



Information Assurance in Wireless Residential Networking Technology: IEEE and Bluetooth

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Information Assurance (IA) and wireless communication remain major areas of information technology research today. IA is an increasing concern in both the government and commercial sectors. Wireless residential networking is among the wireless technology areas that have accelerated most rapidly over recent years. The Institute of Electrical and Electronics Engineers (IEEE) 802.11b and Bluetooth are two of the most commonly used wireless standards in residential network communication. Although targeted at the same wireless home/office network market, these two standards have different roles that are complementary rather than competing. Foreseeing the need for both technologies, recent efforts are ongoing to make the coexistence of both successful. This article focuses on the security issues of IEEE 802.11b and Bluetooth from the IA perspective and highlights their individual strengths and weaknesses from an IA point of view.

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This article focuses on the security issues of the IEEE 802.11b and Bluetooth from the IA perspective and highlights their individual strengths and weaknesses from an IA point of view. It is not intended to be a comprehensive treatment of the subject, but rather a survey of assurance issues that should be of concern to users. There are certainly others beyond those presented here. This article also assumes that the reader has some knowledge of the two protocols discussed and does not include a tutorial.

IEEE 802.11b and Bluetooth

The IEEE 802.11b and Bluetooth are two of the most widely used emerging wireless protocols for over-the-air wireless information exchange targeted for the residential (home/office) market. The IEEE 802.11 is the Medium Access Control (MAC) and Physical Layer (PHY) protocol, developed for Wireless Local Area Networks (WLAN). The PHY layer protocol oversees the actual data transmission process over a communication channel,

while the MAC layer oversees reliable transmission of data with tasks such as data frame formatting, frame flow control, error checking, channel allocation, etc. The IEEE 802.11b is a supplement to the original IEEE 802.11 standard extended to define the standard for wireless LAN products that operate at an Ethernet-like

“Today, researchers foresee the need for these two prevalent technologies to co-exist and already there are products in the market that support both of these technologies.”

data rate. It is also known as the Wireless Fidelity standard.

Ericsson, Nokia, IBM, Intel, and Toshiba founded the Bluetooth Special Interest Group (SIG) in May 1998. Since then, many major companies in the telecommunication business have joined this Bluetooth SIG. Bluetooth is an ad-hoc networking technology that dynamically connects portable/handheld devices such as cell phones, personal digital assistants, laptops, and printers by means of variable network topologies. Bluetooth is primarily designed to replace cables in residential networks for intercommunication between computing/communication devices.

It is important to note that the IEEE 802.11b is designed to support MAC and PHY protocols for a WLAN, whereas Bluetooth is designed as a complete pro-

col for the Wireless Personal Area Network (WPAN). Bluetooth is based on the IEEE 802.11b, but it is basically a radio frequency specification for both voice and data transfer technology that has low latency, low power-synchronization, and short range. While Bluetooth supports voice communication and the IEEE 802.11b does not, Bluetooth does not support many of the features that a full-blown wireless LAN implementation such as the IEEE 802.11b does in order to be used for corporate local area networks.

The IEEE 802.11b does more than Bluetooth in terms of data rate (11 megabits per second [Mb/s] versus 721 kilobits per second [Kb/s]), range (100 meters versus 10 meters), power throughput (280 megawatts [mW] versus <4mW), and therefore costs more than Bluetooth. We point out here that the rates, ranges, and costs are changing so rapidly in this field that figures presented here might change prior to publication. Therefore, we will simply site the differences without further particulars.

Both the IEEE 802.11b and Bluetooth protocol operate at the data link layer with some common operational features but with varied utilities.

Information Assurance

IA is an increasing concern in both government and commercial sectors. IA represents a goal that guarantees all electronically held information would remain protected to a sufficient degree associated with a risk that one is willing to accept.

Due to space constraints, CROSSTALK was not able to publish this article in its entirety. However, it can be viewed in this month's issue on our Web site at <www.stsc.hill.af.mil/crosstalk> along with back issues of CROSSTALK.