UNIVERSITI TEKNOLOGI MARA

ENERGY EFFICIENCY ON DATA CENTRE UNIVERSITI PENDIDIKAN SULTAN IDRIS USING INTERNET OF THINGS (IoT) FOR SMART COOLING SYSTEM

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Dissertation submitted in partial fulfilment
of the requirements for the degree of
Master of Science
(Computer Networking)

Faculty of Computer and Mathematics Science

January 2019

ABSTRACT

The data centre is a facility that consumes a lot of energy and electricity, where it stores the critical data and integrated systems of the user. Other than electricity consumption, air conditioning system is very important to cover the servers, network switches and etc. from the heats. Heat propagation can increase the temperature and causes damage to rack servers, where protection of the system and prolonging their life by cooling the inherent devices is of crucial importance. This research is to implement an IoT in the data centre, UPSI. Therefore, by using the main component such as temperature & humidity sensor DHT22 to collect data. Then, the processed data transmitted through ESP8266EX wireless transceiver module to send data to the cloud. Finally, displaying the results of communication on I2C OLED Module-Blue. In addition, in order to let its display on monitoring based using web-based ThingSpeak.com and Matlab Analytical Tools to analyse the data. This is the best practice to implement an IoT as a new environment in the working place and the approach will enable green cloud computing environment and efficient utilization of energy at data centres UPSI. Comprehensive evaluation, it is a kind of environmental conditions monitoring programme which is low power consumption, low cost, in real-time and remotely.

ACKNOWLEDGEMENT

First of all, Alhamdulillah and thanks to Allah for giving me the opportunity to embark on my Master and for completing this long and challenging journey successfully. My sincere gratitude and thanks go to my supervisor Puan Rozita Yunos and Dr. Siti Arpah Ahmad.

My appreciation goes to my lovely wife, Ezma Rozainee and my daughter, Eryna Sofea for supporting me and give me a motivation to complete my dissertation. Special thanks to my colleagues and friends for helping me with this project.

Finally, this thesis is dedicated to the loving memory of my very dear late father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Al-Fatihah.

TABLE OF CONTENTS

CHAPTER ONE
INTRODUCTION

Chapter one of this research is the identification of the project. This chapter covers background research on the Data Centre, Internet of Things (IoT) implementation, system monitoring, sensor, and software. In addition, the sub-topics are also discussed in this chapter is the Background Study, Problem Statements, Research Questions, Research Objectives, Research Scope and Limitation, Significant of Research and Summary.

1.1   Background of Study

Data Centre is the place for a variety of applications and host servers where it stores the critical data and integrated systems for an institution and an organization that has its own database. It's also referred to as a facility used to accommodate computer systems and associated components such as servers, switches and storage facilities. Nowadays, many organizations are moving their service to the cloud because of high flexibility, cost efficiency, robustness, and scalability. Cloud computing is a way to provide users with remote access to virtualized computing storage and resources to build their IT infrastructures. To provide cloud services to be running all the time, technical migration directly used to help virtual machines to move from one host to another physical host without considering of electricity consumption has been widely used by the IT equipment's and Heating, Ventilation and Air Conditioning (HVAC). Other than electricity consumption, air conditioning system is very important to cover the servers, network switches and etc. from the heats. Therefore, by using the technology Internet of Things (IoT) it can be used to monitor the temperature in the data centre in addition to learning the ways of addressing the problem of energy efficiency.

In the year 2011, ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) specifies ranges of environmental parameters in its Thermal Guidelines for Data Processing Environments. The allowable range values of air temperature and humidity for the data centres is 18-27°C and 5.5°C to 15°C dew point temperature is 60% (relative humidity). According to research, more than 60% of