

Public Abstract  
Prasad J. Wagh  
M.S.  
Computer Science  
DiffServ Overlay Multicast for Videoconferencing  
Advisor: Dr. Michael Jurczyk  
Graduation Term Fall 2005

This dissertation proposes a multicast overlay framework to support videoconferencing in differentiated services network. Internet started as an experimental network for researchers and primarily was used as a medium for applications like file transfer and email. Over the years there has been tremendous growth in technology and it has given rise to new applications. Some of the modern real-time applications like videoconferencing involve group communication and require certain guarantees in terms of available network bandwidth and end-to-end latency. Two different technologies Differentiated Services (DiffServ) and IP Multicast have been proposed. DiffServ provides service differentiation in the network while IP Multicast preserves network bandwidth for group communications. The integration of the two technologies is however a nontrivial task for the contrasting nature of the two technologies.

In this dissertation a framework for implementing videoconference in a DiffServ network (DiffServ Overlay Multicast) is proposed. DiffServ Overlay Multicast uses an overlay multicast algorithm for calculating the multicast tree for distributing the video in a DiffServ network. By moving tree construction, packet replication and network monitoring to the edge routers, a stateless core is maintained. This dissertation also addresses all the issues concerning the integration of DiffServ and IP Multicast. In addition the issue of traffic engineering and load balancing in the network to improve the quality of videoconference is also addressed.