PERFORMANCE EVALUATION OF ROUTING PROTOCOLS IN WIRELESS SENSOR NETWORKS

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2012

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A project submitted to the Graduate School in partial

fulfillment of the requirements for the degree

Master of Science (Information Technology)

Universiti Utara Malaysia

By

Raja Asif Wagan

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ABSTRACT

The growing field of information technology enhanced the capabilities of the wireless communication. The large usage of WSN in the various fields of the real world is scaling with the wide variety of roles for wireless sensor network performance is challenging tasks. The issues of performance in the wireless sensor networks in many literatures, yet more studies are being done on the performance because the user and application needs are keep increasing, to encounter the challenges of the performance issues are studied here by digging out the routing protocols performance in WSN. To conduct the study and analysis on performance of WSN protocols the there are various performance metrics used for the evaluation of performance in WSN. This study will be carried out to come up with the simulation experiments over the directed diffusion (DD) and LEACH routing protocols in terms of energy consumption, congestion and reliability in the wireless sensor networks (WSN) environment with the low power consumptions. The simulation experiments in this study are based on the reliability, delay and other constraints to compare the speed, reliability and electricity saving data communication in the wireless sensor networks (WSN). The discussion of the conducted simulation experiments describes the steps which are pertaining to the protocols and tradeoffs and complexity of the data traffic for the efficiency. The NS2 simulation is used for the simulation based experiments for performance of wireless sensor network (WSN) communications which is demonstrating the comparative effectiveness of the routing protocols in the recent concepts. The results of the simulation are lightening the ways for the minimization of the delay and enhancement in the reliability issues in wireless sensor networks (WSN).

ACKNOWLEDGEMENT

At first I want to thank Allah Who showered His multiple blessings upon me in the form of strength and health to complete this research.

I put forward my cordial thanks to Dr. Mohammed M. Kadhum who not only devoted his endless hours in reading the drafts versions of this project paper, but also provided me the thought provoking and constructive suggestions to improve my research work. I would like to appreciate his constant guidance and friendly behavior that would be remembered forever.

I also render my sincerest gratitude to Mr. Ahmad Hanis Bin Mohd Shabli and Mr. Fazli Bin Azzali whose positive criticism not only paved a way for me to work harder but also enhanced my research skills.

I am really indebted to my parents and other family members who provided me the financial and the moral support to pursue my studies and showed acute patience during my stay at Malaysia.

I have great regard for all those who encouraged and lent me a moral support to carry out this research in a better way.

I wish to extend my warmest thanks to UUM officials who allowed me to use the University resources; and I especially thank the Head of the department and the teaching staff of the department for showing their co-operation during the process of this research.

Raja Asif Wagan

2012

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LIST OF ABBREVIATIONS

WSN	Wireless Sensor Network
WSNs	Wireless Sensor Networks
SN	Sensor Node
GPS	Global Positioning System
FSN	Fixed Sensor Network
PDR	Packet Delivery Ratio
NS2	Network Simulator 2
ACM	Association for Computing Machinery
IEEE	Institute of Electrical and Electronics Engineers
TE	Traffic Engineering
QoS	Quality of Service
CPU	Central Processing Unit
IO	Input Output
MANET	Mobile Ad-Hoc Network
GAF	Geographic Adaptive Fidelity
GEAR	Geographic and Energy Aware Routing
TBF	Trajectory Based Forwarding
BVGF	Bounded Voronoi Greedy Forwarding
GeRaF	Geographic Random Forwarding
RTS	Request to Send
CTS	Confirm to Send
MECN	Minimum Energy Communication Network
SMECN	Small Minimum Energy Communication Network
SPIN	Sensor Protocols for Information via Negotiation
RR	Rumor Routing
ACQUIRE	Active Query Forwarding in Sensor Networks
EAD	Energy Aware Data Centric Routing
LEACH	Low Energy Adaptive Clustering Hierarchy
HEED	Hybrid, Energy Efficient Distributed Clustering
CH	Cluster Head
TEEN	Threshold Sensitive Energy Efficient Sensor Network Protocol
APTEEN	Adaptive Periodic Threshold Sensitive Energy Efficient Sensor Network Protocol
MULE	Mobile Ubiquitous LAN Extensions
SEAD	Scalable Energy Efficient Asynchronous Dissemination
IDSQ	Information Driven Sensor Query
CHR	Cluster Head Relay Routing
SAR	Sequential Assignment Routing
SNFG	Stateless Geographic non Deterministic Forwarding

MAC	Media Access Control
GRAB	Gradient Broadcast
TTDD	Two-Tier Data Dissemination
NAM	Network Animator
TCP	Transmission Control Protocol
CBR	Constant Bit Rate
UDP	User Datagram Protocol
TCL	Tool Command Language

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CHAPTER 1

INTRODUCTION

This chapter contains introduction to this study, problem statement, research questions, research objectives, significance and scope. In this chapter the foundations of this research are given.

1.1 INTRODUCTION

The technological boom is at higher levels, therefore the usage of the electronic devices like Bluetooth, WIFI, PDA, GPS, Mobile and laptops are being used everywhere because they are cheap and easy to mobilize. The distributed wireless devices also brought the wireless sensor networks which are being used widely. The Wireless Sensor Networks (WSN) are basically type of a network which is now becoming embedded to our life and heavily used. The practice of the wireless sensor network (WSN) is increasing in the variety of the areas like chemical, gases, disaster management, agriculture, forecasting, health, patient monitoring, security, industry and etc (Yu, Prasanna, Krishnamachari, 2006). In general, a WSN is the combination or network of the sensor nodes (SN) that node are used for the sensing and communication of the acquired or processed data. The WSN node is having many components in it like power source, circuit, communication and sensing component in a small pack. The WSN are having low power circuit and network technology which is getting power from the source of 2 AA as power source which enables it to work about three years. A wireless sensor network might be having from a few to thousands of sensor nodes responsible for communication and data acquisition. The usage of the

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