Framework

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FRAMEWORK OF CLOUD COMPUTING TOWARD GREEN IT GOVERNANCE IN HIGHER EDUCATION ENVIRONMENT

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Abstract

Green IT movement nowadays has become important issue while Mother Earth has already stated in many research that it already in critical condition. However, it is not easy to start the Green IT implementation especially in Indonesia, even though many actions can be set up immediately to make the world we live in live longer. One of the simple step to implement it is creating cloud computing best practice that can also make IT energy cost more efficient. Particulary in higher education environment in Indonesia that has many facultative holidays, thus it also has many idle time for its server load. Therefore, it is easier to demonstrate the usage of cloud computing toward Green IT movement in higher education environment. On the other hand, Green IT initiative that must come as IT governance policy in higher education environment will become living example for other companies to do the same thing..

Keywords: Cloud Computing, Green IT, Higher Education, IT Governance

1. Introduction

The need of fulfilling green movement has already incorporated many parts of everyday life including IT aspect. However, people still believe that green movement in IT aspect has only become an utopia nowadays. It just because paradox point of view that still see IT as big energy consumer and hardly reduce it.

The past decade has seen many businesses realize the long term effects of pollution and taking responsibility for their actions through social and environmental responsibility initiatives in ways that improve their environmental footprint. As IT plays an integral role in almost all facets of businesses, and as each

stage of the IT lifecycle from manufacturing to usage and disposal can pose environmental damages it naturally follows that demands for CSR and "environmental sustainability" should be extended to IT too [1]

Estimates indicate that ICTs account for 2% of global CO_2 emissions, which is equivalent to the amount generated by the aviation industry [2]. On the other hand, empirical research in US only has stated that nearly 82 billion lbs of CO_2 equivalent are released as a result of the electricity used by U.S. servers and data centers annually [3]. Thus, the importance of Green IT implementation should become a key point for any IT managers in order to make Mother Earth breathe happier

Especially in Indonesia, there is no valid proof which can be mentioned clearly that any corporate or institution already be concerned fully with Green IT implementation. Even in US as the biggest energy consumption from IT field, there is only 32% companies that really care about Green IT implementation [4]. While many IT managements still struggle with their person behavior and also their infrastructure efficiency, actually there is some features from Green IT movement that can be set up immediately to help Mother Earth breathe happier.

However, many Indonesian IT management will be interesting if Green IT movement is dealt with efficiency issues. Since that many top level management in Indonesia still think that IT infrastructure is running in high cost operation and must be more well-organized [5]. On the other hand, implementing Green IT concept is one best way

to have great cost-cutting in IT implementation [4].

Particularly in higher education environment, that should be a living example for other business aspect, then it should become an initiative place to start Green IT Movement [6]. The initiative could be in simple act that can lead to lower energy consumption, one of biggest concern in Green IT movement.

One of the simple act is to reduce the inner server utilization using cloud computing concept [4,7]. Cloud computing implementation at the moment has already proven as best way to reduce energy cost as well as cost-cutting on server implementation. It already stated that in US mid-size business which already implemented cloud computing can save more that $40,000 energy saving per year [4].

However, it is not a simple thing to implement a cloud computing concept in Indonesia. Since that many applications, particularly information academic system in higher education, still being built under local intranet system. Thus, it really need a different framework of cloud computing to be implemented in higher education environment.

And even though a framework has been built, it still need way to present the framework to top level management. Thus, this research try to make a prototype a special framework of cloud computing in higher education environment. Then the framework should have become another consideration of new IT governance policy toward a small step in Green IT movement in Indonesia

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2. Cloud Computing

The definition of Cloud Computing has been stated in many different ways. However, it can be resumed that cloud computing is [8] :

a. Cloud Computing is a new computing paradigm.

b. Infrastructure resources (hardware, storage and system software) and applications are provided in a X-as-a-Service manner. When these services are offered by an independent provider or to external customers, Cloud Computing is based on pay-per-use business models.

c. Main features of Clouds are virtualization and dynamic scalability on demand

d. Cloud services are consumed either via Web browser or via a defined API.

Cloud computing consists of three layers which are [2] :

a. Infrastructure as Service (IaaS)

b. Platform as Service (PaaS)

c. Software as Service (SaaS)

Cloud computing is now being used in a hybrid mode, whereby companies are splitting their workloads between their own data canter and the cloud. At this time, the vast majority of applications are hosted on-premises with only few applications used in the cloud [8]. Thus, cloud computing can handle application "outside" whenever "inside" users is not accessing the application intensively.

Why go to the cloud instead of using traditional server and application provisioning? One scenario may be a small startup com-

pany seeking to introduce its products to market quickly and having little startup capital. By using the resources provided via a cloud provider, the development of its application interface or virtual storefront can be minimized and the infrastructure expense eliminated. This provides the company with the ability to focus on the business at hand and not worry about the establishment and management of its computing environment. [4,8,9]

2. Green Computing

While Green IT is becoming more common in discussion, there is still little common understanding of what this term actually means. In typical conversations when one mentions the term "Green IT", the images being conjured could include [2] :

a. An economic concern
b. An environmental concern
c. A social concern
d. A strategic differentiator
e. An enabler of other green initiatives

Thus, Green IT can be defined as an act that includes core approaches which are [1] :

a. IT infrastructure
b. IT contribution
c. IT support
d. IT role

Green IT "real act" nowadays includes four adoption trends which are [4] :

a. Virtualization and consolidation

b. Energy efficiency

c. Travel reduction

d. Asset disposals

Green IT movement at the present time still become just another last priority for most IT managers. However, Green IT need commitment through top level management that can be achieved with "greener" IT Governance in each company [4,9].

3. Modeling Process

Thus, what should we do in modeling particular framework of cloud computing in higher education environment ? In fact, higher education in Indonesia is not always busy all the time in a year, therefore its' information system also have the same condition. For example, whenever the big holidays come such as Idul Fitri or Christmas Time, there always be facultative holidays in each universities.

However, most of higher education will not let their website or information system become idle in such time. On the other hand, it is such a waste to let their server keep running while only few people accessing it. In this situation, cloud computing implementation should come with great support from top level management.
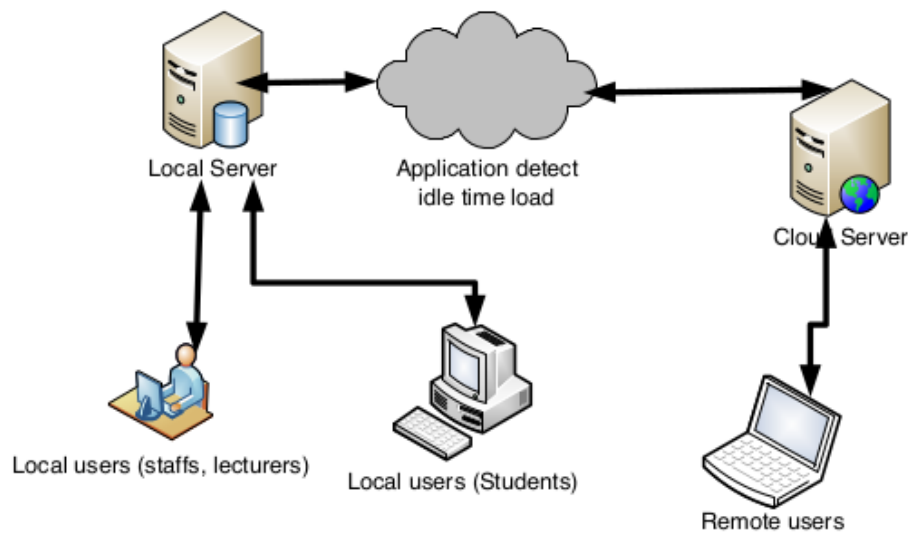
Figure 1. Framework Model

The model that being proposed in this research based on idea that in idle time, server load in higher education must be split up into virtual server that come from remote location. Remote location can be a dedicated server or another virtual private network that being hired from common web hosting provider.

Remote server that will hold the application while in idle time load, will simplify cloud computing implementation. Even though this idea only realize small parts of cloud computing which are SaaS and on-demand virtualization, when this framework being implemented, it should become great initiative to make Mother Earth live more joyful.

While cloud server handle all application process in idle time, local server must be put in power save mode and also must be transferred its latest data into cloud server. This condition will reduce energy consumption for servers load as well as energy con-

sumption in server room [7]. It also can reduce the server room energy consumption, since that server room efficiency an save up more than 80% of energy cost [9]. Therefore, it should be a consideration in making IT cost more efficient using this framework.

The framework that being proposed only use hybrid mode of cloud computing concept [8], thus it should not make the IT department do a heavy work modifying the information system in order to put this framework into practice. However, it still need effort to make server balancing it loads whenever idle time detected.

This idea might seem very simple, nevertheless it is not simple in implementing it. One of big barrier in its implementation is come from top level management. As stated before that only few top level management in the world care about the importance of Green IT, thus many IT managers (especially in higher education environment in Indonesia) will reject this idea immediately.

Most of them will try to deny the framework modeling using security issue and also questioning what is the value added behind the suggestion [4,9]. Although it already stated what is the value added of this framework and also ensuring that security issue in cloud computing is not another big problem again recently [8], it still need self concern from top level management.

It is empirically proven that realization for Green IT movement will only succeeded if it comes from top level management concern [1,2]. That is the main reason why must put this framework into IT governance that should become as initiative approach from top level management concern. Especially in higher education envi-

ronment that become living example for any other companies, whenever they succeeded proving a concept others will try to follow.

4. Conclusion

Still, this framework merely a beginning for Green IT movement. Many people still think that the effort of making the world we live in only by planting more trees or recycling garbage into something useful. However, the need of implementing Green IT is another great shot to help us inherit better world for our children.

Green IT big movement is not coming from individual, in fact it must come from company through its IT governance with full concern helping this world live longer [9]. Especially in developing country that still need better awareness how importance is Green IT.

The framework itself should also being presented more often, thus it really can change point of view from top level management of higher education environment in Indonesia. On the other hand, it is supposed to be followed by best practice example in order to ensure its usage.

Future research from this framework model is making more detail from the model and testing the framework in small scale to prove the framework. Detail of this framework must also include PaaS consideration in order making its virtualization process more feasible.

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