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Cloud Computing and Security Fundamentals

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Abstract*— *In today's era almost all the organizations are preferring to use cloud as their primary storage. Once the organization uploads its data to cloud, then the organization has no control over it. Then comes the security challenges in handling data to cloud service providers. While selecting a Cloud Service Provider we need to be aware about that service provider before giving our data because as from now you will not have all the control.

This paper gives a better understanding on the concept of cloud computing and the risks that came up after outsourcing data handling tasks. Section 1 is Introduction, Section 2 discusses on various Service Models in Cloud Computing, Section 3 contains Cloud Deployment Models, Section 4 focuses on Security Issues and Challenges in Cloud Computing

Keywords*— *Service Models, Cloud Deployment Model, Security Issues, Challenges

I. INTRODUCTION

Cloud Computing is defined as architecture that centralizes server resources on a scalable platform so as to provide on demand computing resources and services. In cloud computing user shares processing power, storage space, bandwidth, memory. The cloud service provider shares its resources and our costs. In this, we as the organization only has to pay for what we are using.

Today all organizations are thinking to reduce their data storage and information security cost. As a huge amount of capital investment is needed for installing hardware for data storage. In this situation the only and efficient solution is that outsourcing this all data handling task to a separate organization, which are cloud service providers. Major cloud service providers in markets are: Google cloud, Microsoft azure, amazon web services. But handing organization's private data to cloud service provider may solve your primary objective of

reducing cost on handling data but also put you in a risk of data security like data loss and data leak.
Cloud computing is an Internet based service which is arranged and shared through internet.

II. SERVICE MODELS IN CLOUD COMPUTING

Cloud computing service models are divided into three classes, according to the abstraction level of the capability. The user has to select out of these service models according to the requirement.
There are service models viz.: SaaS, PaaS, IaaS, Naas.

***Software as a Service (SaaS)*:** SaaS is the model in which an application is hosted as a service to customers who access it via internet. Instead of installing software on user's computer, software is installed on cloud server. And the user can easily access it via internet. Under this SaaS model user is free from the complex part of managing software and hardware.

Benefits:

1. Saas is a broad application in which the services can be anything like online banking services, Gmail, Face book, hotmail and even from a web based email applications ton any inventory control.

2. SaaS is used in the application where there is a main interplay between the enterprise and outside world.

3. SaaS is used in that software which is used for short term manner. Example: collaboration software for any project.

4. SaaS uses some programming interface like API which provide integration between different Tools of a software.

5. SaaS has some products and providers which are well known .For example Microsoft office online

Platform as a Service (PaaS): PaaS supplies all resources required to build applications and services completely from the Internet, without having to download or install software. In PaaS user has full freedom to create environment according to his requirement.

Benefits:

1. It reduces the development and maintenance cost when we develop, deploy and test any application on same integrated environment.

2. There is no need of downloading or installing for users to experience the software online. We all use website like Face book, Gmail, and yahoo etc.

3. It provides scalability, reliability and security which is in built.

4. It has shared architecture means concurrent users can access the application.

5. Pay for use.

Infrastructure as a Service (IaaS): IaaS is offering virtualized resources like computation, storage, and communication. IaaS users can access the services using a wide area network, such as the internet. For example, a user can create virtual machines by login to the IaaS platform.

Benefits:

1. IaaS distribute the resources as a service.
2. Dynamic scaling is allowed in IaaS.
3. In IaaS cost varies.
4. In IaaS, multiple users or customers can access on a same hardware.
5. It has full scalability.

Network as a Service (NaaS): Cloud Network as a service (Naas) provides the capability to use the network services and inter-cloud network connectivity services.

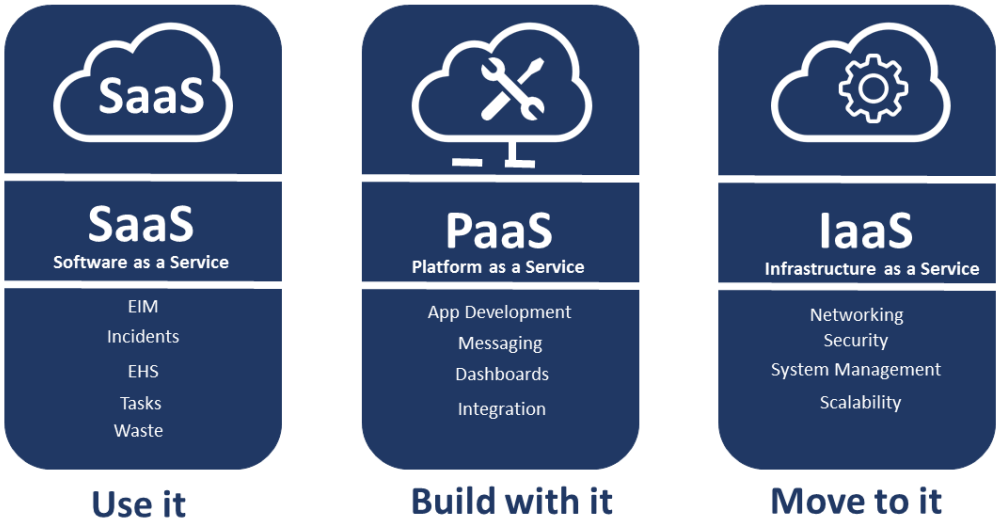


Fig. 1 Shows service models in cloud computing.

III. CLOUD DEPLOYMENT MODEL

Public model: In this deployment model more than one user shares the same hardware for storage, which is provided by their cloud service provider according to user's subscription. Most common uses of public clouds are for application development and testing, non-mission-critical tasks such as file-sharing, and e-mail service.

Private model: In this deployment model the cloud is used by a single organization and managed by cloud service provider which take care of it either on-site or off-site. Private cloud model is more expensive relative to Public cloud model as more capital is needed for acquiring and maintaining. However, private clouds are better able to address the security and privacy concerns for organization.

Hybrid model: In this deployment model an organization make use of private and public cloud model infrastructure, basically it's a combination of both Public and Private cloud models. Hybrid cloud model are generally implemented in organizations where there is seasonal requirement of storage.

Community model: This model is shared between organizations of a particular community like government, banks, commercial enterprises etc.

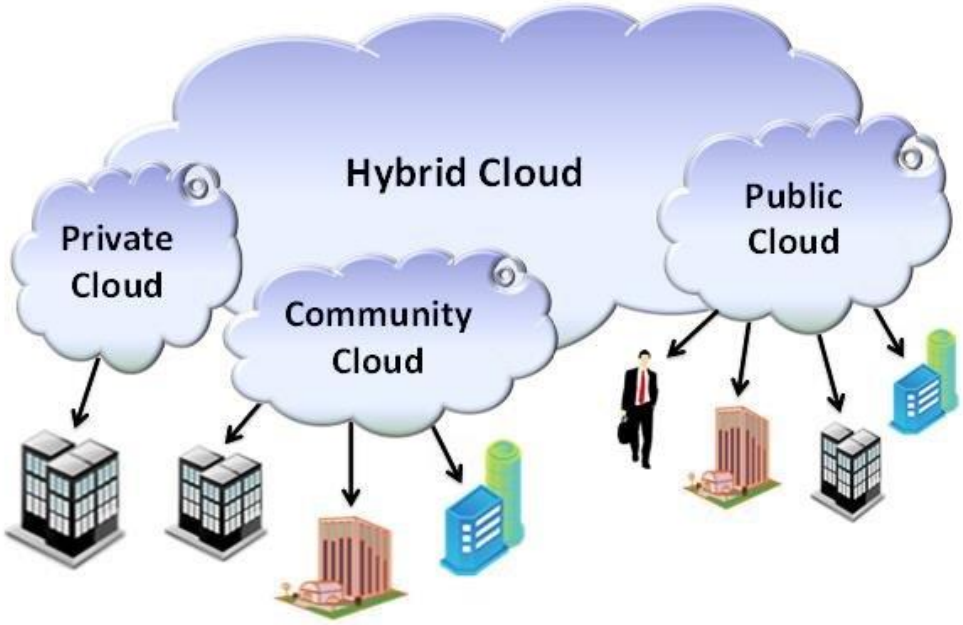


Fig.2 Shows Cloud Deployment Models.

IV. APPLICATIONS OF CLOUD COMPUTING

1. ***Online Data Storage:***
   Cloud computing allows to store data on cloud storage. There is no need to set physical storage systems for storing huge volume of business data.

2. ***Backup and Recovery:***
   Cloud service provider maintains security from their side and also provides backup facility to the data. Backing up data helps organizations to recover their valuable data in case of any failure.

3. ***Bigdata Analysis:***
   Volume of big data is so high where storing that in traditional data management system for an organization is impossible. But cloud computing has resolved that problem by allowing the organizations to store their large volume of data in cloud storage without worrying about physical storage. Next comes analyzing the raw data and finding out insights or useful information from it is a big challenge as it requires high-quality tools for data analytics. Cloud computing provides the biggest facility to organizations in terms of storing and analyzing big data.

4. ***E-commerce Application:***
   Cloud-based e-commerce allows responding quickly to the opportunities which are emerging. Users respond quickly to the market opportunities as well as the traditional e-commerce responds to the challenges quickly. Cloud-based e-commerce gives a new approach to doing business with the minimum amount as well as minimum time possible.
5. ***Cloud computing in education:***
   Cloud computing in the education sector brings an unbelievable change in learning by providing e-learning, online distance learning platforms, and student information portals to the students. It is a new trend in education that provides an attractive environment for learning, teaching, experimenting, etc to students, faculty members, and researchers. Everyone associated with the field can connect to the cloud of their organization and access data and information from there.

6. ***Cloud Computing in Medical Fields:***
   In the medical field also nowadays cloud computing is used for storing and accessing the data as it allows to store data and access it through the internet without worrying about any physical setup. It facilitates easier access and distribution of information among the various medical professional and the individual patients. Similarly, with help of cloud computing offsite buildings and treatment facilities like labs, doctors making emergency house calls and ambulances information, etc can be easily accessed and updated remotely instead of having to wait until they can access a hospital computer.

7. ***Entertainment Applications:***
   Many people get entertainment from the internet, in that case, cloud computing is the perfect place for reaching to a varied consumer base. Therefore different types of entertainment industries reach near the target audience by adopting a multi-cloud strategy. Cloud-based entertainment provides various entertainment applications such as online music/video, online games and video conferencing, streaming services, etc and it can reach any device be it TV, mobile, set-top box, or any other form. It is a new form of entertainment called On-Demand Entertainment (ODE).

V. SECURITY ISSUES AND CHALLENGES IN CLOUD COMPUTING

Before handling organizations data to cloud service provider, some of the security challenges needs to be solved.
Some of the major security issues and challenges in cloud computing are discussed below:

Privacy: Data uploaded to cloud storage is stored in various data centres created by cloud service providers at different location. In public model more than one user shares the same storage, then there is high risk of data leak and data loss as one of user may attack on others data and perform the illegal tasks. So, for confidential data private model is suggested.

Data integrity: It is the responsibility of cloud service provider to maintain data integrity. No one should have access to data except the one who has rights. The stored data must not be modified or deleted by any issue faced by cloud service provider.

Trust Issue: It is the foremost important thing to have trust on our cloud service provider as the organization is handling its data to them. Here, trust is between – human and human, human and machine.

Some other security issues are:

• Access to Servers & Applications

• Virtual Machine Security

• Network Security

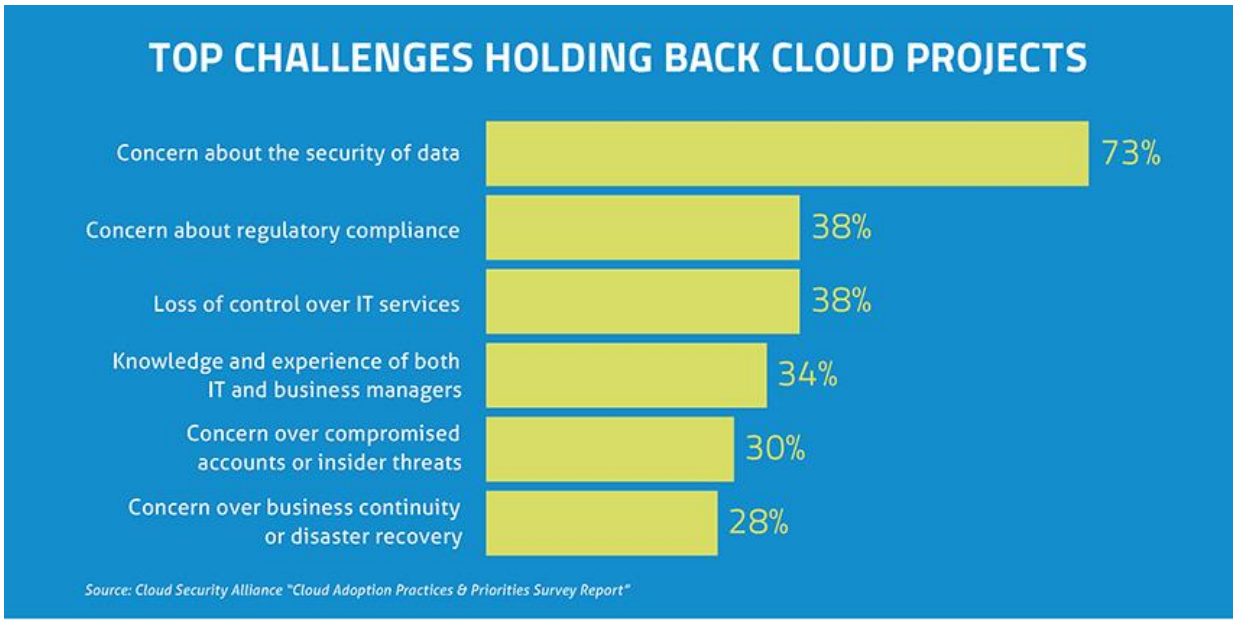
• Data Location

• Data Availability

• Data Segregation

• Security Policy and Compliance

• Patch management



CONCLUSIONS

In this paper we have described the service models of cloud computing, Deployment models in cloud computing and the security issues and challenges that come across using cloud services. This paper will surely help to understand the concepts of cloud computing and security issues.

References

[1]. Haji, A., Ben Letaifa, A., & Tabbane, S. (2010, October). Cloud Computing: Several Cloudoriented Solutions. In ADVCOMP 2010, the Fourth International Conference on Advanced Engineering Computing and Applications in Sciences (pp. 137-141).

[2]. Chun-Ting Huang, Zhongyuan Qin, C.-C. Jay Kuo., "Multimedia Storage Security in Cloud Computing: an Overview" 978-1-457701434- 4/11/$26.00,IEEE,2011.

[3]. F. Yang and Z. B. Chen, "Cloud Computing Research and Security Issues," 2010 IEEE International Conference on Computational Intelligence and Software Engineering (CiSE), Wuhan pp. 1-3, DOI= 10-12 Dec. 2010.

[4]. "Sun Microsystems Unveils Open Cloud Platform," [Online]. Available: http://www.sun.com/aboutsun/pr/2009-03/sunflash.20090318.2.xml,2A

[5]. B.R kandukuri, R.Paturi V, and A.Rakshit, "cloud security issues",2009 IEEE International Conference on Services Computing, sep. 21-25, 2009, Bangalore, India, pp. 517-520.

[6]. Kaur, Anureet. "An Age of Cloud in Mobile Computing (Mobile Cloud Computing).

[7]. Service models in cloud computing: http://www.nexiilabs.com

[8]. Cloud Deployment Models: http://www.researchgate.net

[9]. Top challenges holding back cloud projects: http://www.skyhighnetworks.com

[10]. Evolution of Cloud Computing, its Approaches and Comparison with Grid Computing Rajleen Kaur, Amanpreet Kaur M.Tech CSE, Global Institute of management and Technology, Amritsar

[11]. http://www.thesmallbusiness.org/software/benefitsofcloudcomputing

[12]. https://www.geeksforgeeks.org/

[13]. http://www.allthingscrm.com/cloudcomputing/understanding

