

**FURTHER DEVELOPMENT AND IMPLEMENTATION OF SOFTWARE  
ARCHITECTURE FOR SMART GRID CONTROLLER**

By

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11401054

BACHELOR'S DEGREE  
in

MECHANICAL ENGINEERING – MECHATRONICS CONCENTRATION  
FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY

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July 2018

**Revision after the Thesis Defense on 19 July 2018**

## STATEMENT BY THE AUTHOR

I hereby declare that this submission 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

### FURTHER DEVELOPMENT AND IMPLEMENTATION OF SOFTWARE ARCHITECTURE FOR SMART GRID CONTROLLER

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Research and development on smart grids have been a worldwide revolutionizing trend. The research trend aimed to achieve two things: intelligent, efficient energy expenditure and a seamless integration of decentralized renewable energy sources. A step towards that objective could be done by creating better, flexible software architecture for the implementation of smart grid. In this thesis, the software architecture is to be further developed and implemented for the smart grid controller. The developed software architecture is expected to retain its functionality to restrict unauthorized access by using access control, to establish communications between smart grid controllers, and additionally to add flexibility to the system for future developments. Moreover, the research methodology in this work analyzes the previous implementation of software architecture and used the key principles of test-driven development (TDD) to further develop the software architecture. As a result, the software architecture is updated to accommodate a better smart grid with the use of the combined implementation of service-oriented architecture and container-based architecture.

*Keywords: Smart Grid, Software Architecture, Access Control, Docker, OpenVPN, API, SOAP, Web Services, Test Driven Development.*



## **DEDICATION**

This thesis work is dedicated to my beloved family for their unyielding support, to my closest friends, and to my Mechatronics Engineering batch 2014 classmates.



## ACKNOWLEDGEMENTS

This thesis work was carried out during February-June 2018 at the Power Systems and Power Economics Laboratory of the South Westphalia University of Applied Sciences, Soest.

First and foremost, I would like to express my greatest appreciation and respect to Prof. Dr.-Ing. Egon Ortjohann that had given me the opportunity to be a part of and contribute to the Smart Grid research project.

I would also like to express my gratitude to the laboratory members, especially Dipl.-Ing. Andreas Schmelter and Sashipong Leksawat, M.Sc., who had given me support and guidance towards the completion of this thesis.

I am also grateful to Dr. Rusman Rusyadi, B.Sc, M.Sc., who supported and advised me for my thesis, and the rest of Mechatronics Engineering lecturers of Swiss German University that have patiently taught and guided me during my studies.

I am thankful to my family that has been very understanding and supportive of me in the realization of this thesis work.

I would also like to extend my thanks to Renaldy, Timotius Eka and Wilbert Adiputra for their support that made the completion of this thesis possible.

Lastly, I would like to thank my Mechatronics Engineering batch 2014 classmates for their company and support for the last four years; especially, Inki Sandiko, Reinaldo Qiu and Mohammad Ryan Dirgantara.

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