Port Forwarding

Recall what happens when we have hosts with private IP addresses that are behind a NAT router ...

Network Address Translation (NAT)

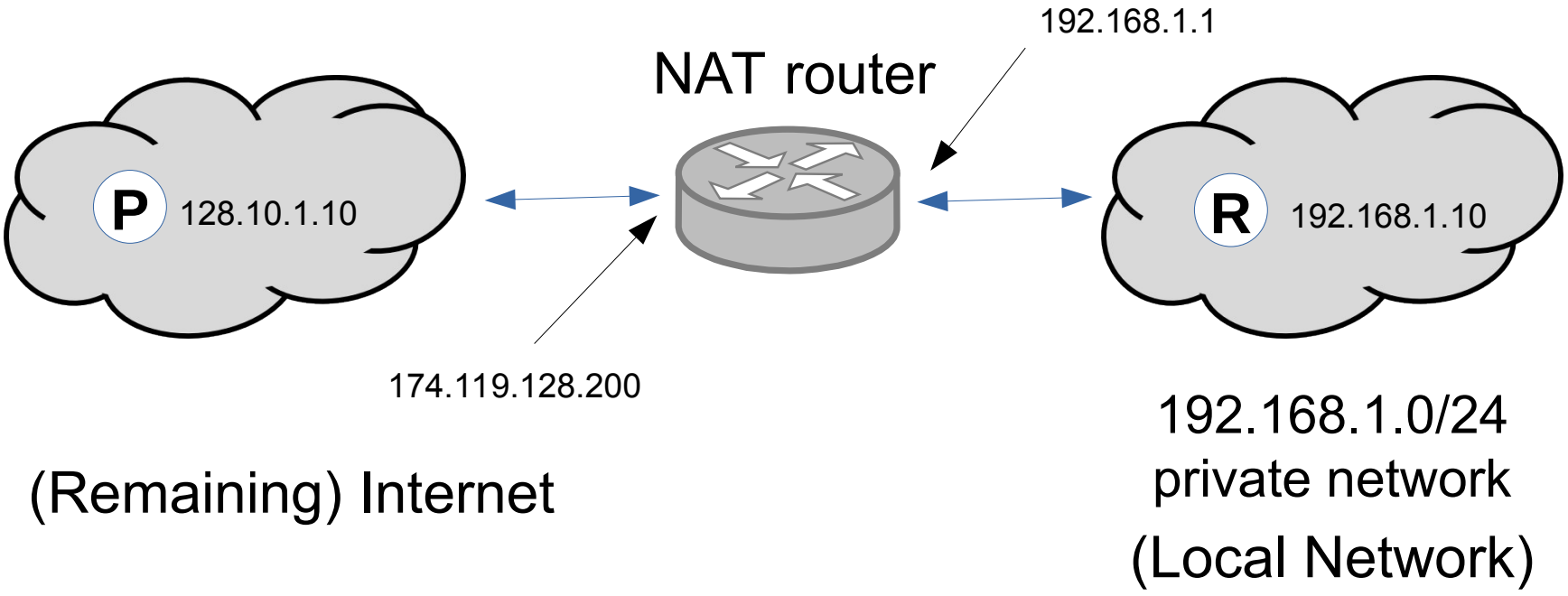
- Is a mechanism for mitigating the depletion of IPv4 addresses. Allows hosts with private IP addresses to share public IP addresses.
- NAT is very common and often combined with firewalls. Broadband routers typically contain this functionality.
- Since translation is performed, a client can change its ISP without having to change any internal IP addresses. The translation merely has to change.
- There are two main variations:
  - Network Address Translation (NAT)
  - IP Masquerading (also referred to as Network Address and Port Translation (NAPT)

NAT

- NAT destroys universal end-to-end reachability of hosts on the Internet.
- A host in the public Internet cannot initiate communication to a host in a private network.
- The problem is worse, when two hosts that are in a private network need to communicate with each other.

NAT Traversal

- NATed hosts are inherently "client-only", i.e., it is not possible for public Internet hosts to originate connections to the private Internet destination hosts.
- e.g., How can we operate an Internet server that is behind a NATed firewall?

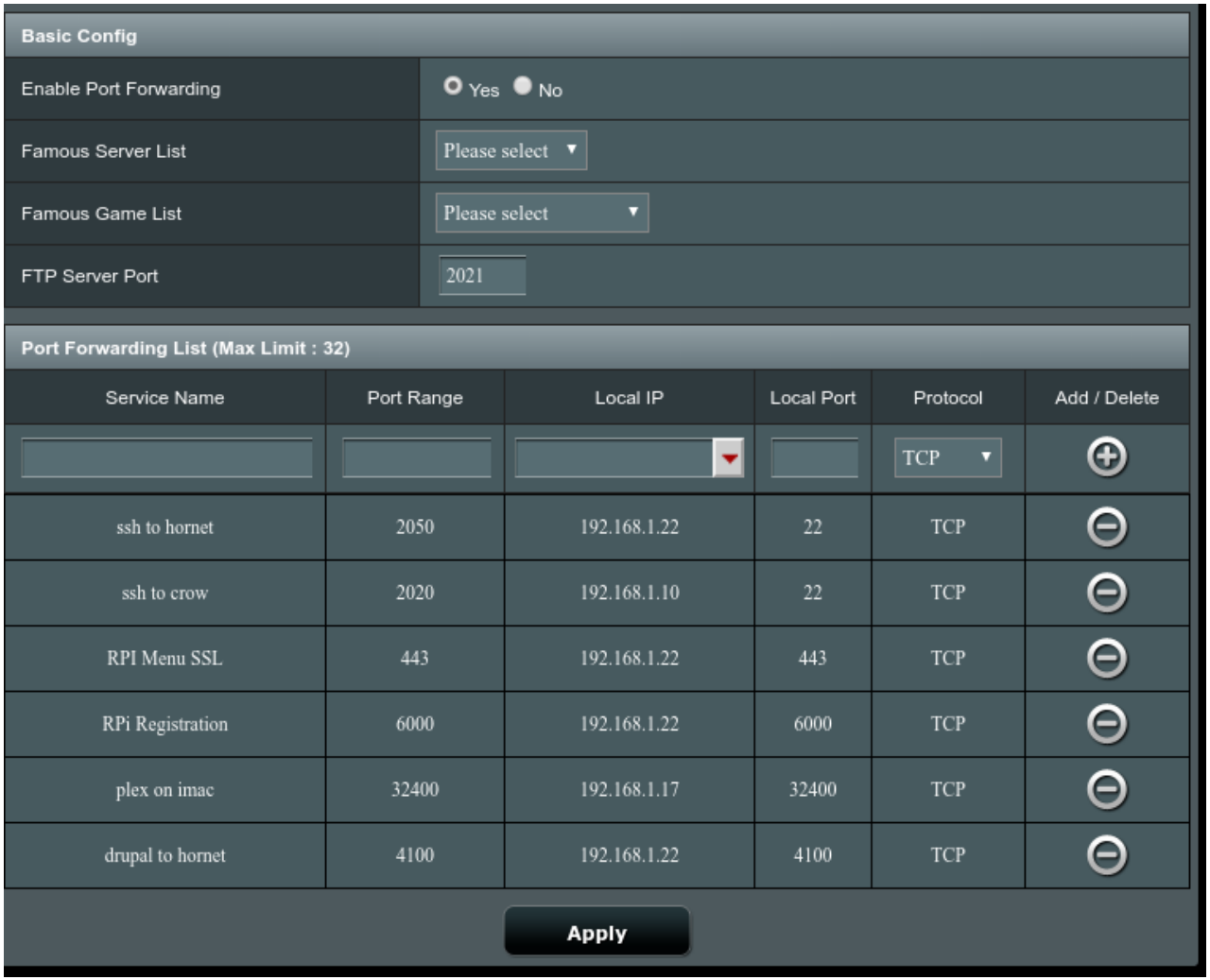


NAT Traversal

- Port Forwarding:
  - statically configure the NAT router to forward incoming connection requests on a given port to the server/port.
  - e.g., In the above example, if host R is running a web server on address/port (192.168.1.10, 80), the NAT could be configured so that any incoming TCP connection to address/port (174.119.128.200, 90) would be forwarded to (192.168.1.10, 80). The web server could then be accessed from a browser using the format:

    http://174.119.128.200:90/<remaining URL>

Router Port Forwarding Example



Basic Config

Enable Port Forwarding	Yes / No
Famous Server List	Please select
Famous Game List	Please select
FTP Server Port	2021

Port Forwarding List (Max Limit : 32)

Service Name	Port Range	Local IP	Local Port	Protocol	Add / Delete
				TCP	
ssh to hornet	2050	192.168.1.22	22	TCP	
ssh to crow	2020	192.168.1.10	22	TCP	
RPI Menu SSL	443	192.168.1.22	443	TCP	
RPi Registration	6000	192.168.1.22	6000	TCP	
plex on imac	32400	192.168.1.17	32400	TCP	
drupal to hornet	4100	192.168.1.22	4100	TCP	

Apply

Port Forwarding: Lab 1 Echo Server

coe4dn4 echo server	50007	7	192.168.1.40	BOTH

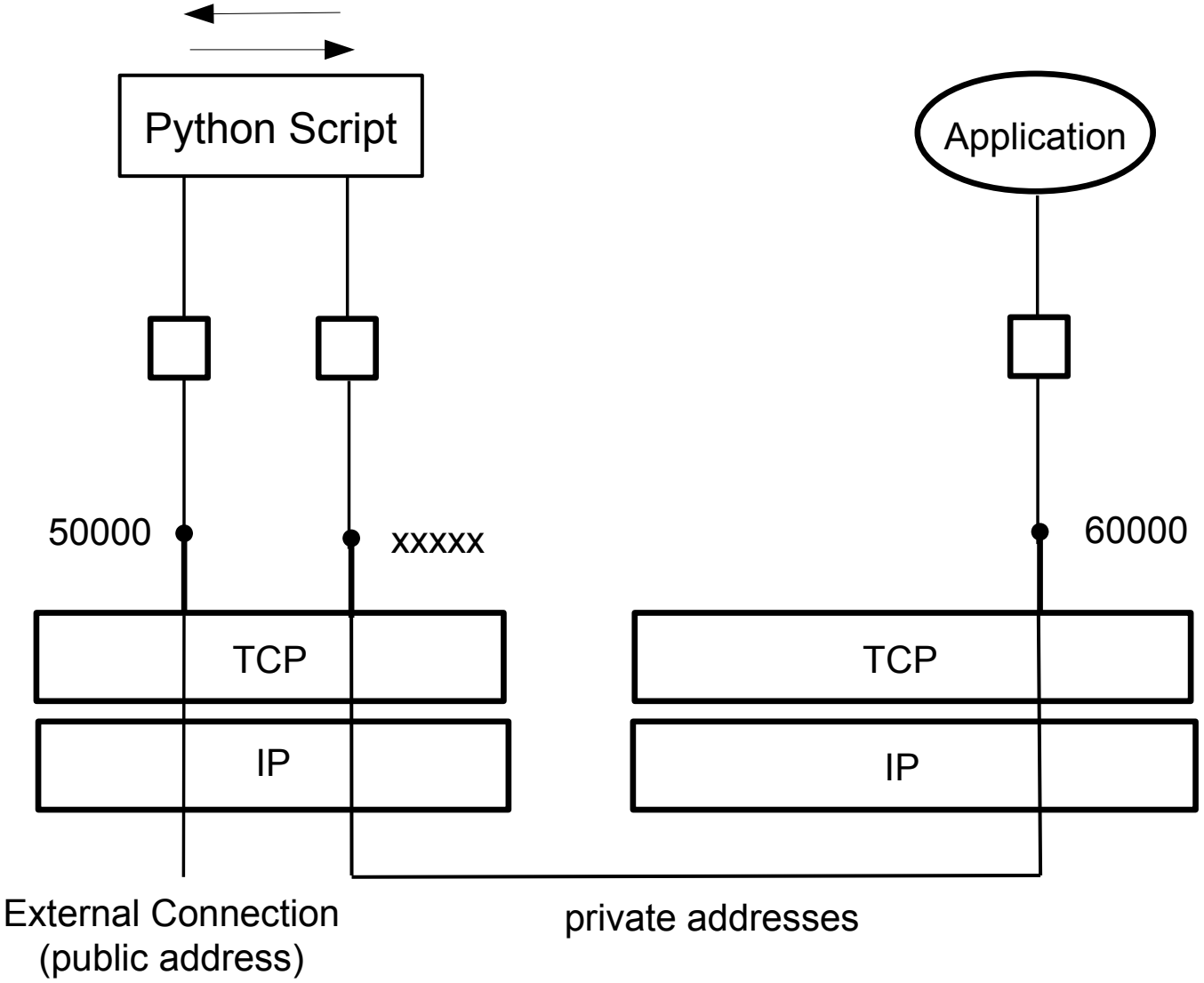
- compeng4dn4.mooo.com at port 50007 gets mapped to 192.168.1.40 port 7.

Port Forwarding

- Uses network address translation (NAT) to redirect a communication request from an address and port number to another address and port number. This is typically done on network firewalls.
- It allows services to be accessed on a host that is protected by having a private IP address and would not be accessible otherwise, i.e., the public destination IP address and port number are remapped by the port forwarder that has access to the private network.

Python Script Port Forwarding

Port Forwarding



Port Forwarding