operation? What are the benefits of the more recent optimizations and what are their limitations? Please illustrate the optimizations by presenting a step-by-step example of a generalized routing process with/without the optimizations.
--Description and step-by-step list maximum 500 words.