To Know About The Latest Bluetooth As A Wireless Technology

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Abstract-

Blue tooth wireless technology is vastly different from 802.11b wireless local area network technology. Not only is it significantly slower than 802.11b products, but also it's also completely incompatible with them. To better understand this, let's take a look at what Blue tooth technology is and what exactly it was designed to do. Bluetooth is a telecommunications industry specification that describes how mobile phones, computers, and personal digital assistants can be easily interconnected using a short-range wireless connection. Bluetooth products achieve this by placing a small, inexpensive radio transmitter/receiver module in each electronic device. This module acts as the physical medium to connect these devices and also provides the necessary communication protocols needed for these devices to successfully transmit data.
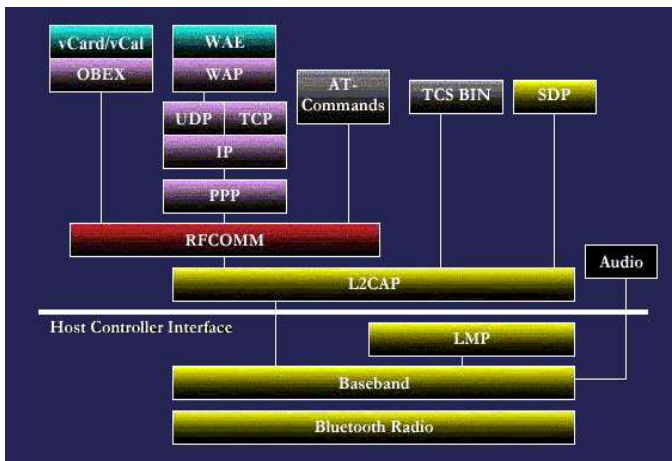
Introduction:

Blue tooth is an industrial specification for wireless personal area networks. It represents very simple proposition obviating the need for connectivity through physical wires. Bluetooth provides a way to connect extreme information between devices such as mobile phones, Laptops, printers, PCS, Digital Cameras and video game consoles over a secure, globally unlicensed short-range radio frequency.

The blue tooth system is both complex and full featured with many components and layers of abstraction. It is a low cost, low power, short range radio technology, originally developed as a cable replacement to connect devices such as mobile p[hone handsets and portable computers.Bluetooth is the term used to describe the protocols of short range (10 meters) frequency hopping, radio link between devices. The devices are then termed blue tooth enabled.

Blue tooth Specifications:

The diagram below shows the blue tooth Specification protocol stack. The brief description of the layer is as follows:

1. Radio: The blue tooth radio layer is the lowest defined layer of Blue tooth Specification. It defines the requirements of blue tooth Transreceiver device operating in 2.4 GHz ISM Band.

2. Blue tooth Baseband: The base band is the physical layer of the bluetooth. It manages physical channels and links apart from other services like error correction, data whitening, hope selection and blue tooth security. The baseband layer lies on the top of the blue tooth radio layer in the blue tooth stack. The baseband protocol manages synchronous and asynchronous links, handles packets and does paging and inquiry to access and inquire blue tooth devices in the area. The baseband transceiver applies a time division duplex scheme.

3. LMP: The link manager for link set up uses the link manager protocol and control .The LMP carries out link set up, authentication, link configuration and other protocols. The LMPO consists of number of PDUS, which are sent from one device to another. LMPDUS are always sent as single slot packets and the payload header is therefore one byte.

4. Host Controller Interface (HCI):It provides the command interface to the base band controller and link manager and access to hardware status and control registers The HCI exits across three sections, the host-transport layer-Host controller, each section playing a different role in the HCI system.

5. L2CAP: The logical link control and adoption protocol is layered over base band protocol and resides in the data link layer. L2CAP provides connection oriented and connectionless data services to upper layer protocol. L2CAP permits higher level protocols and applications to transmit and receive L2CAP data packets up to 64 kilobytes in the length.

6. RF COMM Protocol: The RFCOMM protocol provides emulation of serial ports over the L2CAP protocol. This protocol is based on the EISI standard TS 07.

7. **Service Discovery Protocol (SDP):** This Protocol Provides a mean for applications to discover services, which are available, and to determine the characteristics of available services. A specific SDP is needed in the blue tooth environment since

the services that are available changes dynamically based on the RF proximity of devices in motion.

Blue tooth profile:

A blue tooth profile is a standardized interface between blue tooth devices or it is a general behavior through which blue tooth enabled devices communicate with other devices. To perform it's task, each profile uses particular options and parameters at each layer of the stack. The following is the brief description of the profile:

1.Advanced Audio Distribution Profile (A2DP): This profile defines how quality audio can be streamed from one device to another over blue tooth connection.e.g:-music streamed from mobile phone to wireless.

2.Headset. Audio/Video Remote Control Profile (AVRCP): This profile is designed to provide a standard interface to control TVs, Hi-Fi equipment etc to allow a single remote control to control all of the A/V equipment to which user has access. It may be used in concert with A2DP or VDP.

3.Basic Imaging Profile (BIP): This Profile is designed for sending images between devices and includes the ability to resize and convert images to make them suitable for the receiving devices.

4.Common ISDN Access Profile (CIP): This profile provides unrestricted access to the services, data and signaling that ISDN offers.

5.Cordless Telephony Profile (CTP): This is designed for the cordless phones to work using blue tooth.

6.Dial-up Networking Profile (DUN): This profile provides a standard to access the inherent and other dial-up services over blue tooth. The most common example is accessing the Internet from laptop by dialing up on mobile phones.

7.Fax Profile: This profile is intended to provide a well-defined interface between a mobile phone or fixed line phone and a PC with FAX software installed. Data and voice are not covered by this profile.

8.FileTransfer Profile: It provides access to the file system on another device.

9.General Audio /Video Distribution Profile (GAVDP):It provides the basis for A2DP and VDP.

10.Generic Access Profile (GAP):It provides the basis for all other profiles.

11. Generic Object Exchange Profile (GOEP):IT is based on OBEX (object exchange) which is a communication protocol that facilities the exchange of binary objects between devices.

12. Hard Copy Cable Replacement Profile (HCRP): This provides simple wireless alternative to cable connection between a device and a printer.

13. Hands Free Profile: This Profile is used to allow car hands free kits to communicate with mobile phones in the car. It uses synchronous connection oriented link to carry a mono PCM audio channel.

14. Human Interface Device Profile: It Provides support for devices such as mic, joystick and keyboards. It is designed to provide a low latency link with low power requirements.

15. Headset Profile (HSP): This is the most commonly used profile providing support for popular blue tooth headset to be used with mobile phones.

16. ItercomProfile:It is often referred to as Walkie-talkie Profile. It is proposed to allow voice calls between two blue tooth capable handsets over blue tooth.

17. Object Push Profile (OPP): This is a basic profile for sending objects such as pictures, virtual business cards or appointment details.

18. Personal Area Networking Profile: This Profile is intended to allow the use of blue tooth network encapsulation protocol on layer3 protocols for transport over a blue tooth link.

19. Serial Port Profile: It emulates a serial cable to provide a simply implemented wireless replacement for existing RS-232 based serial communications applications, including familiar control signals

20. SIM Access Profile: This allows devices such as car phones with in GSM transceivers to connect to a SIM card in a phone with blue tooth, so that card phone does not require a separate SIM card.

21. Synchronisation Profile (SYNCH): This profile allows synchnisation of personal information manager (PIM) items

22. Video Distribution Profile (VDP): This Profile allows the transport of video   stream.

23. Wireless Application Protocol Bearer (WAPS) this is a profile for carrying wireless application protocol over blue tooth.

Blue tooth Vs Wi-fi:

Bluetooth-equipped hardware devices contain a Bluetooth chip that will wirelessly connect them to the PC without any interaction necessary from the user. Furthermore, since these are wireless devices, having the ability to be placed and used anywhere in the room.

Bluetooth devices operate in the 2.45 Gigahertz frequency range. Other devices currently operate in this frequency range as well, including cordless phones. One of the ways that Bluetooth devices avoid interfering with other systems is by sending out a very weak 1 mill watt signal — a cell phone by comparison can transmit up to 3 watts. This low power limits the range of a Bluetooth device to about 10 meters.

A frequency-hopping scheme allows devices to communicate even in areas with a great deal of electromagnetic interference. In addition to data, up to three voice channels are available, and each device is assigned a unique 48-bit address. Connections can be point-to-point or multipoint. Bluetooth devices have a maximum transmission rate of only 1 Mbps — up to 2 Mbps in the second generation of the technology — of which about 20 percent of this capacity is used for data headers and handshaking information.

By comparison, Wi-Fi wireless LAN adapters are much more powerful and capable of reaching data transmission rates approaching 54Mbps. The most popular Wi-Fi standard is the one used in your D-Link router, 802.11b. This version provides users with 11 Mbps transmission speeds and also operates in the 2.4 GHz band. Products based on this specification have very good range and can commonly transmit data at distances of well over 100 feet.

The most recently introduced specification, 802.11g, offers users the best of both worlds by providing users with higher transmission rates yet 100 percent compatibility with existing 802.11b products, which means your current investment in 802.11b technology would not be lost if you later decide to upgrade a few of your systems to the new "g" standard. Wi-Fi products also have strong security protocols, which make them a better network solution.

The graph below shows the characteristics of blue tooth Vs Wi-Fi:
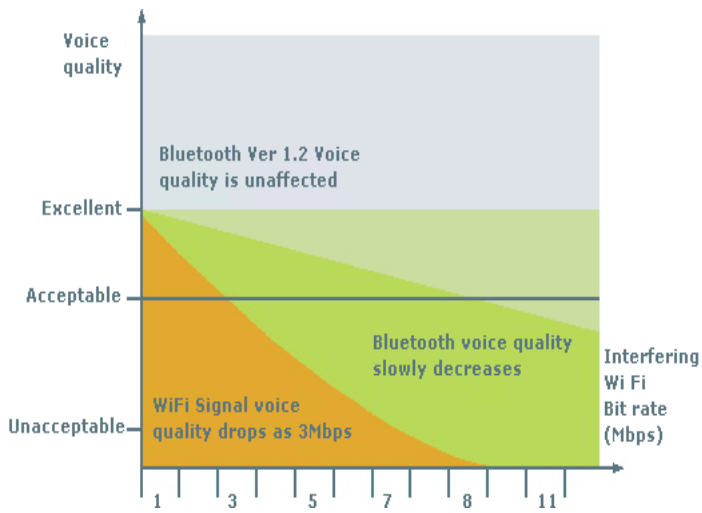
Applications:

1. W ireless control of communication between a cell phone and hands-free headset or car kit. This was one of the earliest applications to become popular

2. Wireless networking between PCs in a confined space and where little bandwidth is required.

3. Wireless communications with PC input and output devices is done using Bluetooth.

4. It is used to transfer the files, contact details, calender appointments and reminders between devices with OBEX.

5. It replaces traditional wired serial communications in test equipment, GPS receivers, medical equipment and traffic control devices.

6. Blue tooth technology is also used to send small advertisements from Blue tooth enabled advertising hoardings to other Blue tooth devices.

The figure below shows the defined applications of Bluetooth and Wi-Fi:
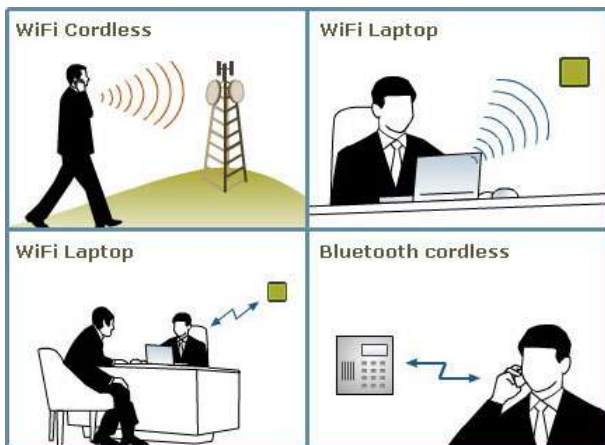
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