ANALYSYS ON SECURITY ISSUE OF SERVICE DILEVRY MODEL SOFTWARE AS A SERVICE (SAAS) IN PUBLIC CLOUD COMPUTING

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"I hereby declare that I have read this thesis and in my
opinion this thesis is sufficient in terms of scope and quality for the
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ANALYSYS ON SECURITY ISSUE OF SERVICE DILEVERY MODEL SOFTWARE AS A SERVICE (SAAS) IN PUBLIC CLOUD COMPTUING.

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A project report submitted in partial fulfillment of the
requirements for the award of the degree of
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I declare that this thesis entitled *"Analysis on Security Issue of Service Delivery Model Software as A Service (SAAS) in Public Cloud Computing"* is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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To my beloved parents, their pray, patience and understanding

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ABSTRACT

The advent of cloud computing in recent years has sparked an interest from different organizations, institutions and users to take advantage of web applications. This is a result of the new economic model for the Information Technology (IT) department that cloud computing promises. The model promises a shift from an organization required to invest heavily for limited IT resources that are internally managed, to a model where the organization can buy or rent resources that are managed by a cloud provider, and pay per use. Cloud computing also promises scalability of resources and on-demand availability of resources. Cloud computing is the era of computing technology environment to increase the capacity or additional capabilities enhancement requirement without investing in new infrastructure, training new personnel or purchase or update new licensing software. Once this happen, this will involved more and more information, data or environment on individual and companies are using cloud computing service. This scenario will impact security for cloud computing environment, performance and services. Major concerning in cloud from enterprise customer are security which reduce of performance and service in cloud computing and complications of data privacy and integrity within cloud environment. These give much impact and effect with cloud computing services. The most significant scenario are effect with cloud computing service are Identity within cloud services or cloud architecture and secured digital authentication during provision services. The security and privacy are most important elements that always consumers take seriously to protect and defense from any vulnerability also breaches of trust in cloud computing services. The educational of awareness of security and privacy in cloud computing services are seriously needed to be in place for all model deployment inside cloud computing services.

ABSTRAK

Kemunculan perkomputeran awan atau “cloud computing” di kebelangan ini telah mencetuskan banyak faedah kepada organisasi-organisasi atau institusi serta pada pelbagai jenis pengguna serta ini memberikan kemudahan pada aplikasi web. Ini adalah satu era ekonomi baru untuk Teknologi Maklumat (IT) bahawa perkomputeran awan menjanjikan perlbagai jenis faedah dan manfaatnya. Model ini menjanjikan peralihan teknologi dimana sebuah organisasi atau institusi perlu melabur dengan modal yang dalam teknologi IT yang terhad serta di uruskan bahagian dalaman organisasi sendiri, untuk model perkomputeran awan ini organisai atau pengguna hanya perlu menyewa sumber yang diuruskan pembekal perkomputeran awan dan hanya perlua membayar penggunaa perkhidmatan yang digunakan. Perkomputeran awan juga menjanjikan sumber yang berskala dan juga diatas permintaan sumber yang sudah tersedia. Perkomputeran awan adalah era persekitaran teknologi komputer dimana ia meningkatkan kapasiti atau keupayaan tambahan keperluan pengguna tanpa melabur dalam infrastruktur baru, memberi latihan kakitangan baru atau pembelian lesen perisian baru. Apabila ini berlaku, ini akan melibatkan lebih banyak maklumat, data atau persekitaran kepada individu dan syarikat-syarikat menggunakan perkhidmatan pengkomputeran awan. Senario ini akan memberi kesan keselamatan untuk persekitaran pengkomputeran awan, prestasi dan perkhidmatannya. Terutama mengenai dalam awan daripada pelanggan perusahaan keselamatan yang mengurangkan prestasi dan perkhidmatan dalam perkomputeran awan dan komplikasi privasi data dan integriti dalam persekitaran awan. Ini banyak memberi impak dan kesan dengan perkhidmatan perkomputeran awan tersebut. Senario yang paling ketara adalah kesan dengan perkhidmatan pengkomputeran awan adalah Identiti dalam perkhidmatan awan atau seni bina awan dan pengesahan digital bercagar semasa penyediaan perkhidmatan.Keselamatan dan privasi adalah elemen yang paling penting yang selalu pengguna mengambil serius untuk melindungi dan pertahanankan dari mana-mana juga kebocoran maklumat atau data dalam perkhidmatan pengkomputeran mega. Pendidikan dan kesedaran tentang keselamatan dan privasi dalam perkhidmatan pengkomputeran mega serius diperlukan untuk penempatan model semua di dalam perkhidmatan perkomputeran awan.

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LIST OF ABBREVIATIONS

SaaS	Software as a Services
IT	Information Technology
SMB	Small Medium Business
VMWare	Virtual Machine Software
NIST	National Institute of Standard and Technology
OS	Operating System
PC	Personal Computer

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Nowadays, computer technology is tremendously up-to-date with higher technology and with several of connection we can access anywhere, anytime and service is just in your hand. The difference of grouping users; community of environment network; layer of level of communication and the resources will go with several communication, data resources and storage resources. Once increased to the IT (Information Technology) specialist and professional come with several methodology and paradigm to resolve and provide solution to the consumers or end users needed in computer technology resources and services online either internally or externally. Once the methodology and paradigm has been established with several area and location with various technology, paradigm and methodology called cloud computing services. The cloud computing services are one of the latest technologies and for the time being are mostly important with several community users, agencies or organizations and several industries or sectors. Cloud computing is a computation technology that describes the software resources, data resources, network resources and storage resources will be shared with the cloud providers either sharing technology will open to community or consumers come from internally or externally services.

"According to NIST , Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources such as networks, servers, storage, applications, and services that can be

rapidly provisioned and released with minimal management effort or service provider interaction. “

From the definition above, it means that cloud computing interact with networks, data, information, storage, services and environment from internally or externally consumers. All components from cloud computing are provided by cloud provider and to all consumers either from private sector, government sector or individual. Which means that cloud computing are in the open area for threats to attack if cloud provider or cloud computing infrastructure does not have strong identity or authentication to protect or prevent all the elements or component from cloud services. The following diagram figure 1.1 is an example of cloud computing environment.

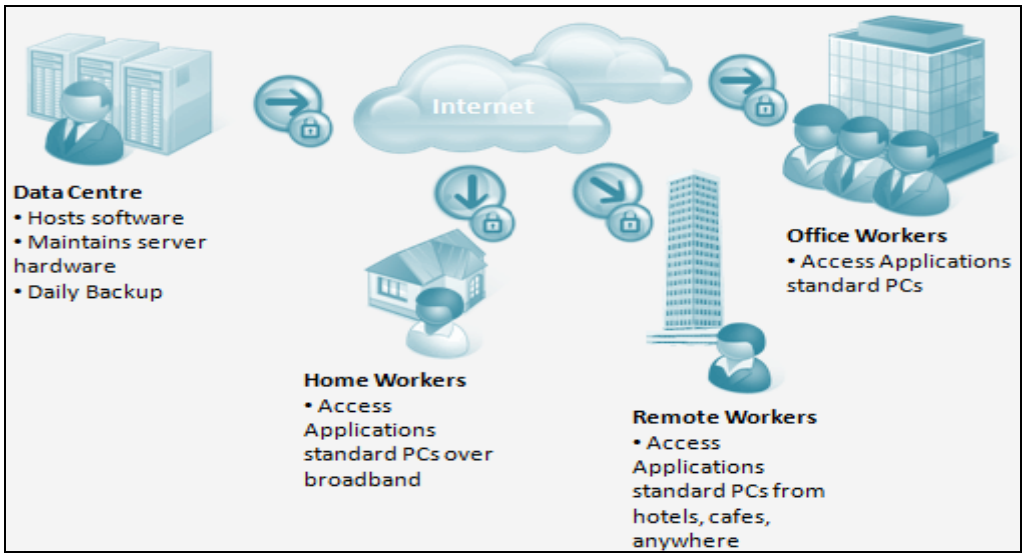

Figure 1.1 Cloud Computing Environment (Source: an Foster 2009)

The cloud computing service has several types of deployment type of services and several types of services model has been opened to all consumers or community in several of industries and sectors. Currently cloud computing services have three types of services such as public cloud computing, private cloud computing and hybrid cloud computing. The deployment for three services have different techniques and technologies based on consumers or industry needed to use their cloud computing services provided by cloud providers. Usually cloud computing also has

different model implementation and deployment based on consumers needed to used their services. Cloud computing provider had been potentially introduced to three types of service model to consumer's public cloud, private cloud or hybrid clod computing service. There are three famous model introduced by cloud computing provider such as Software as a Service (SaaS), Platform as a Services (PaaS) and Infrastructure as a Services (IaaS). In this project or research study will focusing in public cloud computing Software as a Services (SaaS).

"According to (Dustin Amrhein, Armstong et al. 2010) , public cloud computing is characterized as being available to clients from a third party services provider via the internet. The term "public" do not always mean free, even though it can be free or fairly inexpensive to use. A public cloud does not mean that a user's data publically visible; public cloud vendor typically provide an access control mechanism for their users. Public clouds provide an elastic, cost effective means to deploy solutions".

"According to (Luis M. Vaquerol 2009), Software as a Service (SaaS) is an alternative to locally run applications. An example of this the online alternatives of typical office applications such as word processors".

Summary from both statement in journal or white paper, public cloud computing are the most service deployment model are integrate both service either from private to external communication. Once the this kind of services from local integrated with external parties from local area that mean the service in cloud are in public cloud services. Internet connectivity or communication are the once of services as a public cloud computing. All the services, storage, servers or network will be manageable by cloud provider itself.

Saas is a software deployment model where applications are remotely hosted by the application or service provider and made available to customers demand, through the internet. The SaaS model offers the customers with significant benefit

improved operational efficiency and reduced costs. SaaS rapidly emerging as the dominant delivery model for meeting the needs of enterprise IT services.

1.2 Background of the problem

Over the past decade, computers have become widespread within enterprise, while IT services and computing has become a commodity. Enterprise today view data and business process such as transaction, records, pricing information's, product or services by themselves as strategic and guard them with access control and compliance policies. However, in the SaaS model, enterprise data stored at the SaaS's provider's data center, along with the data of other enterprises. Moreover, if the SaaS provider is leveraging a public cloud computing services, the enterprise data might be stored along with the data of other unrelated SaaS applications. The cloud provider might additionally replicate the data at multiple locations across countries for the purpose maintaining high availability. Most enterprise are familiar with the traditional on premise model, where the data is continues to reside within the enterprise boundary, subject to their policies or procedure. In SaaS service delivery model in public cloud computing are more concern about data breaches, application vulnerabilities and availability that can lead to financial and legal liabilities.

"According The States of Enterprise Software: 2009,"security concerns are the most commonly cited reason why enterprise are not interested in SaaS. Consequently, addressing enterprise security concern has emerged as the biggest challenge for the adoption of SaaS applications in the cloud (Heidi Lo Et al., 2009).

In addition, "to a recent IDCI survey, 74% of IT executives and CIO's cited security as the top challenge preventing their adoption of the cloud services model (Calvister, 2009)".

Prior to the new technologies enhancement and upgrading for the new infrastructure of IT technologies sharing, has tremendously increased requirement on sharing infrastructure of technologies for reducing a cost of operational and increase the productivity by enterprise are will give impact on privacy and security of services delivery model in SaaS in public cloud computing. The security issue in SaaS will increase on privacy, integrity and availability will be lower. The following diagram figure 1.2 are example of cloud computing evolution.

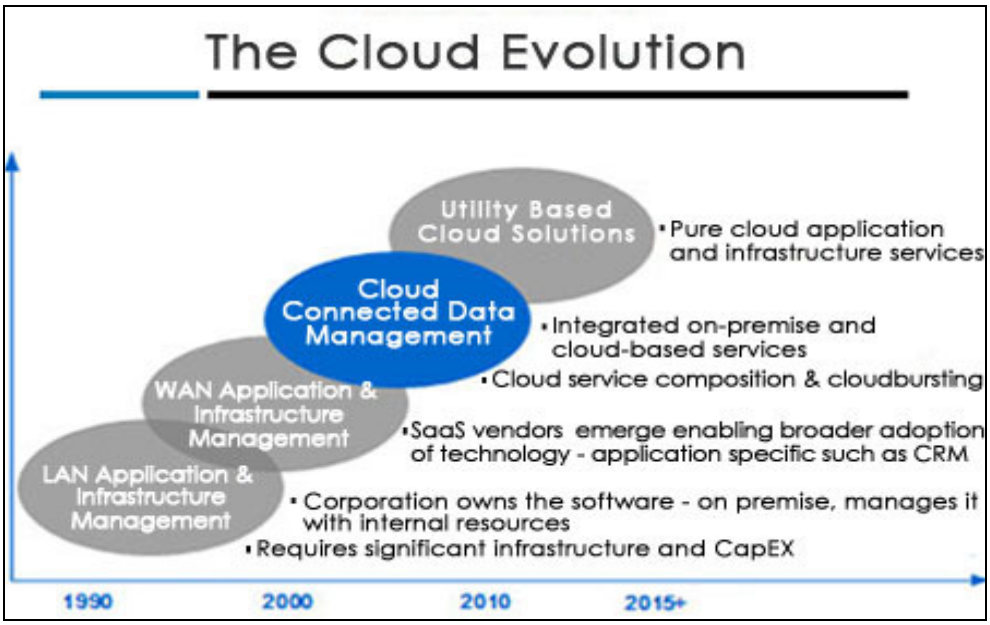

Figure 1.2 the evolution of cloud computing services (Source: blog.karmona.com)

Starting in 1990's, the increasing of requirement in sharing services in the net is already in place until to date. This situation will expedite costs and equipments in cloud provider infrastructure and services. Once this happen, the implication will give great impact on the performance towards privacy and security in cloud computing services. This will make the privacy and security lowest of cloud computing environment environments against the increasingly of business requirements in application and service in cloud computing.

"Security is one of the major issues which reduces the growth of cloud computing and complications with data privacy and data protection continue to plague the market (S.Subashini n 2011) ."

"Analyst estimate that within the next five years, the global market for cloud computing will grow up to $95 billion and that 12% of the worldwide software market will move to the cloud in that period. To realize this tremendous potential, business must address the privacy question raised by new computing model (BNA, 2009)."

1.3 Problem statement

Today small and medium business (SMB) companies are increasingly releasing that simply by tapping into the cloud they can gain fast access the best business applications or drastically boost their infrastructure resources all at negligible cost. Cloud providers currently enjoy a profound opportunity in the marketplace. The providers must ensure that they get the security aspect right, for they are the ones who will carry the responsibilities if things go wrong. The cloud offers several benefits like fast deployment, pay-for-use, lower costs, scalability, rapid provisioning, rapid elasticity, ubiquitous network access, grater resiliency, hypervisor protection against network attacks, low-costs disaster recovery and data storage solutions, on demand security controls, real time detection of systems tempering and rapid re-constitution of services.

"Though cloud computing is targeted to provide better utilization of resources using virtualization techniques and take up much of the work load from the client, it is fraught with security risks (Seccomble et al, 2009)."

1.4 Research question

A research question is a statement that distinguishes the issue or problem to be studied. It also will guide discussion or arguments about the topic of study. Sample of research questions are as follows :

i. What are the security issue facing by service delivery models Software as a Service in public cloud computing?

ii. What are security features or procedure of service delivery models Software as a Services (SaaS) in public cloud computing to prevent or protect from risk of security issues?

1.5 Project Aim

It is essential for end users or enterprise to have the mechanism to control, isolate and simulate of service delivery model SaaS in public cloud computing services. Therefore, the aim of this project is to analyze and benchmark security issues for service delivery model SaaS in public cloud computing by using simulation test cloud computing with several of operating system include Virtual Machine Software (VMWARE) environment with windows XP. VMWare will install at machine have operating system windows 7, also the simulation test will test with smartphone are using windows mobile operating system such as android phone or table phone. The simulation testing will test the several environments to test any security issues in public cloud computing SaaS services.

1.6 Project Objective

These objectives might be accomplished by conducting as follows:

i. To analyze a significant of problems experienced by service delivery model SaaS in public cloud computing environment.

ii. To design a comprehensive diagram simulation test and gather data of service delivery model SaaS in public cloud computing

iii. To implemented the simulation test and distribute survey questionnaire to respondent for benchmark the privacy and security issue in service delivery model SaaS in public cloud computing.

1.7 Project Scope

The scope for this project will be as follows:

i. The project focuses security on the service delivery model Software as a Service (SaaS) in pubic cloud computing

ii. The project is to research and study security issues on service delivery model SaaS in public cloud computing.

iii. A comprehensive framework simulation test and analysing data from implemented simulation test are to benchmark the privacy and security issue of service delivery model SaaS in public cloud computing using implementation simulation test environment.

iv. Assessment survey questionnaire and result analysis of questionnaire.

1.8 Summary

This chapter describe briefly the objectives, scope and aim of the project to be developed. These criteria's are expected to guide in developing this project. The next chapter will focus on the literature review relevant on this study.

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