

DEVELOPMENT CLOUD COMPUTING TECHNOLOGY USING INFRASTRUCTURE AS A SERVICE SERVICE ON AGRIBUSINESS INFORMATION SYSTEM

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ABSTRACT

The purpose of this research is to help PT . Arena Hormon Indonusa in building a website-based cloud computing system to be able to collect, process and present data at PT . Arena Hormon Indonusa, centralized on a cloud server with Infrastructure as a Service service. This research stage is done by renting a cloud server with cluster services so that when corporate data is damaged, the system can back up data so that company data is not lost. The website display design uses the wordpress application so that the branch office can order goods and the head office can monitor the branch development then to access the website the company can rent the domain first. The results of this study indicate that using cloud computing cluster can help PT . Arena Hormon Indonusa in integrating centralized data. The advantage of this research is that the head office does not need to wait for the branch office to send data via e-mail and then can monitor the progress of each branch. The weakness of this research is PT . Arena Hormon Indonusa must pay cloud and domain rent. The reason for the results of such research is because PT. Arena Hormone Indonusa wants data ordering and selling of its branches centralized on the cloud server. The impact of this research PT . Arena Hormon Indonusa can monitor the progress of each of its branches in realtime and the branch office can directly order goods and send sales data that are centralized in cloud server on PT . Arena Hormon Indonusa.

Keywords : Cloud Computing, Infrastructure as a Service (IaaS), Cloud Server, Wordpress, and Cluster

1 Introduction

PT. Arena Hormon Indonusa is a company that was established in 2015 and is engaged in Agro Industry, based in Bandung Regency which sells plant vitamin products. The company has 13

branches in 2016, 14 branches in 2017, and 15 branches in 2018. Every year, branches will increase by at least one.

Based on interviews with the Head of IT at PT. Arena Hormon Indonusa in Bandung Regency explained that the central branch in Bandung Regency already has a Sales Information System in the form of a desktop sales application and has an offline server to store, process and present sales data. Then the branch in the City of Jakarta, Medan City also has the same system in the Bandung Regency. However, other branches have sales information systems using Microsoft Excel applications to store, process and present sales data and do not have servers to store their data.

Another problem obtained from the interview with the Head of IT at PT. Indonusa Hormone Arena, which is a company that wants to request sales data for each of its branches, must send data via e-mail and whatshapp so that in processing all of the sales data is stored on a server located in the central branch.

In addition, from interviews with the Head of IT at PT. Indonusa Hormone Arena is also known that data monitoring cannot be done in realtime because the recap of the data that has been processed is sent via e-mail and whatshapp and the data that has been sent is entered into the server by the central office admin. These problems are the obstacles because there is no communication technology system that processes and integrates the data.

Based on the description of these problems, we need a Cloud Computing system that can facilitate the collection, processing of data in 15 branches and centralized in the cloud server under the auspices of PT. Arena Hormon Indonusa and can monitor data or monitor data on each branch in real time. The research is related to monitoring realtime data that has been done by Angga Setiyadi and Eko Budi Setiawan. In this study Angga Setiyadi and Eko Budi Setiawan Setiyadi suggested using realtime monitoring in order to be able to monitor data ordering of goods and sale of goods for each branch and then to increase in terms of product sales [1].

By using a *Infrastructure Service as a Service* based on cluster [2] is a solution to solve problems at PT. Arena Hormon Indonusa because by utilizing the service there is no need to think about the resources of the hardware, network and data storage that can be backed up in the event of a malfunction at PT. Arena Hormon Indonusa [3]. The company can monitor data in realtime [1] by monitoring each of its branches [1].

2 Content

2.1 PT Arena Hormon Indonusa

PT. Arena Hormon Indonusa is a company engaged in agriculture specifically industry plant production of plant stimulants. For a manufacturer, of course, requires suppliers and distributors. Supplier itself is obtained from various regions both inside and outside the country. Likewise, distributors only focus on the domestic market. PT. Arena Hormon Indonusa was established in 2015.

This company focuses on customer service and product quality. With the hope that customers will be loyal to the products offered. In the marketing concept, PT. Arena Hormon Indonusa does various ways to attract customers, including giving gift packages to customers. That way the relationship between the company and the customer is always well established.

2.2 Agribusiness Information System

According to Scott in Deni Darmawan's research the system is input, processing, and output [4]. Based on Nur Fauzi's research, the system is a collection of several components that are interdependent with each other [5].

Based on the understanding of information systems according to Deni Darmawan and Kunkun Nur Fauzi, it can be concluded that the system is a group of components and elements combined into one to achieve certain goals.

Based on the research Deni Darmawan information is a collection of some data that can be processed [6]. Based on the research Deni Darmawan information is a collection of some data that has been processed and can be justified [5].

Based on the understanding of information according to Deni Darmawan and Kunkun Nur Fauzi, it can be concluded that information is a collection of data or facts that have been processed into something useful for the recipient.

Understanding Agribusiness According to Downey and Erickson is an activity related to agriculture [7].

Based on the understanding of agribusiness from research A.incolin is a matter related to agriculture where people can sell and market products related to agriculture [8].

Based on the understanding of Agribusiness according to Downey and Lincoln it can be concluded that agribusiness is a matter related to

agriculture in which there is a market for processed agricultural products that are ready to be marketed to the community.

2.3 Cloud Computing

Cloud computing is a system that can unite and integrate data that is centralized on a server that can be rented according to needs [3].

Cloud computing is a client server model where services such as servers, data storage, networks, and software can be used [9].

From the above understanding it can be concluded that cloud computing is the use of internet-based computing technology to do computing. This system uses to access all information stored and centralized on a cloud server [10] with an internet network where services such as servers, data storage, networks, and software can be accessed by users at any time.

2.4 Cloud Computing Services

In this study the model used is *Infrastructure as a Service* which aims to help adjust the needs of users [3].

2.4.1 Infrastructure As A Service

Infrastructure As A Service is a service for Cloud computing that emphasizes providing network computer services [3].

Infrastructure as a Service is the user can use basic computer services such as processing power, data storage, network components [9].

From the above understanding it can be concluded that *Infrastructure as a Service* is a type of service that provides cloud computing infrastructure in the form of networks, storage, processors, and other devices. With this service the user is allowed to install something that is needed such as the operating system, create their own applications, make server security as needed.

1. Infrastructure as a Service Features

The features contained in *Infrastructure as a Service* can be used if you have rented this feature, namely:

1. *Infrastructure as a Service* choice that can be rented according to your needs
2. The operating system that has been available in accordance with the needs if you have rented.
3. Media storage services that have been provided if you have rented [3].

2. Mechanisms of Infrastructure as a Service

Following below is the mechanism of *Infrastructure as a Service*, namely:

1. Users rent cloud servers as needed.
2. The user selects the server location to be desired
3. The user configures the leased cloud with the specified cluster concept [2].

4. Users can set the amount of data to be used
5. Users can use the service if it has been configured in accordance with the concepts that have been designed [3].

3. Benefits

The benefits of using Infrastructure as a Service are as follows:

1. It is not necessary to build a corporate network infrastructure.
2. Costs incurred according to needs.
3. Has own access rights [3].

2.5 Problem Analysis

Problem analysis is an identification of a problem that can be traced back to the procedure of the results of research conducted by the researcher so that a real problem will occur at that place.

2.6 System Analysis that is Running

This analysis is a way to study, evaluate and understand the problems faced by the system.

2.7 Data Communications Analysis

Data communication analysis is a way to study, evaluate and understand the flow of sending data from the branch office sending the data to the central office.

2.8 Data Delivery Time Analysis

Analysis of data delivery time can be interpreted as a way to study, evaluate and understand the time needed by the branch office to provide data on ordering and selling of main office goods.

2.9 Analysis of IaaS Services

IaaS service analysis at PT. Arena Hormon Indonusa to provide IT infrastructure. In other words, Infrastructure as a Service is like renting a computer that is still empty and the user who will configure the computer to be used as needed. Next IaaS that will be built are in Figure 2.1.

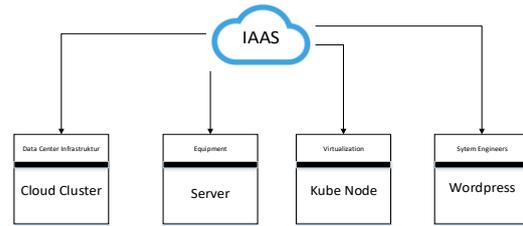


Figure 2.1 IaaS to be built

2.9.1 Analysis of Cloud Computing System Architecture

Architecture System architecture that is built to implement cloud computing has a display interface and design side. The display itself includes computer users and web browsers needed to access Infrastructure as a Service in the form of PT. The Indonusa Hormone Arena that will be used by each of its branches. While the program is located on the cloud server that aims as data storage that builds cloud computing services at PT. Arena Hormon Indonusa.

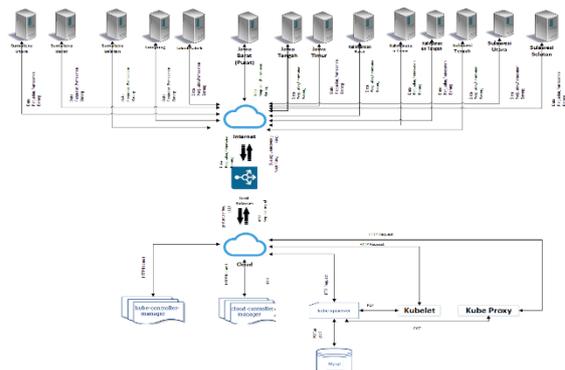


Figure 2.2 System Architecture

2.9.2 Flow Analysis of Cloud Computing Technology Design

Flow Analysis Design of Cloud Computing Technology is a way to build or make a cloud computing so that it is well configured..

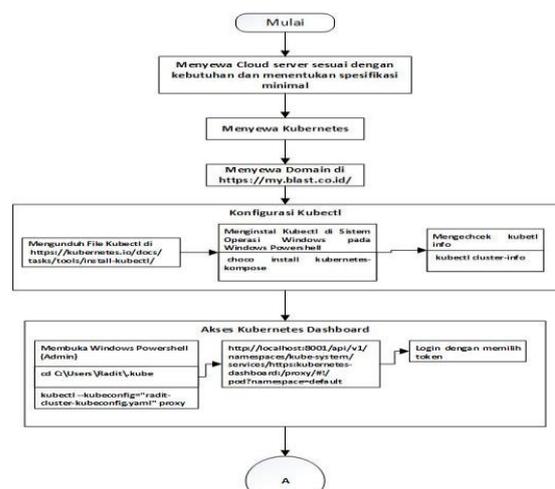


Figure 2.3 Flow Analysis of Cloud Computing Technology Design

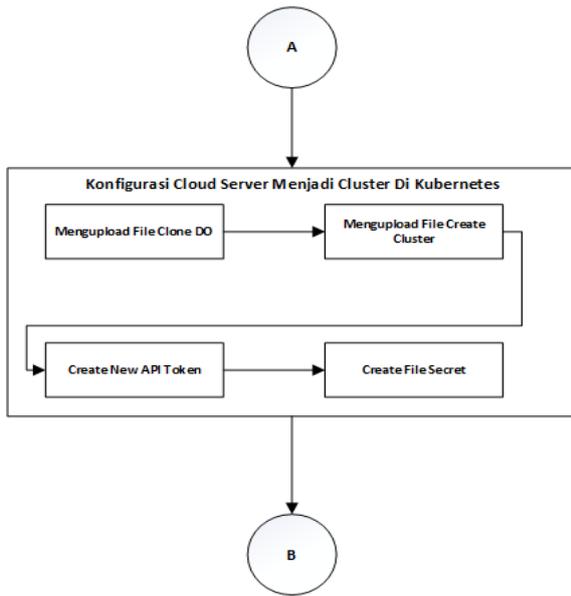


Figure 2.4 Flow Analysis of Cloud Computing Technology Design (A)

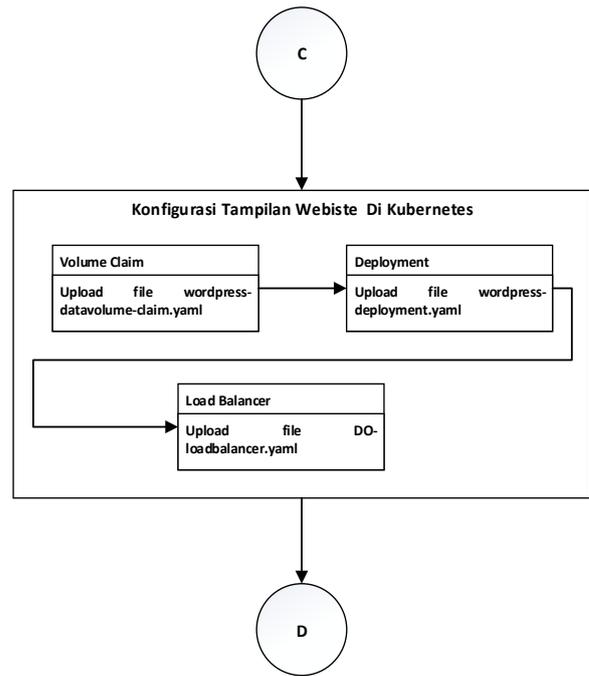


Figure 2.6 Flow Analysis of Cloud Computing Technology Design (C)

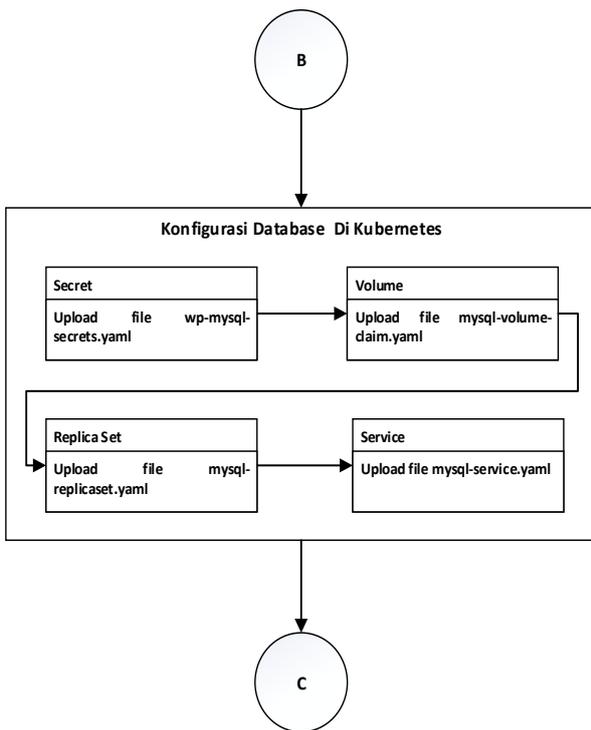


Figure 2.5 Flow Analysis of Cloud Computing Technology Design (B)

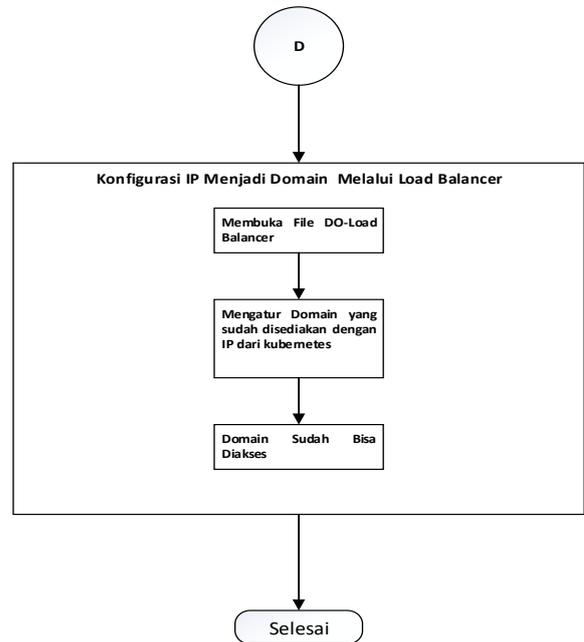


Figure 2.7 Flow Analysis of Cloud Computing Technology Design (D)

Analysis of the flow of cloud computing design above is a step to implement the Infrastructure as a Service service that will be used for headquarters and 15 branches with a website view that can be accessed by PT. The Indonusa Hormones Arena,

Following below is a brief explanation of the design and implementation of cloud computing clusters.

A. Cloud Server Rental

Cloud server leasing and specifying the minimum requirements needed to create a cloud cluster service and data storage on the cloud server. So that PT. Arena Hormon Indonusa only needs to use the services provided by the provision of computer servers, data storage and maintenance. Cloud server rental with 1 GB of memory capacity, 50 GB Storage and 1 TB Bandwidth / month <https://my.blast.co.id> using the Debian x86_64 bit Linux operating system.

B. Domain Rental

Domain Rental aims to manage web hosting so that the system built can run on a cloud server then it needs to be uploaded on the web host. The domain is rented at <https://my.blast.co.id> under the name Domain arenahormonindonusa.xyz.

C. Kubectl Configuration

This stage is the user needs a stable internet network connection to Install Kubectl. By installing Kubectl you will be able to access Kubebrowser dashboard. If it fails to install or the internet is interrupted at one stage of configuration with Kubectl, it will repeat again from the initial stage.

D. Kubernetes Dashboard Configuration

Configuring the dashboard dashboard is intended for users because in the dashboard dashboard it will manage all activities.

E. Cloud Server Configuration in Kubernetes Dashboard

Configuring an existing cloud server in Kubebrowser dashboard is intended for users who are very important in terms of development cloud computing cluster.

F. Database Configuration in Kubernetes

Configuring the Database is very important in terms of building cloud computing clusters that are used as data storage media.

G. Front End Website Configuration in Kubernetes

Configuring Website Display has a very important role in the development of cloud computing cluster so that PT Arena Hormon Indonusa can enter data on the website.

H. IP Configuration to Domain via Load Balancer

Configuring IP into a domain has a very important role in terms of building cloud computing clusters because users can access websites that have been built.

2.10 Analysis of Non-Fungsionalitas Needs

The specifications required include the components that will be needed to build the system that will be created until the system is implemented functional requirements analysis.

As for the results of cloud server analysis that will be used by PT. The Indonusa Hormone Arena as a server with a cloud server is as followst:

Tabel 2.1 Cloud server hardware specifications as a sever

Hardware	Specifications
Prosesor	Intel Core i3
Monitor	LCD 29 inch
RAM (Memory)	2 GB DDR3
VGA	On Board
Harddisk	500 GB
Network Card, Wifi	As Internet Access
Supporting Device	Keyboard, Mouse

The following specifications of software requirements as a server with a cloud server are as follows :

Tabel 2.1 Cloud server hardware specifications as a sever

Software	Specifications
Operating System	Debian
Bandwidth	2TB/Bulan
Ip Address	Ip Public 2
Control Panel	Kubernetes

The following specifications are the hardware requirements as a client namely :

Tabel 2.2 Hardware spesification as a client

Hardware	Specifications
CPU Core	Minimum 2 Core
Harddisk	Minimum 25 GB
RAM (Memori)	Minimum 2,5 GB
Load Balancer	

The following specifications are the software requirements as a client namely:

Tabel 2.3 Software specifications as a client

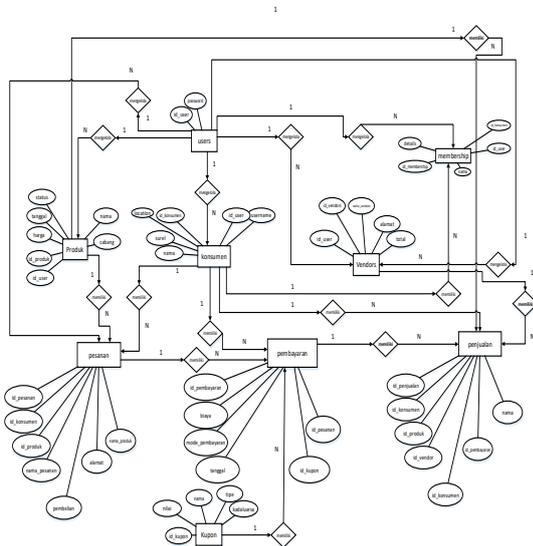
Software	Specifications
Operation System	Windows 8.2
Browser	Mozilla Firefox, Google Chrome, Microsoft Edge

2.11 Analysis of Fungsional Needs

Functional requirements analysis is a design drawing. The tools used to describe the general system to be built are Entity Relationship Diagram, Context Diagram and Data Flow Diagram.

2.11.1 Analysis of Database

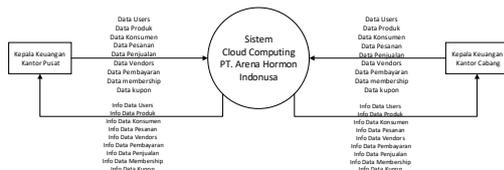
Analisis Database analysis is used to establish ERD, which is a collection of features and relationships that are translated through a collection of fields related to the system .



Gambar 2.1 Entity Relationship Diagram

2.11.2 Context Diagram

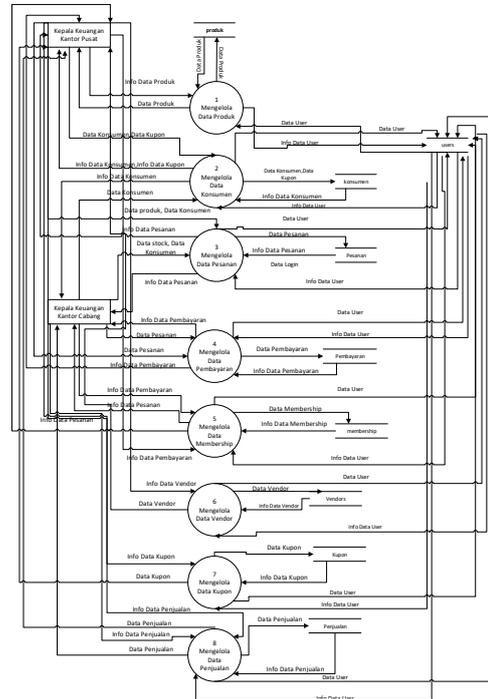
Context Diagram is a clear picture of the data in the system used and changed to describe the flow of data.



Gambar 2.2 Context Diagram Website of PT Arena Hormon Indonesia

2.11.3 Data Flow Diagram

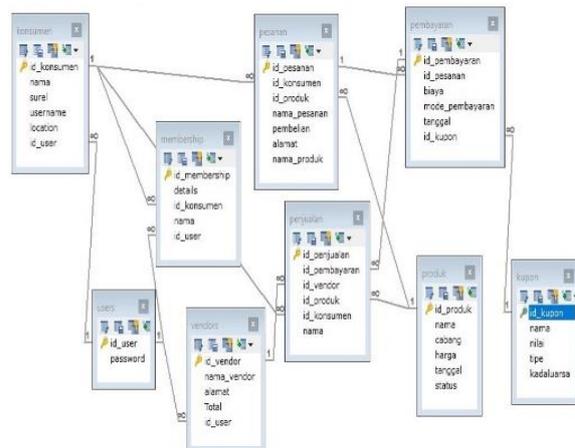
Data Flow Diagram is a technique to describe the data flow that is used as data travel from input to output.



Gambar 2.3 DFD Website PT Arena Hormon Indonesia

2.11.4 Relationship Scheme

A relationship scheme is a relationship between two or more tables in a database system. As well as combining the fields that have the key to connect these fields.



2.12 Implementation and Testing

The implementation and testing phase is the stage to implement the design based on the results of the analysis that has been done on the system so that the application of software built in a real environment and ready to operate.

2.13 Implementation of Cloud Computing Design Flow

After analyzing the design of Cloud Computing, it will then be implemented the stages of analysis that have been analyzed starting from the beginning to completion.

The stages of implementation that will be carried out aim to complete with the design and analysis that have been completed.

3 FINALITY

3.1 Conclusions

The conclusions that can be drawn after going through the stages of development implementation to the testing of systems and services of Cloud Computing Website PT. Arena Hormone Indonusa, then that with the application with cloud computing technology, the following conclusions are obtained:

1. With the Cloud Computing system can help each branch in the collection, processing, presentation of data recap of sales of goods and ordering goods to the central office without each branch need to send the data via e-mail.
2. With the Cloud Computing system can help the Head of Finance of the Head Office can monitor or monitor data ordering goods and data selling goods in realtime through the Website of PT. Arena Hormone Indonusa each branch without the need to request data ordering goods and sales data for each branch.

3.2 Recommendations

In implementing the construction of the Cloud Computing Website PT. Arena2Hormon Indonusa by using the Infrastructure as a Service service, it is hoped that the developer can correct the deficiencies so that later the Cloud Computing Website is expected to be able to better answer the existing problems.

Suggestions for developing this software, by giving a few points include the following:

1. For further development, it is expected that developers can continue this research using other methods or technologies other than cloud computing such as fog computing.
2. The system built in this study the author focuses on Infrastructure as a Service using cloud cluster services only, for further development it is expected that developers can find other focus for example in terms of the user interface, security of the Cloud Cluster and so forth.

THANK YOU NOTE

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REFERENCES

- [1] Setiyadi, Angga dan Setiawan, Eko Budi, "Information System Monitoring Access Log Database on Database Information System Monitoring Access Log Database on Database Server," 2018.
- [2] SaitoHui, Hideto, LeeKe, Chuan Chloe dan Hsu, Jou Carol, *Kubernetes Cookbook: Practical solutions to container orchestration, 2nd Edition, Edition 2*, Edition 2. China: Packt Publishing Ltd, 2018.
- [3] Pratama, I Putu Agus Eka, *Smart City beserta Cloud Computing dan Teknologi pendukung lainnya*. Bandung: Informatika, 2014.
- [4] Fatta, Hanif Al, *Analisis dan Perancangan Sistem Informasi untuk Keunggulan Bersaing Perusahaan dan Organisasi Modren*. Yogyakarta: CV. Andi Offset, 2007.
- [5] Darmawan, Deni dan Fauzi, Kunkun Nur, *Sistem Informasi Manajemen*. Bandung: PT. Remaja Rosdakarya, 2015.
- [6] J. HM, *Analisis dan Desain Sistem Informasi Pendekatan Terstruktur Teori dan Praktek Aplikasi Bisnis*. Yogyakarta: CV. Andi Offset, 2005.
- [7] Saragih, Bungaran, *Agribisnis paradigma baru pembangunan ekonomi berbasis pertanian*. Jakarta: Yayasan Mulia Persada Indonesia, 1998.
- [8] Lincoln, Arsyad, *Ekonomi Pembangunan*. Yogyakarta: Bagian Penerbitan Sekolah Tinggi Ilmu YKPN, 1997.
- [9] Sofana, Iwan, *Cloud Computing Teori dan Praktik (OpenNebula, VMare, dan Amazone)*. Bandung: Informatika, 2012.
- [10] Waloeaya, Yohan Jati, *Cloud Computing- Aplikasi Berbasis Web yang mengubah Cara Kerja dan Kolaborasi Anda Secara Online*. Yogyakarta: CV. Andi Offset, 2012.