

# ABSTRACT

The Internet Protocol Version 6 (IPv6) has introduced several major improvements and services over the current Internet Protocol Version 4 (IPv4). IPv6 solves the address space depletion problem in IPv4, provides a hierarchical addressing system, better system management, improved security and better Quality of Service (QoS). Anycast, one of the new services introduced under the IPv6 specification promises improvements to the current internetworking environment, such as better service location, generalization of services and policy based routing.

The primary issue with anycast routing is the tradeoff between performance and reliability. An anycast routing protocol that can provide shorter end-to-end delay does not always have lower packet loss, and vice versa. This thesis focuses on achieving short end-to-end delay and low packet loss using anycast routing with a load-balancing scheme. The JaNetSim network simulator is used as the simulation environment for the anycast routing. An enhancement to the anycast routing protocol, called the nearest PIM-SM extension for anycast routing is proposed and evaluated. Several load-balancing schemes such as shortest-path, round robin and fuzzy shortest-path are implemented and evaluated as well. Simulation results show that the proposed nearest PIM-SM extension for anycast routing improves the performance by achieving short end-to-end delay and low packet loss.