

IG CS Topic 3.10 Network Hardware

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 - Network
 - Network Interface Card (NIC)
 - Protocols
 - Router
 - Identifying Network Devices

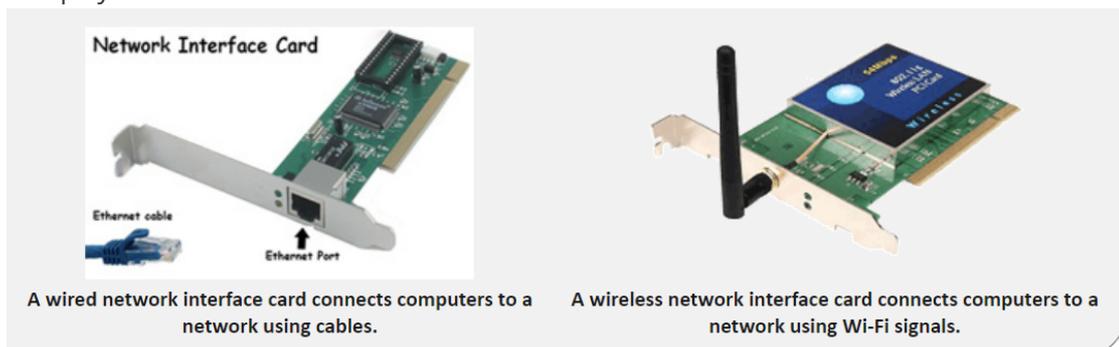
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Network

- computers and devices that are joined together using cables or wireless technology
- Local Area Network (LAN)**
 - a group of computers and network devices connected together, usually within the same building
 - what is in your house
 - formed by a router
- Wide Area Network (WAN)**
 - a large network of information that is not tied to a single location
 - can be formed by several LANs

Network Interface Card (NIC)

- the component in a computer that is used to connect it to a network
- can be wired or wireless NIC (most common)
- E.g. Games consoles contain a NIC card so users can access the internet, download games and play online



Protocols

- A set of rules for how messages are turned into data packets and sent across networks
- Media Access Control Address (MAC)**

- **Def**

- is a unique serial number assigned to each NIC
- 48 bits (each Hex possesses 4 bits)

- **Purpose**

- allows a network to uniquely identify any device even when a dynamic IP address is assigned
- the device's IP address changes depending on the network and the MAC address is unique
- when a device with a NIC transmits data across a network, it will send the MAC address with the data, telling which device on the network the data was sent from

- **Structure**

- consists of a string of **hexadecimal** numbers.
- Example

1A : 5B : 6H : 98 : 78 : 35

- The **first six** letters are the **manufacturers ID**
- The **last six** letters are the **serial ID code for the device**

- **Internet Protocol Address (IP)**

- **Def**

- is a unique identification number given to every device that is connected to the internet
- is assigned by the network or Internet Service Provider (ISP)

- **Purpose**

- identifies a device on the internet or local network
- represents the unique location on which the device is connected to the internet, allowing devices all over the world to communicate with each other
- determines the **exact location** of a device

- **Types**

- **Static IP address**

- an IP address that does not change each time device connects to the network

- **Dynamic IP address**

- an IP address that can change each time a device connects to a network
- Most devices are assigned a dynamic IP address that may change from time to time, unless you pay extra fee for a static address that never changes

- **Versions**

- **IPv4**

- The forth version of internet protocol
- 32-bit, separating binary bits by dots
- class ranges from A to E
- Example

192.168.0.1

- **MOST COMMONLY USED**

- **IPv6**

- The sixth version of internet protocol
- 128-bit, separating hexadecimal letters by ":"
- devised because of the increasing number of devices
- Example

2001 : 0db8 : 85a3 : 0000 : 0000 : 8a2e : 0370 : 7334

○ **Determine IP addresses**

- WAN IPs depend on **where in the world** it connected to the internet from
 - Example

- **Bermuda - 64.147.80.0**
- **United Kingdom - 80.247.16.0**
- **United States - 168.99.0.0**

- Computers on the **same network** would share the **same first few numbers**
 - Example

- **Desktop PC - 64.128.80.101**
- **Printer - 64.128.80.147**

- To locate individual devices on the network

Router

- a network component that examines a data packet to obtain its destination address and then forwards the packet to this address
- **Functions**
 - enable data to be sent between different types of networks
 - to connect devices to the internet (WAN)
 - could be used to connect a LAN to a WAN
 - enable a small peer-to-peer network in the houses
 - find the most suitable route of transmitting data
 - form a LAN by connecting networks together

Identifying Network Devices

- Nodes
 - all devices connected to a network
- Below device are required for accessing the internet
 - a NIC, either wired or wireless
 - a transmission medium, either wired or wireless
 - maybe a switch / hub
 - a router
 - maybe a modem
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