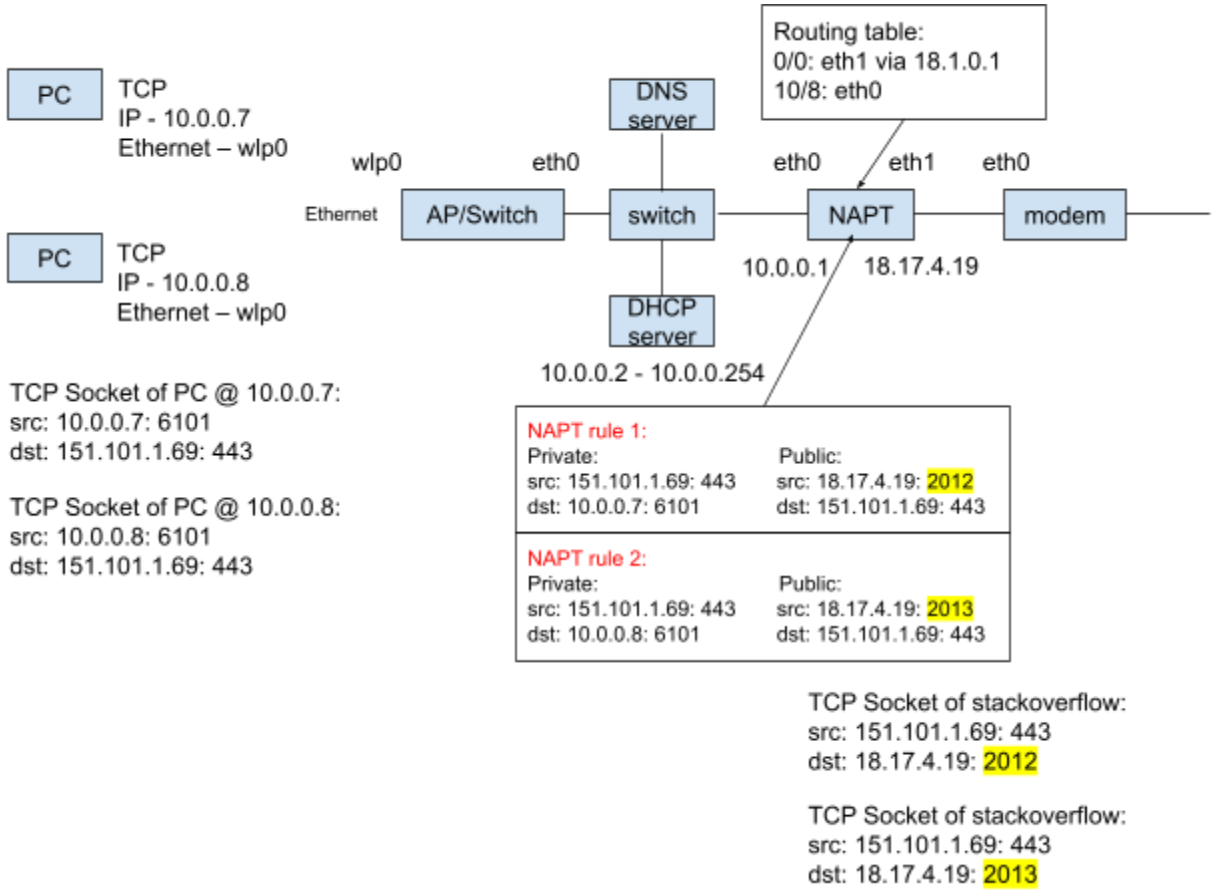
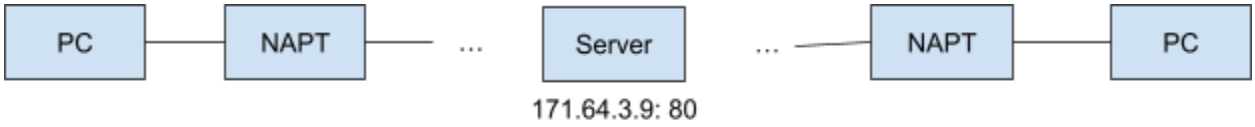
Level 8: NAPT



- If the PC @ 10.0.0.7 wants to start a connection with stackoverflow @ 151.101.1.69 either through a proxy or a transparent proxy or a NAPT translator.
    - The number of TCP connections between any PC on the subnet to stackoverflow is equal to the number of possible port numbers (65536)
    - Each new TCP connection between a PC on the subnet to a public IP address adds a new NAPT rule
    - A NAPT rule is garbage-collected either when a TCP connection is closed or the rule has not been used for a while
- However, what happens if stackoverflow @ 151.101.1.69 wants to start a connection with the PC @ 10.0.0.7? Or how to allow PC @ 10.0.0.7 to host a file server?
    - The dumbest way: have file servers on the public internet that are not behind NAPT, and upload any files to those public servers for sharing

Level 9a: P2P networking via public server

- Use one public server to hold the files between PCs behind NAPTs



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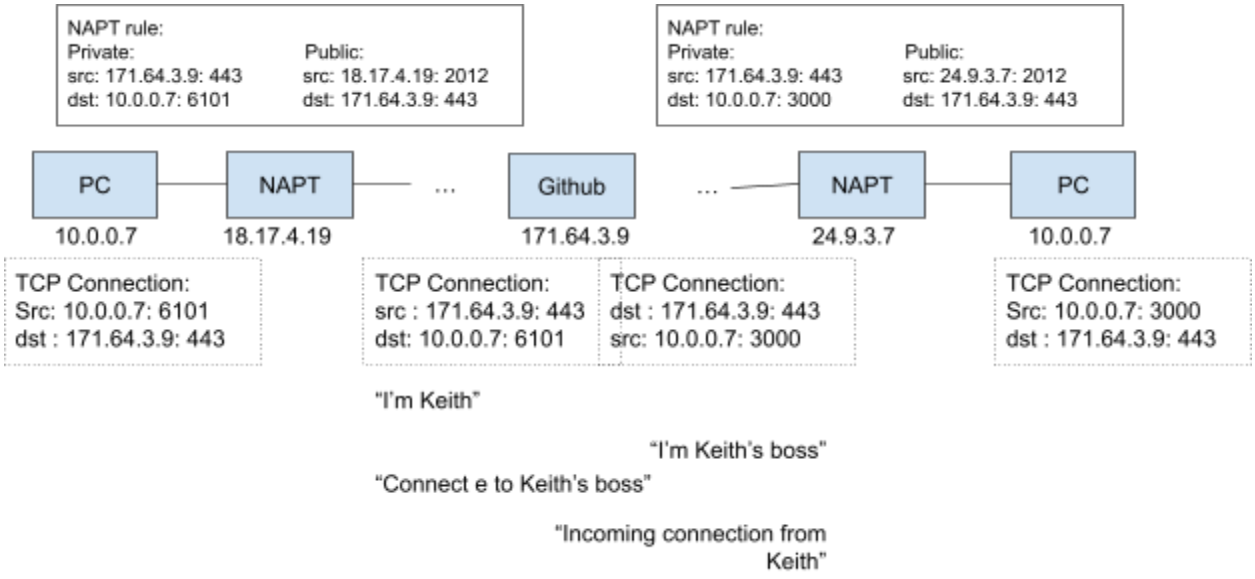
- How to achieve this without having the server to hold on to some files?

Level 9b: P2P networking via public proxy/relay/ TURN (Traversal Using Relays around NAPT)



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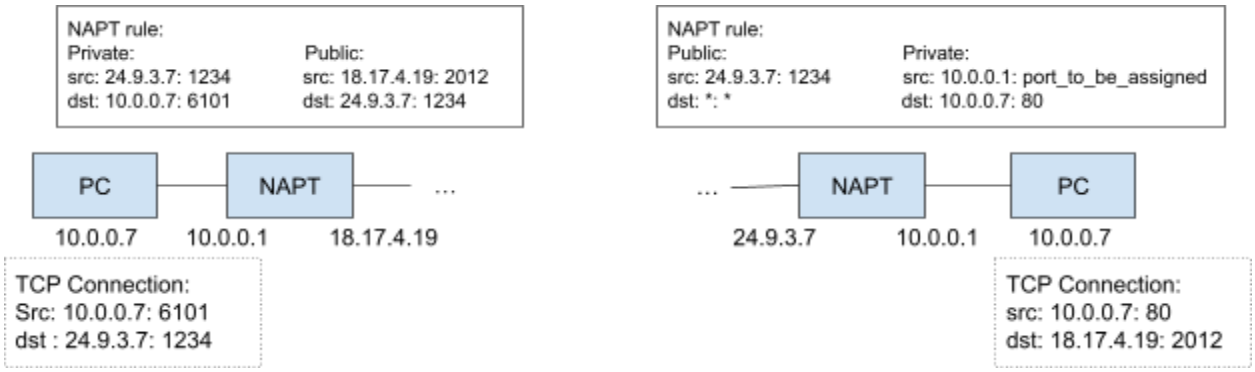
- What could we do if we don't want to connect through any kind of relay server in between?

Level 9c: P2P networking via explicit NAPT rules (port forwarding)

- Why can't two PCs talk to each other when they are both behind NAPT?
  - Their IP addresses are not meaningful on the public Internet
- Why can't one PC connect to the NAPT on the other side?



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- If we add the NAPT rule to the NAPT @ 24.9.3.7 before the TCP Connection is started, then a direct TCP Connection can be established between the two PC behind NAPTs.