

RFC 1918 Private Addresses



- The Internet Engineering Task Force (IETF) documents standards with RFC's (Requests For Comments)
- RFC 1918 specifies private IP address ranges which are not routable on the public internet

RFC 1918 Private Addresses



- Private addresses were originally designed for hosts which should have no internet connectivity
- Public IP addresses cost money
- If an organisation has a part of their network where the hosts need to communicate with each other over IP, but do not require connectivity to the Internet, they can assign private IP addresses

RFC 1918 Private Addresses



- There is a range of private addresses in each address class.
- 10.0.0.0 – 10.255.255.255
 - 10.0.0.0/8
 - 10.0.0.0 255.0.0.0
- 172.16.0.0 – 172.31.255.255
 - 172.16.0.0/12
 - 172.16.0.0 255.240.0.0
- 192.168.0.0 – 192.168.255.255
 - 192.168.0.0/16
 - 192.168.0.0 255.255.0.0

The IPv4 Global Address Space Problem

- The designers of IPv4 did not envision the explosive growth of its use
- 4.3 billion addresses seemed more than enough
- The protocol is not particularly efficient in its use of the available space, with many addresses being wasted



- The Internet authorities started to predict address exhaustion in the late 1980's, and IPv6 was developed in the 90's as the long term solution
- IPv6 uses a 128 bit address, compared to IPv4's 32 bit address
- IPv6 provides more than 7.9×10^{28} times as many addresses as IPv4

The IPv6 Problem and NAT



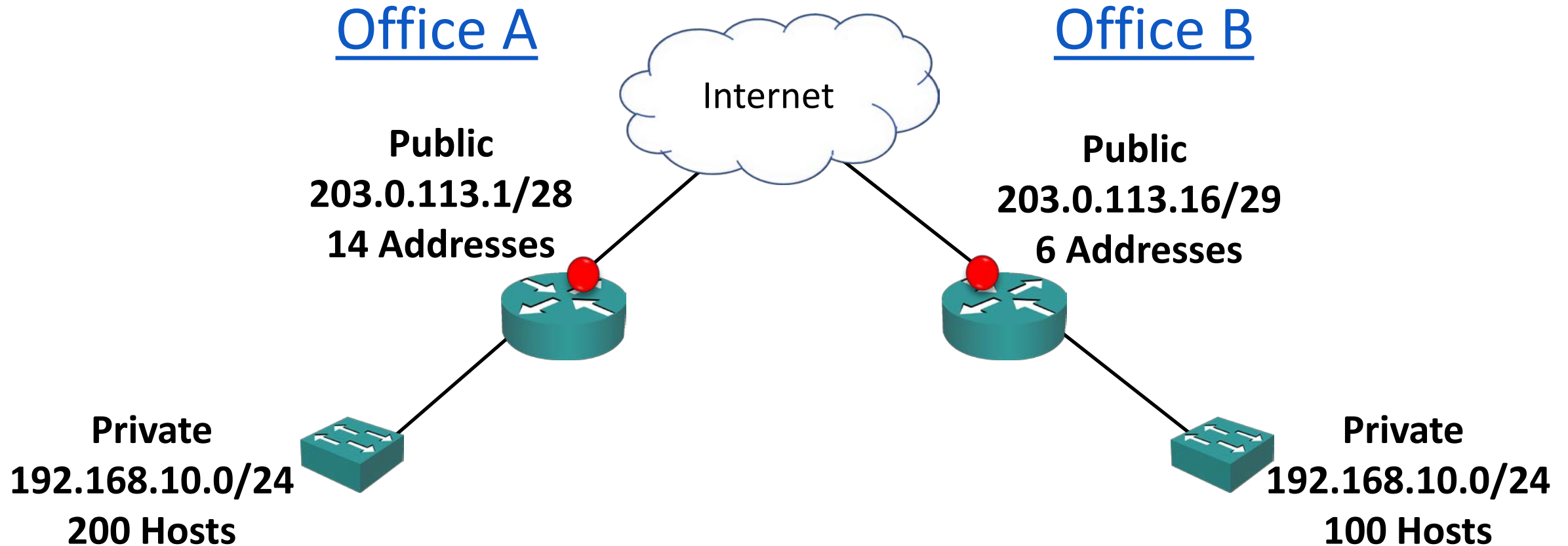
- There is not a seamless migration path from IPv4 to IPv6
- NAT (Network Address Translation) was implemented as a temporary workaround to mitigate the lack of IPv4 addresses until organisations had time to migrate to IPv6

The IPv6 Problem and NAT



- An organisation can use private IP addresses on their inside network, but still grant their hosts Internet access by translating them to their outside public IP addresses
- Many hosts on the inside can share a few or a single public IP address on the outside

Private Addresses and NAT



Today's Networks



- Many industry experts predicted in the early 2000's that IPv6 would be ubiquitous within a few years
- It hasn't worked out that way – most enterprises today use RFC 1918 IPv4 addresses with NAT
- RFC 1918 has the security benefit of hiding inside hosts by default (they don't have a publicly routable IP address), plus network engineers have more experience with IPv4 than v6