Towards Indonesian Cloud Campus

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Abstract- Nowadays, Cloud Computing is most discussed term in business and academic environment.

Cloud campus has many benefits such as accessing the file storages, e-mails, databases, educational resources, research applications and tools anywhere for faculty, administrators, staff, students and other users in university, on demand. Furthermore, cloud campus reduces universities' IT complexity and cost.

This paper discuss the implementation of Indonesian cloud campus and various opportunies and benefits of cloud services for universities. And suggested cloud infrastructure prototype towards cloud campus

Keywords— *cloud computing, information technology, cloud campus, infrastructure.*

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Introduction

The concept of cloud computing dates back to 1960, when John McCarthy opined that "computation may someday be organized as a public utility". The term 'cloud computing' is confusion to many people as the term can be used to mean almost anything. 'Cloud' is used as a metaphor for Internet and its main objective is customization and user defined experience. In other words cloud computing provides shared resources, software and information through Internet as a PAYGO (Pay-as-you-go) basis [2].

recent years, where In the educational institutes. campus, universities, industries are giving their full contribution in transforming the society and entire world economy. Various researches are carried out to update the present IT infrastructure especially in the area of education. Cloud computing can welcomed optioned in be а the universities, campus and educational institutes for higher studies. It gives a better choice and flexibility to the IT departments by building multipurpose computational infrastructure once and then uses it for several purposes for several times.

Google is one of the most famous cloud computing providers. Many people are using the google's cloud services, such as Gmail, Docs, Maps, and so on. With the help of cloud computing the platform and application the user uses can be oncampus or off-campus or combination of both depending on the institutions need.

At present, as many campuses are trying to update their IT infrastructure and data, but they are facing few challenges which can be solved by cloud computing. The challenges are [8];

1) **Cost**: choose the subscription or PAYGO plan.

- 2) **Flexibility**: cloud computing allows to dynamically scale the investment in infrastructures as demand fluctuate.
- 3) **Accessibility**: making the data and services available publicly without losing the sensitive information

As [4] explained, Cloud computing refers to those the applications delivered as services over the Internet and the hardware and system software in the data centres that provide the services. The data centres hardware and software is what called the cloud.

In Deployment models there are:

1.Private Cloud 2.Community Cloud 3.Public Cloud 4.Hybrid Cloud.

VII. SERVICES OF CLOUD

To use the cloud services the campuses or universities and the institutions has to first define their requirements and has to take a special attention for the privacy and critical issues. There are several cloud services as follows; [5]

- 1) **Infrastructure as a Service (IaaS):** can be used to satisfy the infrastructure needs of the students, faculties or researcher globally or locally with some specific hardware configuration for a specific task.
- 2) **Platform as a Service (PaaS):** certain providers are opening up application platforms to permit customers to build their own application without the cost and complexity of buying and managing the underlying hardware and software layers.
- 3) **Software as a Service (SaaS):** the application service provider is hosting the application which runs and interacts through web browser, hosted desktop or remote client. It eliminates the need to install and run

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the application on customer own computer and simplifying maintenance and support.

4) **Computing as a Service (CaaS):** providers offer access to raw computing power on virtual server such as Amazons, EC2 service.

Following the figure shows the university using the services of cloud computing, [6]



Fig.1 University using the services of cloud computing

VIII. CLOUD CAMPUS ARCHITECTURE

higher Due to accessibility, availability, and efficiency of cloud services many campuses, business are trying to make use of these services. Today's cloud computing providers are offering higher education, the opportunity to substitute their data and information in the cloud for campus/universities with existing data centers, servers, and application replacing these traditional campus machines.



Fig.2. (a) Cloud Campus Stuff

The Cloud Computing trend of replacing software traditionally installed on campus computers (and the computers themselves) with applications delivered via the internet is driven by aims of reducing universities' IT complexity and cost [9]. Cloud Computing could be a technological innovation that both reduces IT costs for the college and eliminates many of the time-related constraints for students, making learning tools accessible for a larger number of students. There are many benefits of cloud computing for educational institute and below are listed a few of them [1];

- 1) With cloud computing, universities can open their technology infrastructures to businesses and industries for research advancements.
- 2) The efficiencies of cloud computing can help universities keep pace with ever-growing resource requirements and energy costs.
- 3) The extended reach of cloud computing enables institutions to teach students in new, different ways and help them manage projects and massive workloads.
- 4) When students enter the global workforce they will better understand the value of new technologies [16].
- 5) Cloud computing allows students and lecturer to use applications without

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installing them on their computers and also allows access to saved files from any computer with an Internet connection [17].





Fig. 2. (a) and (b) shows the cloud stuff and cloud campus architecture. Universities can develop their own cloud by making use of their existing resources or multiple universities can come together and can develop cloud campus, in which they can share all the resources from the various universities.

IX. CONCLUSIONS

Cloud computing is an emerging computing paradigm and next generation platform that can provide tremendouz value of information of any size. The shift towards cloud campus would enable the universities and educational institutions to save maney and take benefit of the developing technology. Furthermore, using cloud campus could be share and distribute the educational resources such books, lecture notes, and other as educational resources to any kind of devices and platforms. This means that, the students able to access to the cloud using computer content by tablet. smartphone, computer notebook, etc.

The main objective of this paper was to identify the essensial of cloud campus which can be considered as a new era to the campus education and has the full potential to make a revolution in the field of education and technology in Indonesia.

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