

A cross platform of Wireless Sensor Network for monitoring the factors of geographical area

Ummadi Janardhan Reddy, D.Nagabhushanam Suresh Babu Satukumati,
Naresh Nelaturi, A.N Lakshmipathi,

ABSTRACT: Software exploitation is necessitating new approaches and strategies to target and gather a large amount of user base by making use of intense practices of developers. Multi-level platform application development is one of the well known practices established by various environments. Such practices enable the deployment of programs on a variety of platforms available to users or as define by the users. The foremost goal of the present paper is to develop a cross platform based smart wireless sensor network for an environment. Wireless Sensor Networks have appeared as a growing research area where most study scholars and industrialists aim on. Wireless Sensor Networks can furthermore be characterized as a mesh of devices, which can sense the natural environment and communicate the data gathered from the monitored area through wireless communications. This paper investigates exploitation of cross platform based remote monitoring system through wireless sensor network. The ability to document and detail alterations in parameters of interest has become progressively valuable. Investigations were presented for an isolated monitoring system by utilizing Zigbee nodes. These nodes sends sensors information wirelessly to base station, which collects the information, allows it to be analyzed and displayed in various platform based environments as needed.

Key Words — wireless sensor network, cross platform, Zigbee, sensors, multilevel, smart.

I. INTRODUCTION:

As the software development environment matured as a serious business in few decades, its popularity and demand arose among the users [2]. Implicitly advanced concepts, languages and development methodologies emerged in the software domain to serve the needs of the users of different platforms. Cross platform application development is one of the famous practices deployed by various environments.

- U janardhan reddy is currently working as assistant professor in the department of information technology in vignan university, Guntur. E-mail: ummadi.janardhan@gmail.com.
- D Nagabhushanam is currently working as assistant professor in the department of information technology in vignan university, Guntur. E-mail: bhushanamdot@gmail.com.
- S suresh babu is currently working as assistant professor in the department of information technology in vignan university, Guntur. E-mail: suresh.satukumati@gmail.com.
- N Naresh is currently working as assistant professor in the department of information technology in vignan university, Guntur. E-mail: naresh855@gmail.com.
- AN Lakshmi pathi is currently working as assistant professor in the department of information technology in vignan university, Guntur. E-mail: anantha.sathya@gmail.com.

Such practices enable the deployment of software on a variety of platforms available to users or as define by the users [2] [7]. In Cross-Platform approaches the premise is that an application maker can design and create an application using a single language or tool set, and through "clicking a button" instantly deploy for a variety of platforms. The pros of this approach have long been touted as the need to only maintain a single code base and have the ability to fix any problem immediately available for any platform.[9] Another advantage has also been comprised that this approach greatly reduces the cost of programs development as the one code groundwork needs less testing. Cross-Platform applications can furthermore make it exceedingly easy for users. According to a report published recently, statistics show that market share for cross-platform mobile development tools has exceeded the value of \$1.6 billion currently and this value is expected to reach \$8.2 billion by 2016. These results show that there is a great demand of software which is developed for more than one platform [7]. Cross-platform evolvement furthermore, assists an enterprise to evolve their product with lesser efforts to cipher and therefore, sustains the effective

cost of the app. The highly competitive market claims faster and scalable development of apps for gaining a bigger client base [7].

Self-configuring wireless sensor networks can be invaluable in numerous civil and infantry submissions for collecting, processing, and disseminating broad ranges of convoluted ecological data. Be-cause of this, they have attracted considerable research attention in the last few years [5]. Several other groups are investigating efficient hardware/software system architectures, signal processing algorithms, and network protocols for wireless sensor networks. A quite agent application in wire-less sensor systems is event following, which has widespread use in applications such as security surveillance and wildlife environment monitoring. Monitoring various factors such as temperature and humidity along with other factors can be of significance [1] [4]. A traditional approach to assess these factors in an environment meant individuals manually taking measurements and ascertaining them at various times.

The explosion in wireless technology has glimpsed the emergence of many measures, particularly in the developed, scientific and medical radio band. To control applications, there have been a multitude of proprietary protocols, which bottlenecked interfacing [3] [4]. Need for a broadly acknowledged benchmark for communication between sensors in low data rate wireless networks was felt. As a response to this dilemma, numerous businesses forged a coalition to conceive a standard which would be acknowledged worldwide. It was this Zigbee Alliance that created Zigbee. Zigbee has been developed looking into the needs of communication of data with simple structure like the data from the sensors. ZigBee is a specification for a suite of high level communication protocols used to create personal area networks built from small, low-power digital radios [5]. ZigBee is based on an IEEE 802.15 standard. ZigBee is used in applications that require a low data rate, long battery life, and secure networking. ZigBee has a defined rate of 250 Kbit/s, best suited for periodic or intermittent data or a single signal transmission from a sensor or input device. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that requires short-range wireless transfer of data at relatively low rates [6].

II.PROBLEM IDENTIFICATION:

From the past decades in embedded software application development and utilization is dedicated to only

particular environment. From platform to platform the application development procedure (coding, compiling, debugging, and exporting) should differ. I.e. every application was platform dependent. Due to these reasons cost and time increases proportionally. Cross platform application development is one of the famous practices deployed by various environments. Such practices enable the deployment of programs on a variety of stages available to users or as characterize by the users. Many years before, when Bluetooth expertise was presented, it was considered that Bluetooth would make Wi-Fi redundant. But the two coexist rather well today, so do many other Wireless measures like Wireless HART and ISA100.11a. Then why would we need another WPAN benchmark like Zigbee? The answer is the submission aim of Zigbee coalition - reduced cost and reduced power for power efficient and cost productive intelligent devices.

III.PROPOSED PROTOCOL:

Our proposed work will eliminate the disfavours of previous systems. In our aimed system we can develop a multi cross platform application which retrieves the factors of a geo-graphical area in terms of graphical representations. The base station every time sends the values of sensors to receiver node .the values of receiver node can be converted in to graphical forms. There is no need of special code or application development for every dissimilar system. Our exemplary depicts "write once run anywhere". I.e. one application can run anywhere which affords the factors of a region.

IV.SYSTEM PROTOTYPE:

As the system is cross platform, the prototype is going to be more flexible and similar to all platforms. Main aim of this prototype is to meet the requirements and justify the supervising factors of a particular geographical area through a WSN to implemented application which is platform independent. The following prototype comprises of a micro controller unit along with two Zigbee nodes act as transceiver and receiver respectively and of course a wireless network. By using the Zigbee nodes we have to setup a WSN in between base station and destination station.

Versatile sensors are interfaced with microcontroller unit at base station of a user required geo graphical area. The microcontroller unit colligated to transceiver node. The respective multi platform application, serial and respective WSN libraries can be developing using embedded c, post script, java, c, JavaScript, html. Regarding working of the

system, when a user tries to access the geographical area Zigbee transceiver node records the selection of the user and sends signal to receiver. Transceiver which was controlled by microcontroller unit has sensors which help in keep changing from time to time. ZigBee receiver receives the information and displays it through application. The values which were obtained will be analyzed and presented with details such as graphs.

V.FUNCTIONAL DESIGN:

A. Centralized control unit:

Centralized command unit comprises of controller and transceivers. Microcontroller as the command center controls the transmission and receiving of data.

B. Sensor environment: The sensor natural environment senses the time to time alterations of a geographical area and drives the facts and figures to microcontroller unit.

C. Cross platform application:

The cross platform based application run on any environment irrespective of operating system. It receives the data from WSN nodes and represents the values in terms of graphs to the user view.

D. Main program:

The major program of the command fatal accomplishes information receiving, investigation and storage of every terminal.

F. Microcontroller subprogram:

The micro controller subprogram mostly accomplishes the obtaining of sensors information from every terminal and transmission of instruction from control terminal it is the connective ligament of every terminal and the control terminal.

VI.PROCESS DESIGN:

This activity focuses on the conceive of the client interaction types i.e. the program and procedures required to evolve the types.

A. System Specification:

It formalizes conceive of the applications user related interface methods, processing and controlled procedures.

B. Low Level Design:

The procedural design or constituent level design is also treated as reduced grade conceive which will deal with the reduced grade of the purposeful minutia such as implementation minutia.

VII.EXPERIMENTAL RESULTS:

We have undertaken various experiments to evaluate the functioning of our application. Our aimed system mainly

concentrates on cross platform application development for unique WSN based embedded systems. Our final resultants would limn best performance among all platforms with reliable values and analysis. The accuracy of reading and displaying sensor data in all operating platforms is well and good. Our multi platform application won't take a separate system or platform based device drivers for any operating system environment. From the analysis it is found that maximum throughput is achieved across all operating environments.

Network delay is one of the significant performance characteristics that affect the network. There are diverse delays happen in a network namely, processing delay, queuing delay, transmission delay, propagation delay. Our experiment we calculated the propagation delay. The time between the data packet and the acknowledgement packet is considered as delay. The delay is calculated from the timestamps. WPA provides delay in microsecond points. This gives more correctness to the outcome which we obtain.

The following investigation shows performance of our multi stage application over distinct 9.5

Each and every system has some limitations in universe. Our present proposed design concentrate on cross stage development for overseeing the factors of a natural environment through WSN. The foremost limitations of Zigbee encompass short variety, reduced complexity, and reduced data speed. The farther implementation is aspiring towards on to minimization of limitations. I.e. supervising of data from any place in any platform like mobile, internet etc. So we are evolving mobile traverse stage application which retrieves data from base station and also ascertain through internet from any place in the world.

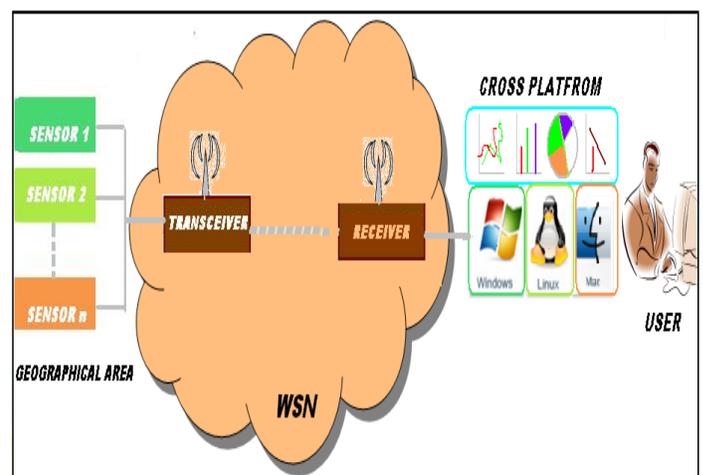


Fig: 1 Prototype of Proposed System

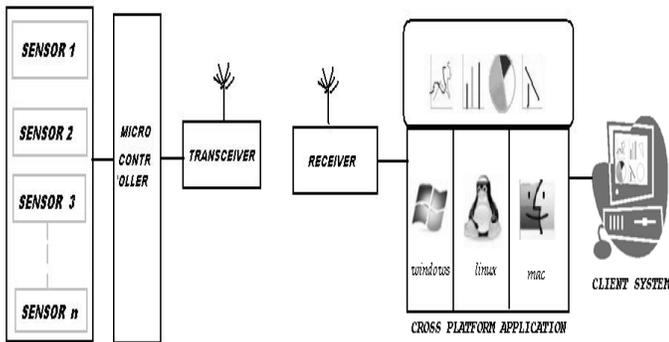


Fig: 2 Functional Design of System

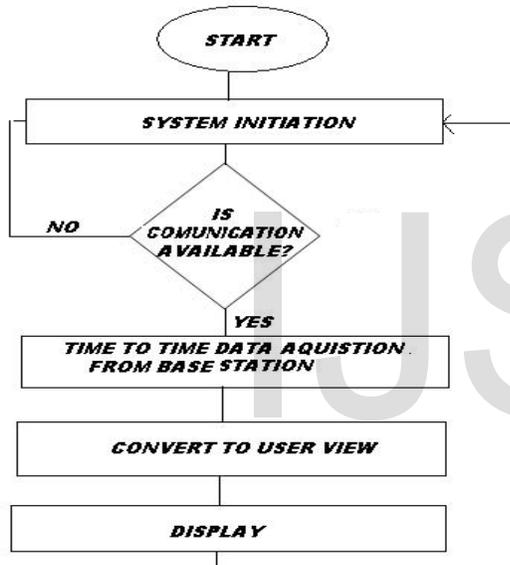


Fig: 3 Flow chart of main program

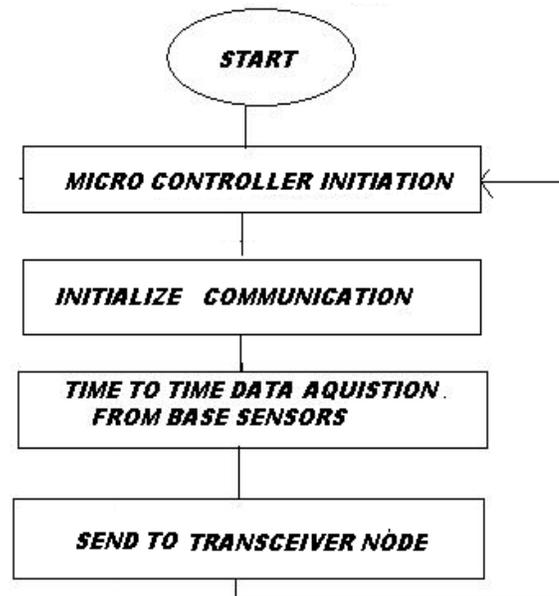


Fig: 4 Flow chart of micro controller unit

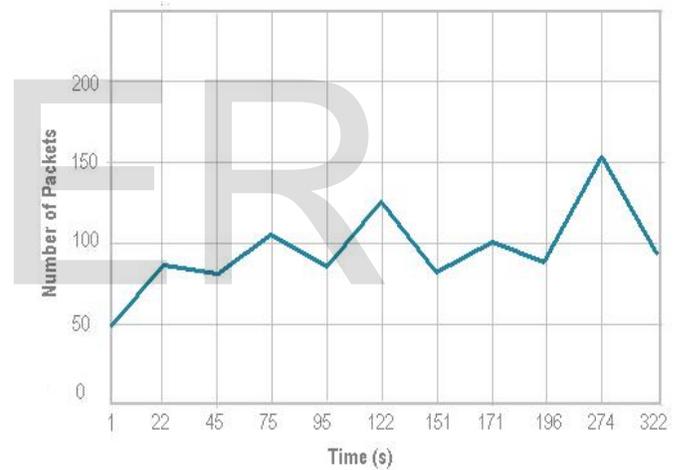


Fig: 5. Data packets across network

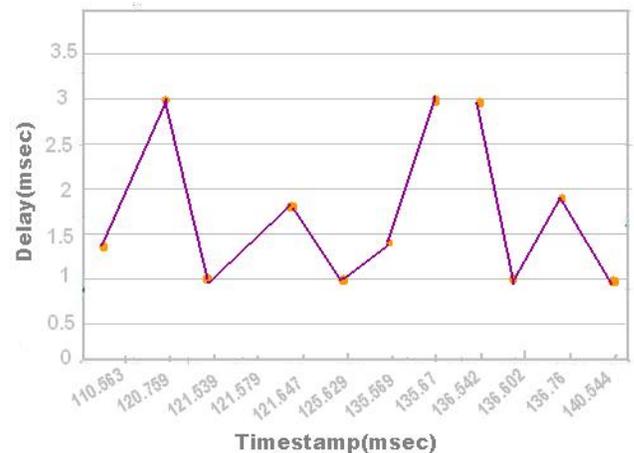


Fig: 6. Analysis of Packet Delay

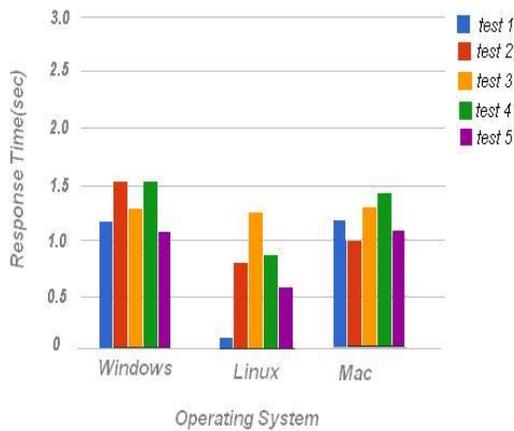


Fig. 7. Functioning timestamp results of distinct platforms



Fig. 10. Sensors Broadcast Data

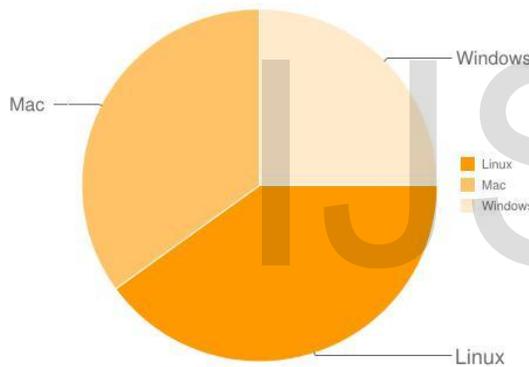


Fig. 8. Performance evaluation



Fig. 9. Cross Platform Monitoring Application

IX.CONCLUSION:

Our suggested prototype and experiments would influence cross platform application development for WSN based supervising systems in embedded environments. Our proposals would limn the utilization and effective implementation of WSN. Our suggested prototype will helpful in myriad areas like labs, chemical plants, industrial areas, platform independent environments etc.

REFERENCES:

- [1] Dan O’sullivan, Tom loge (2004) Physical Computing: sensing and controlling the physical world with computers, Thomson; 1st edition (May 28, 2004).
- [2] David Frankk .Impact of Cross-platform Development on Businesses - National Internet and Technology [WWW document] <http://www.examiner.com/article/impact-of-cross-platform-development-on-businesses> (accessed 26th June 2013).
- [3] E. Dalila Pinedo-frausto, J. Antonio García-macías (2008) An Experimental Analysis of ZigBee Networks, pp.723-729.
- [4] Haefke.M, Mukhopadhyay S.C and Ewald.H (2011) A ZigBee Based Smart Sensing Platform for Monitoring Environmental Parameters, in IEEE International Conference on Instrumentation and Measurement Technology (May, 2011).1-8.
- [5] HoSeong Cho, DaeHeon Park, Chul-Young Park, Hong-Geun Kim, Chang-Sun Shin, Yong-Yun Cho, and Jang-Woo

Park (2011) A study on localization based ZigBee and Monitoring system in Greenhouse environment, in IEEE 3rd International Conference on Data Mining and Intelligent Information Technology Applications (October, 2011);190-195.
[6] Shao Yong, Zhang yi, Wang Jian and Qin Tinggao (2009) Research and Implementation of ZigBee Networking, in IEEE International Conference on Mechatronics and Automation (Changchun, China, August 9th -12th, 2009);3992-3996.

[7] Will Harlan. The importance of having Cross-Platform applications? [WWW document]
<http://www.yetihq.com/blog/what-is-the-importance-of-having-cross-platform-applications/> (accessed 27th February 2012).

IJSER