Bluetooth is a wireless technology that was invented by the telecom vendor Ericsson in 1994. It is used to exchange data over short distances using short-wavelength UHF radio waves. Its architecture allows for many Bluetooth devices to communicate within the same general area. Bluetooth also gets compared to Wi-Fi frequently even though they are very different technologies. Bluetooth is managed by the Bluetooth Special Interest (BSI) group over 30000 member companies to ensure that standards are met and safety is addressed. The BSI was formed in 1998 and the first version of the technology was released one year later in 1999. Bluetooth has many current day uses and the BSI hopes that it will have more interesting and unique uses in the near future.

Bluetooth submits data by using short-wavelength UHF radio waves in the ISM ban from 2.4 to 2.485 GHz. Bluetooth divides the transmitted data into packets and transmits every packet on any of the 79 channels available for Bluetooth. Bluetooth uses frequency-hopping spread spectrum (FSHH). This increases security as it makes signals harder to jam or interfere. It also allows for Bluetooth to quickly find an open channel in case another device is operating on the channel it wants to use.

Bluetooth architecture uses a master-slave structure. Bluetooth master-slave are symmetrical and allow for machines to act as either a master or a slave. Two or more radio devices interacting with each other form a piconet. Everything within the piconet use the same frequency. Piconets consist of a master and one or many slaves (up to 7). Each item in the piconet can therefore be identified by a 3-bit address. One device is designated as the master and all of the other connected devices are the slaves. This allows all of the connected devices to be synched up to the same clock and hop interval. It also allows Bluetooth to operate in non-contention as the master will designate times for the slaves to transmit. This will mean that collisions won’t happen. For example, a piconet could be a master phone being connected to a pc, headphones, and a camera.

Some people get confused between Wi-Fi and Bluetooth. Bluetooth transmits small amounts of data over a short distance by linking together devices such as computers, phones, and other electronic devices. Wi-Fi transmits much larger pieces of data over the internet and can be spread worldwide. Bluetooth does not need Wi-Fi to function since it transmits its data by using radio frequencies. The frequencies of Bluetooth don’t interfere with Wi-Fi frequencies because Wi-Fi and Bluetooth can operate on different channels on similar frequencies. Also Wi-Fi can possibly operate at higher frequencies than Bluetooth. Bluetooth and Wi-Fi can work in tandem to create a better user experience. For example, you could fetch music from Spotify and send it through Bluetooth to a wireless headset.

The security of Bluetooth is also an important item to look at. As with most wireless connections, a ‘hacker’ can gain access to the communication by simply being within the range of the wireless communication. Bluetooth encrypt the connections that they using link keys or PINs to make it so that eavesdropping will not occur. It also encrypts the data using the same encryption key used for the initial pairing. Like all things, it is impossible for Bluetooth to be 100% secure. Having Bluetooth enabled means that other Bluetooth devices can see it. Therefore, it is feasible that malicious data could be attempted to be sent to your Bluetooth device. To ensure maximum safety it is recommended that Bluetooth only be turned on while it is being used, removing pairs that are not in use, and not inputting prompts for PINs or link keys to connect.

Bluetooth has many advantages that make it a useful system to use in everyday life. Bluetooth is extremely useful for short distance device interaction. Bluetooth is generally more secure than Wi-Fi simply because the range of Bluetooth is much smaller than Wi-Fi. So, for people to hijack your information they would have to be much closer than they would with Wi-Fi. It’s a worldwide standard so places that you visit all over the world will allow you to make use of Bluetooth objects. Its low power consumption also makes it appealing to use. There is also some drawbacks to Bluetooth. While there is an advantage to having short range communications, it also could be seen as a disadvantage. Bluetooth is usually not wide enough to stretch through an entire house so if you’re playing music from your phone to your speakers, the connection can be very easily lost if you move to far. The bandwidth is also lower meaning data can’t be transferred at an extremely high rate.

Bluetooth has had many uses and still has many uses today. Bluetooth is very heavily used for wireless mice and headphones. It is also extremely well known for wireless headsets that connected to mobile phones. Bluetooth 5 is the newest iteration of Bluetooth and increases the range, speed and messaging capacity. The main purpose is to make better Internet of Things connections to try and make full home IoT possible, with all IoT objects interacting with each other. It also wants to achieve this goal by moving from the old app to machine pairing and moving toward a connectionless IoT that needs no pairing. They are also trying to achieve that by using Bluetooth beacons.

Bluetooth beacons are machines that transmit Bluetooth signal to communicate with any Bluetooth device in its range. Bluetooth beacons use low energy beams. Beacons are very cheap and therefore can be installed in many locations for a low cost. They don’t connect to devices but just send a beam of information to devices. It is mostly used and going to be used in retail stores. Beacons can be used in retail stores to send customers deals as they walk by products, determine the flow of customers throughout each day and optimize the store based on the data, and to determine where workers are in the store.

Bluetooth is a very wide spread technology that allows for simple wireless communication between devices. It has many current day uses and will continue to have larger and more unique uses in the future. One day, it is possible that all of our home devices will be able to communicate with each other allowing for very interesting and unique interactions like a toaster starting to toast a bagel that will finish right as your coffee is finished brewing.

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