Type Of Cloud Computing (Public And Private) That Transform The Organization More Effectively

Mahyar Amini [1], Nazli Sadat Safavi [2], Seyyed Mojtaba Dashti Khavidaki [3], Azam Abdollahzadegan [4]

[1,2,3,4]Faculty of Computing, UniversitiTeknologi Malaysia (UTM), 81300 Johor Bahru, Malaysia

Abstract

Cloud computing is very essential to any organization since it can help it to achieve the success in its business. Therefore this paper is giving the small introduction of the cloud computing and its benefit that could help the organization to perform their business. Moreover, it discusses the type of the cloud computing (public and private) and providing comparison between them by identifying their advantages and disadvantages that will influence the organization. Selecting the right cloud typing is the most important factor that help the organization.

Keywords— **Cloud Computing, Public Cloud Computing, Private Cloud Computing, Organization**

1. Introduction

Cloud computing is a general term for anything that involves delivering hosted services over the Internet. These services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flowcharts and diagrams [1].

A cloud service has three distinct characteristics that differentiate it from traditional hosting. The minute or the hour sells it on demand, typically; it is service, as they want at any given time; and the service is fully managed by the provider (the consumer needs nothing but a personal computer and Internet access). Significant innovations in virtualization and distributed Computing, as well as improved access to high-speed Internet and a weak economy, have accelerated interest in cloud computing[1].

A cloud can be private or public. A public cloud sells services to anyone on the Internet. (Currently, Amazon Web Services is the largest public cloud provider.) A private cloud is a proprietary network or a data center that supplies hosted services to a limited number of people. When a service provider uses public cloud resources to create their private cloud, the result is called a virtual private cloud. Private or public, the goal of cloud computing is to provide easy, scalable access to computing resources and IT services [1].

Infrastructure-as-a-Service like Amazon Web Services provides virtual server instance API to start, stop, access and configure their virtual servers and storage. In the enterprise, cloud computing allows a company to pay for only as much capacity as is needed, and bring more online as soon as required. Because this pay-for-what-you-use model resembles the way electricity, fuel and water are consumed; it's sometimes referred to as utility computing [2].

Platform-as-a-service in the cloud is defined as a set of software and product development tools hosted on the provider's infrastructure. Developers create applications on the provider's platform over the Internet. PaaS providers may use APIs, website portals or gateway software installed on the customer's computer. Force.com, (an

outgrowth of Salesforce.com) and GoogleApps are examples of PaaS. Developers need to know that currently, there are not standards for interoperability or data portability in the cloud. Some providers will not allow software created by their customers to be moved off the provider's platform [2].

2. Literature Review

2.1. Cloud Computing IBM Global Services

Predicted to transform IT over the next decade, cloud computing is an emerging trend that provides rapid access to dynamically scalable and virtualized IT resources.

IBM is fully embracing the potential of all types of cloud-based solutions rooted in industry-based, to collaborate with organizations around the world to help create dynamic IT infrastructures through virtualization technologies and new cloud management techniques that enable a simplified anywhere, anytime self-service approach for the delivery and consumption of IT services [3].

Because they provision and allocate services on demand, cloud-based technologies can provide unlimited scalability and a higher-quality, more efficient infrastructure while simultaneously fostering rapid innovation [3].

2.1.1 Implementing a cloud computing solution

The step should be to assess how might be able to transition from a traditional onsite client server and data center model to an IT infrastructure where applications, compute, storage and business processes are all delivered as cloud-based services.

But need a trusted partner to help you decide how and where to start in making that transition. IBM is an industry leader in contributing to and establishing cloud reference architectures while developing and delivering cloud-enabling technologies and products to companies around the world. Our deep data center expertise is based on vast experience in managing multiple, global next-generation cloud computing centers and refined through thousands

successful implementations and projects [3].

2.2 Cloud Computing HP

HP solutions allow implementing cloud in the right for enterprise, by leveraging your existing technologies to build private cloud, consume enterprise cloud services, manage and secure all services to gain competitive or service advantage, and transform applications and infrastructure, and HP need an associate that has the knowledge to know which service models are right for business [4].

Few cloud vendors truly understand the unique needs of service design and delivery for the largest companies in the world. Through HP's experience in running these services in complex, multi application environments allows us to avoid significant management issues once all services in a hybrid delivery environment are in place. And our unique delivery of enterprise cloud services sets us apart from other vendors because enterprises know that our solutions are secure, open, automated, resilient, and seamless [4].

2.2.1 HP Cloud Application Transformation Services

Transform legacy IT operational models to adapt to a service-centric, hybrid delivery model. Both applications and infrastructure services take on new, shared characteristics that can help drive new efficiency and opportunity [5].

2.2.2 Cloud Computing Deployment Models

There are many deployment models for cloud computing public, private, hybrid and Community. a public cloud is implemented by a cloud service provider who makes those services available to external entities. The provider is responsible for all of the capital and operating expense of the underlying infrastructure. It spreads that cost across all of its consumers either through a direct fee or through revenue generated fromadvertisements [2].

3. Type of cloud (Public and Private)

3.1. Public Cloud Computing

Public clouds are "stand-alone," or proprietary, clouds mostly off-premise, run by third party companies such as Google, Amazon, Microsoft, and others [2].

Public clouds are hosted off customer premises and usually mix applications (transparently) from different consumers on shared infrastructure [5].

Public (or external) clouds deliver a select set of dynamically provisioned, standardized business process, application and infrastructure services and resources using Internet-based technologies on a flexible, variable payment and self-service basis. Typically owned and managed by an offsite, third-party provider, the billing is provided on a fine-grain utility computing basis and accessed by subscription.

Examples of public clouds are Google Apps, iPhone apps and Amazon's Elastic Compute Cloud (EC2). (IBM is collaborating with Amazon to enable software developers to quickly build preproduction applications based on IBM software within the Amazon EC2 environment)[3].

As enterprises and service providers become more experienced with the cloud architecture model and gain confidence in the security and access-control technologies that are available, it is expected that many service providers will deploy externally facing cloud services.
In simple terms, public cloud services are characterized as being available to clients from a third party service provider via the Internet. The term "public" does 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 is publically visible; public cloud vendors typically provide an access control mechanism for their users. Public clouds provide elastic, cost effective means to deploy solutions [5].

In addition,Public clouds are owned and operated by third parties; they deliver superior economies of scale to customers, as the infrastructure costs are spread among a mix of users, giving each individual client an attractive low-cost, "Pay-as-you-go" model. All customers share the same infrastructure pool with limited configuration, security protections, and availability variances. These are managed and supported by the cloud provider [6]. Figure 1 represent the concept of the public cloud computing.
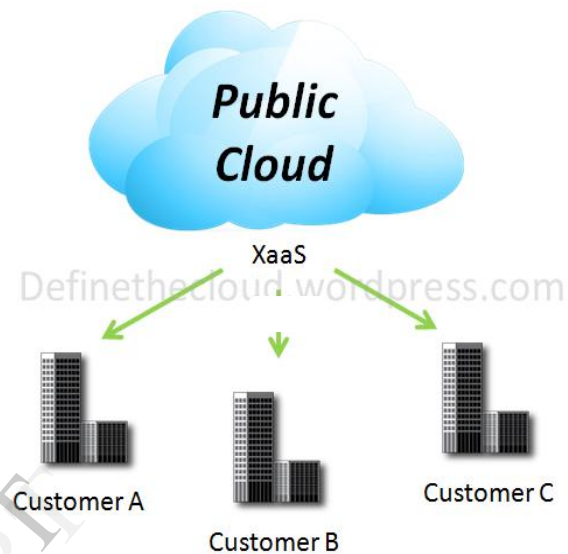

Fig 1: Public Cloud Computing.

3.2. Private Cloud Computing

Private (or internal) clouds provide security rich to request access to services business process application, infrastructure, resources, and managed within the organization. Cloud can be delivered through special drawing data center, or intranet, with limited access to users and networks partner [7].

There is a layer of new technologies and usually add-default management, infrastructure, a cloud, self-service portals, loading systems, costs, and more to existing data systems center and operations.

Private clouds are typically designed and managed by an IT department within an organization. A private cloud is usually built specifically to provide services internally to an organization [7].

Private clouds may be in a collocated facility or in an existing data center. This model gives a high level of control over the cloud services and the cloud infrastructure. Cisco has a strong portfolio of solutions, products, and services, which enable private cloud infrastructures [7].

Private cloud is a computing model that uses resources, which are dedicated to your organization. A private cloud shares many of the characteristics of public cloud computing including resource pooling, self-service, and elasticity and pay-by-use delivered in a standardized manner with the additional control and customization available from dedicated resources.

Figure 2 shows the concept of the Private Cloud Computing and Figure 3 shows the main difference between the public and private clouding which is the private cloud computing allows the organization to have its own firewalls that enable the firm to have control, while the public cloud doesn't provide this criteria [4].
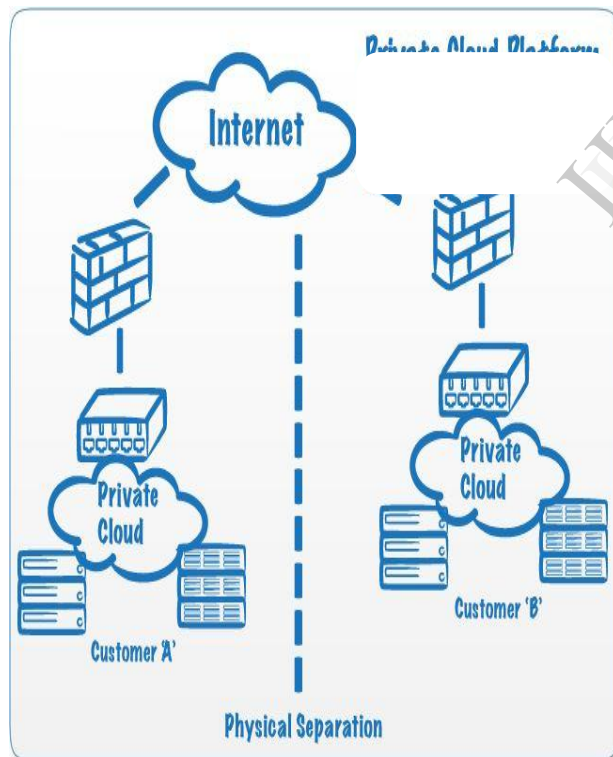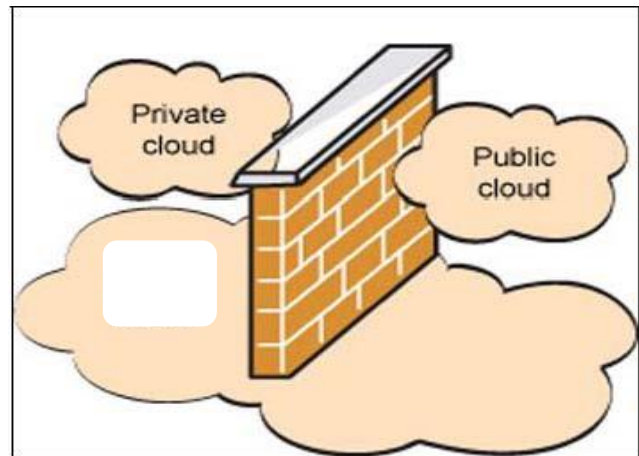
Fig3: Difference of Public and private CloudComputing.

4. Comparisons between Private and Public cloud Computing:

To compare between the public and private cloud computing, we have to discuss the advantage and disadvantage of the public and private cloud [6][7].

4.1 Advantage of public cloud computing

- Cost: Having a cloud computing model in place, organizations can trim their IT budgets because they don't have to purchase physical hardware (which also saves on energy costs), as the servers are virtual - hosted at a third party. Organizations can customize their clouds with specific storage parameters, applications, and security options so that they only pay for what they need. Since the cloud is hosted by a third party, the organization doesn't need to spend money to have an employee monitor the system; it is taken care of by the host [8].

- Time: In house servers take time to maintain. If hardware or software configurations need to be altered, or if a server crashes or needs to be restarted, the process can often take a couple of hours or a couple of days depending on the situation. With cloud computing, because everything is virtualized, reconfiguring the cloud takes minutes.Also because

Fig2: Private Cloud Computing.

the servers are hosted on the cloud, if one server fails, another can instantly be activated, reducing down time [8].

- Maintenance: Due to the fact that the public cloud system is hosted off site, internal employees are not responsible for maintaining the system. The design lets users update or introduce technologies into the system at a much faster rate as everything is managed at the host company. Having a virtualized public cloud means never having to deal with a physical server; it can be maintained from a simple configuration screen [8].

4.2 Disadvantage of public cloud computing

- Lack of Control: Due to the fact that third party providers are in charge of storing and maintaining the data systems, many feel as if they don't have enough control over their personal data [8][9].

- Speed: Public Clouds are based on Internet connections, meaning the data transfer rate is limited to that of the Internet Service Provider (ISP), which is usually no more than 10mbps.If an organization is storing and transferring large amounts of data (high definition video for example), a public cloud may not be the best bet [9].

- Lack of Investment: Although a great cost saving method by reducing the need to invest upfront, renting the service from an outside provider also means that there is little capital gained. Having items such as servers and network equipment can pay off in the long run as assets and tax advantages [9].

4.3Advantage of Private cloud computing

Private clouds are built from software that runs on a piece of hardware at the organization. The difference between a public cloud and a private cloud is that a private cloud is controlled by the organization. The benefits of this system are that although an investment due to the fact hardware is required, it costs considerably less than traditional data management systems. The cost savings is due to virtualization in which one physical server acts as host to several virtual servers, each of which runs on a layer of

software [10].

- Control: Due to the fact that the hardware is on-site, organizations have more control over their data. The organization is in charge of monitoring and maintaining the data giving them complete oversight of their data [10].

- Performance: The private cloud is deployed inside the firewall on an organization's intranet, meaning that transfer rates are dramatically increased. Read access off of private clouds can be as fast as 100mbps, or even more if the organization has a gigabit Ethernet connection. Storage capacity is also higher with a private cloud. Private clouds usually start with a few terabytes and can be increased by adding additional disks [10].

4.4 Disadvantage of Private cloud computing

- Cost: Private clouds are more expensive than public because they require both hardware and maintenance personnel. To build a private cloud, an organization needs to invest in hardware or use already existing systems whereas a public cloud is all handled off site. Private clouds also require system administrators. However, one system administrator could easily manage a 100-node cloud with a part-time effort [10][11].

- Maintenance: Since the private cloud is hosted on sight, the organization needs to provide adequate power, cooling, and general maintenance. The host organization also runs the risk of data loss due to physical damage of the unit (i.e. fire, power surge, water damage) [8].

5. Selecting right cloud computing type

Selection between the private and public cloud computing is based on the organization's type, organization's business, firm size and top manager interest of the organization. If we look to the organization type, we can say that there is two main types namely as well defined IT infrastructure and neworganization [12].

Moreover, for the well defined IT infrastructure such as

Enterprise and government organizations, the private cloud computing is more suitable to them since they need to have many sources, so it better to have them in their premise and also because Enterprise and government organizations have already made investments in large data centers with thousands of servers, supporting infrastructure, and management software. Clearly, these investments will not be retired overnight. Rather, these organizations need a way to transform this powerful, albeit static, infrastructure into a dynamic, fully automated cloud that still conforms to existing security and privacy policies [13].

Moreover, the cloud computing is suitable the organization that wants to have greatest level of security and control over their application and resources since the private cloud computing providing company or organization to have its own firewalls to handle the security issues [14].

Whereas the most startup new organization uses the public cloud computing since it does not have enough IT developers, so it needs help in implementing their applications and services. In addition the public clouds computing is convenient choice in the following situation [12][13]:

- When the organization need to test and develop application code.

- When organization have SaaS (Software as a Service) applications from a vendor who has a well-implemented security strategy.

- Organization need incremental capacity (the ability to add Your standardized workload for applications is used
- Computer capacity for peak times).

6. Conclusion

Cloud computing is a general term for anything that involves delivering hosted services over the Internet. The cloud computing can be categorized in to twotypes: public and private cloud computing, which they have advantage, and disadvantage of implementing them in the specific organization.

The selection between the private and public cloud computing is based on the organization's type, organization's business, firm size and top manager interest of the organization. If we look to the organization type, we can say that there is two main types namely as well defined IT infrastructure and startup new organization.

7. References

[1]Amini, M., & Sadat Safavi, N. (2013). Cloud Computing Transform the Way of IT Delivers Services to the Organizations. *Innovation & Management Science eJournal (Available at SSRN 2256379)*, *1*(61), 5.

[2]Amini, M., & Sadat Safavi, N. (2013). Cloud Computing Transform the Way of IT Delivers Services to the Organizations. *Available at SSRN 2256379*.

[3]Armbrust, M., Fox, A., Griffith, R., Joseph, A., Katz, R., Konwinski, A., & Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM*, *4*(53), 50–58.

[4]Leavitt, N. (2009). Is cloud computing really ready for prime time. *Growth 27.5*.

[5]Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. (2009). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. *Future Generation computer systems*, *25*(6), 599–616.

[6]Jansen, Wayne, & Grance. (2011). Guidelines on security and privacy in public cloud computing. *NIST special publication*.

[7]Baliga, J., Ayre, R. W., Hinton, K., & Tucker, R. S. (2011). Green cloud computing: Balancing energy in processing, storage, and transport. *Proceedings of the IEEE*, *1*(99), 149–167.

[8]Catteddu, D. (2010). Cloud Computing: benefits, risks and recommendations for information security. *Springer Berlin Heidelberg*, (pp. 17–17).

[9]Foster, I., Zhao, Y., Raicu, I., & Lu, S. (2008). Cloud computing and grid computing 360-degree compared. *Environments Workshop, 2008. GCE'08 IEEE*, (pp. 1–10).

[10]Peng, J., Zhang, X., Lei, Z., Zhang, B., Zhang, W., & Li, Q. (2009). Comparison of several cloud computing platforms. *Information Science and Engineering (ISISE), 2009 Second International Symposium on (pp. 23-27). IEEE*.

[11]Grossman, R. L. (2009). The case for cloud computing. *IT professional IEEE*, *2*(11), 23–27.

[12]Zhang, Q., Cheng, L., & Boutaba, R. (2010). Cloud computing: state-of-the-art and research challenges. *Journal of Internet Services and Applications*, *1*(1), pp 7–18.

[13]Chang, V., Bacigalupo, D., Wills, G., & De Roure, D. (2010). A categorisation of cloud computing business models. *In Proceedings of the 2010 10th IEEE/ACM International Conference on Cluster, Cloud and Grid Computing*, (pp. 509–512).

[14]Bider, I., & Perjons, E. (n.d.). Preparing for the era of cloud computing: Towards a framework for selecting business process support services. *In Enterprise, Business-Process and Information Systems Modeling. Springer Berlin Heidelberg*, pp (16–30).