



9 - Comparison of Wireless Technologies

The use of wireless technologies is beginning to appear similar to the initial development of the railways. Each technology seems to have a different “gauge” and compatibility issues seem to confuse the novice.

In the three preceding chapters on wireless technologies, it is possible for the novice to become confused as the practicability and/or utility of each technology. This short chapter is provided to help clarify the broad range of offerings and assist in defining the advantages and benefits of each technology.

The two main wireless technologies that appear to be in competition with each other are the Wireless Personal Area Network (WPAN) technology of Bluetooth and the Wireless Local Area Network (WLAN) technology of IEEE 802.11 also known as Wi-Fi. In actuality these two technologies are not in competition with each other as was the case for Beta and VHS video. The WPAN and WLAN technologies were designed for different purposes.

Functional differences

The WPAN technology is cheaper, uses less power and is designed to be included in mobile computing devices such as mobile telephones and personal digital assistants. These devices are planned to work within close proximity of other devices therefore forming a “personal area” network. The WPAN technology is designed to be able to join *ad hoc* networks that may or may not be reformed. This provides low-power file sharing over short distances.

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The WLAN technology is designed for greater data rates and also uses more power than the WPAN devices. The cost of the equipment is higher and with the introduction of a variety of IEEE 802.11 standards, some of the manufacturers will be including chip sets to manage two or more formats. The distance that the signal can travel is higher and the establishment of a connection can be facilitated for commonly used Access Points and WLAN networks.

Interconnection

It is possible for devices to contain both the Bluetooth and the IEEE 802.11 technologies but due to the power usage of IEEE802.11, it more likely that a notebook computer will include Bluetooth technology for transmission of files and data from the notebook to a mobile phone or personal digital assistant. In this configuration, notebook computer would be able connect with portable devices to receive or send data while connected to the Internet through a more robust WLAN connection.

Bluetooth enabled devices would be able to connect with peripherals such as printers and facsimiles to send file or receive files for wireline transmissions. These mobile devices, including cameras, would be able to interconnect and send to printers for output.

Proliferation

As mobile devices are likely to be more numerous than notebook computers, there is an expectation that Bluetooth devices will out-sell IEEE 802.11 devices. This estimate does not mean that Bluetooth will “win out” over IEEE 802.11 it is just that due to the cost and power consumption, Bluetooth technology is more easily accessed. In 2006, the installed base of Bluetooth devices is expected to be around 1600 million with IEEE 802.11 devices around 80.6 million.¹

Conflicts

The Bluetooth technology uses the same frequency as IEEE 802.11 technology and this is within the Industrial Scientific and Medical (ISM) frequency at 2.4GHz. The popularity of these devices within the same frequency appears as if there is likely to be conflict in the use of these wireless technologies. As it is still early days in the use of these devices and the vendors are heavily promoting ease of use and high data rates, there is little conflict at present. However as these devices become more popular, conflicts may occur.

The Bluetooth technology uses a Frequency Hopping Spread Spectrum so that the data packets are sent to other devices within the 1MHz frequencies contained in the ISM spectrum. The IEEE 802.11 uses a Direct Sequence Spread Spectrum where the signal is sent across a number of frequencies in the ISM range. Therefore, between these two technologies there is no direct conflict however as these signal become more prolific there are bound to be some reductions in the data speeds in the future.²

Summary

Both of these technologies will be in combined use in the time period of this project. At present these devices are being included in new equipment at a premium but this is expected to become a mass-market product within the next

five years. Bluetooth protocols allow for a broad range of uses but these have not been provided in these early stages.

The applications for Bluetooth appear to be more plentiful than for the IEEE 802.11. Bluetooth can be used to broadcast advertising messages from retail stores to passers by to encourage them to enter the shop. It will be possible for visitors to fast food outlets to load the menu and select their order via a mobile phone or personal digital assistant. It is for reasons such as these that the Bluetooth technology will become more plentiful but both technologies will be used simultaneously.

One of the first uses of IEEE 802.11 will be within the home market with multiple users accessing broadband connections through a number of wireless notebook connections.

¹ Hunn, N. (2002). *Bluetooth and wi-fi - the market status*. London: TDK Systems.

² Pico Communications. (2001). *Cats and dogs living together: A comparison of Bluetooth and Wi-Fi (802.11b)*. Cupertino, CA: Author. Available:
http://www.pico.net/white_papers.html Accessed: 5 June 2003.