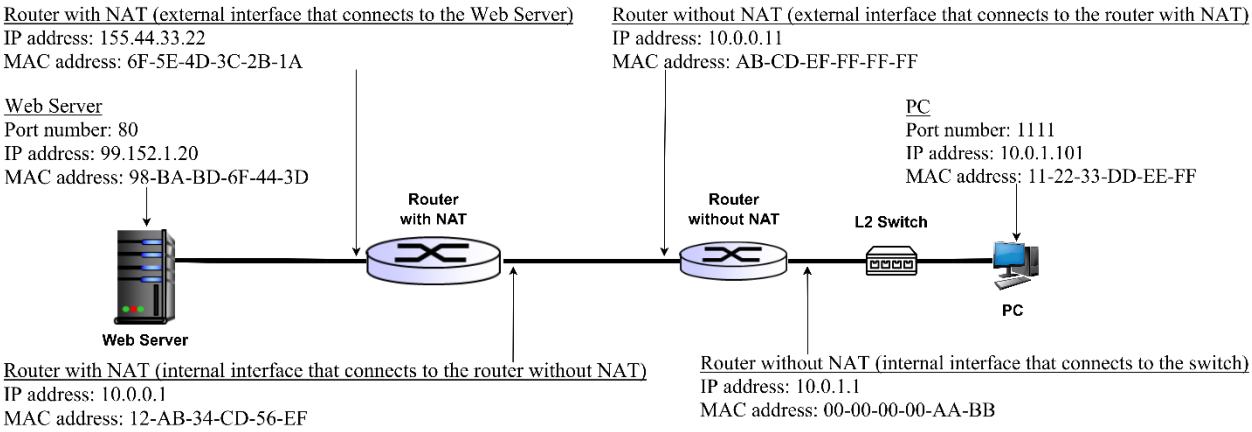

1. Create the NAT, ARP, switching and routing tables for the network above.
2. Show how the packet header changes as the packet travels through the network. Consider that the PC knows the IP address of the web server.

NAT Table

Router with NAT

WAN	LAN
155.44.33.22, 3000	10.0.1.101, 1111

Routing Tables

Routing Table in Router without NAT

Network Address	Interface
10.0.1.101	10.0.1.1 (Switch)
10.0.1.x	10.0.1.1 (Switch)
10.0.0.x	10.0.0.11 (External)
All other addresses	10.0.0.11 (External)

Routing Table in Router with NAT

Network Address	Interface
10.0.0.x	10.0.0.1 (Router without NAT)
10.0.1.x	10.0.0.1 (Router without NAT)
99.152.1.20	155.44.33.22 (External)
All other addresses	155.44.33.22 (External)

Switching Table

Switching Table in L2 Switch

MAC Address	Port
11-22-33-DD-EE-FF	Internal (PC)
00-00-00-00-AA-BB	External (Router without NAT)

ARP Tables

If a machine wants to send a packet to an IP address that is not in its ARP table, the MAC address will be set to default gateway (next hop router) MAC address.

ARP Table in PC

IP Address	MAC Address
10.0.1.1	00-00-00-00-AA-BB (Default gateway)
10.0.1.101	11-22-33-DD-EE-FF

ARP Table in Router without NAT

IP Address	MAC Address
10.0.0.1	12-AB-34-CD-56-EF (Default gateway)
10.0.0.11	AB-CD-EF-FF-FF-FF
10.0.1.1	00-00-00-00-AA-BB
10.0.1.101	11-22-33-DD-EE-FF

ARP Table in Router with NAT

IP Address	MAC Address
99.152.1.20	98-BA-BD-6F-44-3D
155.44.33.22	6F-5E-3D-3C-2B-1A
10.0.0.1	12-AB-34-CD-56-EF
10.0.0.11	AB-CD-EF-FF-FF-FF

ARP Table in Web Server

IP Address	MAC Address
99.152.1.20	98-BA-BD-6F-44-3D
155.44.33.22	6F-5E-3D-3C-2B-1A

The packet going from the PC to the web server goes through the following header changes:

1. Between PC and L2 Switch

S MAC: 11-22-33-DD-EE-FF	S IP: 10.0.1.101	S port: 1111	Pay-load
D MAC: 00-00-00-00-AA-BB	D IP: 99.152.1.20	D port: 80	

2. Between L2 Switch and Router without NAT

S MAC: 11-22-33-DD-EE-FF	S IP: 10.0.1.101	S port: 1111	Pay-load
D MAC: 00-00-00-00-AA-BB	D IP: 99.152.1.20	D port: 80	

3. Between Router without NAT and Router with NAT

S MAC: AB-CD-EF-FF-FF-FF	S IP: 10.0.1.101	S port: 1111	Pay-load
D MAC: 12-AB-34-CD-56-EF	D IP: 99.152.1.20	D port: 80	

4. Between Router with NAT and Web Server

S MAC: 6F-5E-3D-3C-2B-1A	S IP: 155.44.33.22	S port: 3000	Pay-load
D MAC: 98-BA-BD-6F-44-3D	D IP: 99.152.1.20	D port: 80	

Now the packet goes from the web server to the PC and the header changes are the following:

5. Between Web Server and Router with NAT

S MAC: 98-BA-BD-6F-44-3D	S IP: 99.152.1.20	S port: 80	Pay-load
D MAC: 6F-5E-3D-3C-2B-1A	D IP: 155.44.33.22	D port: 3000	

6. Between Router with NAT and Router without NAT

S MAC: 12-AB-34-CD-56-EF	S IP: 99.152.1.20	S port: 80	Pay-load
D MAC: AB-CD-EF-FF-FF-FF	D IP: 10.0.1.101	D port: 1111	

7. Between Router without NAT and L2 Switch

S MAC: 00-00-00-00-AA-BB	S IP: 99.152.1.20	S port: 80	Pay-load
D MAC: 11-22-33-DD-EE-FF	D IP: 10.0.1.101	D port: 1111	

8. Between L2 Switch and PC

S MAC: 00-00-00-00-AA-BB	S IP: 99.152.1.20	S port: 80	Pay-load
D MAC: 11-22-33-DD-EE-FF	D IP: 10.0.1.101	D port: 1111	