Wireless Networks

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Wireless Networks:

☐ A **wireless network** is any type of computer network that uses wireless data connections for connecting network nodes.

☐ **Wi-Fi (Wireless Fidelity)**

☐ **Bluetooth**

Bluetooth

☐ **_Bluetooth_** is a specification (IEEE 802.15.1) for the use of low-power radio communications to link phones, computers and other network devices over short distances without wires.
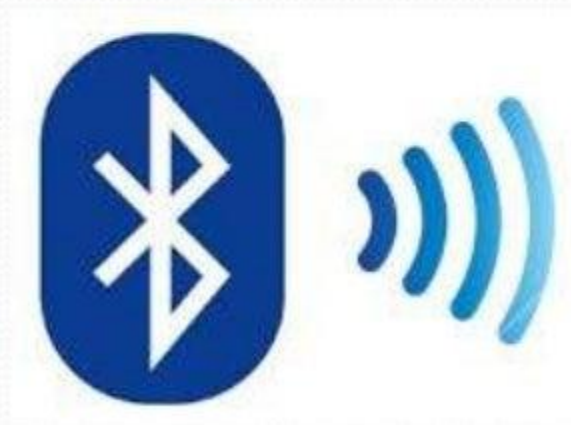
Wi-Fi (**Wireless Fidelity**)

☐ Wi-Fi is a <u>wireless</u> networking technology that allows computers and other devices to communicate over a wireless signal.

☐ **Wi-Fi**, is a <u>local area wireless technology</u>

Father of Wi-Fi

- The "Father of Wi-Fi," Vic Hayes is senior research fellow at Delft University of Technology in Delft, Netherlands.

How a Wi-Fi Networks Works

☐ A Wi-Fi hotspot is created by installing an internet connection.

☐ A single access point can support up to 30 users.

☐ Many acess points can be connected to each other via ethernet cables to create a single large networks.

☐ An access point acts as a base station.

Wi-Fi Works:

Wireless Networks Types:

☐ Wireless PAN – Performance Moderate , Cable replacement for peripherals

☐ Wireless LAN – Performance High, Mobile extension of wired networks

☐ Wireless MAN - Performance High, Fixed wireless between homes and businesses and the Internet

☐ Wireless WAN - Performance Low, Mobile access to the Internet from outdoor areas

Hardware:

Wi-Fi Technology

☐ Wi-Fi networks use radio technologies to transmit and receive data at high speed

☐ IEEE 802.11 b

☐ IEEE 802.11 a

☐ IEEE 802.11 g

IEEE 802.11 b

- Introduced in late 1999
- 4-6 Mbps (actual speed)
- Most Popular
- Least Expensive
- 100 – 150 feet range
- Operates at 2.4GHz radio spectrum
- Interference from mobile phones and bluetooth devices which can reduce the transmission speed.

IEEE 802.11 a

- Introduced   in 2001
- 15 – 20 Mbps (Actual speed)
- 50 – 75 feet range
- More Expensive
- Operates at 5 GHz (less popular)
- Not compatible with 802.11b

IEEE 802.11 g

- Introduced in 2003
- 54 Mbps speed
- Compatible with 'b'
- 100 – 150 feet range
- Combine the feature of both standards (a , b)
- 2.4 GHz radio frequencies

Latest technology in Wi-Fi

☐ The **latest Wi-Fi technology**, called "802.11ac," offers speeds of up to 1.3 Gigabits per second.

☐ That's fast enough to transfer an entire high-definition movie to a tablet in under 4 minutes, share photo albums with friends in a matter of seconds or stream three HD videos at the same time.

802.11ac

- We 're <u>probably familiar</u> with 802.11a/b/g/n, all of which are protocols for the <u>802.11 wireless networking standard</u>.

- We can safely bet that any device with Wi-Fi connectivity, from your laptop to your Smartphone, supports at least wireless B or G, and if it came out within the past few years, it should support wireless N. <u>802.11n</u> (or the latest draft of it, 802.11n-2009) is the fastest of the ones that are currently widely available.

- <u>802.11ac</u> is a new Wi-Fi protocol and is intended to be the natural successor to 802.11n. We may have heard it called "5G Wi-Fi" or "Gigabit Wi-Fi."

Elements of a Wi-Fi networks

☐ **Access point:** The access point is a wireless LAN transceiver or " base station" that can connect one or many wireless devices simultaneously to the internet.

☐ **Wi-Fi cards :** They accept the wireless signal and relay information. It can be external and internal.

☐ **Safeguards:** Firewalls and anti-virus software protect networks from uninvited users and keep information secure.

Roaming

☐ A wireless computer can "roam" from one access point to another, with the software and hardware maintaining a steady network connection by monitoring the signal strength from in-range access points and locking on to the one with the best quality. Usually this is completely transparent to the user; they are not aware that a different access point is being used from area to area. Some access point configurations require security authentication when swapping access points, usually in the form of a password dialog box.
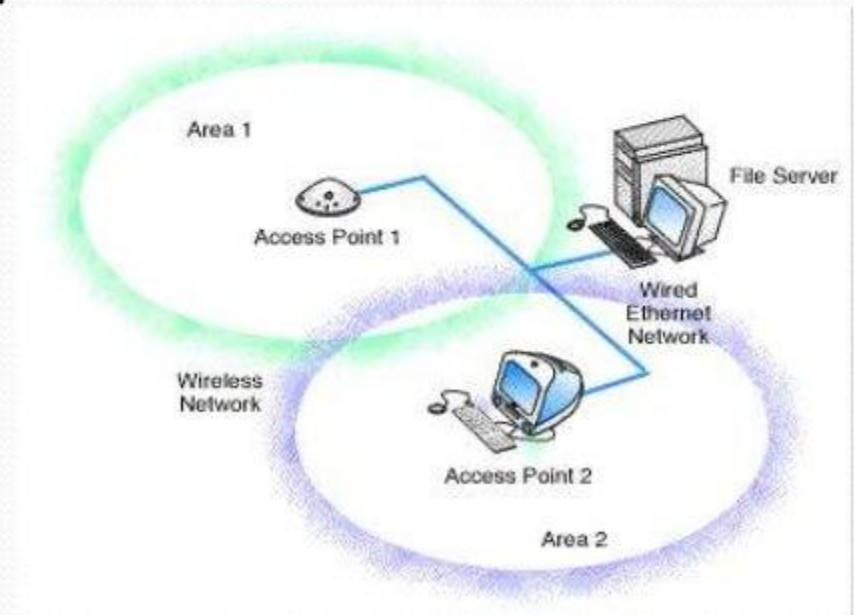
If we have more than one hardware access point then how can we share a single Internet connection?

☐ If an existing wired LAN already has an Internet connection, then the hardware access points simply connect to your LAN and allow wireless computers to access the existing Internet connection in the same way as wired LAN computers.

Advantages of Wi-Fi

- Convenience
- Mobility
- Productivity
- Deployment
- Expandability
- Cost
- Speed
- Security
- Flexibility
- reliability

Limitations

- Interference
- High power consumption
- Range
- Degradation in performance

Conclusion

☐ Wi-Fi is a universal wireless networking technology that utilizes radio frequencies to transfer data. Wi-Fi allows for high speed Internet connections without the use of cables or wires.

☐ Since nearly all new laptops come with internal wireless cards

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