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SPIN PROTOCOL FOR WIRELESS SENSOR NETWORK

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ABSTRACT

Nowadays, Wireless Sensor Networks are emerging because of the technological developments in Wireless Communication. Wireless Sensor Networks are deployed mostly in open and unguarded environment. The key features of Wireless Sensor Networks are low power, low-memory, low-energy scaled nodes. Security is a fundamental requirement for Wireless Sensor Network. Security is the main concern for everything whether it is for wired based network or wireless based network. Security in Wireless Sensor Network plays an important role in node communication. For Wireless Sensor Network so many security protocol available but some have some limitation. In this paper, our center of attention is security protocols for Wireless Sensor Network through this paper, we have to identify the security protocols and their limitation for Wireless Sensor Network.

Keyword : WSN, Security, SPIN

1. INTRODUCTION

A Wireless Sensor Network [1] is a wireless network consisting of large populations of specially distributed sensor nodes to cooperatively monitor physical or environmental condition [2]. A sensor is device that has sensing and receiving capability to sense and receive a signal and react to that signal in individual manner.

Wireless Sensor Network consist many sensor node which are limited in computation, less memory space and small in size. Self-organizing and self-configuration are the special feature of this network. Wireless Sensor Network is vulnerable to various attacks. So that's why security must in Wireless Sensor Network. Security has contained that the attacks and monitoring on Wireless Sensor Network. Wireless Sensor Network [1] has contained several sensor nodes and actuators are highly distributed. Due to the high distribution only security is very much needed in the network. So, here discussion based on security protocol for Wireless Sensor Network. Secure wireless sensor network, security must be integrated into every node of the system. This is due to the possibility that a component implemented without any security could easily become a point of attack. This dictates that security must pervade every aspect of the design of a wireless sensor network application that will require a high level of security [3]. In this paper, section 2, we discussed about security in WSN. In section 3, we discussed about SPIN protocol. In section 4, Simulation for working of SPIN protocol.

2. SECURITYIN WSN

The security in wireless sensor network is essential and their main objective is to maintain the data freshness, self organization, synchronization of time, protected localization, cost efficiency, self healing. Challenges in Security for wireless sensors are to retain the security against standard resources, un trusted communication and unattended operation [4][5]. The constraints for node in sensor network are to have high energy, storage, memory and processing speed. The wireless networks are unreal, having collision and latency and lack of physical infrastructure and remotely managed. The common attacks like interruption, modification, fabrication are frequently occurs in the networks. Security threats in sensor network are most importantly focused on authentication, availability and certifications. In this, they perform the attacks like modification, forgery, deletion and replay attack [2].

3. SPIN PROTOCOL

SPIN is a modification of classic flooding. In classic flooding the information is forwarded on every outgoing link of the node. The drawbacks of flooding includes, draining out the battery life of the sensor network to a great extent. Hence a new protocol named SPIN was developed to overcome the drawbacks [6].

SPIN is an adaptive routing protocol, which transmits the information first by negotiating. As specified earlier, transmission of data consumes more energy. To cope up with this problem SPIN make use of metadata of the actual data to be sent. Assume a node has to send a sensed image file it first generates the metadata for image, and this metadata is broadcast [6]. Metadata will contain the description of the message that the node wants to send. The actual data will be transmitted only if the node wishes to receive it. For this purpose SPIN makes use of 3 messages namely,

1. ADV
2. REQUEST
3. DATA

ADV: Before sending a message, a node first generates the descriptor of the message to be sent. This metadata is exchanged by making use of ADV message. ADV message informs the size, contents and requirements of the message. This helps the receiving node on deciding transmission of the message.

REQUEST: After receiving the ADV message receiver node verifies the descriptor whether the message is a duplicate and whether receiver node's battery capabilities are enough to transmit the data. If the node is interested in data, it replies with a REQUEST message to the sender node.

DATA: If the sender node receives a REQUEST message, it starts the actual transmission of data by making use of DATA message. This is the actual data transfer phase.

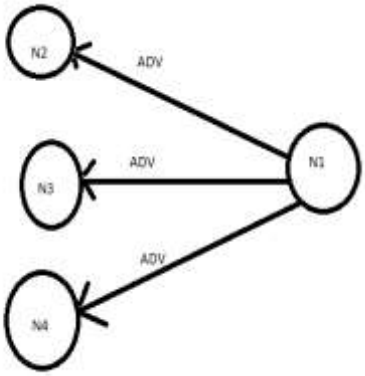

Figure 1 ADV message

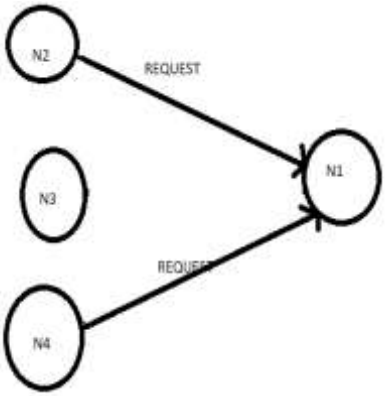

Figure 2 Request message

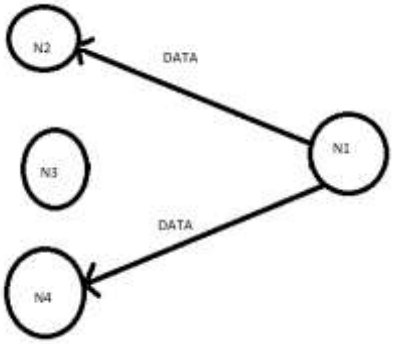

Figure 3 Sending DATA

The SPIN transmission is data centric; it is only transmitted to the nodes that have interest in the data. This process continues until the data reaches the sink node. SPIN reduces both the network overhead and the energy consumption in the transmission. There will not be duplicate messages in the network since nodes negotiate before transmitting the data.

4. SIMULATION

We had to simulate with 5 nodes. We has deployed the simulation in NS2. Now node 0 sends to advertisement message to its neighbor's nodes 1, node2, node3 and node 4. Advertised message contained meta dat which has smaller then to actual data. After getting advertisement message interested node give back to request for actual data. After getting request source node given to actual data to the requesting node.

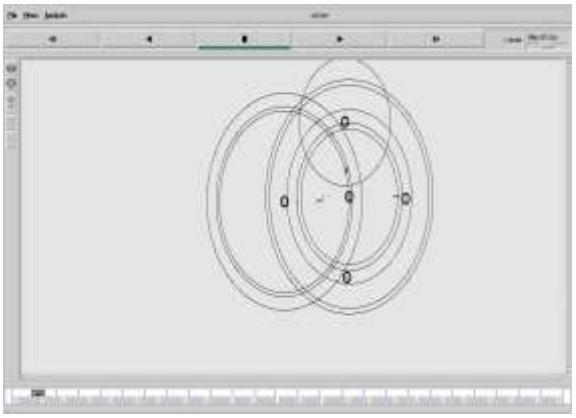

Figure 4 sending ADV

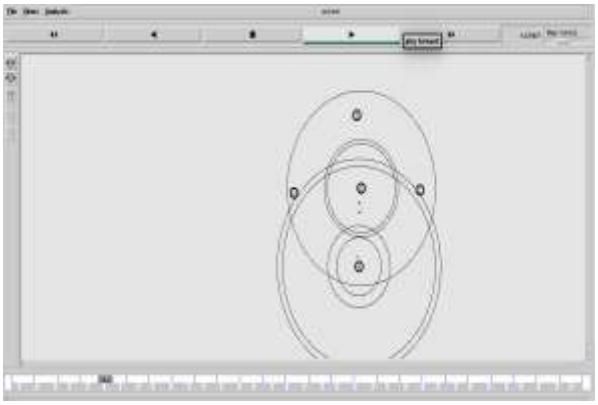

Figure 5 sending REQ

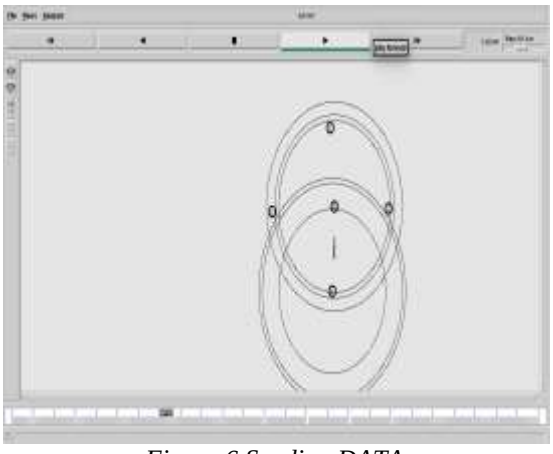

Figure 6 Sending DATA

5. CONCLUSION

In this paper, we mainly present working of SPIN, Sensor Protocol for Information via Negotiation for Wireless Sensor Network. SPIN protocol has contained three stages which has implement in simulation.

In future work, SPIN has consumed some energy at transmitting and receiving messages. We believe that this security routing protocol would increase the data communication security on WSN in nearly future.

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