COMPUTER NETWORKS

ASSIGNMENT 6

SUBMITTED TO: Dr Umar Farooq

SUBMITTED BY: M. Wajih Haider

Roll no: 280818

CE-40

SYNDICATE - B

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DEPARTMENT OF COMPUTER AND SOFTWARE ENGINEERING

TASK :

Network address translation (NAT) helps multiple hosts to connect to the Internet using a single public IP address. NAT traversal is a CN technique which establishes and maintains IP connections across gateways that uses NAT.

There are few NAT traversal mechanisms which that helps in connecting to the server placed behind NAT which are as follows:

One Solution to this problem is to statically configure NAT to send all the packets at given port to server. In this solution we add Port no to NAT table, a static line which tell that packet directed to some port no and particular IP would go specifically to that particular path/device. For this we need:

i. Non routable IP Address in the server
ii. Port No.
iii. A port forwarding mechanism in the router

This is the simplest solution but is not scalable as it can only be used only for 1 or 2 servers.

Second Solution is Universal Plug and Play (UPnP) in this protocol NAT devices and servers communicate with each other automatically as the router directs the request to the suitable server. Connections are also made on different ports based on TCP and UDP preferences. This protocol is used to add many servers, or the number is going up and down dynamically. This solution is not appropriate for the normal user, this can be used for some organizational purposes but not for general use.

Third Solution is famously named as NAT hole punching, this is used for TCP and UDP applications in form of TCP hole punching and UDP hole punching. This mechanism is used to connect two devices which are behind router that use NAT. In this mechanism the connection is initiated to the main unrestricted server which then sends the source port number of both machines to other which are trying to communicate, this allows them to get the entry in that NAT router which later on allows them to communicate directly. This is used by Skype and Whatsapp and other modern applications using online gaming and Voice over Internet Protocol.

Another solution is also known as TURN, Traversals using relays around NAT. This also takes place when one or both machines trying to communicate are NAT-ed hence behind NAT. In this we know that the unrestricted server is connected by device once so the entry is added there, therefore, the server would relay them. The communication between two devices behind NAT would not communicate directly but through this unrestricted server.