

**REFACTORING AND FURTHER DEVELOPMENT OF REAL-TIME  
ORCHESTRATION SYSTEM FOR SMART GRID CONTROLLER**

By

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## STATEMENT BY THE AUTHOR

I hereby declare that this thesis is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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## ABSTRACT

### REFACTORING AND FURTHER DEVELOPMENT OF REAL-TIME ORCHESTRATION SYSTEM FOR SMART GRID CONTROLLER

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Smart grid, which is regarded as the future power grid, utilises two-way flows of information and electricity to create a distributed and automated energy delivery network. The aim of this thesis is to refactor and develop software capabilities for real-time orchestration system in smart grid operations. The developed functions are expected to enable intelligent power system operations on smart grid controller unit. To ensure that behaviour of the legacy system is preserved, a method to refactor the orchestration system is presented and applied to the system. Development of features to enable interaction between orchestration system and database systems are also elaborated. Furthermore, distributed version control system implementation is proposed to enable version control capability in the orchestration system.

*Keywords: Smart Grid, Orchestration System, Refactoring, Code Smells, Database, NoSQL, ArangoDB, Version Control, Git*



## DEDICATION

This thesis is dedicated to my family and my closest friends, for their unwavering support and presence throughout difficult and trying times.



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