

# Pre-security-notes "networking"

## what is networking

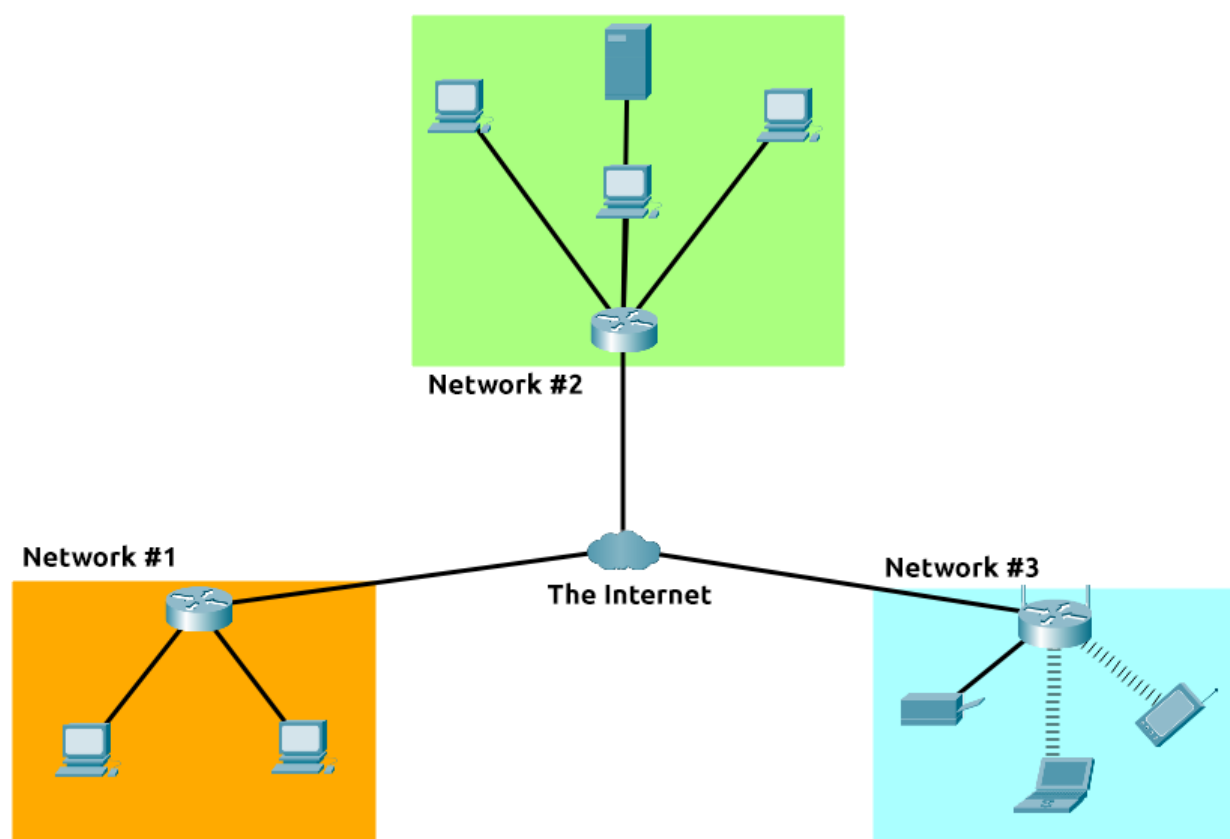
Networks are simply things connected together

in computing network can be formed by anywhere from 2 devices to billions connected together

## what is the internet ?

simply a giant network that consist of many small networks

Fig



internet consist of many small networks

those small networks called **private networks** where networks connecting them called **public networks "internet"**

so , networks can be classified into :

- private network
- public network

## identifying devices on a network

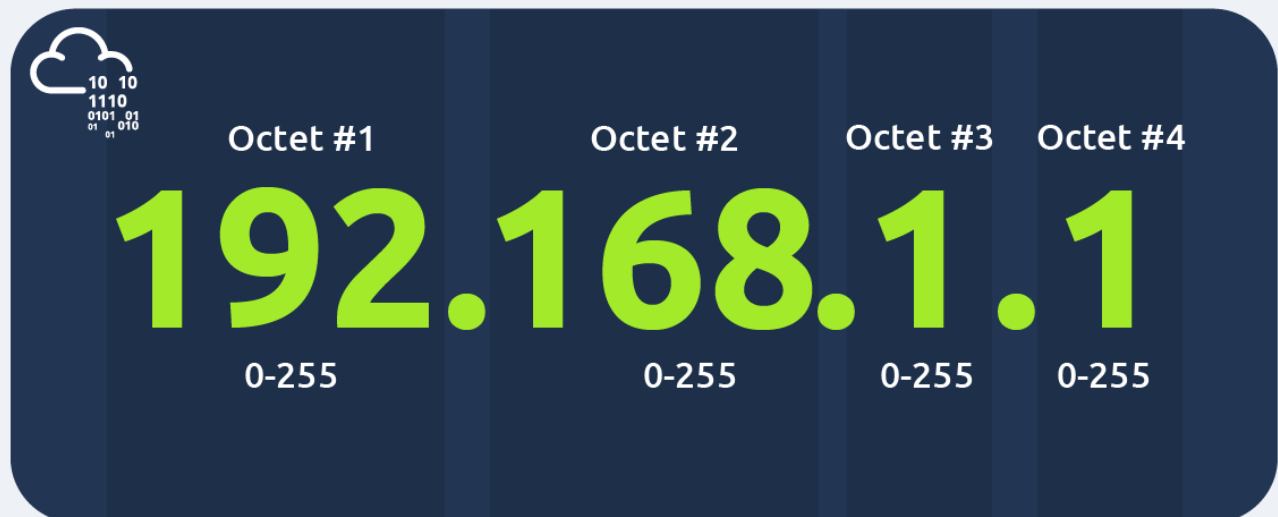
devices like humans have two things to being identified :

- name --> IP
- fingerprint --> MAC

## IP address

IP address (or Internet Protocol) address can be used as a way of identifying a host on a network for a period of time

 Figure



IP is a set of numbers divided into 4 pieces we call them 4 octets, IP change from device to another in the same network , it's illegal to having same IP for two different devices in the same network

to make a communicate understandable and more convenience IP Addresses follow a set of standards known as **protocols**. These protocols are the **backbone** of networking and force many devices to communicate in the same **language**,

A **public** address is used to identify the device on the Internet(**public network**), whereas a **private** address is used to identify a device among other devices in the **private network**

 Note

if two devices in the same **private** network they will having a **different** IP address in the **private** network , but when go online to the internet they will communicate to the outside world with one **same public IP** address

that public IP address given by ISP (internet server provide) e.g. WE egypt (LOL)

there's two types of IP versions : IPv4, IPv6

4 -> old one e.g. 86.157.52.21

6-> new one because many devices go online these days and there's no capacity in IPv4 for that e.g.

2a00:22c4:a531:c500:425f:cce6:c36b:f64d

version 6 have more IPs capacity

## MAC address

 Figure

Vendor who build the  
network interface  
(in this instance, Intel)

Unique address of the  
network interface

The MAC address is displayed in a dark blue box with a cloud icon in the top left corner. The address is 'a4 : c3 : f0 : 85 : ac : 2d', where 'a4', 'c3', and 'f0' are in red, '85' is in green, and 'ac' and '2d' are in yellow.

devices have another address a physical one fixed address burned on NIC in the motherboard and it's **unique** wrote in hexadecimal

OH nooooo it's can be **spoofed** too !! "using that in hacking stuff" to make a firewall passing that MAC address

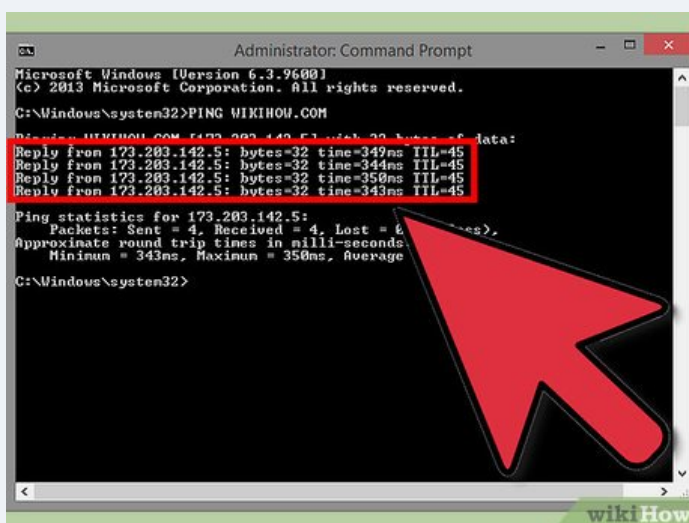
## ping (ICMP)

it's a protocol send packets to check the performance of connection between two devices in the same network  
the mechanism is simply the sender send a **ICMP echo packet** and waiting for **ICMP echo reply** from the target device

```
ping 192.168.1.254
```

### Figure

the respond be like :

A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. The window shows the command 'C:\Windows\system32>PING WIKIHOW.COM' and its output. The output shows four successful replies from 173.203.142.5 with varying times and TTL values. A red rectangular box highlights the four reply lines. A large red arrow points from the bottom right towards the highlighted text. The window also shows ping statistics for 173.203.142.5: Packets: Sent = 4, Received = 4, Lost = 0, Minimum = 343ms, Maximum = 358ms, Average = 349ms. A 'wikiHow' watermark is visible in the bottom right corner of the screenshot.

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Windows\system32>PING WIKIHOW.COM

Reply from 173.203.142.5: bytes=32 time=349ms TTL=45
Reply from 173.203.142.5: bytes=32 time=344ms TTL=45
Reply from 173.203.142.5: bytes=32 time=358ms TTL=45
Reply from 173.203.142.5: bytes=32 time=343ms TTL=45

Ping statistics for 173.203.142.5:
    Packets: Sent = 4, Received = 4, Lost = 0
    Approximate round trip times in milli-seconds:
        Minimum = 343ms, Maximum = 358ms, Average = 349ms

C:\Windows\system32>
```

next --> intro to LAN