

What is WiFi?

WiFi commonly referred to as Wireless technology or 802.11 networking share the same purpose and functionality of your standard network. Except instead of using wires connecting you to a network you use a wireless protocol called 802.11. 802.11 come in three forms: 802.11a, 802.11b, and 802.11g.

802.11a supports data transfer speeds of up to 54 Megabits per second. 802.11a uses the 5 GHz frequency range which basically means that it emits a radio frequency of 5 GHz, similar to a FM radio station emitting 106.1 MHz. 802.11a, for its time, had good data transfer performance, but due to the high cost to manufacture 802.11a devices and its short signal range (up to 60feet), which was easily obstructed. 802.11a devices pretty much have disappeared off of the market.

802.11b supports data transfer speeds of up to 11 Megabits per second. 802.11b uses the 2.4 GHz frequency range. Compared to 802.11a, 802.11b transmits data at a slower rate, but 802.11b can transmit data up to 300 feet and is less likely to be obstructed by minor obstacles (walls, floors, etc...). In the market 802.11b devices also tend to be cheaper to manufacture.

Because of the way 802.11a and 802.11b transmit radio signals 802.11a devices are not compatible with 802.11b devices, and visa versa. Thus, 802.11b is one of the most widely adopted wireless standards on the market. 802.11g supports data transfer speeds of up to 54 Megabits per second. 802.11g also uses the 2.4 GHz frequency range. Since 802.11b and 802.11g use similar radio transmission techniques, 802.11g can also transmit data up to 300feet and also is compatible with 802.11b networks and devices.

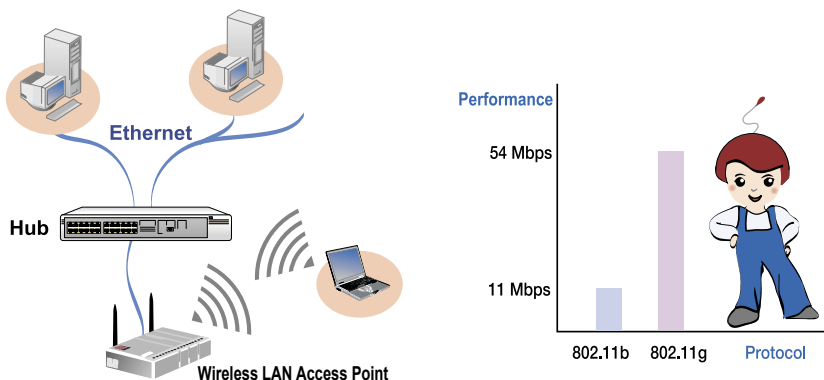


Figure 7.

What is Bluetooth? Bluetooth[®]

The Bluetooth SIG (Special Interest Group) was formed in early 1998 as a result of the global commitment of the five founding companies (Ericsson, Nokia, IBM, Toshiba and Intel). Its purpose was to enable seamless voice and data transmission via wireless, short-range radio, this new technology would allow users to connect a wide range of devices easily and quickly, without the need for cables. It currently competes with the 802.11 specification for wireless networking.

As stated before, Bluetooth was originally intended as a point to point connection between computers and cell phones to keyboards and headphones -- to make its own connections, without wires, cables or any direct action from a user.

Like Wifi, Bluetooth operates on the 2.4 GHz frequency range. Unlike Wifi, Bluetooth is less prone to interference by other 2.4 GHz devices (baby monitors, garage door openers, florescent lights, etc.,). To accomplish such a feat, Bluetooth implements two techniques to avoid interference.

One of the ways Bluetooth devices avoid interfering with other systems is by sending out very weak signals of 1 milliwatt. By comparison, the most powerful cell phones can transmit a signal of 3 watts. The low power limits the range of a Bluetooth device to about 10 meters (32.8 feet), cutting the chances of interference between your computer system and your portable telephone or television. Even with the low power, the walls in your house won't stop a Bluetooth signal, making the standard useful for controlling several devices in different rooms.

The second technique used to avoid interference is called "Frequency Hopping". The theory is that, it is unlikely that several devices will be on the same frequency at the same time, because Bluetooth uses a technique called spread-spectrum frequency hopping. In this technique, a device will use 79 individual, randomly chosen frequencies within a designated range, changing from one to another on a regular basis.

In the case of Bluetooth, the transmitters change frequencies 1,600 times every second, meaning that more devices can make full use of a limited slice of the radio spectrum. Since every Bluetooth transmitter uses spread-spectrum transmitting automatically, it's unlikely that two transmitters will be on the same frequency at the same time. This same technique minimizes the risk that portable phones or baby monitors will disrupt Bluetooth devices, since any interference on a particular frequency will last only a tiny fraction of a second.

When Bluetooth-capable devices comes within range of one another, an electronic conversation takes place to determine whether they have data to share or whether one needs to control the other. The user doesn't have to press a button or give a command -- the electronic conversation happens automatically. Once the conversation has occurred, the devices form a point-to-point network. Bluetooth systems create a personal-area network (PAN) that may fill a room or may encompass no more distance than that between the cell phone on a belt-clip and the headset on your head. Once a connection is established, the members randomly hop frequencies in unison so they stay in touch with one another and avoid other connections that may be operating in the same room.

WiFi[®] vs. Bluetooth[®]

At this point you are probably asking your self, "What is the difference between Wifi and Bluetooth? Which one is better?" Well the answer is "Neither!" Neither Bluetooth nor Wifi is better than the other. It all depends on the application they will be used in. Both Wifi and Bluetooth have their pros and cons. The following is a small list of Wifi's and Bluetooth's pros and cons:

- **Speed** : Bluetooth has a maximum data transfer rate of 720 Kilobits per second, while Wifi has a maximum data transfer rate of up to 54 Megabits per second for 802.11g, and 11 Megabits per second for 802.11b.
- **Frequency** : Both Bluetooth and Wifi operate in the 2.4 GHz frequency range, but Bluetooth using its Digital Spread Spectrum technique is less prone to interference from other devices than Wifi.
- **Security** : Both Bluetooth and Wifi have encryption. In most cases Bluetooth is more secure and less prone to hacking than Wifi (WEP 128-bit). Bluetooth also usually is very easy to setup security between devices (in some cases is automatically done for you without your knowledge), while Wifi requires you know more a little about Wifi security protocols.
- **Applications** : Bluetooth is considered more of a direct cable replacement, and is designed for point-to-point connections. For example, Bluetooth can replace Serial, USB, or Fire Wire cables to devices. Wifi was originally designed to replace existing Ethernet cabling.
- **Ease of Use** : In most cases pairing Bluetooth items is a relatively simple process, considering most Bluetooth products some with easy to use setup software. Unlike Wifi which may need previous knowledge of networking protocols or may need help from a network administrator to get things up and running.
- **Power** : Bluetooth radios use as little as 1milliwatt of power, where Wifi can use in an excess of 3 Watts.
- **Distance** : In most cases 802.11b or g can transmit up to 1200 feet in an unobstructed space, while Bluetooth is limited to distances of up to 30 feet (Some new Bluetooth devices are known to transmit data in distances exceeding 30 feet).

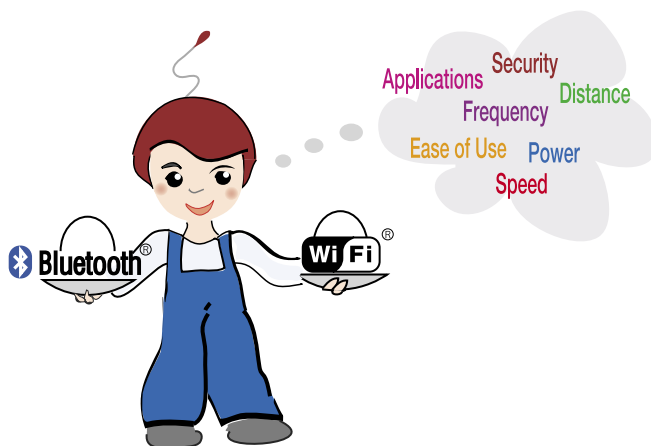


Figure 8.