# Positive Energy Worker

## Subtitle

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I can not dedicate something that does not belong to me, so dear parents . . .

# Acknowledgements

And I would like to acknowledge ...

# Abstract

This is where you write your abstract ...

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# Chapter 1

# General Introduction

Intro: Blockchain, IoT, Cloud Computing, fancy words that shaped the actual era of IT
Problem: With all the innovation they have brought, are we using them the right way ?
Previous trials
Project's purpos

In this context, this project, originally suggested by iExec, is performed as part of the preparation to obtain the computer science engineering degree from the Faculty of Mathematical, Physical and Natural Sciences of Tunis, University of Tunis ELMANAR, Tunisia. This report illustrates the work that has been done, from design to requirements and implementation. Those topics are covered in five chapters, we start by contextualizing the project and discussing the state of the art by comparing our perspective to some existing ones. After, we present the requirements and technical specifications which will lead us to the implementation details. Finally we conclude and suggest some improvements to the current limitations.

# Chapter 2

# Project Context

## 2.1 Context

- pfe
- Engineering degree

## 2.2 Host company

Started in 2016, iExec was co-founded by Dr. Gilles Fedak and Pr. Haiwu He.

Ph.D, CEO and Co-Founder, Dr. Gilles Fedak has been a permanent INRIA research scientist since 2004 at the ENS in Lyon, France. His research interests lie in Parallel and Distributed Computing, with a particular emphasis on the problematic of using large and loosely-coupled distributed computing infrastructures to support highly demanding computational and data-intensive science. He co-authored about 80 peer-reviewed scientific papers and won two Best Paper awards. Pr. Haiwu He, Ph.D, Co-Founder and Head of Asian-Pacific Region was a research engineer expert at INRIA Rhone-Alpesin Lyon, France from 2008 to 2014. He has published about 30 refereed journal and conference papers. His research interest covers peer-to-peer distributed systems, cloud computing, and big data.

iExec aims at providing decentralized applications running on the blockchain a scalable, secure and easy access to the services, data-sets and computing resources they need. This technology relies on Ethereum smart contracts and allows the building of a virtual cloud infrastructure that provides high-performance computing services on demand.

iExec leverages a set of research technologies that have been developed at the INRIA and CNRS research institutes in the field of Desktop Grid computing. The idea of Desktop Grid (aka. Volunteer Computing) is to collect the computer resources that are underutilized on the Internet to execute very large parallel applications at the fraction of the cost of a traditional supercomputer. iExec relies on XtremWeb-HEP, a mature, solid, and open-source Desktop Grid software which implements all the needed features: fault-tolerance, multi-applications, multi-users, hybrid public/private infrastructure, deployment of virtual images, data management, security and accountability, and many more.

iExec is developing a new Proof-of-Contribution (PoCo) protocol, that will allow off-chain consensus. Thanks to the Proof-of-Contribution, external resource providers will have the usage of their resources certified directly in the blockchain.

iExec aims to deploy a scalable, high-performance, secure and manageable infrastructure sidechain that will promote a new form of distributed governance, involving key HPC, big data and cloud industry leaders.

iExec is using its ERC20-compliant token to provide standard and secure payments. RLC which stands for "Run on Lots of Computers", can be securely and easily stored, transferred, traded, divided and used to make payments. This widely adopted cryptocurrency (87 million RLC are currently in circulation) is used to access all iExec's services.

From a research project, iExec is now a company, whose headquarters are in Lyon, France, with a subsidiary in Hong Kong.

## 2.3 Problematic

- Enegy Consumption
- Centralized Services
- Idle IoT devices
- Idle Computing resources

## 2.4 Suggested Solution

- Positive Energy Worker - Usefull use cases - Multi-functionality IoT devices

## 2.5 Adopted Methodology

- To Do

## 2.6 Hidden section

**Lorem ipsum dolor sit amet**, *consectetur adipiscing elit.* In mag a dignissim nisl iaculis nec. Praes et tempus mi cursus.

Etiam elementum eleifend sed [1]. Maecenas dapibu augue ut urna Integer non dictum nunc.

[1] My footnote goes blah blah blah! ...

# Chapter 3

# State of The Art

## 3.1 Introduction

- what's out there

## 3.2 Critique de l'existant

- Centalized
- Energy Consumption
- Idle resources

## 3.3 Conclusion

# Chapter 4

# Design & technical specifications

## 4.1 Introduction

- intro

## 4.2 Architecture

### 4.2.1 Global System Architecture

### 4.2.2 Scheduler

### 4.2.3 Worker

### 4.2.4 Software Development Kit (SDK)

## 4.3 Detailed Design

## 4.4 Conclusion

# Chapter 5

# Requirements and Analysis

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- intro

## 5.2 Requirements

### 5.2.1 Functional Requirements

### 5.2.2 Non-Functional Requirements

## 5.3 Analysis

### 5.3.1 General Use Case Diagram

### 5.3.2 System Sequence Diagram

## 5.4 Conclusion

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- intro

## 6.2 Environment

### 6.2.1 Hardware

### 6.2.2 Electronic Card: Raspberry Pi

### 6.2.3 Solar Panel

### 6.2.4 Battery

### 6.2.5 Witty Pi

### 6.2.6 Software

### 6.2.7 Development Technologies

### 6.2.8 Documentation

## 6.3 Illustration

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# Chapter 7

# General Conclusion And Perspectives

# References