
Cybersecurity

CSCS

Introduction to Networks

Part 3

Today's Adenda

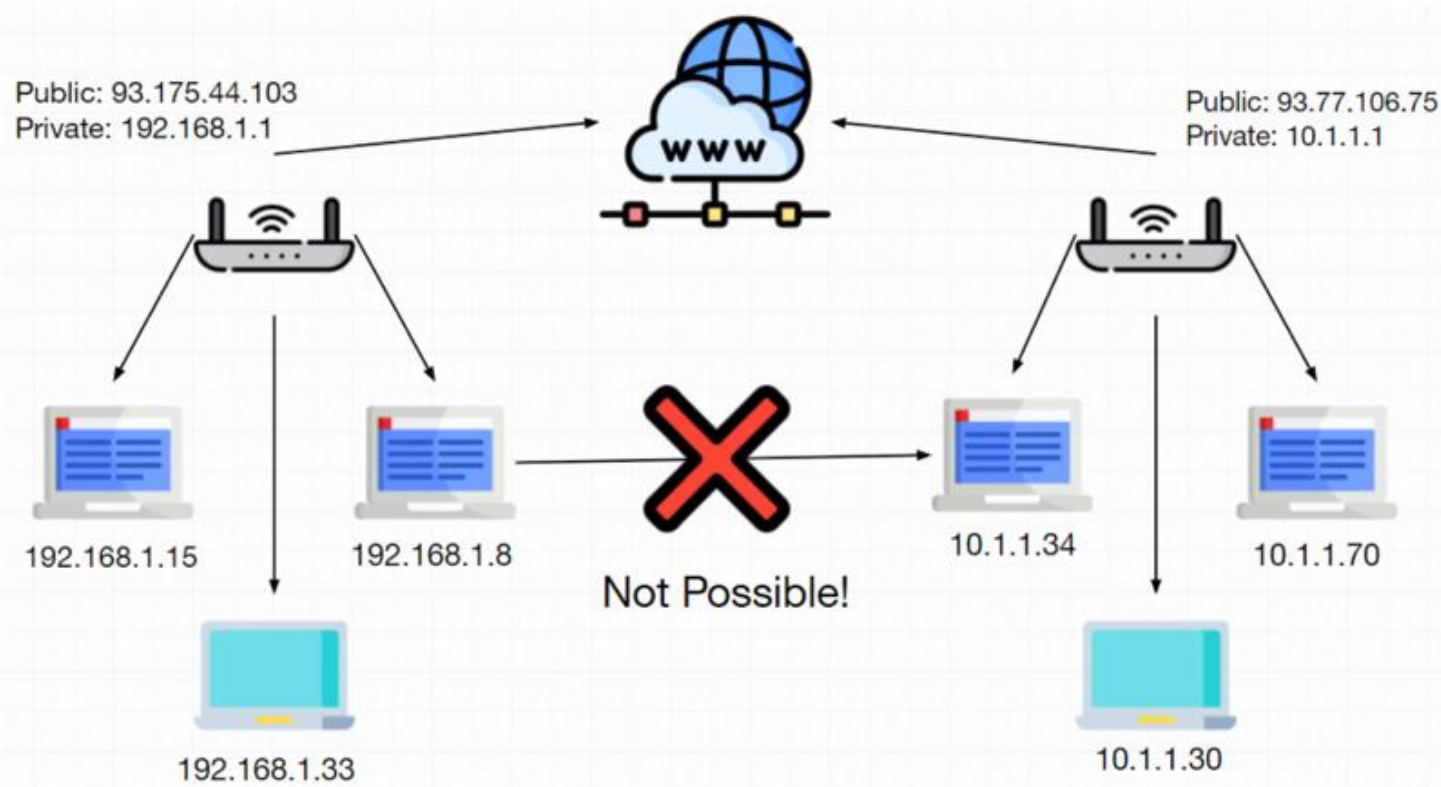
- A basic intro of

Private Vs Public IP Addresses

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 - Firewalls translates private IP addresses to public IP addresses using a process called NW Address Translation (NATing).
 - NAT allows a single device called gateway computer (router) having a public IP address to act as an agent between the Internet and the private NW.
 - This means that a single public IP address can represent an entire group of computers on the Internet.

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- Request For Comments --- A document that describes the specifications for a recommended technology
- These ranges are:
 - IPv4:
 - 10.0.0.0 to 10.255.255.255
 - 172.16.0.0 to 172.31.255.255
 - 192.168.0.0 to 192.168.255.255

Private IP Addresses

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- Security:
 - Private IP addresses are not directly exposed to the public internet, providing a layer of security by keeping internal devices hidden from external threats.

Public IP Addresses

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 - Used for communication over the Internet, making them accessible from any device globally.
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 - Used for communication over the Internet, making them accessible from any device globally.
 - Public IP addresses are routable on the internet and are assigned by Internet Service Providers (ISPs).
- Range:
 - Encompasses all IP addresses not reserved for private use.
 - These addresses must be unique across the entire internet to avoid conflicts.

Public IP Addresses

- Usage:
 - Assigned to devices that need to be reachable from outside the local network, such as web servers, email servers, and network gateways.
 - Public IP addresses enable direct communication between devices on different networks.

Public IP Addresses

- Security:
 - Public IP addresses are exposed to potential security risks as they are accessible from the Internet.
 - It's crucial to implement proper security measures, such as firewalls and intrusion detection systems, to protect devices and services with public IP addresses.

Classful Addressing on the Internet Layer (IPv4)

- Class A IP Addresses

0	Net ID (7)	Host ID (24)
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- Total Addresses: $2^7 - 2 = 126$ *networks*
- Range: 1.0.0.0 to 126.0.0.0
- Hosts per Network: $2^{24} - 2 = 16777214$ *hosts*
- Subnet Mask: 255.0.0.0 or /8

Classful Addressing on the Internet Layer (IPv4)

- Class B IP Addresses

10	Net ID (14)	Host ID (16)
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- Total Addresses: $2^{14}-2 = 16384$ networks
- Range: 128.0.0.0 to 191.255.0.0
- Hosts per Network: $2^{16}-2 = 65534$ hosts
- Subnet Mask: 255.255.0.0 or /16

Classful Addressing on the Internet Layer (IPv4)

- Class C IP Addresses

110	Net ID (21)	Host ID (8)
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- Total Addresses: $2^{21}-2 = 2097152$ networks
- Range: 192.0.0.0 to 223.255.255.0
- Hosts per Network: $2^8-2 = 254$ hosts
- Subnet Mask: 255.255.255.0 or /24

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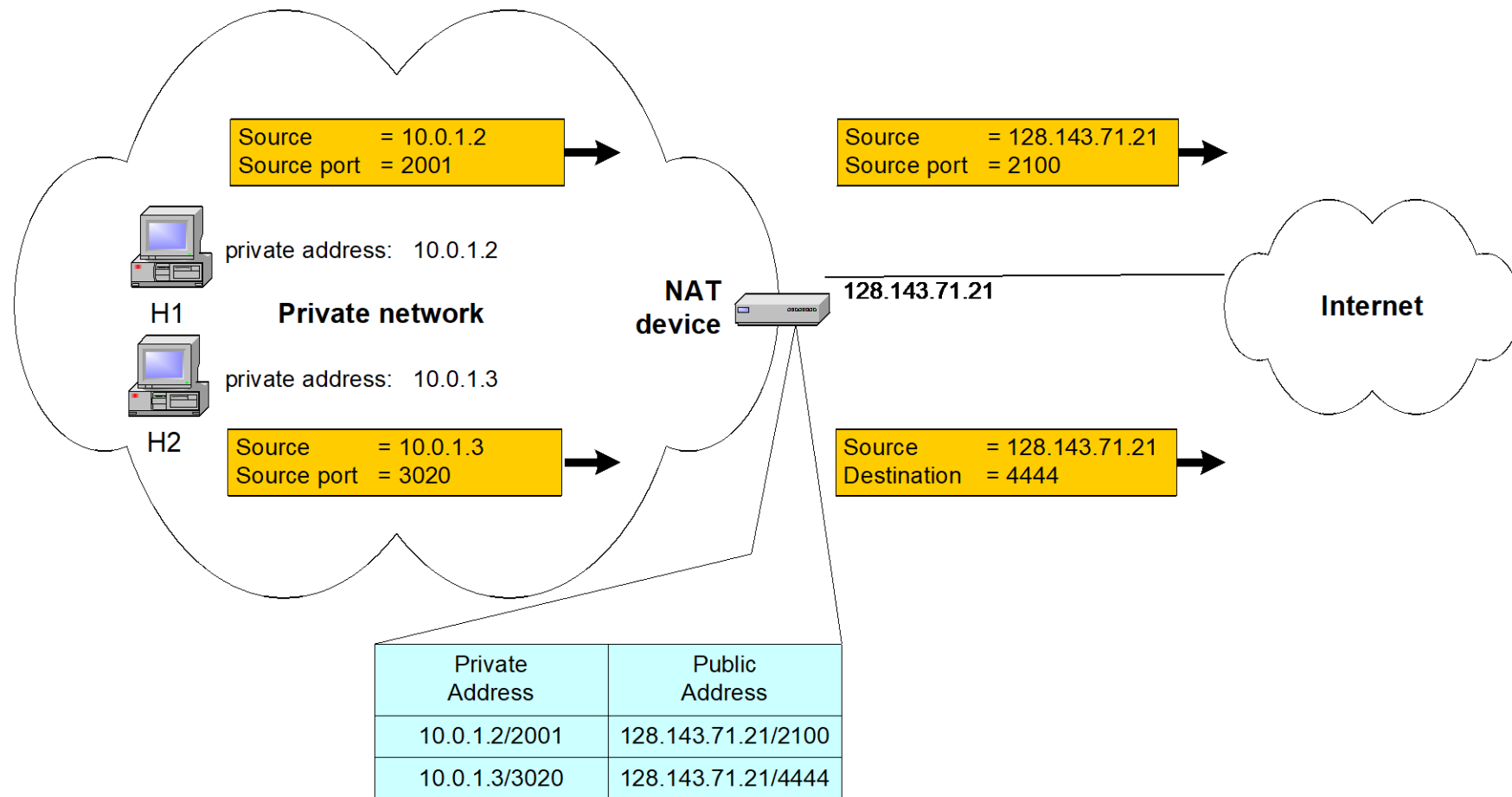
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- Every network has a subnet mask that is represented with all 1's in the network portion and with all 0's in the host portion.
- To get the network address you just bit-wise AND the IP address with the subnet mask.

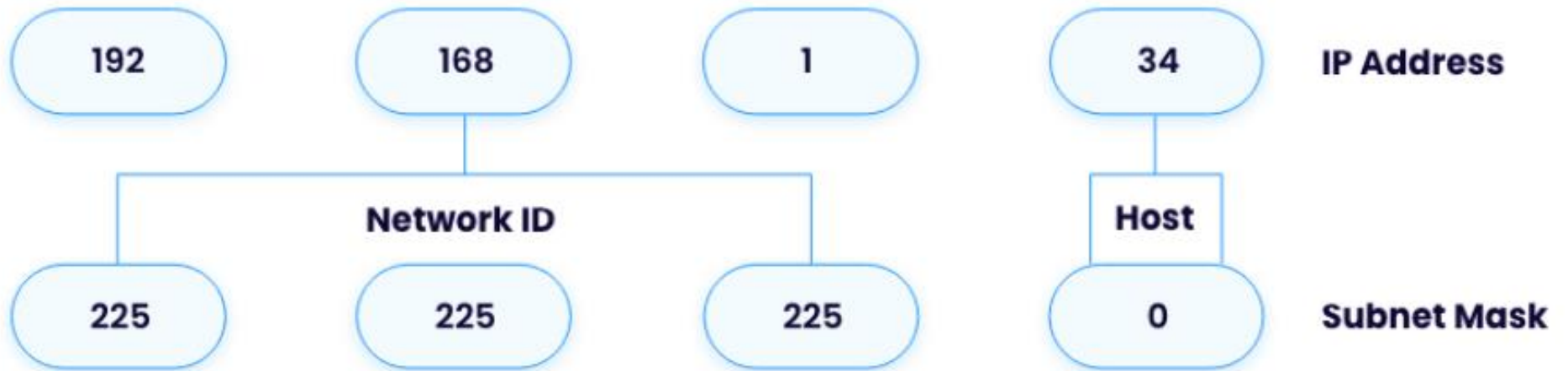
The Concept of NATing



What is CIDR - Classless Inter Domain Routing

- It is a method of assigning IP addresses that improves the efficiency of address distribution and replaces the previous system based on Class A, Class B and Class C networks.

What is a Subnet Mask



- A subnet mask is used to identify a network and host part in an IP address.