

## ABSTRACT

This project report is a two-pronged effort. On the one hand, it details the problems of the IPv4 Internet that led to the decision to revise the Internet protocol and the solutions that are instantiated into IPv6. On the other hand, it details an effort to actually implement a web server over the IPv6 test backbone. As such, it represents sort of a hybrid ‘mini-thesis’ rather than a traditional system development project.

The most extensive section of the report is an extended literature review structured as a detailed comparative analysis of the shortcomings of the IPv4 protocol and the solutions that were devised in IPv6. Topics include IP addressing, headers, extension headers as the version 6 of the Internet Control Message Protocol, Flows and Multicasting, Routing and Autoconfiguration.

This is followed by a chapter dealing with the IETF strategies for the transition from IPv4 to IPv6. Various tunneling mechanisms are described, as is the experimental IPv6 backbone called the 6Bone. Strategies for accessing the IPv6 backbone are presented.

The last section reports on an effort to establish connectivity through the IPv6 network, and, as a proof of concept, to serve HTTP clients through it. Various software solutions are explored, feasibility and cost analyses performed and a candidate matrix constructed. A system based on GNU Linux and the Apache web server was selected. Details of the construction of the working system conclude the report.