

## ABSTRACT

### VoIP PERFORMANCE IN N GEO SATELLITE IP NETWORKS WITH ON-BOARD PROCESSING CAPABILITY

In this thesis study, an adaptive routing policy utilizing the real-time network information of a two-layered satellite network is introduced. In a satellite network, depending on the requirements and properties of services provided, various kinds of satellites from different orbits can be employed. Geostationary Earth Orbit (GEO) systems are not suitable for Voice over Internet Protocol (VoIP) applications due to long end-to-end delay values about 250-270 ms. Non-Geostationary Earth Orbit (NGEO) systems consisting of Low Earth Orbit (LEO) and Medium Earth Orbit (MEO) satellites can satisfy the performance requirements of VoIP applications. Moreover, a two-layered system of LEOs and MEOs can outperform single plane satellite networks. However, due to the dynamic topology of these networks and nonuniform traffic distribution over the Earth, terrestrial packet based routing algorithms cannot perform well. The proposed routing scheme dubbed as “Adaptive Routing Protocol for Quality of Service” (ARPQ) prevents the congestion on some bottleneck links by distributing the traffic over the entire network. Furthermore, link capacities can be efficiently used. Additionally, delay and jitter sensitive voice traffic is processed in a prioritized way to prevent long queueing delays. By a set of simulations, we showed that proposed mechanism performs better than nonadaptive routing mechanisms and therefore can enable VoIP applications over satellite networks.