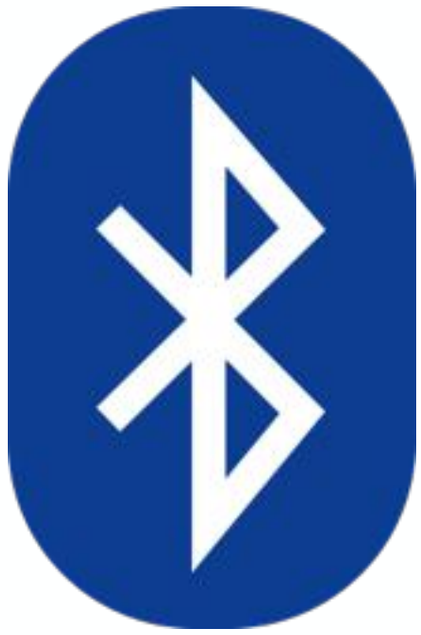
Bluetooth

in a nutshell



A Quick Look

Introductory Level

Designed for iPad. Applicable to other devices.

Revised November 2016

What is Bluetooth?

Invented by Ericsson in 1994. Named after Harald Bluetooth (anglicised) King of Denmark. The Bluetooth logo consists of the combined runes of Harald's initials.

- Bluetooth was originally promoted by Ericsson, Intel, Nokia, Toshiba and IBM.
- It is a radio frequency technology that uses very little power (1milliwatt).
- It is wireless, inexpensive and connections happen automatically (all being normal).
- The Bluetooth1 standard has a maximum transfer rate of 1 Megabits per second.
- Bluetooth 2 can manage data transfer rates of up to 3 Megabits per second (including both communication packets and application data).
- Bluetooth operates on a radio frequency of roughly 2.45 GHz (similar to WiFi)

What is Bluetooth?

(continued)

- Bluetooth utilises a standard reserved for **I**ndustrial, **S**cientific and **M**edical devices (ISM)
- It utilises device specific transmission protocols which are determined by the manufacturer of each Bluetooth device.
- Bluetooth uses a data packet based protocol with a master and slave structure.
- One master device can communicate with up to 7 slave devices
- There are many USB adapters or 'dongles' available for Bluetooth connectivity on older computers (requires some software installation).
- Most Bluetooth devices are battery-powered Class 2 devices with a range of up to about 10 metres (adequate for most situations).

Personal Area Network

Bluetooth

Laptop with USB Bluetooth 'dongle'
- Master device.

Wireless Bluetooth speakers

Bluetooth
handsfree headset

Wireless mouse - Bluetooth

Smart phone
- Bluetooth enabled

iPad - inbuilt
Bluetooth adaptor

Most modern mobile phones, tablet and desktop computers have Bluetooth capability.

Some Bluetooth Devices

- Smartphones such as the iPhone, normally have Bluetooth capability.
- Wireless handsfree headsets for mobile phones normally use Bluetooth
- Bluetooth USB 'dongles' provide the Bluetooth radio chip for computers that do not already have it (generally older computers)
- Bluetooth portable speakers are also common
- A wireless mouse or keyboard will also normally be Bluetooth

Smartphones - normally have 3G, WiFi and **Bluetooth** connectivity.

Normally 'enabled' or 'disabled'

Bluetooth mobile phone headpiece for handsfree connectivity.

Normally a 'Slave' device

Bluetooth USB 'dongle'

Provides Bluetooth for older computers

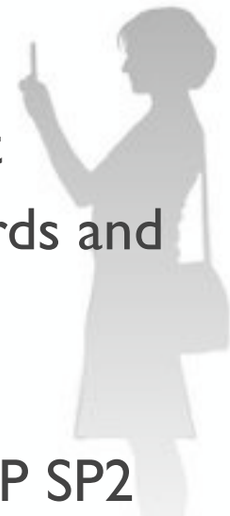
Bluetooth Applications

Typical Applications of Bluetooth:

- Mobile phone handsfree headset
- Wireless mobile phone to portable speaker system
- Wireless speakers for tablet computers
- Wireless networking between PCs in a limited space
- Wireless mouse, keyboards and printers
- Wireless transfer of files between devices
- Replacement of wired serial connections for GPS receivers, medical equipment, barcode scanners and traffic control devices
- Replacement for infrared devices where line of sight was required
- And many other applications such as gaming devices, cordless phones etc

Bluetooth

Bluetooth is a convenient replacement for cabling, especially for personal portable devices, which allows minimal configuration and quick connectivity. Connected devices are automatically configured by the software controller.



USB Bluetooth adapters are available for computers that don't have already inbuilt Bluetooth technology, allowing the connection of external devices such as keyboards and printers without the use of cables.

Apple has been using Bluetooth technology since 2002, and Microsoft Windows XP SP2 allowed Bluetooth to operate natively on a PC (circa 2004). Linux supports Bluetooth also and most Linux kernels come with the BlueZ stack originally developed by Qualcomm.

Bluetooth devices avoid interference with other devices by emitting a very low energy frequency signal of about 1 mW (cell phones transmit a signal of about 3 W). Bluetooth transmits data on multiple frequencies (up to 1,600 times per second) thereby reducing the chance of interference. Also devices have individual addresses and will ignore data from other systems. Any possible interference will last only a fraction of a second and will be corrected by the Bluetooth software.

Bluetooth devices create a Personal Area Network (PAN) called a **piconet**

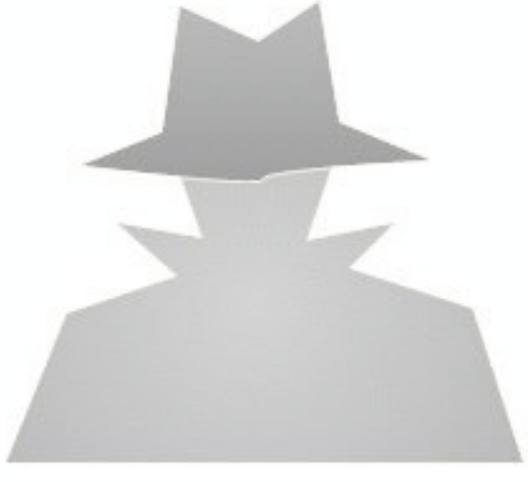
Bluetooth Security

Because Bluetooth is also a wireless technology, it has the same security issues that apply to Wi-Fi.

Whilst Bluetooth mode is on '**discoverable**', there is the potential for other devices to send data to it.

On the other hand, with Bluetooth on '**non-discoverable**', other Bluetooth devices outside of the trusted network cannot connect and send data to the device.

In 'Airplane Mode', Bluetooth (and all other wireless functionality) will be automatically turned 'Off'



Bluetooth Settings - IOS

*Accessing the **Bluetooth** slider button.*

IOS devices (iPhone and iPad) should be similar to these screen shots.
(iPhone 3GS - IOS version 6.1.6)

The settings are normally accessed from a **Settings** icon on the Home Screen.
Under 'Settings' tap 'Bluetooth'. On the next screen, move the 'Bluetooth' slider to ON (if it is OFF).

If you do not want to use Bluetooth then make sure the slider is in the OFF position.

Following is a quick method to turn off Bluetooth on a device with IOS 7 (iPad or iPhone).

Quick Method on iPad with IOS 7 or later.

*Swipe up from bottom of the screen to bring up the **Control Center**, then toggle the Bluetooth button ON or OFF as required (white is ON, black is OFF).*

Summary

- Bluetooth started to become popular by about 2002, mostly with handsfree mobile phone sets and other cable-free implementations.
- It is now supported natively by all major Operating Systems
- It utilises radio frequencies around the 2.45 Ghz band (similar to WiFi)
- Bluetooth connections frequency switch between a range of frequencies (1600 times per second) to avoid interference
- It uses only about 1 mW of power, making it perfect for battery powered portable devices that require only short range connectivity
- One Bluetooth Master device, can have up to 8 Slave devices connected
- Similar security issues exist for Bluetooth as for WiFi, both being 'wireless'.

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