

## Digital Communication II 2004 – Paper 9 Question 7 (JAC)

This is covered in Michaelmas term in lectures 3 (basic routing), 9 (RSVP) and 12 (multicast routing), as well as a little throughout. It is covered well in Keshav.

- (a) Multicast Addressing and Routing provides a set of mechanisms for senders to transmit packets that are replicated by the routers so that they can be received by multiple systems. Explain how the basic mechanisms of *IGMP*, *reverse path forwarding* based on the underlying unicast routes, *pruning* and *grafting*, fit together to create this network service. [8 marks]

Basically, IGMP is host to edge signalling - 2; RPF is send packet out all interfaces except one it arrived on or back towards its source - 2; prune when router sends message to say "here there are no receivers for that group", and graft is router propagating IGMP signal effectively - 4;

- (b) How might IP multicast be a risk for a network provider? [3 marks]

Obviously, it gives leverage to a DDOSser - a bit like maillists let spammers wreak havoc too...

- (c) The Resource Reservation Protocol, RSVP is a *receiver oriented* signalling protocol to establish state in routers for the purposes of classifying packets into flows and scheduling those flows onto routers. Explain what is meant by "receiver oriented", and how this enables RSVP to be used by a multicast (many-to-many) application. [5 marks]

RSVP has 2 message types - PATH and RESV - path states flow properties, but RESV is receivers request to actually set aside capacity in the schedule at each hop for a flow and is when admission control happens - because its from receiver, if there are multiple receivers, it only takes  $O(n)$  RESVs rather than  $O(n^2)$  PATH+RESV...

- (d) Why is TCP not going to work well with multicast? [3 marks]

Ack implosion wont scale that well...

- (3) what is philosophically odd about using TCP with RSVP? [2 marks]

TCP adapts. RSVP is for inelastic flows - if you had a reservation, why would you adapt?