P2P Networking and NAT Traversal
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Motivation

In the past, “server-client” was the model of internet connections. This required a server to process data transactions and provide services. Peer-to-Peer (P2P) is an innovative idea which considers a computer as a server and a client to maintain the P2P network.

With this technology, network traffic and CPU workload can be distributed to every node instead of one server so that hardware cost can be saved. ICQ, MSN Messenger, Bit-Torrent, and PPstream are the examples of P2P applications.

However, one of the most critical issues related to P2P networking is the shortage of the global IPv4 address. The shortage causes that the computer may only obtain a private IP address from the router, an example of NAT (network address translators). Consequently, the connectivity of the P2P Network is adversely affected.

Objectives

In this project, we have developed peer-to-peer applications with NAT traversal ability. This will allow computers, for instance, A to D in the figure, which are using private IP addresses to connect to the Internet, to retain direct peer-to-peer connections.

User Applications such as Voice-over-IP, file sharing, and message chatting are implemented. Our application program also allows computers only with private IP addresses to provide application services such as HTTP and FTP for the Peer Network.
1) User applications have been implemented
2) Peer-to-Peer connections can be established
3) TURN Server is the solution to non-traversable NAT

Conclusion

NAT traversal has expanded the spectrum of discussion of solving the problem of shortage of IP addresses, while IPv6, a newly developing protocol of Network Layer, stands at another end of the spectrum of the discussion.

NAT traversal can be applicable to the traversal of VPN and firewall with minimal of configurations.