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SECURITY ANALYSIS IN CLOUD COMPUTING- A REVIEW

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ABSTRACT

Cloud Computing is one among the most recent developments within the IT trade conjointly referred to as On-Demand Computing. It's broadly made use to deliver services over the internet for low priced and technical motives. The Cloud could be a cluster of servers that give extremely climbable services like Software as a Service, Platform as a Service, and Infrastructure as a Service to remodel Computing in business. Besides all the significant features of the Cloud environment, there are challenges of confidentiality and security. In this paper, we tend to give a transient review of Cloud Computing and conjointly layout transient discussion of the characteristics of Cloud Computing, challenges, profits, and its applications. This paper also lay out a comparison between the two major front-runners in the field of Cloud Computing.

KEYWORDS: *Cloud Computing, Software as a Service, Platform as a Service, Infrastructure as a Service, Multi-Tenancy*.

1. INTRODUCTION

In classical desktop Computing, software programs are installed on a computer that allows dynamic resource allocation on joining resources using a grouping of techniques from parallel, distributed, and platform virtualization technologies. The documents which are created stored on the personal computer. It may generate a problem of memory or storage. All documents are achieved with other computers on the same available network but it cannot be accessed by computers from the external network.

Cloud Computing is a type of resource which is used on large scale for cost effective purpose. With the help of Cloud the vendor or the users can implement any type of services. In Cloud Computing, software programs are not installed on user computer although these are stored on servers and anyone can access with the help of internet. The Cloud facilitates various necessary software's and on-demand tools that can be shared in various IT industries. Amazon was the first company in implementing the concept of Cloud Computing.

Depending on the kind of service provided, there are three kinds of Cloud services conjointly termed as delivery models; Infrastructure as a service, (IaaS), Platform as a Service (PaaS) and Software as a service (SaaS).

1) IaaS is Infrastructure as a Service is used to support operations, servers, networking elements, and storage. It provides or answerable for housing, running, and upholding. The client usually pays as a per-use-basis. Amazon is one of the Cloud providers offering IaaS, where these services are EC2 and S3.
2) PaaS uses some dedicated API to manage the behavior of a server hosting engine which runs and duplicated the execution are required by the user. The user can configure and develop their application on the precise platform. Microsoft Azure is an associate example of PaaS.

Types of Platform as a Service (PaaS):

- Open Platform & Open Service
- Add-on Development Possibility
- Application Delivers only Environments
- Standalone Developments Environments

3) SaaS deals with using any application or service via the Cloud. Software as a service is also called as "Software on Demand" that is used the internet to run after a firewall on a native area network. In this services given by SaaS are "pay-as-you-go" model, or at no charge. To use the applications of this technology need to access over the internet as a service. SaaS was broadly deployed for sales automation and customer relationship management (CRM). These days it is widely used in computerized billing, human resource management, collaboration invoicing, and content management. Google Apps is one of the examples that provide collaboration on various applications, like event management, project management etc. via the internet.

2. CHARACTERISTICS OF CLOUD COMPUTING

Cloud Computing started its base in the middle of 2007 and is growing swiftly till date. It has numerous options that build users wish to switch to the Cloud Computing environment. Some of these characteristics are deliberated below:

Elasticity and Scalability: The Cloud resources are often provisioned or de-provisioned as per the rise or decrease in the user demand. The Computing power, memory, and alternative facility are often scaled up or down as per the user demand.

Ease of use: User does not require owning and maintaining hardware, software and additional resources. These Cloud services

can be directly accessed by means of a web browser. Without any additional resources, to run and execute Cloud services. A normal desktop system with usual internet connectivity is adequate.

Device and Location Independent: Since the Cloud services will be accessed through a web browser, it will gain access from geographically anywhere and from any device that supports internet. A Cloud service will be accessed like any web service.

Provision for custom application development using PaaS: Software production using PaaS is simpler compared to in-house application production, which needs hardware and software support moreover as necessary development tools to be owned, installed and managed. Where-in Cloud Computing environment development tools and software are available in the form of service which makes development simple and quicker.

Reduced cost: When making an entry into a new business, the expense needed for infrastructure is reduced by moving to the Cloud. As computing power, storage and different resources are used from the Cloud; price to buy further as manage them is greatly affected. It is advantageous for the organizations if the resources are required by them just for the minor duration. Thus, rather than owning them Cloud is a better option.

Multi-Tenancy: A single data server, Computing, and alternative resources are shared among numerous users by means of virtualization and isolation. This feature permits effective utilization of resources.

Reliability: Multiple resources are available for Computing power, Storage etc. for providing services to the users. Also, the data may be stored at numerous locations by the supplier. This redundancy in terms of data storage and different resource permits provision for disaster recovery and achieves reliability and availability of data as well as services.

3. RELATED WORK

Paper [1] shows different models of Cloud with risk related to them and various issues that are present in Cloud Computing industries these days. It describes that Cloud gives us pay-per-use facility through which we can have services from the Cloud. Cloud basically runs on the internet. Moreover, it saves the time and cost to a customer. [2] shows a contemplated architecture design for Cloud Computing, that insures the safe behavior of data at client and server side. Basically, they had shown their interest on authentication, key generation, and data encryption on the Cloud. [3], shows the different types of Cloud Computing, services, also focuses on security issues and challenges. The basic concern revolves around security. Moreover, they showed two models one is multi-tendency and the pooled Computing resources in Cloud Computing e.g. These days hackers are using these services as their cheaper source to store their data and they can plan for the attack in future. [4], discussed some query processing with Map Reduce and Hadoop. They also implemented XACML for Hadoop (Hadoop basically an application used to make the blocks).Next, they worked open encryption standards they told that it is important to every user to check whether the data is encrypted or not. They also used one term Cirrus which provided limited access on to their economic model, because does not provide hardware support. Paper [5] defined numerous facility and arrangement of Cloud Computing and classifies three critical tasks. He also explained the Gartner Hyper-Cycle, 2012. [6], shows comprehensive factors of adopting Cloud Computing and privacy issues, check out the several Cloud deployment and service models. Moreover, they also give a more genuine view of scalability, higher resource utilization. Paper [7] has shown the Cloud security in terms of Cloud security threats and technical components of Cloud Computing. He broadly focused on Cloud services threats and how to prevent data loss and leakages. He also reviewed some concepts regarding Cloud Computing security. [8]

has shown review of services focused on architecture reduce material skill above for end customer, greater flexibility and some concept of the issues it tries to address, related research topics, and a "Cloud" application accessible nowadays. [9] has shown security worries arises in Cloud Computing environments and review some approaches to upholding integrity and realm security protection as virtual resources. [10] has publicized an environment of the architecture, and desirability and vulnerability as a cybercrime target are linked to privacy and security and likewise explain privacy and security of Cloud Computing.

Security Objective for Cloud Computing:-

- Defend postal Services of data from unofficial access and alteration of data.
- Protect information resources from delivering chain threats.
- To protect Cloud Computing infrastructure need to avoid from not permitted user.
- Look after internet browsers from attacks of hackers (who breaches information).
- Encryption standard must be high.
- Trust between CPs and customers' need to be strong.
- Supporting of portability and physical partition must be there between PCI and non-PCI applications.

Table 1. Amazon vs Google

	Amazon	Google
	1994	1995
Ranking	3	4
Revenue(2015)	$107 billion	$74.54 billion
Type of Site	E-Commerce	Search Engine
Type of Services	Online Shopping	Online links

4. BRIEF HISTORY

Amazon organization was started by what Bezos knows by the name Regret Minimization Framework this company exhibits its efforts to fend off any regrets for not participating sooner in the boom in internet business at that time. In 1994, afterward, Bezos left his job as vice-president of D.E. Shaw & Co., which was basically a Wall Street firm, and moved to Seattle. He began to work on a business plan for what would eventually become Amazon.com. Jeff Bezos incorporated the firm as "Cadabra" on July 5, 1994, and then they went online as Amazon.com in 1995.

Google is founded by Larry Page and Sergey in March as a Research project. Both are Ph.D. student at Stanford University. In explorer of a new dissertation theme, Page had been in view of among other things exploring the mathematical view in front of the World Wide Web, understanding its link formation as a giant graph. His supervisor, Terry Winograd, boost him to pick this concept and Page focused on the problem of finding out which web pages link to a given page, based on the thought that the number and nature of such backlinks were paramount information for an analysis of that page.

Table2. Comparison between Amazon and Google

Parameters	Amazon	Google
Data Security	The Payment Card Industry (PCI) information security standards and data security are defined by the Council of Payment Card Industry. For the credit card payment, we need a payment card industry certification. It is required to prevent from credit card fraud.	Google implement appropriate technical and organization measures to protect customer against accidental loss. Google may update or modify such security measures from time to time provided that (i) such update and modification do not result in material degradation of the security of the services. (ii) Google continues to

		adhere to such security measures then in effect.
Operational Security	We can say it as physical access or operational security both are same and it is strictly control two things and those are at the perimeter and at building ingress point by specialized security organization utilizing video surveillance, interruption detection systems, and additional electronic means. Official members must pass two-factor validation a minimum of two times to access data center floors. Automatic fire detection and restraint tools have been installed to minimize risk. Power security also provides climate and temperature security.	Vulnerability Management process that actively scan for security threats using a combination of commercially available and purposed built in-house tools, intensive automated and manual penetration affords, quality assurance process, software security reviews, and external audits.
Storage Security	Amazon provides AmazonS3 (Amazon Simple Storage Service) that can be used only or together with rest of the AWS Services such as Amazon Elastic Compute Cloud (Amazon EC2). Adding to this, we have	Google provides objects storage: High level of durability and availability and performance. Nearline Storage is a low-cost. Integrity checking Competitive and flexible pricing.
	Amazon S3, which is you pay only for the storage you actually use. There is no minimum fee and no setup cost.	
Cloud Lock		Protect data in Google Apps from cyber Security threats and inadvertent misuse.
Privacy	AWS warehouses are housed in ordinary facilities. Physical access is strictly controlled both at the perimeter and at building ingress intrusion detection systems, points by professional security staff utilizing video surveillance, and other electronic means. All physical entrance to data centers by Amazon web services employees is logged and audited regularly. Two-factor validation a minimum of two times to access data center floors.	Google provides transport layer security and local file storage security. gsutil performs all operations using transport layer encryption (HTTPS), to protect against data leakage over shared network links. gsutil takes a number of precautions to protect against security. Note that protection modes are not supported by Windows.
Infrastructure Security	Amazon's Applications handles the candidate develops and handles the software to automate IT process for hosts like	

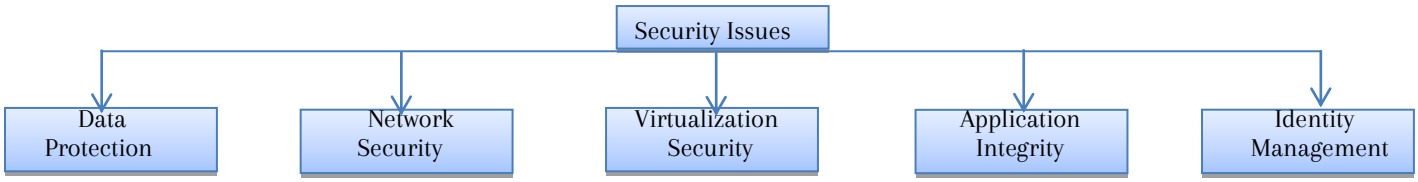
	(Linux and Unix) especially in the areas of third-party software delivery, internally developed software and configuration management. The infrastructure team maintains and operates a Linux and Unix configuration management framework to address hardware scalability, ease of use, auditing, and security management.	

Security is one of the main issues arising these days in Cloud Computing that needs not be handled as soon as possible. There some techniques through which we can save our data from the unauthorized user and from hackers also. The main reason is the consumer has to be aware of risks of data breaches in this new environment.

Cloud Computing is made up of infrastructure, platforms and application. Each segment provides different products for a business and each segment performs different operations according to the business requirements. There are many security issues for Cloud Computing covers many technologies including Operating System, virtualization, networks, database, transaction, load balancing, and memory management.

Following are some issues in Cloud Computing environment:

5. SECURITY ISSUES



Three Basic Cloud Deployment Models:-

1) ***Private Cloud:*** In this the Cloud framework is arranged and all available resource maintained and controlled by the firm. Cloud organization is establishing for a selected aggregation and managed by a third party underneath a service level agreement. Only single organization preferred to operate via company Cloud.

High Security & Privacy	More Control
Energy Efficiencies	Improved Reliability

Figure 1. Advantages of Private Cloud

2) ***Public Cloud:*** Client can access services without any control and at specific rent. Cloud organization is possessed and accomplish by a supplier who suggests its retune to public domain. e.g. Google, Amazon, Microsoft offers Cloud services via The Internet.

Cost Effective	Reliability	Flexibility
High Scalability	Location Independency	Utility Style Costing

Figure 2. Advantages of Public Cloud

3) ***Hybrid Cloud:*** This can be a combination of Private and Public Cloud infrastructures. However, the characteristics are unique that provides an advantage to a user. For example, for general Computing enterprise could select to make usage of external services, and its own data Centre's comprises its own data Centers. Hybrid Cloud model has a range of benefits.

Scalability	Security
Cost Efficiency	Flexibility

Figure 3. Advantages of Hybrid Cloud

6. CONCLUSION

Cloud Computing is the latest technology that's being widely used everywhere over the globe. This paper is an analysis of different security issues faced by Cloud Computing and comparison of different security issues faced by Google and Amazon moreover, we are trying to show the before and after changes of Cloud Computing of both the organizations. We also tried to show that the importance of security for the user as well as provides. There is no doubt that Cloud Computing has bright future.

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