UNIVERSITY OF TARTU
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE
Institute of Computer Science

Your Name

# Thesis Tittle

Master/Bachelor Thesis (30 EAP)

*Supervisor: his/her name, degree*
*Co-supervisor: his/her name, degree*

**Author:..... ".....” Month 201X**

**Supervisor:..... ".....” Month 201X**

**Professor:..... ".....” Month 201X**

TARTU, 201X

# Abstract

150 words explaining your work

# Contents

**List of Figures** **v**

**1 Introduction** **3**

1.1 Introduction . . . . . 3

1.1.1 Motivation . . . . . 3

1.1.2 Contributions . . . . . 3

1.1.3 Outline . . . . . 3

**2 State of the Art** **5**

2.1 Topic . . . . . 5

2.2 Summary . . . . . 5

**3 Problem Statement** **7**

3.1 Research Question . . . . . 7

3.2 Summary . . . . . 7

**4 Your Contribution** **9**

4.1 Your Brilliant Ideas ... . . . . 9

4.2 Summary . . . . . 9

**5 Case Studies** **11**

5.1 Case of Study... . . . . 11

5.2 Summary . . . . . 11

**6 Conclusions** **13**

**7 Related Work** **15**

**8 Future Research Directions** **17**

**9 Sisukokkuvõte** **19**

**Bibliography** **21**

# List of Figures

## LIST OF FIGURES

# Acknowledgements

I would like to acknowledge ...

## LIST OF FIGURES

# 1

# Introduction

## 1.1 Introduction

Briefly summarize the question (you will be stating the question in detail later), and perhaps give an overview of your main results. (it is not just a description of the contents of each section)

### 1.1.1 Motivation

Some of the reasons why it is a worthwhile question.

### 1.1.2 Contributions

Solution developed - (e.g. algorithm, tools, etc.)

### 1.1.3 Outline

Brief introduction of each chapter

# 2

# State of the Art

The state of the art used in the thesis highlighted the advances in the cloud computing domain and the mobile domain... There are a number of code offloading solutions already present. In this section we summarize the current research related to this topic and give an overview about the different types of architectures.

## 2.1 Code offloading

Dynamic Code offloading is a relatively new field of research. Solutions, which use dynamic code offloading, do not require modification of existing applications. Instead, programs that were not designed for distributed execution are partitioned at runtime based on execution history and information about the resources of the device. This means that there is no need for built-in remote execution logic in applications, it is taken care of automatically.

### 2.1.1 OLIE

The first project to use dynamic code offloading was OLIE (ofoading inference engine). This was targeted to resource-restrained devices in general, such as PDAs and mobile phones. It used the popular Java runtime due to its diversity and platform independency. The main goal was to relieve the memory constraint of the mobile device, thus enabling running memory-intensive applications without degradation. To be successful, the project needed to address two key problems: 1) when to offload and 2) what policy to use to select objects for offload. The first issue is finding the right time to trigger

the offloading process. To achieve this, OLIE constantly monitors the resources of the mobile device e.g. memory usage and wireless network bandwidth. The offloading decision is made based on a fuzzy control model, which includes a generic fuzzy inference engine and decision making rules. If the current system and network conditions match any specified rule, an offloading action is triggered. During the offloading process, some program objects are transferred to a remote device, thereby reducing the local memory requirement. For these objects, remote method invocations are automatically generated. To determine, which objects to offload, OLIE creates and maintains a graph, in which nodes are classes and edges denote interactions between classes. This graph contains information about the size of objects created by the class, number of interactions between classes and amount of information transferred between classes. OLIE uses an advanced algorithm to find the best 2-way cut of the graph, based on the target memory consumption and resource status. According to the result of this computation, objects are migrated between the remote server and mobile device.

## 2.2 Summary

Summarize the chapter with at least two paragraphs.

# 3

# Problem Statement

Transition - Since the establishment of SyncML by the Open Handset Alliance (OHA); the synchronization of data is the adopted approach for supplying cloud resources to the handset...

## 3.1 Research Question

Engineering theses tend to refer to a problem to be solved where other disciplines talk in terms of a question to be answered. In either case, this section has three main parts: 1. a concise statement of the question that your thesis tackles 2. justification, by direct reference to section 3, that your question is previously unanswered 3. discussion of why it is worthwhile to answer this question.

## 3.2 Summary

To counter the problems with the interoperability across multiple clouds, to perform data-intensive processing invocation from the handset and to introduce the platform independence feature for the mobile cloud applications, the following thesis discusses a Mobile Cloud Middleware (MCM) (**?** ). The middleware provides a unique interface for mobile connection and multiple internal interfaces and adapters, which manage the connection and communication between different clouds. The MCM capabilities for managing the resource intensive tasks can easily be envisioned in several scenarios which are discussed in further sections as case of study.

## 3. PROBLEM STATEMENT

# 4

# Your Contribution

Transition - Several are the issues that were discussed in previous chapter, regarding the use of cloud services from the mobile...

## 4.1 Your Brilliant Ideas ...

This part of the thesis is much more free-form. It may have one or several sections and subsections. But it all has only one purpose: to convince the examiners that you answered the question or solved the problem that you set for yourself in Section 4. Here, you have to present. Your brilliant idea(s), description, mathematical model that support your idea(s), analysis of the solution (e.g. performance, scalability, etc.)

## 4.2 Summary

Summarize the chapter with at least two paragraphs.

# 5

# Case Studies

Transition - The development of mobile applications that requires data-intensive processing and at the same time that keeps a tolerable interaction with the user, its feasible though the use...

## 5.1 Case of Study...

## 5.2 Summary

Summarize the chapter with at least two paragraphs.

# 6

# Conclusions

Summarize your work and results.

# 7

# Related Work

Compare your solution with existing projects. How your solution is better than the others?, why to use your solution?, etc.

# 8

# Future Research Directions

Briefly indicate how your current research can be extended, some improvements, etc.

## 8. FUTURE RESEARCH DIRECTIONS

# 9

# Sisukokkuvõte

Eesti abstract...

# Bibliography

[1] G. Chen, D. Kotz, A survey of context-aware mobile computing research.