PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Midterm Examination Semester I : Academic Year : 2004

Date : 5 August 2004 Time : 9.00 – 12.00 Room : R201

Subject : 240 – 575 Special Topics in Information Network Engineering II

(Differentiated Services in the Internet)

Instruction:

- Make sure that there are 5 problems (100 points) in your exam paper.
- This exam is closed book and you have 3 hours to complete your exam.
- All of your answers can be written in either Thai or English.
- Dictionary and Calculator are allowed.
- No palm pilots or other hand held computers are allowed.

Problem 1 (25 points)

1.1 The fundamental problems in QoS include the fact that FIFO does not provide isolation; and differentiation in terms of delay or bandwidth. Explain how the problem of QoS differs from the problem of congestion control (considering that both of them manage resources). *(5 points)*

1.2 Explain how the end-to-end principle has led to an opposite design of the Internet as compared to the telephone system *(10 points)*

1.3 Discuss the tradeoffs between "stateful, "reduced state" and "stateless" architectures (eg. Intserv, Diffserv, and Edge-based Closed-loop architectures respectively). *(10 points)*

Problem 2 (20 points)

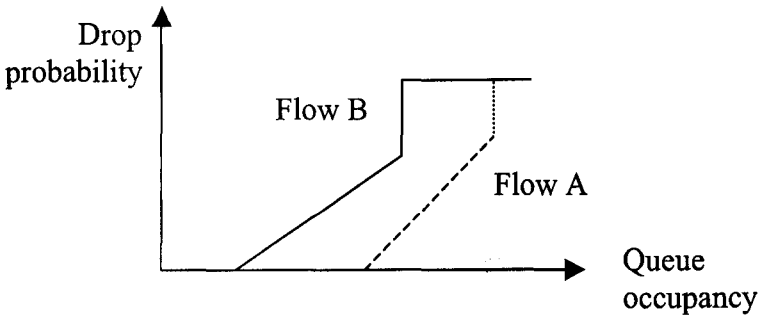
2.1 What protocols (defined by IETF) can be used in implementing Internet Telephony? Explain also the main task of each protocol *(10 points)*

2.2 Name a widely used technique to compensate the variation of multimedia data transmission over the best-effort service of the Internet *(10 points)*

Problem 3 (20 points)

3.1 How does the use of active queue management (AQM) schemes like random early detection/drop (RED) at routers help TCP congestion control over-and-above the congestion control functions at end-systems? *(10 points)*

3.2 Suppose that two flows share the same queue. Flow 'A' is given a higher drop preference than flow 'B', as indicated in the figure below. Can we claim that flow 'A' is protected from flow 'B'? Why or why not? *(10 points)*



Problem 4 (25 points)

4.1 What is the main problem when emulating GPS (General Processor Sharing) with (unweighted) round-robin? *(5 points)*

4.2 What problem does Fair Queueing address? *(10 points)*

4.3 Description of the Weighted Fair Queueing (WFQ) algorithm. *(10 points)*

Problem 5 (10 points)

5.1 What are the differences between traffic shaper and traffic policer? *(4 points)*

5.2 Describe a (r, b) curve of token bucket descriptors for a source, where r is a token refreshment rate and b is bucket size, and how does it help in selecting a traffic descriptor? *(6 points)*

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