COE 344 – Quiz # 2

Name: Key Solution ID#:

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1) (5 points) Fill in the following table with proper information regarding each application. The first three columns show the service requirements for each application:

Application	Data loss (i.e. 100% error free)	Bandwidth	Time sensitive	Underlying Transport protocol	Application-layer protocol
e-mail	Yes	Elastic (no mimimum BW requirement)	NO	TCP	E.g. HTTP, SMTP, DNS, etc.
Real-time audio	NO	Minimmum BW requirement	Yes	UDP	e.g. RealNetworks, Window Player
e-commerce applications	Yes	Yes/No	Yes/No	TCP/UDP	e.g HTTP

2) (2 points) What do you need in terms of addressing to allow you application communicating correctly across the network?

We need at least three addresses:

- Process address to Uniquely specify the intended process within the host
- Network address to Uniquely specify the intended host over the Internet
- Hardware address to Uniquely specify the intended host over the local network

3) (8 points) Consider the following computer network where users at the institutional networking browsing the web. Assume that the average request rate from institution's browsers to origin servers = 15/sec and the average web page is 200Kb, compute the following:

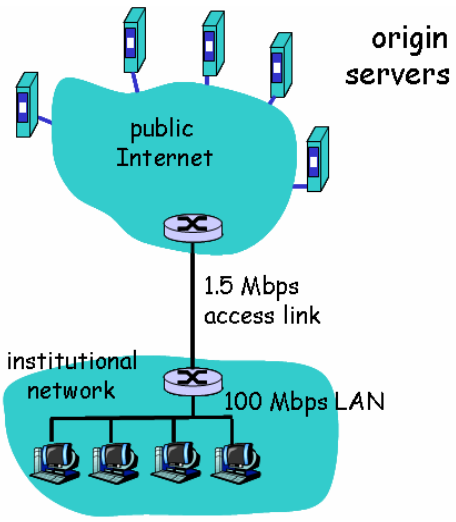
a) (2 points) The access link utilization

$$U = \frac{\text{Required Data rate}}{\text{Avaialable Data rate}} * 100 = \frac{15 * 200 * 10^3}{1.5 * 10^6} * 100 = 200$$

b) (2 points) The institutional network utilization

$$U = \frac{\text{Required Data rate}}{\text{Avaialable Data rate}} * 100 = \frac{15 * 200 * 10^3}{100 * 10^6} * 100 = 3$$

c) (4 points) Overall expected delay (approximate). Is there any problem? If yes, suggest a solution.



The overall delay is composed of three parts: public internet delay + access network delay + institutional delay

Overall delay= few seconds + minutes + few milliseconds ≈ few minutes which is very large and the network designer must avoid such delay.

One solution is to have a web cache proxy at the institutional side to save the visited web pages and then when another use requests the same page, the page will be downloaded from the institution cache and not from the origin server. This method will save the browsers a lot of waiting time and then the overall delay will be reduced to few seconds.

Another solution is to increase the access network capacity but this solution is an expensive one.