

## ABSTRACT

Today, the allocation of IPv4 addresses began to decrease. It's time to switch to IPv6. In fact, the infrastructure used today is very complicated for the protocol changes from IPv4 to IPv6 at once. It needs a transition mechanism. One of the transition mechanisms is tunneling. Tunneling IPv6 over IPv4 is a way to pass IPv6 packets in IPv4 networks via packet encapsulation. GRE is a tunneling protocol that has the ability to carry more than one type of communication protocol addressing.

This final project implemented IPv6 over IPv4 network interconnection using GRE tunneling mode. Then analyzed the network performance when running a VoIP application and FTP, also compared with other tunneling modes, 6to4 and ISATAP.

From the research done, GRE tunneling gives better performance than 6to4 or ISATAP. In GRE tunneling, throughput for VoIP and FTP applications is higher than in 6to4 or ISATAP. GRE also gives the value of delay, jitter, and packet loss (for VoIP application) also the value of retransmission and Round Trip Time (for FTP application) that are lower than 6to4 or ISATAP do. That is because in GRE tunneling, there's no need for address translation to know the other end of tunnel since it has been manually configured at the router. So the packet processing in the router is faster.

**KEYWORDS :** IPv6, IPv4, *tunneling*, GRE, VoIP, FTP