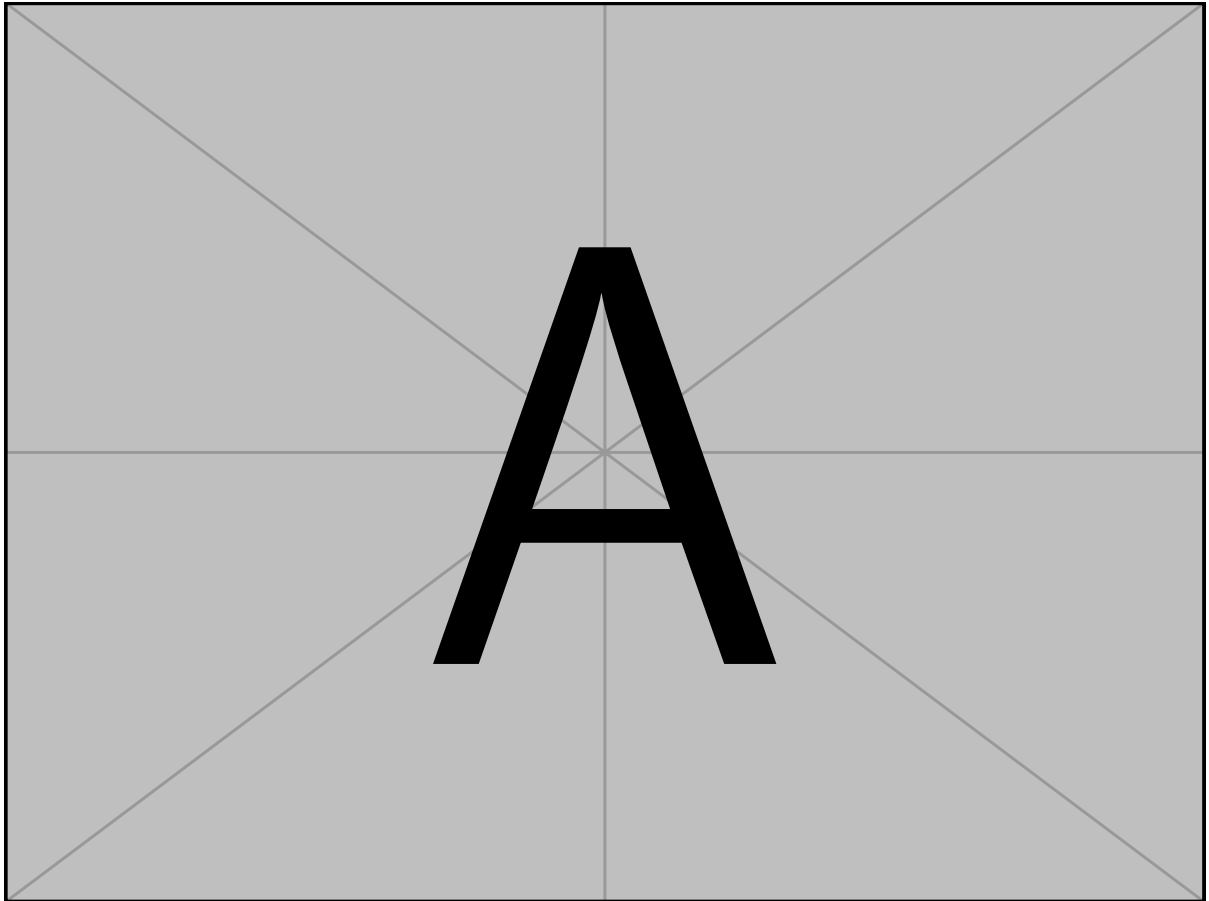

Embedded IoT for Eclipse Arrowhead



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To my dad Bengt-Göran Martinsson a special thanks for proof reading is required...

ABSTRACT

The abstract is a mini thesis on its own. It should contain the briefest of motivation and problem description, what has been done, and summarize the results. The purpose is to give the reader a quick view of the content, and encourage the reader to read the rest of the thesis. It's also helpful to put the reader in the right frame of mind for the rest of the thesis. This section is typically anything between one paragraph for short research papers (of 8 pages) to a page for a full thesis

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ACKNOWLEDGMENTS

Here it is supposed to say something really smart about my thesis I think. (Maybe leave this part out)

CHAPTER 1

Introduction

1.1 Background

The number of devices connected to the Internet has risen from 7 billions in 2018 to an estimated 35 billions in 2021 according to Security Today and that number is only going to increase.[1]

1.2 Motivation

With the numbers of devices connected to the Internet, IOT-devices from now on, rising to an estimated 38.6 billion devices world wide by 2025 the need to enable communication between those devices have never been bigger.

1.3 Problem definition

This project aims to investigate the possibilities, benefits and limitations of using Eclipse Arrowhead framework on embedded devices in contrast to commercially available solutions such as Amazons Amazon Web Services, AWS from now on, and Microsofts Azure. The way to measure the difference between either using a central broker, the MQTT protocol used by AWS and Azure or using peer to peer, HTTP protocol used by the Arrowhead framework to handle the communication between devices in terms of latency, energy consumption and security.

1.4 Equality and ethics

Equality and ethics are learning objectives for the program and should be reflected upon in the thesis if applicable. This section can be omitted if not at all relevant to the problem definition, but in many cases the thesis topic touches upon these topics even if

it is outside the scope of the work itself and in such cases a single paragraph may be sufficient to cover the reflection.

1.5 Sustainability

Similar to the equality and ethics section this is one of the learning objectives for the program and should be reflected upon in the thesis if applicable. For a quick overview of what is considered to be included in sustainability you can see the united nations list of sustainability goals: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

1.6 Delimitations

Describe what is not covered in the thesis. Things you realize may have to be addressed to create a complete solution, but that would be too much work, or that may simply be out of the scope of your scientific area.

1.7 Thesis structure

Describe how the rest of your thesis is organized. (e.g. In section 2 we discuss, in section 3 there is a... etc.). This is really just to help guide the reader to where different parts of your work can be found.

CHAPTER 2

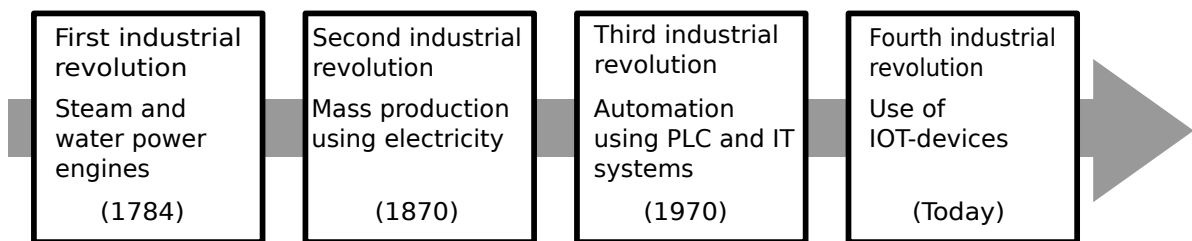
Related work

2.1 Related work

2.1.1 Internet of things

2.1.2 Industry 4.0

Lasi argues that the term industry 4.0 was coined beforehand as a planned fourth industrial revolution.[] The use of internet of things devices, IoT-devices from now on, and cyber physical systems, CPS from now on is what defines the fourth industrial revolution Vadiya means[]. See figure x for a short historic overview of previous industrial revolutions. According to Vadiya[] industry 4.0 promotes the connection of sensors and devices both to the internet and to other sensors or devices.



2.1.3 Arrowhead framework

2.1.4 Security

CHAPTER 3

Theory

3.1 Theory

Primarily this section should be about scientific methods and theories you need to evaluate/compare/invent to solve your problems from 1.3. In some cases it may be ok to describe different technologies, but the purpose is to describe something and then draw a conclusion from that. Example, if you decide to discuss different databases, it may be for the purpose of selecting the best type for your implementation later on (based on for example data representation, scalability, speed, etc.). Optimally the problems in 1.3 are not solved by anyone else yet, in which case this section needs to describe how to solve them (new algorithms, mathematical approaches, etc.).

This section can have a lot of subsections (3.1, 3.2, 3.3, etc.).

Implementation

4.1 Implementation

This is not a step-by-step instruction or diary to your work. Instead, you should describe your technical approach and solution, describe architecture, components, etc. Think software engineering... Perhaps use a few useful uml-diagrams or illustrate the system architecture. Keep in mind that the purpose of the implementation section is to describe your implementation to solve the problems from 1.3.

4.1.1 System architecture

4.1.2 System component

Evaluation

5.1 Evaluation

Describe the test setup to verify that your problems from 1.3 have been solved. This can be done in different ways depending on focus of your problems. Some problems may purely objective, such as "improve the performance of X compared to Y". These are easy to evaluate since you simply need to compare the performance, and perhaps compare against a few more technologies that you have listed in Section 2 (related work). In other cases the problems may be very subjective, such as "Create a mobile app that can be used while driving, and which shows the most fuel efficient time to change gear". This problem will require a user-study in which several persons drive without the application, you calculate the fuel consumption, then they drive with the application and then you calculate the fuel consumption again. Then you collect the objective measurements (fuel consumption comparisons) and the subjective opinions from the users about whether the application was unobtrusive, usable, etc. (typically via a questionnaire)

CHAPTER 6

Discussion

6.1 Discussion

Discuss how you solved your problems from 1.3, and what the results were (from section 5). Describe alternative solutions, what you could have done differently, problems you encountered, how your results compare to other peoples' results, etc. Go through each problem individually, and then in the end add general remarks and discussion points which are outside the problems themselves but that you think may be valuable to share with the reader. This section can have several subsections.

Conclusions and future work

7.1 Conclusions and future work

This section describes the outcome of your work and summarizes your efforts. It also outlines things that are left to do to reach a full solution, or to integrate your solution with something else.

CHAPTER 8

References

8.1 References

This section should be easy if you always write down your references the moment you read them / use them. There are, however, several acceptable ways of writing references. There are plenty of instructions online to help you get these correct. The typical format is: [1] Authors separated by comma, "Title in cursive and within citation marks", Place of publication, (for articles you also add issue, number, and pages as well), date.

instead of [x] you can also use [First Author (, et. al), year]

REFERENCES
