IP Addresses and Port Numbers – Part 2

Amazon Web Services

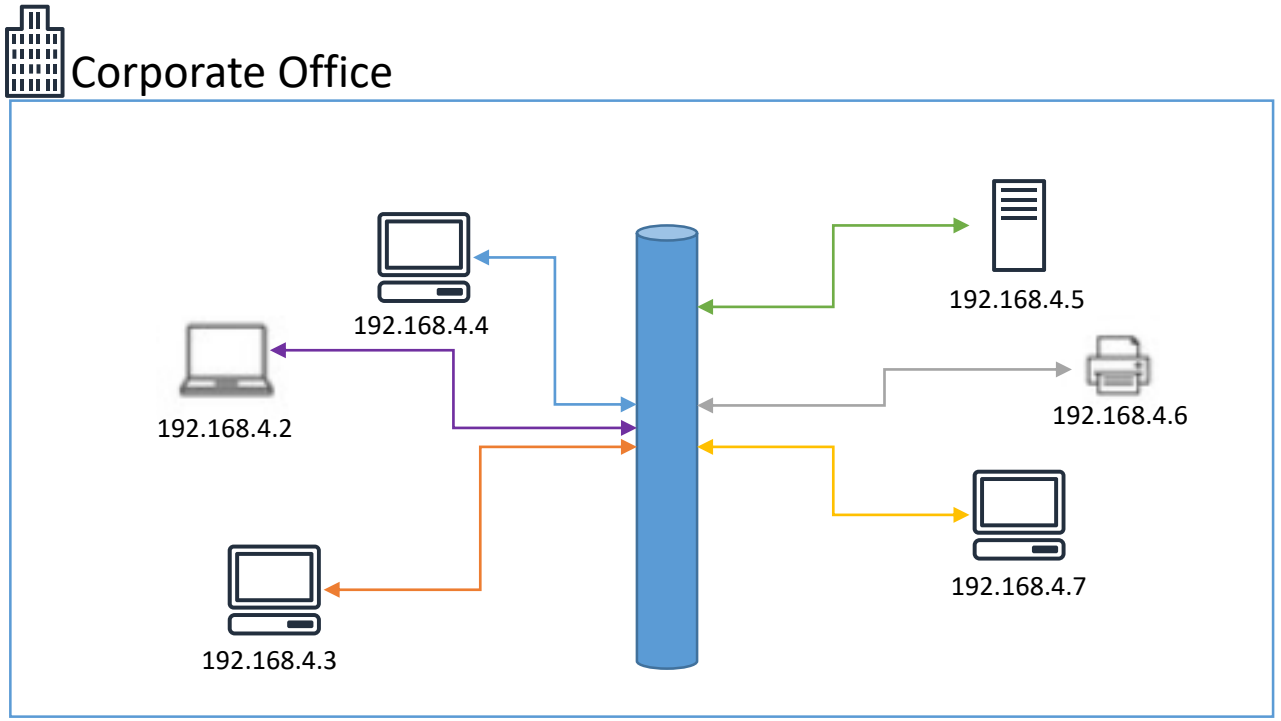
Private IP Address vs. Public IP Address

The Problem with IPv4 32Bit Address

Only 4,294,967,296 Devices on the Internet

Private IP Address vs. Public IP Address

However, not every device needs to accessible from the public Internet



A bright idea from the IANA

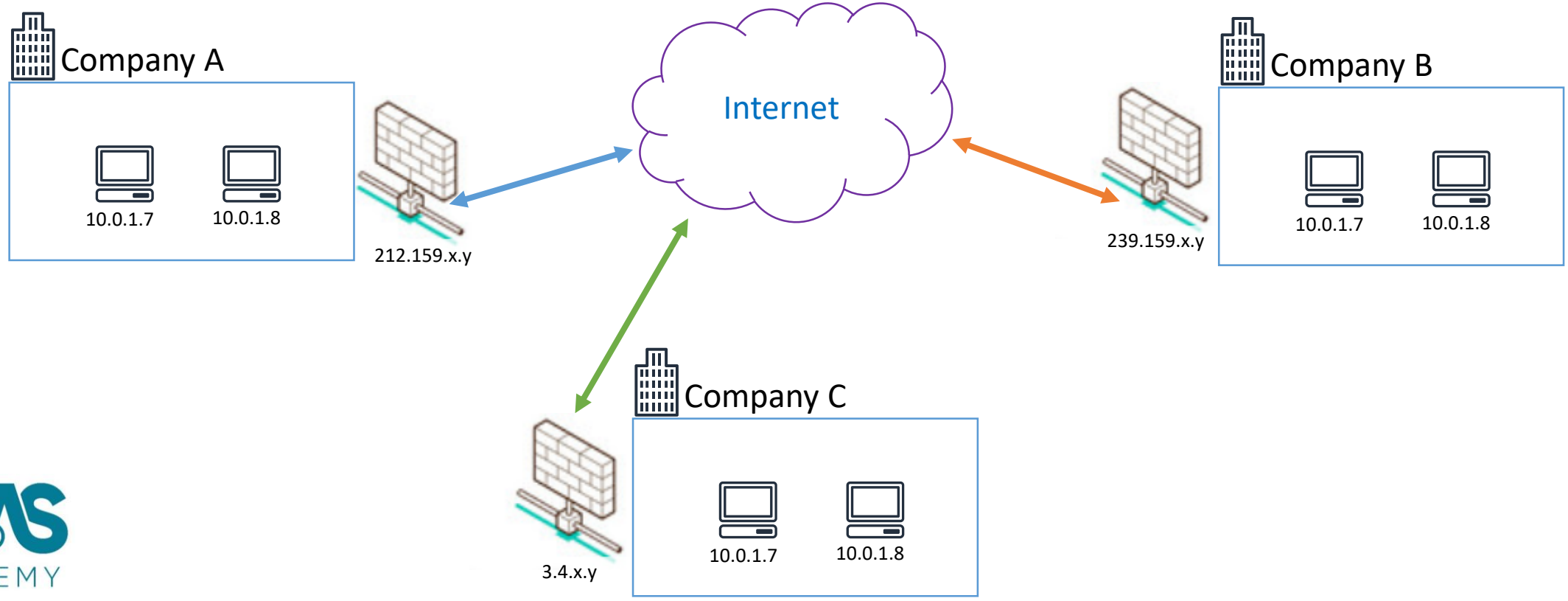
- The Internet Assigned Numbers Authority (IANA) came up with the brilliant idea to reserve certain IP Address ranges for private use

Class	IP Range	Number of Devices
Single Class A	10.0.0.0 to 10.255.255.255	16,777,216
Contiguous range of 16 Class B blocks.	172.16.0.0 to 172.31.255.255	1,048,576
Contiguous range of 256 Class C blocks.	192.168.0.0 to 192.168.255.255	65,536

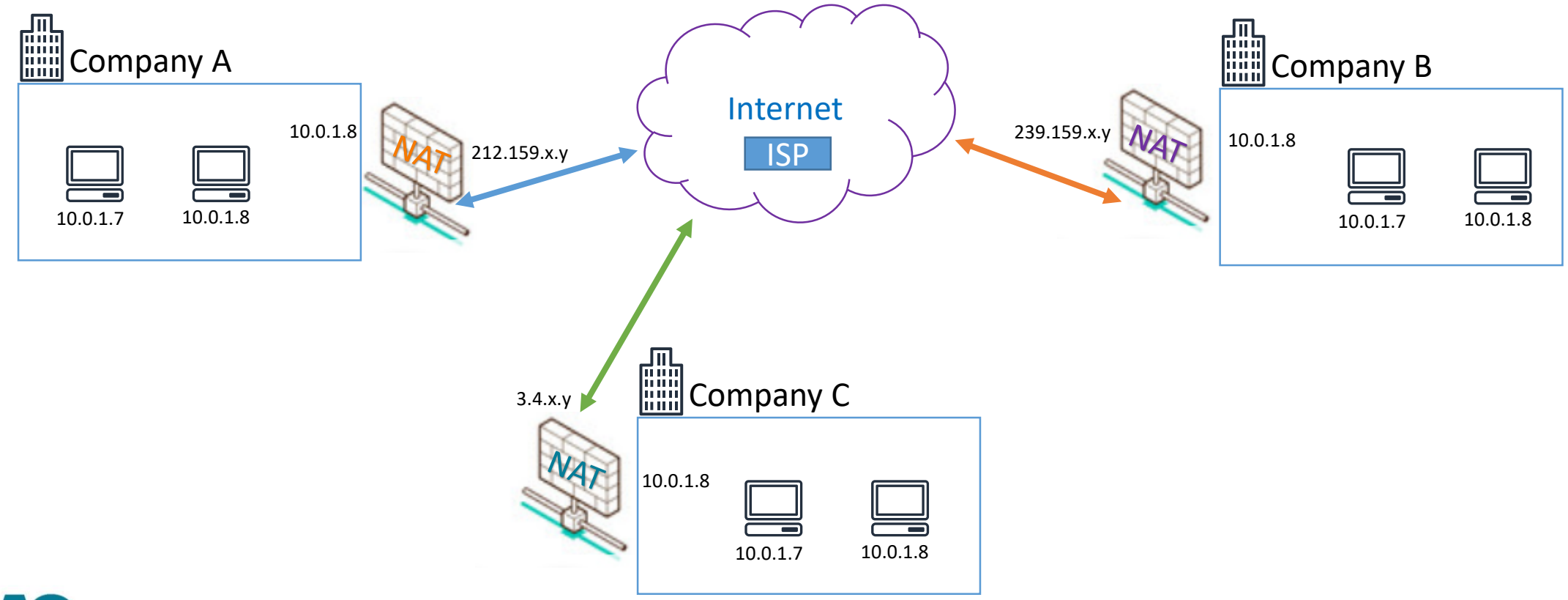
- APIPA - Another range of private IP addresses is 169.254.0.0 to 169.254.255.255, but those addresses are for Automatic Private IP Addressing (APIPA) use only, designed for internal Microsoft Networks.

Key Benefits of Private IPv4 Address

- Private devices that are not accessible directly from the Internet
- Conservation of Public IP Addresses



Network Address Translation (NAT)



Private IP Address & NAT

- Network address translation (NAT) is a method of remapping one IP address space into another by modifying network address information in the IP header of packets while they are in transit across a traffic routing device
- NAT enables you to map multiple internal devices' private IP Address to a single Public IP Address – This is know as a one-to-many NAT
- NAT devices can offer security by ensuring that inbound initiated access from the Internet is prevented or only allowed on certain ports.

IAS ACADEMY

Port Numbers

What is a Port number?

Telphone Switchboard Analogy

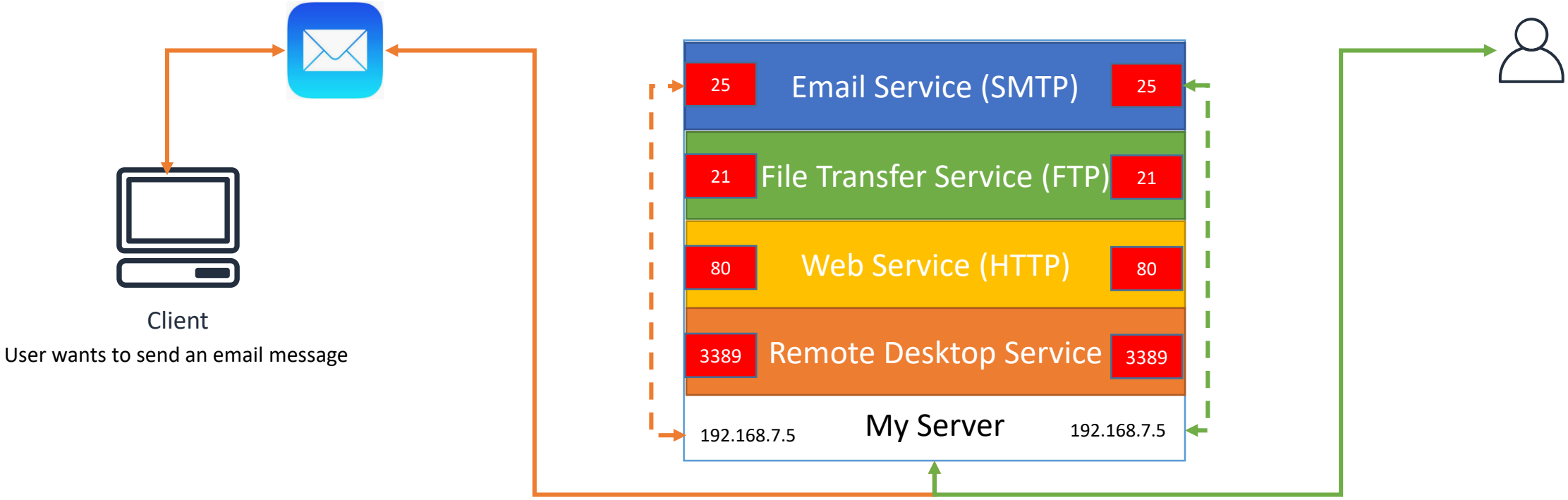
Good morning. Who may I direct your call to?

What is a Port Number?

A port number is a way to identify a specific process or an application to which a network message is to be forwarded when it arrives at a server.

- **Transmission Control Protocol (TCP)**
- **User Datagram Protocol (UDP)**
- **Port Numbers are 16-Bit Integers added to the header and appended to the message being transmitted.**

What is a Port Number?



Port Number Ranges and Well Known Ports

- **Port numbers 0-1023 – Well known ports.** These are allocated to **server services** by the **Internet Assigned Numbers Authority** (IANA). e.g Web servers normally use **port 80** and SMTP servers use **port 25** (see diagram above).
- **Ports 1024-49151- Registered Port** -These can be registered for services with the **IANA** and should be treated as **semi-reserved.**
- **Ports 49152-65535**– These are used by **client programs** and you are free to use these in client programs. When a Web browser connects to a web server the browser will allocate itself a port in this range. Also known as **ephemeral ports**.

Next Video