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
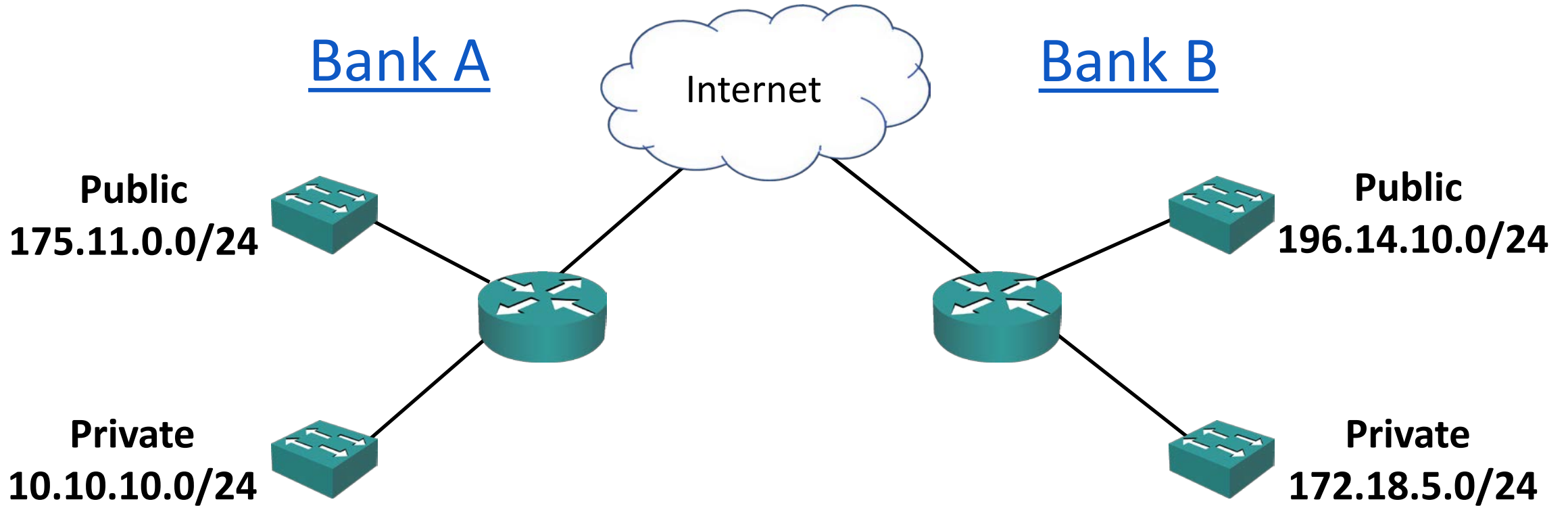
RFC 1918 Private Addresses

- Sticking with our theme of 'how IP addressing was meant to work', these 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.
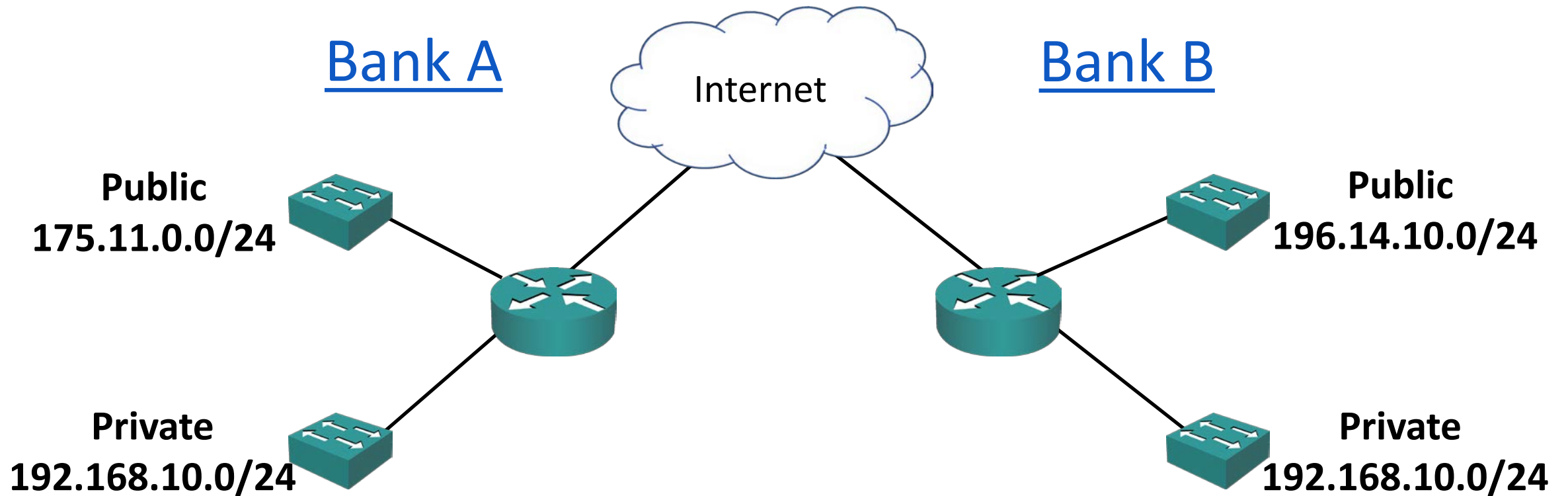
RFC 1918 Private Addresses

- 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

RFC 1918 Example 1

Bank A

Internet

Bank B

Public
175.11.0.0/24

Public
196.14.10.0/24

Private
10.10.10.0/24

Private
172.18.5.0/24

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RFC 1918 Example 2

Bank A

Bank B

Internet

Public
175.11.0.0/24

Public
196.14.10.0/24

Private
192.168.10.0/24

Private
192.168.10.0/24

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

IPv6

- 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

Private Addresses and NAT

Office A

Office B

Internet

Public
175.11.0.1/28
14 Addresses

Public
196.14.10.25/29
6 Addresses

Private
192.168.10.0/24
200 Hosts

Private
192.168.10.0/24
100 Hosts

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