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AN ANALYTICAL STUDY OF CLOUD COMPUTING'S EFFECT ON ENTERPRISES

Sushant Rai[*1] Prof. Dharmenrda Kumar[*2]
School of Business, Galgotias University, Greater Noida, Uttar Pradesh, India

ABSTRACT

To withstand the inevitable stream of change, innovations are required. The majority of businesses are attempting to use virtualization to lower their computer costs. The development of cloud computing was prompted by the need to lower computing costs. Better utilisation, lower administrative and infrastructure expenses, and greater utilisation are all benefits of cloud computing. Cloud computing is the combination of utility computing with software as a service (SaaS).

In the end, it can be said that Cloud Computing is more advantageous for medium and small-sized businesses than it is for large businesses in terms of cost and data security.

INTRODUCTION

Because of the opportunities it presents, cloud computing has recently been one of the most talked-about technologies and attracted a lot of media and analyst interest. According to IDC, which conducts market research and analysis, the market for cloud computing services was $16 billion in 2008 and is expected to reach $42 billion annually by 2012 (Gleeson, 2009). According to estimates from Lynch (2008), cloud computing offers cost advantages of three to five times for commercial applications and more than five times for consumer applications. In a press release dated June 2008, Gartner predicted that cloud computing would be "no less influential than e-business."

The phrase "cloud computing" is used to refer to both a platform and a particular kind of application. It serves as a platform that provides, configures, and reconfigures servers, which can be either physical or virtual computers.

RESEARCH METHODOLOGY

RESEARCH QUESTION

Due to its low cost and promising processing capabilities, cloud computing is one of the most discussed technologies today and is crucial for businesses. In my research, I'll focus on the relationship between businesses and cloud computing. I will research Fox Mobile Group since they are a company employing cloud computing to help me with my research issue, which is:

What are the perceived benefits and drawback regarding cost and data security for Enterprises to adopt Cloud Computing?

PURPOSE OF RESEARCH

The goal of the thesis is to identify the advantages and disadvantages that businesses can experience while using cloud computing to create and manage their information system in terms of cost, data security, and data availability. The factors related to cost and data security that businesses should consider when implementing cloud computing for the effective and efficient use of their information system are concluded.

RESEARCH DELIMITATION

Since the enterprise on which I am focusing, i.e. Fox Mobile Group, does not use it, I will not take into account SaaS (Software as a Service) and PaaS (Platform as a Service) of cloud computing during my research. I won't be looking at the entire enterprise's information system; instead, I'll concentrate on a select few divisions or parts of it (the divisions will be picked after the initial interview with the business). I also won't talk about the legal concerns with cloud computing security.

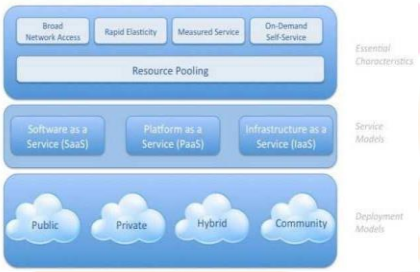
MODELING AND ANALYSIS

I.CLOUD COMPUTING

➢ Both SaaS apps provided over the Internet and the hardware and system software in datacenters that offer those services are included in cloud computing. While Private Clouds are internal datacenters not accessible to the general public, Public Clouds are made available to the public on a pay-as-you-go basis. SaaS and utility computing, or the sale of services via public clouds, are combined to form cloud computing. SaaS and Utility Computing can be used or provided by individuals.

➢ CLOUD COMPUTING ARCHITECTURE

NIST is a respected institution in the field of Information Technology. They provide a working definition of Cloud Computing, which includes five essential characteristics, three cloud services models, and four cloud deployment models



➢ CLOUD COMPUTING EVOLUTION

➢ • Distributed systems effectively and efficiently share resources, yet conventionally, all systems had to be in the same location.

➢ • Although pricey, mainframe computing is strong and dependable.

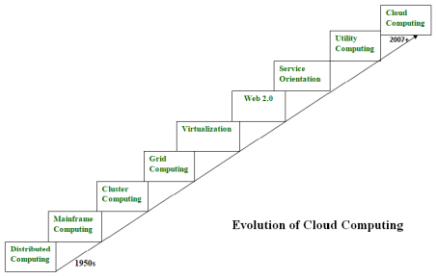
➢ • Introduced in the 1980s, cluster computing is more affordable, equally capable of handling large computations, and new nodes may be added with ease.

➢ • Grid computing, established in the 1990s, connects systems at many locations over the internet, although it can encounter problems with connectivity and distance.

➢ • By creating a virtual layer on top of the hardware, virtualization enables the simultaneous operation of several instances.

➢ • Quality of Service and Software as a Service ideas in service orientation allow low-cost, adaptable, and evolvable applications, and Web 2.0 provides interactive and dynamic web sites.

➢ Pay-per-use utility computing offers a variety of services.



Evolution of Cloud Computing

➢ CLOUD COMPUTING ADOPTION

Before implementing cloud computing, businesses must carefully weigh the advantages, disadvantages, and cultural processes involved. Enterprises will probably create a heterogeneous computing environment with dedicated servers and public cloud providers after adoption, which is predicted to take 10 to 15 years. Technical and socio-technical considerations, such as cost, secrecy, control, and the effect on work procedures, influence how decisions are made. Businesses must support risk management, give accurate cost information, and make wise decisions when balancing

benefits and risks.

➢ CLOUD COMPUTING AND COST

With pay-per-use billing, cloud computing has the advantage of turning capital expenditures into operating costs. The most popular cost model for cloud computing is short-term billing, though there are other options as well. From the perspectives of the supplier and the consumer, and using various cost/price models for both, the economics of cloud computing are examined.

➢ COST IN CONSUMER PERSPECTIVE

With the pay-per-use model provided by cloud computing, users can purchase computing resources only as needed and release them when not in use. For instance, AWS provides Scalable Storage Service (S3) and Elastic Compute Cloud (EC2), both of which charge customers for storage space, GHz consumption, and additional bandwidth for data transport. Although the cost of this pay-as-you-go model is higher than the cost of purchasing a server, the advantages of elasticity and risk transference outweigh the price. Tiered pricing, per-unit pricing, and subscription-based pricing are a few additional pricing strategies. While per-unit pricing is frequently used for data transfer and memory usage, AWS uses a tiered pricing structure. Software as a Service (SaaS) is the primary application for the subscription-based approach, which enables users to budget for recurring costs.

➢ COST IN PROVIDER'S PERSPECTIVE

Businesses must take into account both the investment cost and the cost of delivering Cloud Computing services. When switching to public clouds is prohibited by legal restrictions and renting out extra IT space becomes feasible, private clouds are crucial. The cost of cloud data centres has been investigated, and researchers contend that expenses can be minimised by optimising server, infrastructure, power, and networking costs. For instance, lowering bandwidth costs by creating tiny data centres and operating data centres at cooler temperatures (Greenberg et al., 2009, p3).

➢ CLOUD COMPUTING'S COST EFFECT

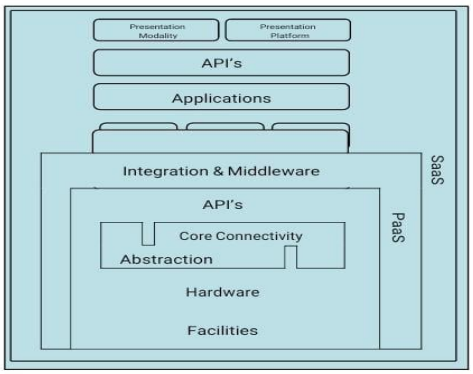
We may argue that the majority of businesses made the transition from Grid to Cloud since, as I've already indicated, Cloud Computing is an extension of Grid Computing. Therefore, I will now investigate how switching from Grid to Cloud affects businesses. I'll examine what Grid Computing offered and what Cloud Computing offers today to support business economics.

II.CLOUD COMPUTING AND DATA SECURITY

This section deals with the data security issues related to Cloud Computing in the enterprise world.

➢ DATA SECURITY IN CLOUD

Enterprises can store their data more cheaply on the cloud than they can on-site, but security is a major worry for them. Businesses might not have full control over the physical infrastructure in the cloud, which includes where their data is stored and the security measures in place. Web services and browser issues may lead to technical security risks in cloud computing. Since the majority of computation is done on remote servers and the client PC is only used for I/O and command authorization, common attacks on web services include XML Signature Element Wrapping. Browser security is also important. TLS is necessary for host authentication and data encryption since without the



TLS handshake, encryption and signatures cannot be employed.

Figure 2 - Cloud Reference Model (Cloud Security Alliance, 2009, p18

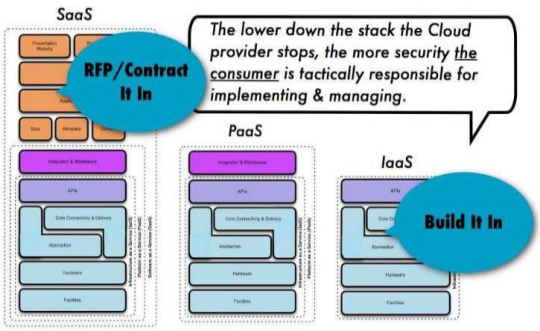
1. When addressing security concerns in cloud computing, two main areas should be taken into account:
1. Domains of Governance
2. Operational Domains

Governance domains:

- legal and electronic discovery;
- compliance and audit;
- information lifecycle management;
- portability and interoperability;
- strategic and policy concerns, including governance and corporate risk management.

Operational domains

- Tactic security issues,
- traditional security measures, and
- business continuity
- Application security,
- data centre operations,
- incident response notification and correction,
- encryption and key management,
- identity and access management, and
- virtualization are some of the topics covered.



➢ SECURITY BENEFITS OF CLOUD COMPUTING

I have talked about the data storage issues in Cloud Computing however; one must also look into the benefits of data

storage in Cloud Computing. Craig Balding in his blog 'Assessing the Security Benefits of Cloud Computing" talks about these benefits. He advocates that there are some technical security arguments in favor of Cloud Computing assuming that we can find the ways to manage the risks. European Network and Information Security Agency (ENISA) have also researched on the benefits for enterprises adopting Cloud Computing. Cloud Computing has a lot of potential to improve security for enterprises and the ways it can improve security is described below.

CONCLUSION

The financial and security impacts of cloud computing on enterprises are the main topics of this study. Cloud computing is a popular topic, but its definition and restrictions are still a mystery. Cloud computing, which does not employ private clouds, combines SaaS and utility computing. Businesses consider cost when deciding whether to employ cloud computing, and factors like elasticity, flexibility, data centre costs, pricing models, and administrative costs might affect cost reductions. Cloud computing is the most economical choice for medium-sized and smaller organisations, although private clouds are more beneficial for large businesses. Businesses are extremely concerned about security. While cloud computing has some benefits, such as scale and a uniform interface, there are security problems, such as a loss of control over physical data and web browser security, and these benefits are offset by security and legal challenges. In conclusion, cloud computing is a beneficial technology, but cost is still the main factor preventing organisations from implementing it, and security is not a significant advantage. Due to cost savings and increased security, private clouds are more advantageous for large enterprises.

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