Aalto University School of Science Degree Programme in Computer Science and Engineering

Gonçalo Marques Pestana

# Energy Efficiency in High Throughput Computing

Tools, techniques and experiments

Master's Thesis Espoo, 1 December, 2014

DRAFT! — September 25, 2014 — DRAFT!

Supervisors: Professor Jukka K. Nurminen Advisor: Zhonghong Ou (Post-Doc.)



Aalto University School of Science

## School of Science ABSTRACT OF Degree Programme in Computer Science and Engineering MASTER'S THESIS

Author:	Gonçalo Marques Pestana			
Title:				
Energy Efficiency in High Throughput Computing Tools, techniques and experi-				
ments				
Date:	1 December, 2014	Pages:	12	
Major:	Data Communication Software	Code:	T-110	
Supervisors:	Professor Jukka K. Nurminen			
Advisor:	Zhonghong Ou (Post-Doc.)			
abstract				
Keywords:	energy efficiency, scientific computing,	ARM, In	itel, RAPL,	
	tools, techiques			
Language:	English			

## Acknowledgements

I wish to thank all students who use LATEX for formatting their theses, because theses formatted with LATEX are just so nice.

Thank you, and keep up the good work!

Espoo, 1 December, 2014

Gonçalo Marques Pestana

#### Abbreviations and Acronyms

2k/4k/8k mode COFDM operation modes

3GPP 3rd Generation Partnership Project

ESP Encapsulating Security Payload; An IPsec security

protocol

FLUTE The File Delivery over Unidirectional Transport pro-

tocol

e.g. for example (do not list here this kind of common

acronymbs or abbreviations, but only those that are essential for understanding the content of your thesis.

note Note also, that this list is not compulsory, and should

be omitted if you have only few abbreviations

### Contents

Al	obreviations and Acronyms	4
1	Introduction 1.1 1st section	<b>6</b>
2	Background	7
3	Tools and techniques for measuring energy efficiency of scientific software applications	8
4	Experiments	9
5	Conclusions	10
$\mathbf{A}$	First appendix	12

### Introduction

#### 1.1 1st section

this is why I'm writing[1]

Background

Tools and techniques for measuring energy efficiency of scientific software applications

## Experiments

## Conclusions

## Bibliography

[1] European Commission. Strategic developments for the european publishing industry towards the year 2000 - europe's multimedia challenge, 1996.

#### Appendix A

## First appendix

This is the first appendix. You could put some test images or verbose data in an appendix, if there is too much data to fit in the actual text nicely.