

University College London

Department of Computer Science

**M.Sc. in Data Communication Networks and Distributed
Systems, 2000**

Z10 Integrated Services

Saleem Bhatti and Jon Crowcroft

EXAMINATION QUESTIONS

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QUESTION 1

a) Explain the steps in the development of the **Reverse Path Multicast (RPM)** mechanism starting from simple flooding. Your answer should include a clear explanation of each stage of refinement in the process from the simple flooding, and what the effects of the refinement are for the operation and behaviour multicast delivery. Also include a brief analysis of options for how the multicast delivery tree can be grown.

[12 marks]

b) Explain how the MBONE provides IP multicast capability across the Internet. Your answer should include a description of how MBONE connectivity is configured, any problems that may arise from such a configuration and how the range (scope) of multicast transmission is controlled.

[13 marks]

QUESTION 2

a) What are the advantages of a datagram network protocol (such as the Internet Protocol) compared to a purely circuit-switched network for general data applications?

Explain how some of these advantageous characteristics that you list for general data applications pose problems when trying to offer QoS (quality of service) capability to applications over datagram networks.

[6 marks]

b) Describe how the use of RSVP with the INTSERV (Integrated Services) model tries to solve these problems for IP-based networks? (Your answer should include a description of the purpose and the operation of RSVP.)

[9 marks]

c) List the drawbacks of the RSVP/INTSERV approach as described in your answer to part b) above. Describe briefly the principals and general features of an alternative QoS mechanism, DIFFSERV (Differentiated Services), which may help to overcome some of these drawbacks. (Your answer should consider the impact on the network and the applications when comparing the DIFFSERV approach to that of the RSVP/INTSERV approach.)

[10 marks]

QUESTION 3

a) Explain why TCP is unsuitable for real-time communication, making reference to the functions and service that TCP provides, as well as the mechanisms it uses during operation. Illustrate your answer by using a real-time voice flow as an example. Your answer should include a description of the relevant mechanisms that are used in the operation of TCP.

[15 marks]

b) Discuss why it might be useful for real-time applications to develop a flow-rate adaptation mechanism which is “TCP-like”. Explain what it means to have “TCP-like” behaviour in this context and highlight the difficulties that could arise in using “TCP-like” behaviour for real-time flows.

[10 marks]