Designing Architecture Technology Based Cloud Computing in Building Materials Manufacturer

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ABSTRACT

Users can access the necessary services from anywhere and at any time thanks to the cloud computing technology, which places the majority of processing and computing on the Internet. However, in practice, each business develops its own information systems architecture and requirements. This brings up a number of issues, including the potential for redundant information systems, the lack of data structure standards, the inability of information systems to consolidate their data, and inconsistent information system development. The motivation behind developing a model of information technology architecture using the idea of cloud computing stems from some of these issues. A cloud-based information technology architectural model was created in line with the requirements and needs of the organization based on the analysis of the company's state and the use of the chosen framework. Another Indonesian company is anticipated to benefit from the research, primarily as a resource for constructing the information technology architecture.

KEYWORDS: Information Technology Architecture, Cloud Computing, Manufacturer

1. Introduction

Information technology architecture within an organization becomes the blueprint (blue print), which explains how the elements of technology and information management work together as a single unit. Thus the application of information technology architecture will greatly help meet the organizational goals.

The presence of latest Cloud Computing technology in the world of information technology provides enormous benefits in the design of information technology architecture where the majority of computing is dijaringan process and the Internet, allowing users to access the necessary services from anywhere.

As said by John Zachman [2] that enterprise architecture is already no longer be an option but has become a liability. Every company is looking for a level of performance of their mission. Enterprise architecture [3] is one of management practices to maximize the contribution of the company's resources, IT investment and system development activities to achieve its performance objectives. In order to achieve the organization's mission through optimal performance of business processes with environmental efficiency of information technology (IT), the application of enterprise architecture should be included in the roadmap of the company [4]. Enterprise architecture to help organize and clarify the relationship between the strategic objectives of the company, investment, business solutions and measurable performance improvement.

From 2004 and 2005 that there is rapid progress in the implementation of enterprise architecture in countries like India, Singapore and Brazil. Based on a survey of 2003 enterprise architecture applied to the main thing is to manage complexity (managing complexity), provides a road map (road map) but gradually in the space of two years in 2005 the application of enterprise architecture turned into a means of support in the decision decision (supports decision making), and to arrange for the company's IT portfolio (manage IT portfolio) [5].

TOGAF is an industry standard for architecture development method and a resource base that can be used freely by any organization wishing to develop enterprise

architecture for use in the company itself. TOGAF provides a variety of methods and tools to assist companies in preparing for, develop, deploy and maintain the architecture of the company. TOGAF made and continue to be refined on an ongoing basis based on best practice from various companies and organizations. TOGAF architecture supports four types, namely business architecture, data architecture, application architecture and technology architecture.

The development of cloud-based architecture to be one option. [8] Perter Mell and Tim Grance of the National Institute of Standards and Technology (NIST) Information Technology Laboratory defines cloud computing as a model that facilitate the availability and configuration of services in the form of software, networks, servers, storage and applications. A service can be installed and removed easily [9]. Cloud computing models have five main characteristics On-demand self-service, Broad network access, resource pooling, Rapid elasticity and Measured Service.

2. Literature Review

2.1 Information Technology Architecture

According to Andersen [10], the enterprise architecture is a strategic information that defines the mission of the company, as well as information technology and what it will take to achieve the mission. Enterprise architecture consists of basic architecture, architecture and planning objectives that are structured to achieve the goal. The basic architecture of an enterprise architecture is an existing condition (existing), such as the enterprise network architecture. Architecture is an architecture firm goal to be achieved or will be constructed (to-be). To achieve the goal of architecture, we need a plan and measures structured so that gradually will be achieved.

Information technology architecture is the basic organization of software intensive systems. A system is a software-intensive because the most prominent part of the architecture is the application of information technology, the part that allows the user to perform business work. Framework or information technology architecture design framework is now quite widely available. But basically have the same goal which simplify the design of information technology architecture in a company.

2.2 Cloud Computing

Various definitions of cloud computing expressed by many experts and researchers [11], [12] ·. Peter Mell and Tim Grance of the National Institute of Standards and Technology (NIST) Information Technology Laboratory defines cloud computing as a model that facilitate the availability and configuration of services in the form of software, networks, servers, storage and applications. A service can be installed and removed easily [9]. Cloud computing models have five main characteristics ie On-demand self-service, Broad network access, resource pooling, Rapid elasticity and Measured Service.

In the definition expressed by Andersen [10] · emphasized the concept of distributed system (grid computing) and virtualization. In a distributed system, there was division of tasks in running a process. For example in the search process on search engines, like Google. When visitors conduct a search, then the search engines will divide tasks into multiple search engines (processors), so the search results will be produced faster. When viewed from the development, cloud computing consists of four (4) models, namely the private cloud, Community cloud, public cloud and hybrid cloud [11].

3. Methodology

The research method used as a reference using TOGAF Architecture Development Method methodology adapted to the concept of cloud computing.

ADM, or the methodology for architectural design inside TOGAF Architecture Development, is a thorough, integrated process for creating and maintaining an enterprise architecture. ADM consists of the nine fundamental steps listed below:

1. The preparation phase (Preliminary Phase): The framework and principles.
2. Phase A: Architecture Vision. Defining the scope and mapping all strategic planning.
3. Phase B: Business Architecture. Describing the current architecture business and determine the gap between them.
4. Phase C: Information System Architecture. Developing data target architecture and technology.
5. Phase D: Technology Architecture. Creating the overall target architecture which shall be applied to the next stage.
6. Phase E: Opportunities and Solutions. Developing an overall strategy, deciding what to buy, build or re-use, and how to implement the architecture described in phase D.
7. Phase F: Migration Planning. Migration Planning. Putting the project and develop planned migration.
8. Phase G: Implementation Governance. Determining preparation for implementation
9. Phase H: Architecture Change Management. Monitoring system and determine whether to start a new cycle should repeat back to the preparatory stage.
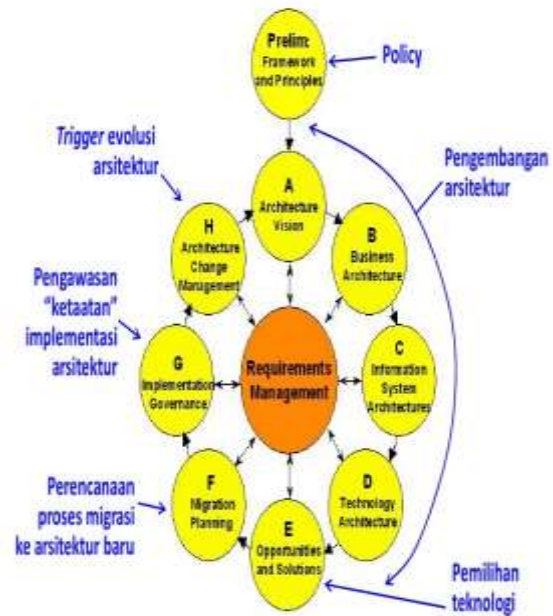

Figure 1. Research Methodology

4. Results and Discussion

4.1 Analysis of Application Architecture

Analysis on Information System Architecture conducted to determine activity include architecture information system architecture of data and applications used by the company. Data architecture focuses on how the data is used for the needs of business functions, business processes and business services.

That they observed there 5 application information system implemented by the company. The information system applications, among others:

1. Human Resources Information System.
2. Accounting out information system.
3. Purchasing Information System.
4. Warehouse Information System.
5. Production Information System.

Based on the results of the mapping application in the enterprise information system, there are several applications that include Support categories, namely: Information Systems Helpdesk, Information Systems Goods Inventory, Website and E-Mail. That is application quite necessary for the company.

In Key Operation, there are nine applications of information systems, namely: Human Resources Information System, Accounting Information Systems, Information Systems Purchasing, Warehouse Information Systems, Information Systems Production Information System. The fifth application above is a core application that is supposed to available in the company. If one or more of the application is not available, then the business process will be interrupted or obstacles. Therefore, the application will be made five services in the Cloud.

On the Strategic category, there are three systems of information, namely: Executive Information Systems, Project Management of Information Systems and Knowledge Management System. The implementation of the information system will enhance the competitiveness (Competitive Advantages) for the company. While the categories are High Potential Employee Career Development Information System.
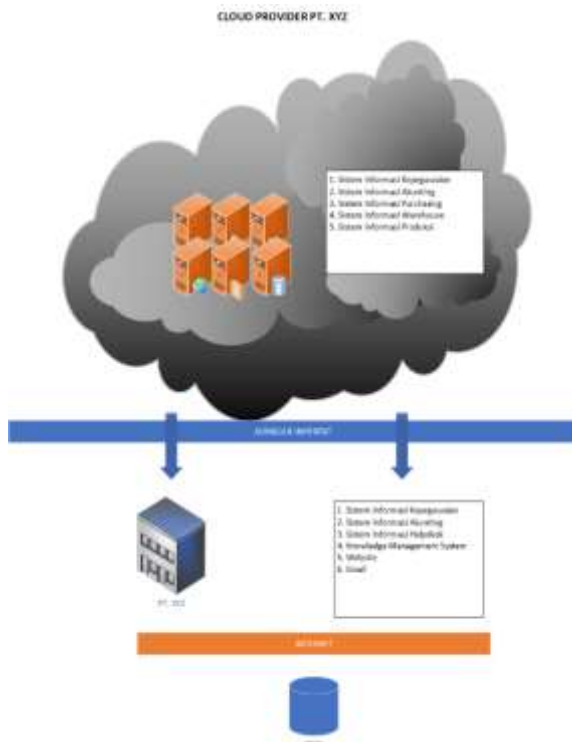

Figure 2. Cloud-based application architecture

The application architecture has the objective to define the applications required applications to manage data and business support functions that exist in college. In general, the step of mapping the relationship of applications with business functions are to: 1) Establish the use of applications that use business functions organization based on the needs of the business functions by reviewing business processes and data used, 2) determine the policies of use and how services that exist in the application that support business functions, 3) support the analysis of the gap between application roles in supporting the organization's business processes, 4) Determining the role of applications in support of business functions and identify the need for application changes in future.

Applications are becoming Key Operation placed in Cloud Provider PT. XYZ. These applications include: Human Resources Information System, System out information Accounting, Information Systems Purchasing, Warehouse Information System, Production Information System. Cloud Provider PT. XYZ through INHERENT network to each division. Information systems within the organization fall under the support categories of Information Systems Helpdesk, KMS, Website, and E-Mail, as depicted in Figure 2.

4.2 Information Technology Architecture Model

The architectural design of cloud-based information technology is currently in development. The design process begins with identifying the fundamental ideas behind the technology that will be employed up until the essential technological alternatives. The definition of technology architecture is viewed as a technological platform that will be used to support the company's business operations as well as to provide an application environment for managing data.
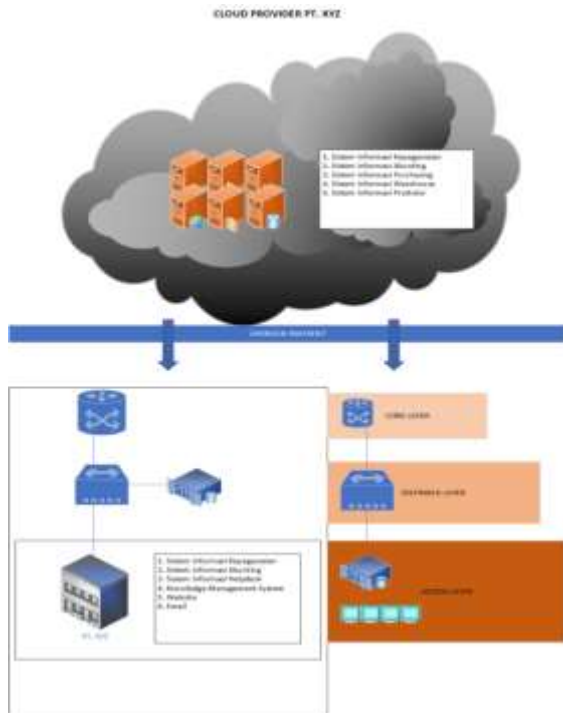
Figure 3. Information Technology Architecture Model

The first step that must be done is to determine the principles of the technology platform that will diguankan. The goal is to clearer and scalable technology includes hardware, software and communications.

Designing the architecture of information technology is done via cloud computing. The technology employed has a significant impact on how successfully cloud-based information technology develops. The cloud-based architecture model for corporations is shown in Figure 3 as a technology architecture that is based on the model of development.

Hardware, software, network services, and infrastructure management are just a few of the technological elements that make up infrastructure as a service. Hardware components include tangible elements like servers, storage, UPSs, and other auxiliary elements like a power supply. A separate server configuration can be provided for each user in accordance with their individual needs thanks to the software components, particularly about operating system and related applications. Network service components put up data communication services over the network. The network being

used is one that has always existed. The management infrastructure, which is the final component, functioned to control how the infrastructure, particularly the information infrastructure, was used.

5. Conclusion

A model for the information technology architecture organizations that make construction materials was created by employing a cloud-based architecture modeling framework based on user requirements and includes business architecture, data architecture, application architecture, and technology architecture.

The challenges caused by redundant information systems, a lack of data consolidation and standardization, and inconsistent information system development will be resolved with the implementation of the cloud computing concept and information technology design. Producing architectural models will benefit businesses because it will cut down on the costs associated with application development.

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