Athens University of Economics and Business
Master of Science in "Computer Science"

Fall Semester 2015-16

Course: "Computer Networks"
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<u>1st Assignment of Exercises (v.2)</u>

Assignment: October 25, 2016
Deadline: November 15, 2016

The assignment can be carried out by teams of two students .

1. Prepare a short report (about 2 pages) on the market penetration and economic success of CDN companies (Akamai and others) and of the relevant services offered by ISPs.

2. Prepare a short report (about 1.5 pages) on how dynamic content (either content that is frequently modified or content that is influenced by application events) and live-streaming are served by CDNs.

3. Search in the Web for numbers estimating the volumes of Internet traffic of the different applications (peer-to-peer, cloud, video, CDNs κτλ.). Prepare a short report (about 2 pages) on the evolution in the recent years of these volumes of traffic, of the total traffic, and of the percentage over the total Internet traffic that each application represents. Such data can be found (among other sources) in the periodic reports of certain organizations and companies such as Sandvine, CISCO, etc. The report should also include a qualitative assessment of traffic growth, of the distribution of traffic among applications, on which applications are the dominant ones etc.

Each of the reports should include the references employed.

The following exercise is based on Problem 22 from Chapter 2 of the textbook by Kurose-Ross, version 6.

4. Numerical investigation of the minimum (lower bound) the time needed for distributing a file under the client-server and the peer-to-peer models; see the formulae of slides 78 and 79 of the presentation on Application Layer by Kurose και Ross ©. Assume that:
   - the file size is $F = 10$ Gbits,
   - the upload capacity of the server is $u_s = 20$ Mbps,
   - the download capacity per user is $d = 10$ Mbps, and
   - the upload capacity per user is $u = 1$ Mbps,

and calculate and depict graphically the minimum times for distributing the file under client-server and peer-to-peer as a function of the number N των χρηστών, for $N = 10, 25, 50, 75, 150, 200, 250$ and 500, as well as write a brief comparison of the outcomes for client-server and peer-to-peer. Then, do again the calculations and graphs for $u = 2$ Mbps and $u = 5$ Mbps.