

Investigating the Energy Consumption of Member Discovery in Bluetooth Low Energy

by

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Declaration

I, the undersigned, declare that this work has not previously been submitted as an exercise for a degree at this, or any other University, and that unless otherwise stated, is my own work.

Ben Lynch

February 15, 2017

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...ABSTRACT...

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Chapter 1

Introduction

1.1 Introduction

Internet of things/WSNs; Emedded systems with limited power - low energy protocols
- BLE [1]

1.2 Problem Area

Member discovery/member consensus in semi static Ad-hoc netoworks - role call

1.3 Motivation for this research

The rise of the Internet of things and Bluetooth Low Energy playing a large part in it.

1.4 Dissertation Structure

Chapter 2

Background

2.1 Introduction

2.2 Bluetooth Low Energy

2.2.1 Scanning and Advertising

2.3 Low Energy Ad-hoc Protocols

2.3.1 Routing Protocols

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2.4 Summary

Chapter 3

Methodology

3.1 Introduction

3.2 Protocol Assessment

Research - simulation

3.3 Custom Simulation

3.3.1 Existing Simulators

3.3.2 Custom Simulator Discussion

3.4 Analysis of BLE Data Packets

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Chapter 4

Implementation

4.1 Introduction

4.2 nrf51

4.2.1 nrf51 DK

4.2.2 nrf5 SDK

4.2.3 Nordic Python API

4.3 Summary

Chapter 5

Results and Analysis

5.1 Introduction

5.2 Energy Measurement Methods

5.3 Simulation Results

5.3.1 AODV

5.4 Medium Scale Evaluation Results

6-8 devices of AODV role call

5.5 Summary

Chapter 6

Conclusion

6.1 Conclusion

Appendix

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- [1] G. D. Greenwade, “The Comprehensive Tex Archive Network (CTAN),” *TUGBoat*, vol. 14, no. 3, pp. 342–351, 1993.