

This work shows the design, presentation and study of an algorithm that solves the multicast routing problem. Although the algorithm could be applied to any level of the protocol stack, this paper studies its use in the application level. The algorithm (actually a family of algorithms) provides optimally routing tables between nodes belonging to the same multicast group; this way the time needed by data to reach every group node can be minimized.

The algorithms rely on the restriction of retransmitting the data to every node  $s$  times at most. To study the algorithm's features and behaviour, a series of simulations have been made over a virtual network that models an IP network. Over that one, a second network of user nodes belonging to the group has been defined. Inside this network, created at application level (so we can call it overlay network), two versions of the algorithm have been executed, the  $S/S/s$  and the  $S/S-1/s$ , with different values for  $s$ , to obtain the delay times of sending the data.

The main conclusion, according to the simulations made, is that if the number of packets to be sent is big enough, the models with less delay are the simple ones,  $S/S/1$  and  $S/S-1/2$ , where every node retransmits every packet just once. Also, analytical analysis has been made to determine the minimum number of packets that makes  $S/S/1$  the fastest model. Congestion risk has been considered by studying the linkstress results of backbone nodes, proving that the simpler models,  $S/S/1$  and  $S/S-1/2$ , have better load balancing properties.