# NAT&ICMP

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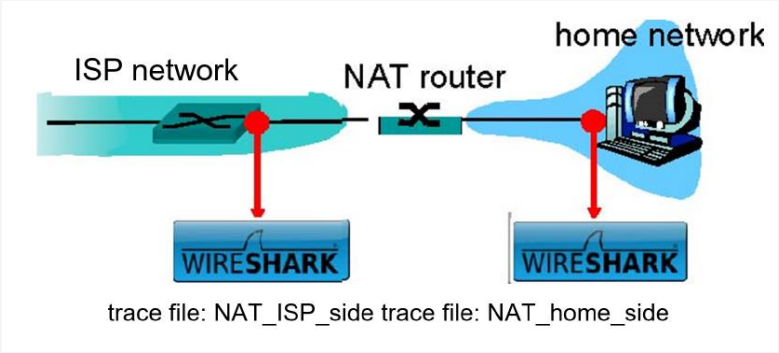
# Lab. NAT

- 아래 주어진 trace file (capture file)들을 관찰하고 다음에 답하라.




- NAT_home_side와 NAT_ISP_side를 동시에 관찰하면서 “http&&ip.addr==64.233.169.104”로 display filter를 실행하라.
- Home network의 IP 주소가 NAT router를 거치면서 어떻게 변하는지 관찰하라.
- IP header field 중 어떤 field가 추가로 변하는가?
- 해당 NAT router의 NAT Translation Table을 작성하라.

# #1 NAT

## Network programming

http&&ip.addr==64.233.169.104

| No. | Time | Source | Destination | Protocol | Length | Info |
|---|---|---|---|---|---|---|
| 85 | 6.069168 | 71.192.34.104 | 64.233.169.104 | HTTP | 689 | GET / HTTP/1.1 |
| 90 | 6.117570 | 64.233.169.104 | 71.192.34.104 | HTTP | 814 | HTTP/1.1 200 OK (text/html) |
| 93 | 6.241357 | 71.192.34.104 | 64.233.169.104 | HTTP | 719 | GET /intl/en_ALL/images/logo.gif HTTP/1.1 |
| 103 | 6.308118 | 64.233.169.104 | 71.192.34.104 | HTTP | 226 | HTTP/1.1 200 OK (GIF89a) |
| 106 | 6.330131 | 71.192.34.104 | 64.233.169.104 | HTTP | 809 | GET /extern_js/f/CgJlbhICdXMrMAo4NUAILCswDjgHLCswFjgQLCswFzgDLCs |
| 121 | 6.407366 | 64.233.169.104 | 71.192.34.104 | HTTP | 648 | HTTP/1.1 200 OK (text/javascript) |

```
Frame 85: 689 bytes on wire (5512 bits), 689 bytes captured (5512 bits)
Ethernet II, Src: Dell_4f:36:23 (00:08:74:4f:36:23), Dst: Cisco_bf:6c:01 (00:0e:d6:bf:6c:01)
Internet Protocol Version 4, Src: 71.192.34.104, Dst: 64.233.169.104
Transmission Control Protocol, Src Port: 4335, Dst Port: 80, Seq: 1, Ack: 1, Len: 635
Hypertext Transfer Protocol
```

ISP side

| | | | | | | |
|---|---|---|---|---|---|---|
| 56 | 7.109267 | 192.168.1.100 | 64.233.169.104 | HTTP | 689 | GET / HTTP/1.1 |
| 60 | 7.158797 | 64.233.169.104 | 192.168.1.100 | HTTP | 814 | HTTP/1.1 200 OK (text/html) |
| 62 | 7.281399 | 192.168.1.100 | 64.233.169.104 | HTTP | 719 | GET /intl/en_ALL/images/logo.gif HTTP/1.1 |
| 73 | 7.349451 | 64.233.169.104 | 192.168.1.100 | HTTP | 226 | HTTP/1.1 200 OK (GIF89a) |
| 75 | 7.370185 | 192.168.1.100 | 64.233.169.104 | HTTP | 809 | GET /extern_js/f/CgJlbhICdXMrMAo4NUAILCswDjgHLCswFjgQLCswFzgDLCswG |
| 92 | 7.448649 | 64.233.169.104 | 192.168.1.100 | HTTP | 648 | HTTP/1.1 200 OK (text/javascript) |

```
Frame 56: 689 bytes on wire (5512 bits), 689 bytes captured (5512 bits)
Ethernet II, Src: HonHaiPr_0d:ca:8f (00:22:68:0d:ca:8f), Dst: Cisco-Li_45:1f:1b (00:22:6b:45:1f:1b)
Internet Protocol Version 4, Src: 192.168.1.100, Dst: 64.233.169.104
Transmission Control Protocol, Src Port: 4335, Dst Port: 80, Seq: 1, Ack: 1, Len: 635
Hypertext Transfer Protocol
```

Home side

# #1 NAT

Network programming

| | | | | | |
|---|---|---|---|---|---|
| 56 | 7.109267 | 192.168.1.100 | 64.233.169.104 | HTTP | 689 GET / HTTP/1.1 |

라우터를 거치면서 Source Address가 사설 IP였던 192.168.1.100에서 공인 IP인 71.192.34.104로 매핑되어 바뀌었다.

| | | | | | |
|---|---|---|---|---|---|
| 85 | 6.069168 | 71.192.34.104 | 64.233.169.104 | HTTP | 689 GET / HTTP/1.1 |

Home side

# #1 NAT

## Network programming

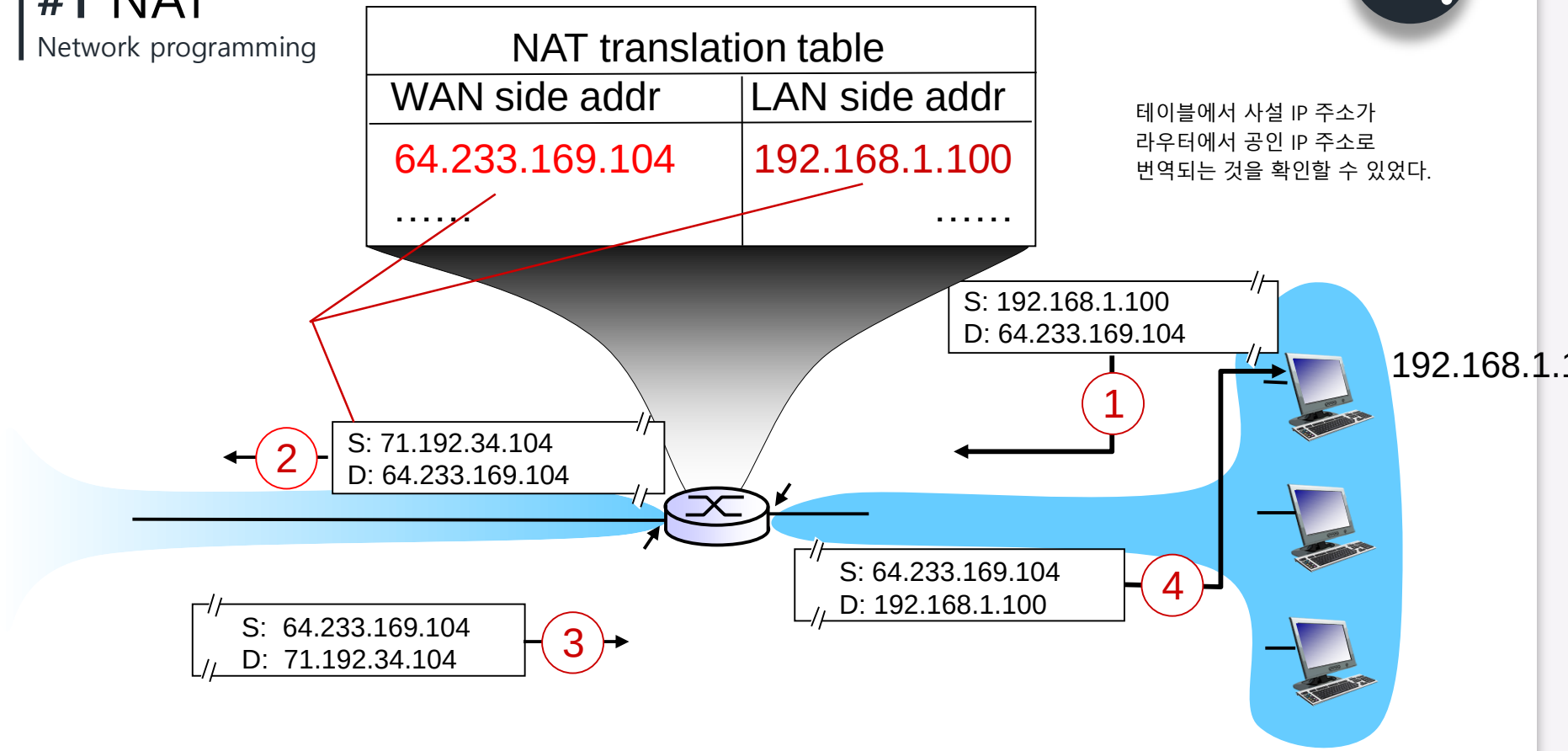
```
Internet Protocol Version 4, Src: 192.168.1.100, Dst: 64.233.169.104
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 675
    Identification: 0xa2ac (41644)
  > Flags: 0x4000, Don't fragment
    Time to live: 128
    Protocol: TCP (6)
    Header checksum: 0xa94a [validation disabled]
    [Header checksum status: Unverified]
    Source: 192.168.1.100
    Destination: 64.233.169.104

v Internet Protocol Version 4, Src: 71.192.34.104, Dst: 64.233.169.104
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 675
    Identification: 0xa2ac (41644)
  > Flags: 0x4000, Don't fragment
    Time to live: 127
    Protocol: TCP (6)
    Header checksum: 0x022f [validation disabled]
    [Header checksum status: Unverified]
    Source: 71.192.34.104
    Destination: 64.233.169.104
```

Home side에서 라우터를 거쳐 ISP side로 넘어갈 때 IP header의 변화가 있었다. 우선 Header checksum의 값이 변화가 있었으며 Time to live가 시간의 흐름에 따라서 라우터를 거쳤을 때 줄어들었다.

# #1 NAT

Network programming




테이블에서 사설 IP 주소가
라우터에서 공인 IP 주소로
번역되는 것을 확인할 수 있었다.