

Study of Integration of RFID and WSN

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ABSTRACT

In this paper, we studied about integration of RFID and WSN. Wireless sensor networks (WSN) and radio frequency identification (RFID) are two important wireless technologies that have a wide variety of applications and provide limitless future potentials. RFID facilitates detection and identification of objects that are not easily detectable or distinguishable by using current sensor technologies. However, it does not provide information about the condition of the objects it detects. Sensors, on the other hand, provide information about the condition of the objects as well as the environment. Hence, integration of these technologies will expand their overall functionality and capacity.

Keywords: RFID, WSN, Radio Waves, Sensor.

I. INTRODUCTION

Integration of RFID with WSN is one of the techniques employed for enhancing more applications and security. Three types of integrations are suggested. The first one is heterogeneous network architecture with a mix of RFID tags and WSN nodes and a smart station that will be used for collecting information from two networks. The second type of integration includes integration of the reader and a WSN node in one device. The third type is a smart active tag that merges functionality of a WSN node and an active tag. The possible ways of integrating WSNs into the existing RFID network based on the standards defined by EPCGlobal (www.epcglobal.org).

Integrity is a concept that ensures that data can only be modified, replaced by authorized agents. Integrity deals with both the correctness and reliability of data. Integrity requires that the data being sent is complete, unmodified and entirely in its original form. OSP aims to provide confidentiality, authentication and integrity of messages by employing the security primitives. Some of them are used much more in industry and academia than others. In addition, WSN nodes can be independent or attached to objects/people.

II. RADIO FREQUENCY IDENTIFICATION

Radio frequency identification (RFID) uses electromagnetic field of radio frequency for automatic identification of objects with a unique ID number which is stored in the attached tag [1]. Both RFID and barcode systems have the same goal; identifying objects without human intervention. However, barcode has some disadvantages which have been solved by RFID system:

1. Barcode readers need a straight line of sight scanning.
2. Each barcode device should be read one by one.
3. Barcode reader cannot read damaged labels.
4. Only the type of objects can be identified.
5. Barcodes do not provide updating option in new process in the label.
6. In barcode system traceability should be performed by implementers. Thus, some problems may arise



Figure 1: Barcode Examples[5]



Figure 2: Application of RFID.

III. WIRELESS SENSOR NETWORKS

Wireless sensor networks (WSNs) consist of sensing, computing, and communication elements and are used for monitoring environment's temperature, humidity, pressure, etc. In other words, WSN is a network which is made up by nodes that sense and control the environment cooperatively. Nowadays, WSN is used in many areas such as traffic control, health care monitoring, healthcare applications, and supply chain.

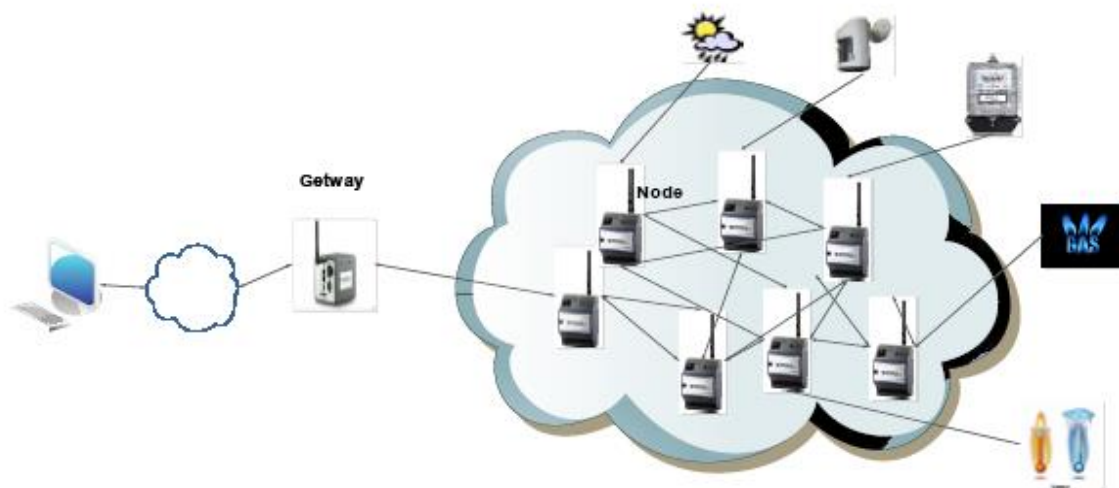


Figure 3: Components of Wireless Sensor Network

The main WSN characteristics:

- limited power
- tolerate harsh situation
- capable of managing the node errors
- mobility of nodes
- changeable topology of network
- failures of communication
- nodes dissimilarity
- spreading in huge scale criterion
- proceeds without assist (using easily) [22]

IV. INTEGRATION OF RFID AND WIRELESS SENSOR NETWORKS

RFID tags are used for identifying people in the museum tour and WSN is used to locate the leader of the group [3]. After the locations of the leaders of a group are known, the lost members are guided in finding their group leaders. Integration in which RFID is used to assist positioning that is identified using sensors. A positioning system for first responders is described in which different sensors are used to estimate the position of first responders and RFID tags placed at known positions are used to correct the estimated Position [4].

V. CONCLUSION

RFID tags integrated with sensors have limited communication capabilities. In high-end applications, it is possible to integrate RFID tags with wireless sensor nodes and wireless devices, such that the integrated tags are able to communicate with many wireless devices which are not limited to readers. The main difference between the tags with integrated sensors are traditional RFID tags which communicate only with readers, while the tags in this class are able to communicate with other wireless devices, including tags themselves.

Therefore, the tags in this class are able to communicate with each other and form a multiple hop network. These new tags may be compliant with existing RFID standards or they can have proprietary protocols.

VI. REFERENCES

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