Why is Bluetooth 2.0 better?

The main features of Bluetooth Core Specification Version 2.0 + EDR are:

• 3 times faster transmission speed (up to 10 times in certain cases)
• Lower power consumption through reduced duty cycle
• Simplification of multi-link scenarios due to more available bandwidth
• Backwards compatible to earlier versions
• Further improved BER (Bit Error Rate) performance

Name few applications of Bluetooth?

* Wireless control of and communication between a cell phone and a hands free headset or car kit. This is the most popular use.
* Wireless networking between PCs in a confined space and where little bandwidth is required.
* Wireless communications with PC input devices such as mouses and keyboards and output devices such as printers.
* Transfer of files between devices via OBEX.
* Transfer of contact details, calendar appointments, and reminders between devices via OBEX.
* Replacement of traditional wired serial communications in test equipment, GPS receivers and medical equipment.
* For remote controls where infrared was traditionally used.
* Sending small advertisements from Bluetooth enabled advertising hoardings to other, discoverable, Bluetooth devices.
* Wireless control of a games console, Nintendo's Wii and Sony's PlayStation 3 will both use Bluetooth technology for their wireless controllers.
* Sending commands and software to the upcoming LEGO Mindstorms NXT instead of infra red.

How many devices can communicate concurrently?

A Bluetooth device playing the role of the "master" can communicate with up to 7 devices playing the role of the "slave". This network of "group of up to 8 devices" (1 master + 7 slaves) is called a piconet. A piconet is an ad-hoc computer network of devices using Bluetooth technology protocols to allow one master device to interconnect with up to seven active slave devices (because a three-bit MAC address is used). Up to 255 further slave devices can be inactive, or parked, which the master device can bring into active status at any time.

What is Pairing?

Pairs of devices may establish a trusted relationship by learning (by user input) a shared secret known as a "passkey". A device that wants to communicate only with a trusted device can cryptographically authenticate the identity of the other device. Trusted devices may also encrypt the data that they exchange over the air so that no one can listen in. The encryption can however be turned off and passkeys are stored on the device's file system and not the Bluetooth chip itself. Since the Bluetooth address is permanent a pairing will be preserved even if the Bluetooth name is changed. Pairs can be deleted at any time by either device. Devices will generally require pairing or will prompt the owner before it allows a remote device to use any or most of its services. Some devices such as Sony Ericsson phones will usually accept OBEX business cards and notes without any pairing or prompts. Certain printers and access points will allow any device to use its services by default much like unsecured Wi-

Fi networks.

How secure a Bluetooth device is?
Bluetooth uses the SAFER+ algorithm for authentication and key generation. The E0 stream cipher is used for encrypting packets. This makes eavesdropping on Bluetooth-enabled devices more difficult.

What is Bluetooth SIG?
Bluetooth Special Interest Group (SIG)

Bluetooth wireless technology is revolutionizing personal connectivity by providing freedom from wired connections. It is a specification for a small-form factor, low-cost radio solution providing links between mobile computers, mobile phones, other portable handheld devices and automobiles, as well as connectivity to the Internet. The Bluetooth SIG, comprised of leaders in the telecommunications, computing, automotive and consumer electronics industries, is driving development of the technology and bringing it to market. The Bluetooth SIG includes Promoter member companies Agere, Ericsson, IBM, Intel, Microsoft, Motorola, Nokia and Toshiba, and thousands of Associate and Adopter member companies. The Bluetooth SIG, Inc. headquarters are located in Overland Park, Kansas, U.S.A.

What are the problems with older versions (1.0 and 1.0 B)?
Versions 1.0 and 1.0 B had numerous problems and the various manufacturers had great difficulties in making their products interoperable. 1.0 and 1.0B also had mandatory Bluetooth Hardware Device Address (BD_ADDR) transmission in the handshaking process, rendering anonymity impossible at a protocol level, which was a major setback for services planned to be used in Bluetooth environments, such as Consumerism.

What are Different Classes in Bluetooth?
Bluetooth is a radio standard and communications protocol primarily designed for low power consumption, with a short range (power class dependent: 1 meter, 10 meters, 100 meters) based around low-cost transceiver microchip in each device.

Bluetooth lets these devices communicate with each other when they are in range. The devices use a radio communications system, so they do not have to be in line of sight of each other, and can even be in other rooms, so long as the received power is high enough.

What are Bluetooth profiles?
A profile is a description of how to use a specification to implement a particular function. The International Standards Organization (ISO) first came up with the idea of profiles. In Bluetooth, there are several profiles available and they are arranged in a hierarchical fashion. For example, in order to use the headset profile, a device must also include the lower level profiles such as the serial port and general access profiles.

What are some of the uses of Bluetooth?
Depending on the Bluetooth profiles included on the device, Bluetooth technology has the capability to wirelessly synchronize and transfer data among devices. The Bluetooth audio capabilities can be used for headset and hands free applications. The exact functionality provided by a Bluetooth enabled device depends on the Bluetooth profiles included.

How does Bluetooth fit in with WiFi?

The 802.11b (WiFi) standard is commonly used for wireless networking. Bluetooth is not a competitor with 802.11b, but rather a complement to it. While 802.11b is generally a replacement for wired local area networking, Bluetooth is more commonly used as a replacement for cables between individual devices. Bluetooth is designed to link devices within a very short range (up to 33 feet). Bluetooth is part of the 802.15 standard

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What is the history of Bluetooth?
Bluetooth was initiated by Ericsson, IBM, Intel, Nokia and Toshiba in early 1998. These companies later formed a special interest group known as the Bluetooth SIG. The Bluetooth 1.0 specifications were released on July 26, 1999, but the technology has only recently become inexpensive enough for widespread use.

What is it - a technology, a standard, an initiative, or a product?
Bluetooth wireless technology is a de facto standard, as well as a specification for small-form factor, low-cost, short range radio links between mobile PCs, mobile phones and other portable devices. The Bluetooth Special Interest Group is an industry group consisting of leaders in the telecommunications, computing, and networking industries that are driving development of the technology and bringing it to market

Is Bluetooth an IEEE standard, like IEEE 802.11 and Ethernet?
Being an IEEE standard will be a big plus to widespread adoption of Bluetooth, and IEEE 802.15 working group for personal area networks (PAN) announced that they will be adopting Bluetooth as the IEEE 802.15 standard.

What types of companies are likely to adopt or promote Bluetooth technology?
Companies likely to adopt this technology include, but are not limited to, software developers, network vendors, silicon vendors, peripheral and camera manufacturers, mobile PC and handheld device manufacturers, consumer electronics manufacturers and more.

What companies are involved in the Bluetooth initiative?
Global technology leaders Ericsson, Nokia, IBM, Intel and Toshiba founded the Bluetooth SIG in 1998. These companies are now supported by over 1,000 other organizations with a wide range of expertise, including Widcomm, Inc.

Are different brands of Bluetooth products compatible?
Yes. They have to. The Bluetooth Logo Certification Program requires Bluetooth products to interoperate with products manufactured by other vendors; those products that don't interoperate will not be allowed to use the Bluetooth logo.

Is Bluetooth practical for use with mobile devices?
Yes. One concern for mobile computing users is power consumption. Bluetooth radios are very low power, drawing as little as 0.3mA in standby mode and 30mA during sustained data transmissions. Bluetooth radios alternate among power-saving modes in which device activity is lowered to maximize the mobile power supply.

What kind of encryption will be used for Bluetooth security?
The Bluetooth specification 1.0 describes the link encryption algorithm as a stream cipher using 4

LFSR (linear feedback shift registers). The sum of the width of the LFSRs is 128, and the spec says "the effective key length is selectable between 8 and 128 bits". This arrangement allows Bluetooth to be used in countries with regulations limiting encryption strength, and "facilitate a future upgrade path for the security without the need for a costly redesign of the algorithms and encryption hardware" according to the Bluetooth specification. Key generation and authentication seems to be using the 8-round SAFER+ encryption algorithm. The information available suggests that Bluetooth security will be adequate for most purposes; but users with higher security requirements will need to employ stronger algorithms to ensure the security of their data.

What is the range of Bluetooth transmitter/receivers?

Bluetooth is designed for very low power use, and the transmission range will only be 10m, about 30ft. High-powered Bluetooth devices will enable ranges up to 100m (300ft). Considering the design philosophy behind Bluetooth, even the 10m range is adequate for the purposes Bluetooth is intended for. Later versions of the Bluetooth spec may allow longer ranges.

What is the data throughput speed of a Bluetooth connection?

Bluetooth transfers data at a rate of 721 Kbps, which is from three to eight times the average speed of parallel and serial ports, respectively. This bandwidth is capable of transmitting voice, data, video and still images

Will Bluetooth and Wireless LAN (WLAN) interfere with each other?

No, both Bluetooth and WLAN can co-exist. Since Bluetooth devices use Frequency Hopping and most WLANs use Direct Sequence Spreading techniques they each appear as background noise to the other and should not cause any perceivable performance issues.

Will other RF (Radio Frequency) devices interfere with Bluetooth Devices?

No. Bluetooth radios operate on the unlicensed 2.4 GHz (Industrial, Scientific and Medical) frequency band that is shared among other devices (microwave ovens, cordless phones, garage door openers, etc.). Bluetooth radios switch frequencies at such a rapid pace (1,600 times per second) and the data packets are so small that interference from other RF sources is highly unlikely. Bluetooth is a robust communication system.

What is Frequency-Hopping Spread Spectrum (FHSS)?

Frequency-Hopping Spread-Spectrum (FHSS) is a spread spectrum modulation scheme that uses a narrowband carrier that changes frequency in a pattern known to both transmitter and receiver. Properly synchronized, they maintain a single logical channel. To an unintended receiver, FHSS appears as short-duration impulse noise. More simply, the data is broken down into packets and transmitted to the receiver of other devices over numerous "hop frequencies" (79 total) in a pseudo random pattern. Only transmitters and receivers that are synchronized on the same hop frequency pattern will have access to the transmitted data. The transmitter switches hop frequencies 1,600 times per second to assure a high degree of data security

How secure is a Bluetooth network?

Bluetooth is extremely secure in that it employs several layers of data encryption and user authentication measures. Bluetooth devices use a combination of the Personal Identification Number (PIN) and a Bluetooth address to identify other Bluetooth devices. Data encryption (i.e., 128-bit) can be

used to further enhance the degree of Bluetooth security. The transmission scheme (FHSS) provides another level of security in itself. Instead of transmitting over one frequency within the 2.4 GHz band, Bluetooth radios use a fast frequency-hopping spread spectrum (FHSS) technique, allowing only synchronized receivers to access the transmitted data

What is the future direction of the Bluetooth standard?

At this time, we anticipate the Bluetooth SIG to evolve the Bluetooth technology to provide greater bandwidth and distances, thus increasing the potential platforms and applications used in the emerging personal area networking marketplace.

How is Bluetooth used?

Bluetooth can be used to wirelessly synchronize and transfer data among devices. Bluetooth can be thought of as a cable replacement technology. Typical uses include automatically synchronizing contact and calendar information among desktop, notebook and palmtop computers without connecting cables. Bluetooth can also be used to access a network or the Internet with a notebook computer by connecting wirelessly to a cellular phone.

Do you Know about OBEX Protocol?

IrOBEX (shortly OBEX) is a session protocol developed by the Infrared Data Association (IrDA) to exchange objects in a simple and spontaneous manner. OBEX, which provides the same basic functionality as HTTP but in a much lighter fashion, uses a client-server model and is independent of the transport mechanism and transport API, provided it realizes a reliable transport base. Along with the protocol itself, the "grammar" for OBEX conversations between devices, OBEX also provides a model for representing objects and operations. In addition, the OBEX protocol defines a folder-listing object, which is used to browse the contents of folders on remote device. In the first phase, RFCOMM is used as sole transport layer for OBEX.

What is Service Discovery Protocol?

Discovery services are crucial part of the Bluetooth framework. These services provide the basis for all the usage models. Using SDP, device information, services and the characteristics of the services can be queried and after that, a connection between two or more Bluetooth devices can be established. SDP is defined in the Service Discovery Protocol specification.

What is Link Manager Protocol?

The link manager protocol is responsible for link set-up between Bluetooth devices. This includes setting up of security functions like authentication and encryption by generating, exchanging and checking of link and encryption keys and the control and negotiation of baseband packet sizes. Furthermore it controls the power modes and duty cycles of the Bluetooth radio device, and the connection states of a Bluetooth unit in a piconet.

Is it possible to connect multiple Bluetooth hubs?

No, only one hub can be used at a time with a computer. USB or Serial devices can be added.

List some Technology characteristic of Bluetooth?

Omni directional,
Adaptive output power to minimize interference,
Support Synchronous & asynchronous services,
Fast Frequency Hopping to avoid interference,
Short data packets to maximize capacity during interface.

What is the total number of masters and slaves in a piconet?

1 Master and 7 Slaves.

Under what frequency range does Bluetooth work?
2.45 GHz is the frequency range.

What is the frequency range used for Bluetooth in Europe and United States?
2402 MHz to 2480 MHz are the frequency ranges used in USA and Europe

What is the frequency range used for Bluetooth in Japan?
2472 to 2497 MHz is the frequency range used for Bluetooth in Japan.

What is Piconet?
A collection of devices connected through Bluetooth technology in an ad hoc fashion.

What is a Bluetooth dongle?
A device that hangs outside of a computer, or phone to provide Bluetooth connection.

Why can Bluetooth equipment integrate easily in TCP/IP network?
Because Bluetooth uses wireless LAN standards IEEE for data transmission.

Which method is used for Data transfer?
Asynchronous Connectionless (ACL) is Data transfer method in Bluetooth

Give a generic description of Bluetooth?
Bluetooth is a low-cost, short-range (RF) links between mobile PCs, mobile phones and other portable devices. Bluetooth can transmit through solid, non-metal objects.

How does Bluetooth use frequency hopping for security?
Bluetooth picks a random frequency out of 79 and then hops around the range about 1600 times per second.

Why is Bluetooth called a cable replacement technology?
Bluetooth technology allows the creation of Personal Area Networks without cables or wires that are usual in home networks.

What is FCC and how does it relate to Bluetooth?
FCC is Federal Communication Commission, which issues licenses to the stations for specific frequencies. It also decides who is able to use which frequency for what purpose. Since Bluetooth is using unlicensed spectrum, FCC has no direct involvement with Bluetooth

What is FEC in Bluetooth?
Forward Error Correction is a method by which Bluetooth increases its noise immunity. FEC is a method that enables a receiver to not only detect, but also correct errors in a transmission.

What is Airport?
Airport is a wireless communications system, like Bluetooth. It is based on the IEEE 802.11 recommendation. It also uses 2.4 GHz frequency band, but its range is about 45 meters and it boasts a transmission speed of 11 Mbit/second. It is developed by Lucent Technologies.

Which technology is used in Bluetooth for avoiding interference?
Frequency hopping is the technology used in Bluetooth.

How many SCO links are there in a piconet?
In a piconet, there can be up to three SCO links of 64,000 bits per second each.

Which Bluetooth version uses adaptive frequency hopping? Why?
In Version 1.2 Adaptive frequency hopping method is used, which improves resistance to radio interference, and provides higher transmission speed.

Is it possible to connect multiple Bluetooth hubs?
No, only one hub can be used at a time with a computer. USB or Serial devices can be added.

List some Technology characteristic of Bluetooth?
Omni directional, Adaptive output power to minimize interference, Support Synchronous & asynchronous services, Fast Frequency Hopping to avoid interference, Short data packets to maximize capacity during interface.

Which method is primarily used for Voice transfer?
Synchronous Connection Oriented (SCO) is a method primarily used for Voice transfer.

What is the strength of the signal transmitted by powerful cell phones?
The powerful cell phones can transmit a signal of 3 watts.

What are the other (competing or not) wireless technologies?
Wi-Fi, IrDa, EDGE, UWB (Ultra Wide Band)