Implementation and Performance Evaluation of 6to4 Manual Tunneling and Dual Stack IPv4/IPv6 Network Simulation Model for GNS3 and JPerf

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Abstract:

The transition of networks from IPv4 to IPv6 presents many challenges to the backbone and access networks. Various solutions have been proposed to that effect, including dual stacking, tunneling, and translation transition mechanisms. Each of these mechanisms has pros and cons on implementation. In addition to the pros and cons of each method, 6to4 manual tunneling and dual stack methods are extremely easy to implement using existing network equipment instead of spending heavily on new devices. The implementation has experienced a lot of performance problems because it depends on transition mechanisms that are not yet mature. As a result, there is no overarching strategy to address all possible IPv6 implementation scenarios. This paper compares 6to4 manual tunneling and dual stack transition mechanisms and adopts dual stack transition strategy for better performance of IPv6 networks with focus on bandwidth, packet loss, latency, and jitter performance metrics for GNS3 and JPerf.

Keywords: IPv4, IPv6, Dual Stacking, Tunneling, GNS3, JPerf.