BLUETOOTH TECHNOLOGY: STRATEGIC ANALYSIS OF ITS ROLE IN GLOBAL 4G WIRELESS COMMUNICATIONS

Iftakhar Ul Hasan
Department of Computer Science
Government College University Faisalabad (LC)
Pakistan

Syed Ali Shah
Department of Computer Science
Government College University Faisalabad (LC)
Pakistan

Abstract - The modern age is based on technology use of technology life become global village but every technology in growing stages. In technology most important is telecom Bluetooth is part of telecom. Bluetooth is a new short range wireless technology intended to enables wireless communication between varied devices. It is gaining increasing attractiveness and acceptance in the world today. There is a growing body of research on the subject but very few, if any of the analyses, provide a balance view of the technology, which describe its pros and cons and implication for business with a description of the technology in terms of its hardware, software and network infrastructure. This microanalysis is followed by a large analytical view, which includes the advantages of this technology its role in the global fourth generation (4G) wireless scheme, safety and business implication.

Keywords: Security, Secure Simple Paring (SSP), Feasibility Study, Wireless Communication, Countermeasure, Wireless LAN

I. INTRODUCTION

Bluetooth is a network standard and protocol. It defined the way for transmission of data between two Bluetooth devices with short range radio waves. The devices can transmit data at a rate up to 3 Mbps using Bluetooth. The devices must be within a distance of the 30 feet however the distance can be extended using additional equipment. All the Bluetooth devices uses small chip to communicate with other Bluetooth devices many Bluetooth enables devices are available like notebook computers, desktop computers, smarts phone, printers and keyboards etc. Bluetooth wireless port adapter can be used to exchange existing USB port into Bluetooth port [1-3].

In this paper the research is focus on Bluetooth technology its critical view and analyzed its strategic how this technology work specially the paper role of Bluetooth in 4th Generation technology. Technology can be divided into two specifications: the core and the profile condition. The core specification introduced how the technology mechanism, while the profile specification concentrate on how to build inter operating devices using the interior technologies [3-6]. The interface of Bluetooth is based on a nominal antenna power of 0 dBm with extension for operating at up to 20 dBm worldwide. Compile to this interface with ISM band rules up to 20 dBm in America, Japan, and most European countries. The Bluetooth radio uses frequency hopping method to spread the energy across the ISM spectrum in 79 hops displaced by 1 MHz, starting from 2.402 GHz and stopping at 2.480 GHz. Currently, the SIG is working to harmonize this 79-channel radio to work globally and has instigated changes within Japan, Spain, and other countries. When Bluetooth-capable devices come within range of one another, an electronic discussion determines whether they have data to share or whether one needs to control the other. The electronic discussion occurs automatically and there is no need for the users to push a button or give a command. Once the discussion has initiate, the devices, whether part of a computer system or a stereo, form a network. The frame consisting of a transmit packet followed by a receive packet is the basic statement unit. Each packet can be collected of multiple slots (1, 3, or 5) of 625 as a distinctive single-slot frame hops at 1600 hops/s. Multi slot frames will allow higher data rates because of the elimination of the turnaround time between packets and the reduction in header overhead. For example, single-slot packets can have a maximum data rate of 172 kbps, while a five-slot, one-multi slot frame will support a721-kbps

rate in the five-slot direction with a 57.6-kbps rate back channel in the one-slot direction [7-14].

II.   PROPOSED RESEARCH

This paper begins with a microanalysis of Bluetooth by describing the technical details such as hardware, software, connectivity, security, error control and interference handling. A broader perspective which describes the numerous applications of Bluetooth, its performance against competing technologies its advantages and implementation issues will then be addressed. Since cellular telephones are a key application area for the technology, some predominant health and safety concerns are also discussed. Next the paper illustrates the role of Bluetooth in the global 4G wireless scheme and its business implications. The last section concludes with a discussion on the future directions of Bluetooth.

III.   DISCUSSION AND RESULTS

A.   Bluetooth technologies: a microanalysis

Bluetooth technology permit devices to converse with each other, harmonize data, and connect to the Internet at high speeds without cables or wires. Bluetooth radio and baseband controller can be installed on a device that links with Universal Serial Bus (USB) port, a PC Card, or incorporated on a system board to add Bluetooth functionality to a computer or other host device. Communications between Bluetooth devices are normally peer-to-peer with each device being the same.

When two or more devices connect into a small hoc network called a picante, one device acts as the master and the others are slaves for the interval of the picante connection. All devices in the picante are harmonized to the master's clock and hopping series. Pico nets start with two linked devices, such as a transportable computer and a cellular telephone, and may grow to include as many as eight devices. Users do have the alternative of setting up their Bluetooth devices synchronized with the picante, but release its AMA for an 8-bit Passive Member Address (PMA).

Error control and retransmission

Bluetooth uses an error improvement scheme called forward error correction (FEC) and an automatic repeat request (ARQ) scheme for tainted or missing data. The FEC is projected to reduce the number of retransmitted data packets; however, packet definitions are elastic, permit a choice of using FEC or not. In an environment where errors are infrequent, the FEC can be eliminated to trim down overhead.

All packets include a header containing link information. Packet headers are always cosseted by FEC so the link information can carry on bit errors.

B.   Bluetooth technologies: macro analysis

Bluetooth's flexibility enables its use in extensive range of mobile digital devices. Many vendors have Bluetooth-equipped devices available today and many more have foodstuffs in the planning and growth stages. A description of these applications is obtainable below. Bluetooth is not the only competitor for wireless connectivity. Strong competition exists from IrDA, Ultra-Wideband Radio, Home RF, etc. In this section we discuss the major issues for Bluetooth and their possible collision.

Bluetooth applications

The basic applications of Bluetooth include wireless connectivity between computing and mobile devices like MP3 players, PCs, Mobile phones and PDAs, but ultimately it will lead to a host of consumer electronic devices like sound systems, wrist watches, TVs, and speakers, microwaves, camcorders. All these would enable these devices to be in a unremitting contact between each other and allow them to contribute to their resources.

Comparison with other technologies

There are previously quite a few ways to get approximately using wires. In this one is to carry information between components passing through beams of light in the infrared spectrum. Infrared is used in the majority television remote control systems and with a typical called Infrared Data Association (IrDA); it is used to connect some computers with peripheral devices. Most of these computer and entertainment purposes, infrared is used in a digital mode. Infrared communications are fairly reliable and do not cost very much to build into a device, but there are a couple of drawbacks. First, infrared is a ''line-of sight technology. The second drawback is that infrared is almost always a ''one-to-one'' technology. Data can be exchanged between a desktop computer and a laptop computer, but not between a laptop computer and PDA at the same time. These two characters of infrared are actually beneficial in some regards. Because infrared transmitters and receivers have to be lined up with each other, interference between devices is exceptional. The one to-one nature of infrared infrastructure ensures that message goes only to the proposed recipient even in a room full of infrared receivers.

C. Business implications and Outlook

Bluetooth in the global 4G wireless scheme

Cellular telephones these days are primarily intended for speech and not predominantly good at deliver data. The enhancements to existing second generation systems (so-called 2.5G) allow data to be carried much more easily and at higher rates (typically between 28.8 and 64 kbps, though higher rates are possible), and where required, as packets rather than circuit switched. The next generation of cellular telephony known as fourth generation (4G) has been designed to carry packet data and speech is simply treated as a fastidious data application. 4G system scan deliver numerous services with differing bandwidth necessities, concurrently if needed. Data rates of up to several hundred kbps will be readily available to the terminal .One of the areas where Bluetooth will have important impact is in the prop up of other wireless delivery mechanisms such as cellular telephony. While national networks are suited to delivering communication on the move or wireless to any location, purely local interconnection is better handled by a local communication system. To deliver telephony-based services from one undefined location to another and to hand out the services and functions at those locations, a mixture solution is required. At the core of this application is a cellular handset with an in-built Bluetooth transceiver.

Business implications of Bluetooth

The essential use of Bluetooth technology will be to offer an easy way to wirelessly be linked electronic devices diagonally a wide range of products. The Bluetooth SIG has laid out five nonspecific uses that the technology will fall into: three-in-one phone, the Internet Bridge, interactive conference, mechanical synchronizer and the ultimate head set. When a new technology is announced, it usually takes years before products come into view. With Bluetooth, it seems that almost every company that is able of designing a semiconductor chip has published a road map of its Bluetooth silicon extending numerous years into the future. The chip roadmaps even contain dates, Capabilities and silicon technologies. Scores of companies have announced products. If 10% of those products are successful, the Bluetooth market will be massive.

IV. CONCLUSIONS

Bluetooth is one of the key technologies that can make the mobile information society possible, blurring the boundaries between home, the office, and the outside world. The seamless connectivity promised by Bluetooth makes it possible to explore a range of interactive and highly transparent personalized services, which were even difficult to dream of because of the complexity involved in making various devices talk to each other. However, there are issues to be sorted out. One potential problem being faced by Bluetooth is that hardware for it is being created faster than software. There are also worries that the part of the radio spectrum used by Bluetooth is becoming too crowded. A report by Aegis Systems says that Bluetooth, other wireless networking systems, microwave ovens, outdoor broadcast units, and radio-based CCTV units may all interfere with each other. Another potential drawback is speed. Bluetooth sends information at about 725 kbps. By comparison, cell phones in the next few years are expected to go as fast as 2Mbps. In other words, a cell phone could receive data at blazing speeds, only to have Bluetooth slow it down when transferring the information in real time to another appliance.

V. REFERENCES

[1] A. D. David, C. Yen and D.H. Shih, Bluetooth technology: an exploratory study of the analysis and implementation frameworks, Computer Standards & Interfaces 26 (2004) 263–277

[2] G. Chakraborty, K. Naik,D. Chakraborty,N.Shiratori and D. Wei, Analysis of the Bluetooth device discovery protocol, Springer Science+Business Media, LLC 2008.

[3] J.Villegas,Bluetooth Low Energy Version 4.0 ,Helping create the internet of things.

[4]I. Almamam,M.A.Saruri and M.A.Akhras,Secure public key exchange Against man in the middle attacks during secure simple pairing(SSP) in Bluetooth, World applied journal 13(4) 769-780, 2011.

[5] BluetoothLow Energy,2012 LitePoint, A Teradyne Company.

[6] P. Stirparo and J. Löschner,Secure Bluetooth for Trusted m-Commerce, *Int. J. Communications, Network and System Sciences*, 2013, 6, 277-288

[7] T.C. Yeh, J.R. Peng, S.S.Wang, and J.P. Hsu, Securing Bluetooth Communications, International Journal of Network Security, 14 (4): 229-235, July 2012

[8] N.B.N.I. Mina, M. Tarique, A Secured Bluetooth Based Social Network, *International Journal of Computer Applications (0975 – 8887)26(1): July 2011*

[9] J. Padgette, K. Scarfone and L. Chen,Guide to Bluetooth security , *Recommendations of the National Institute of Standards and Technology, June 2012.*

[10]*L. M. Kieu,* Bus And Car Travel Time On Urban Networks: Integrating Bluetooth And Bus Vehicle Identification Data, *Linking policy, research and outcomes, Perth, Australia 2012*

[11] New specification .Group and Goals Lead Technology Roadmap,Bluetooth Technology in 2010

and J. Inouyze.

[12] A. Madhavapeddy and A, Tse,A Study of Bluetooth Propagation UsingAccurate Indoor Location Mapping

[13] *R. Guerin, E. Kim and S. Sarkar ,*Bluetooth TechnologyKey Challenges and Initial Research

[14] Bluetooth Basics a learn.sparkfun.com tutorial Available online at: http://sfe.io/t117

[15] J. Haartsen, M. Naghshineh