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Development and Evaluation of a Web of Things Simulation Framework

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Master's Thesis

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Declaration of Authorship

I, Anatolii Tsirkunenko, declare that this thesis titled "Development and Evaluation of a Web of Things Simulation Framework" and the work presented in it are my own unaided work, and that I have acknowledged all direct or indirect sources as references.
This thesis was not previously presented to another examination board and has not been published.

Signed:

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Abstract

This thesis is about ... This thesis shows that ...

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1

Introduction

"Software and cathedrals are much the same – first we build them, then we pray."

Sam Redwine

TECHNOLOGY is on the move and this topic is important because it will change the world.

1.1 Motivation

1.2 Problem Statement

As a long term goal we would like to have ... The problem is that ... still does not work. So we will investigate the questions

- whether A
- or whether B

1.3 Contributions

1.4 Structure of This Document

First, ...

2

Background

"There is always a well-known solution to every human problem – neat, plausible, and wrong."

Henry Louis Mencken

This chapter gives an overview of ...

2.1 Multiphysics Engineering Simulation Software

Let's cite something [1].

2.2 Web of Things

3

Web of Phyngs Approach

3.1 Case Construction Sequence

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Web of Phyngs Simulator Implementation

4.1 Multiphysics Simulation Software Coupling

4.2 Geometry Generation and Coupling

4.3 Web of Things Coupling

4.4 Discussion

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Evaluation

5.1 Small Geometry?

5.2 Large Geometry?

5.3 Large Geometry with multiple things?

5.4 Discussion

6

Conclusion

We successfully ...

6.1 Outlook

But we still need to ...

A

Appendix

Bibliography

[1] M. Correia, G. S. Veronese, N. F. Neves, and P. Verissimo, "Byzantine consensus in asynchronous message-passing systems: a survey," *Int. J. Crit. Comput.-Based Syst.*, vol. 2, pp. 141–161, 07 2011. cited on p. 3