

c) i) When a host wants to send a packet to the internet, the NAT router intercepts it and changes the packet header. The source IP, for example 192.168.1.10 is changed to the routers public IP, so 133.178.23.14. The source port, for example 50000 is replaced with a new unique port from the NAT router available pool of unique ports, for example 62101. These information changes are stored in the NAT routers translation table.

When the server from the internet replies, the reply goes to the NAT router, which looks the unique destination port of the reply (62101 in this example) and checks the translation table for the corresponding entry with the destination IP and destination port of the internal host. In this example the IP would be 192.168.1.10 and the port 50000.

ii) The translation table needs to store the source IP, the source port, the unique port of the NAT router for this connection, the destination IP, the destination port and the used protocol for the connection.

d)

source IP	source port	NAT port	dest IP	dest port	protocol
192.168.1.1 (winA001)	51001	62001	141.43.4.130	80	TCP
192.168.1.2 (winA002)	51002	62002	141.43.4.130	80	TCP
192.168.1.3 (winA003)	51003	62003	141.43.4.130	80	TCP
192.168.3.1 (server01)	80	80	141.43.4.132	54231	TCP

e) The NAT router would check the translation table to see the corresponding source port to which port the response arrived. Here the response arrives at port 62002, which corresponds to the source port 51002. Then the NAT router changes the destination IP and destination port of the response (from its own IP (133.178.23.14) and the router port (62002)) to the host IP (192.168.1.2) and host port (51002), in accordance to the translation table.
After that the NAT router sends the response to the host.