

CampusConnect-secure communication using zigbee

Harsh Parashar¹, Abhishek Ladke², Samadhan Mandpe³, Pooja Singh⁴, Aditya Goswami⁵

Mitali Ingle⁶

¹²³⁴⁵ Student, CSE, Dr. Bababsaheb Ambedkar college of engineering and research, Maharashtra, India

⁶ Assistant professor, CSE, Dr. Bababsaheb Ambedkar college of engineering and research, Maharashtra, India

Abstract: This project is used to communicate or transmit a text message from one place to another place through wireless mesh network. The text message is encrypted and the encrypted message was transmitted through wireless Zigbee. At the receiver end the signal was received by the standard receiver and the analog signal was fed to the Zigbee (sender) and it was decrypted by the Zigbee(receiver) and the message was displayed over the LCD display.

There can be several receivers which can receive the message send by the sender at the same time. Every receiver have its own computer where the data is encrypted using private algorithms and display the sent data on the receivers screen. We consider a cognitive wireless network that makes access to spectrum licensed to the primary user. In this network, the secondary user will be allowed to use the idle frequency channel of the primary user. It's primarily depending on the proper spectrum

ZigBee has been developed to support lower data rates and low power consuming applications. Targets to analyze various parameters of ZigBee physical Performance of ZigBee is evaluated on the basis of energy.

1. INTRODUCTION

ZigBee Alliance, the standards body which defines ZigBee, also publishes application profiles that allow multiple OEM vendors to create interoperable products. The current list of application profiles either published or in the works are:

- Home Automation
- ZigBee Smart Energy
- Personal Home

ZigBee devices are actively limited to a through rate of 250Kbps, compared to Bluetooth's much larger pipeline of 1Mbps, operating on the 2.4 GHz

ZigBee is an established set of specifications for wireless personal area networking (WPAN), i.e. digital radio

connections between computers and related devices. WPAN Low Rate or ZigBee provides specifications for devices that have low data rates, consume very low power and hence devices can have long battery life. Zigbee is widely used in Homes automation.

2. LITERATURE REVIEW

The architecture and protocols of Zigbee are developed for enhancing wireless network features and is considered as one of the major achievement in development of WSN's (wireless sensor network). It is developed to fulfil the goals in wireless sensors that utilize low power and low cost. This Protocol is established by Zigbee Alliance, 2006 which based on the IEEE 802.15.4 in which it specifies that it provides support to both physical and MAC sub-layer of data-link layer in wireless network. It uses services from Network layer and Application layer for Bi-directional wireless communication which is both energy and Cost efficient. The protocol is widely employed in many applications particularly in Wireless sensor Network. Zigbee provides a secure way to transmit data through a wireless medium. we can make our personal mesh network for commercial and industrial and health care, wellness and fitness application and other application.

Other wireless technologies and protocols specified by IEEE like Bluetooth and Wi-Fi but it has many disadvantages like high battery consumption and also the bandwidth obtained while transmitting the data is also less. Also building complex topologies increases cost as well as time complexity. Although, Zigbee does not have any requirement for high data rates and provides flexibility of adding more nodes to provide connectivity between many devices. Having low power consumption makes these devices more efficient that is they can work upto several months or some cases for years, the range of these devices is upto 250 feet and data rate as low as 9.6 Kb/s.

3. PROPOSED SYSTEM

The proposed CampusConnect application has following objectives:

- To create a windows application to share messages in a private campus network using a zigbee technology.
- The data can be shared with authorized users at a same instance of time using cryptographic algorithms.
- The data is encrypted at the senders side and is decrypted at the receivers side using a private key (md5, Triple-des).
- The user must be always online in order to receive the messages that are sent by the sender.

The requirements for the project are:

HARDWARE

- 1) Zigbee chip
- 2) Voltage regulator
- 3) PN junction diode
- 4) Resistor
- 5) Capacitor
- 6) IC MAX 232
- 7) LED Lights
- 8) Connecting wires
- 9) Copper cladded plate

SOFTWARE

- 1) VISUAL STUDIO 2009
- 2) XCTU
- 3) WINDOWS XP & ABOVE
- 4) PHOTOSHOP CS5+

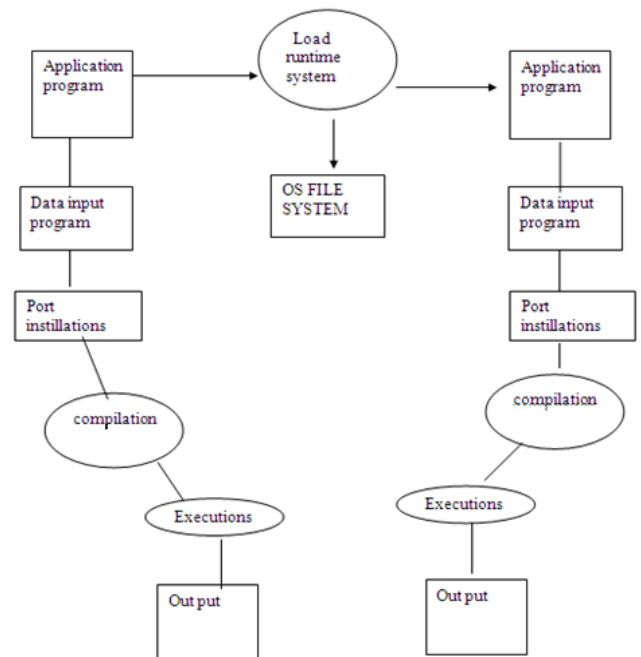


Fig (1.0) represents the work flow of our application and the hardware.

- I. Authentication: authentication will be provided by logging in by personal credentials so that other people using the same computer cannot use the network.
- II. ZIGBEE: Zigbee will act as trans-receiver. Which perform all the data transfer in our network.
- III. CampusConnect app: this app will provide the graphical user interface for the user to chat and transfer text files to the sender.
- IV. NETWORK: the network will be a mesh network in which 250 user can be connected to a single zigbee. The speed of the network will depend upon the zigbee chip used in the network hardware.

IMPLEMENTATION

- Zigbee chip needs a module to connect with the computer.
- This module will work as an intermedaiator between the computer and the zigbee chip.
- Module have several electronic components require to work efficiently.
- Circuit diagram of module is given below.

- Transformer is required to step down the AC voltage to 12V.
- Electronics component requires DC, so AC is converted to DC using four p-n junction diode making a bridge rectifier.
- Now capacitor are used to smooth out the fluctuating DC into a smooth DC.
- Voltage regulators are used to regulate voltage for different component according to the requirement.
- Strings of 0 and 1 will be the input to the module from computer, this is stored in module in the form of +ve and -ve voltages in the sequence of capacitors.
- IC 232 will manage the inputs to the capacitors and the zigbee chip.
- Zigbee chip have antenna to transfer the 0 and 1 in wireless channel of bandwidth 2.3Ghz.
- Each zigbee have its unique id, to perform transmission.
- Zigbee chips of sender and receiver need each other unique id coded inside them in order to communicate with each other.
- USB or RC232 cable is used to connect the module with the computer.
- In computer first the application of CampusConnect need to run, in order to perform communication.(shown in the photo below)



Fig- Final working module

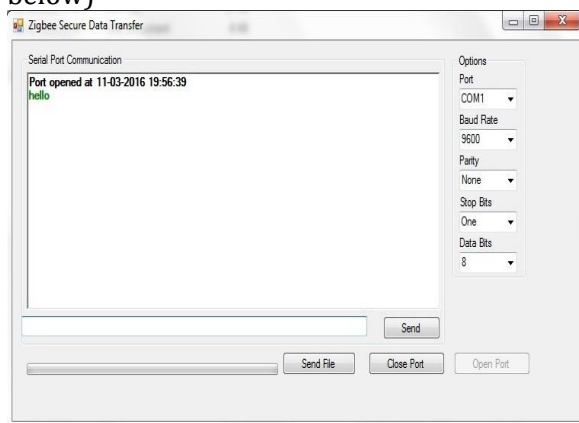


Fig- GUI for message transmission

- Internal security between the zigbee mesh network is provided using MD5 and Triple DES algorithm.
- User login is required in campusconnect application to provide more security.
- Final zigbee module ready for communication is shown in figure

CONCLUSION

- Through this app users can create their own private network
- The private network can handle as many as 250 users at a time
- Data from any session will be private and hidden to all external entities
- The data is secured from the senders end to the receivers end
- The speed of data transmissions is fast
- The technology used(zigbee chip) is very cheap
- The frequency at which zigbee chip work is provided free by the government

REFERENCES

- Junbeom Hur and Kyungtae Kang, "Secure data retrieval for decentralized disruption tolerant military network" (IEEE/ACM FEBRUARY 2014)
- C.C. Aggrawal and P.S. Yu proc. "On text clustering with side information" (IEEE ICDE conf., Washington, DC, USA, 2012)

BIOGRAPHIES

Mr. Harsh Parashar is pursuing his BE in CSE from Dr. Babasaheb Ambedkar college of engineering and research, wanadongari. Dist.-Nagpur, Maharashtra, India.



Mr. Abhishek Ladke is pursuing his BE in CSE from Dr. Babasaheb Ambedkar college of engineering and research, wanadongari. Dist.-Nagpur, Maharashtra, India.



Mr. Samadhan Mandpe is pursuing his BE in CSE from Dr. Babasaheb Ambedkar college of engineering and research, wanadongari. Dist.-Nagpur, Maharashtra, India.



Mrs. Pooja Singh is pursuing her BE in CSE from Dr. Babasaheb Ambedkar college of engineering and research, wanadongari. Dist.-Nagpur, Maharashtra, India.



Mr. Aditya Goswami is pursuing his BE in CSE from Dr. Babasaheb Ambedkar college of engineering and research, wanadongari. Dist.-Nagpur, Maharashtra, India.



Ms. Mitali Ingle is Assistant Professor in Dept. of Computer Science & Engineering in Dr. Babasaheb Ambedkar college of engineering and research, wanadongari. Nagpur, Maharashtra, India