

A SURVEY REGARDING IMPROVING PRIVACY IN THE CLOUD FROM TIME TO TIME

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ABSTRACT

Cloud is one of the major computing technologies which are evolved in the internet these days. Compared to all the security is the only problem that is arising in growth of the cloud computing. The cloud stores the data over the servers remotely and helps to perform several operations of our data such as saving our data to cloud, retrieving the data, editing the data, removing the data over the cloud. However many of the security problems have to be resolved. Many of the security problems were facing because our data is placed over the service provider side and cannot guarantee regarding data encryption. So by taking this issues this made to move research towards this angle. This paper focus on introduction of cloud concept, evolution of cloud, advantages and disadvantages of the cloud.

KEYWORDS: Review, Data Security, Cloud Security, Storage, Service Provider, Data Operations.

INTRODUCTION

Cloud computing is an internet service that provides various features such as pay as per use, flexibility, on demand service, 24/7 accessibility, resource pooling, scalability etc., that is the main reason where most of the sectors moving from traditional servers to cloud servers the different sectors include banking, software companies, industries, medical sector etc., were moving towards cloud because of their endless features to the users such as efficient, flexible use, scaling resources etc., but apart all these security is the only problem facing by the users because the data is stored on the service provider side so there

may be a chance of data leakage and data privacy problems so mainly the banking sector is not ready to move from traditional server to cloud server because the server is present in somewhere else location, data encryption problems, they don't have all server access privileges etc., were the problems making them not to move from traditional server to cloud server.

At present there are many companies provides cloud services namely S3 and EC2 are the services provides by Amazon, Bluemix service provides by IBM, Azure service provides by Microsoft, Google cloud platform service

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provides by goggle, oracle cloud service provides by oracle etc., there are many Cloud Service Providers(CSP's).of all these are somewhat trustful.

The cloud comprises of different characteristics like:

- **Large scale:** it is a large server provides service to millions of users at a time the service providing to the users depends on the server handling capacity.
- **Virtualization:** The main advantage of cloud is because of virtualization means when the users wants to use any resources they no need to install hardware, software, infrastructure etc., they just request the server for a service and the server gives such access permissions to user or users for a specified time period.
- **More reliability:** The cloud service is more trustworthy compared to traditional servers.
- **Versatility:** cloud has a capability of running different types of applications and different types of supported software over the single cloud server. The cloud treats any software

as a platform independent it doesn't make problem regarding software type, os type etc.,

- **Extendibility:** The cloud has a capability to scale up or scale down the resources like hardware resources, software resources, network resources etc., whenever the user is in need.
- **On demand service:** The amount for the cloud storage depends upon the level we are using. The user pays only how much number of hours the person uses the server for there purpose. The total cost of the server depends on the formula i.e.,

Cost of cloud= how much of storage space used/ total number of hours used

- **Inexpensive:** For the cloud storage users doesn't feel it's too much cost for storing there data because we no need to see the things like: server data backup, server maintenance, server coolant, server security , data security on server , server availability all the time to users etc.,

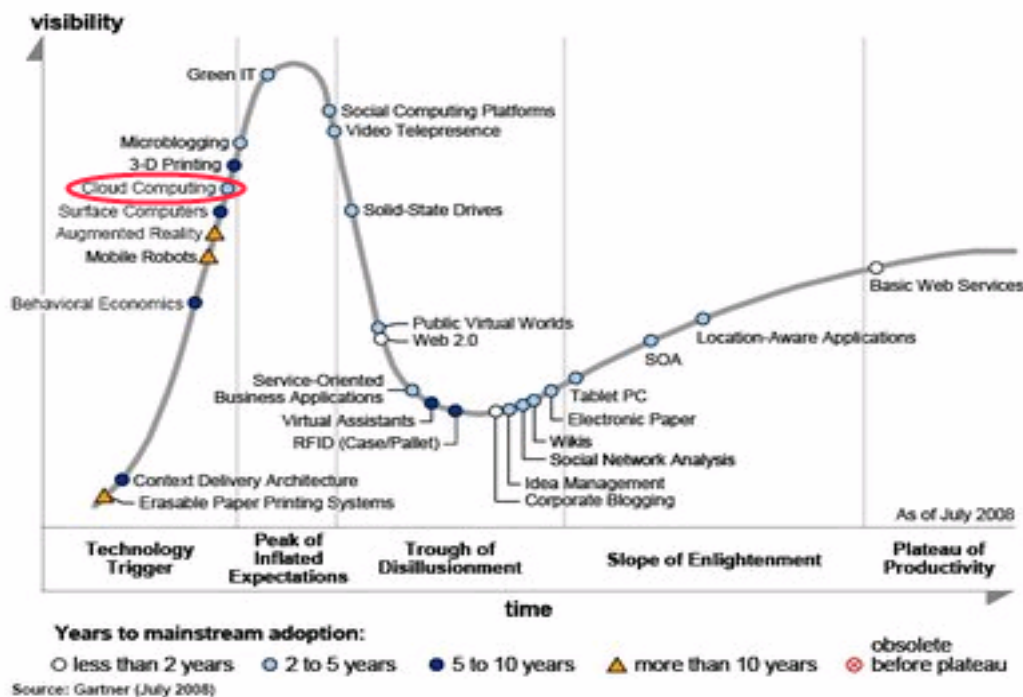


Figure 1. Cloud Computing Development

DEFINING CLOUD COMPUTING

The cloud has multiple services as multi-tenancy, robustness, scalable, resource pooling. The cloud provides major services such as SaaS (software as a service) provides different software to use over the cloud without installing on our devices, PaaS (platform as a service) provides unique platform for different

applications for different software, IaaS (Infrastructure as a service) provides different cloud platform independent services to users. The deployment models on cloud are classified into different types namely public cloud (which is accessible to all users), private cloud (access provided to specific users) and hybrid cloud (developed by the combination of any two clouds).

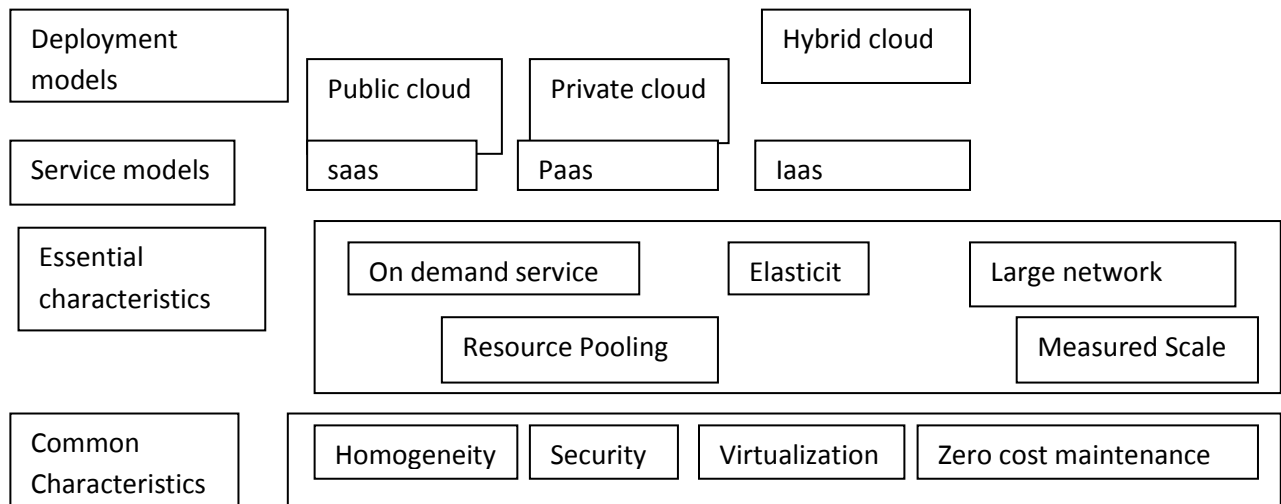


Figure 2. Cloud Computing Framework

HISTORY OF CLOUD

First when cloud was introduced all the companies were using traditional systems with old configuration, making the devices slow and for every type of software the users have to install the required supported software resources, hardware resources, infrastructure resources and required operating system to run the software client needs so all these things for making the software ready on the devices takes more time, require more cost for hardware or software purchasing and installation. So by considering all these problems like cost of purchased products, time taking etc., some popular companies namely Amazon, Google and Microsoft introduced the cloud and named them as Amazon style, Microsoft style and Google style.

They designed a cloud with Virtualization and named as VM's by using in virtual machines in

companies there task and cost of purchasing hardware and software was decreased. When cloud introduced by these 3 companies all companies gave the best service to users and they didn't able to say which one is good.

METHODOLOGY

Many of the developments were moving towards the development of cloud computing and the cloud technology development has increased tremendously as a result the development the security issues and data privacy became the big issue. Many of the researchers worked a lot in the field of cloud development and development of software engineering.

From the year of mid 2017 to till date many of the research articles were published in IEEE, Elsevier, Springer, Scopus, Science Direct, ACM, Google Scholar and Web of Science. In all these

journals many of them were pointed only regarding two questions they are:

1. What are the methods were developed to ensure data security?
2. Were the present data security methods were validated?

Here we took some research articles which were focused on cloud security on different research journals and number of people searched regarding cloud security on that particular year.

Table 1.Number of user search in the particular year

Year	Number of papers in cloud security domain
2007	0
2008	2
2009	2
2010	6
2011	6
2012	9
2013	10
2014	3
2015	33
2016	54
2017	68
Total	193

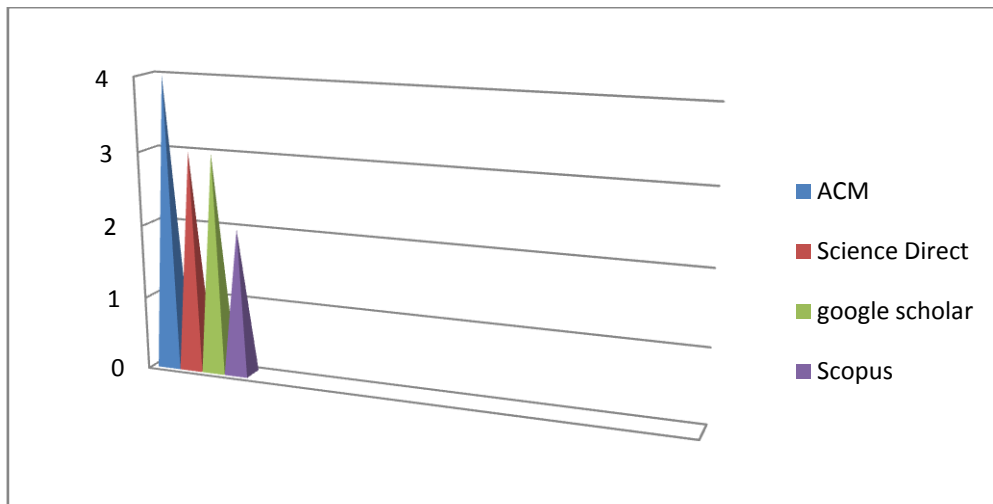


Figure 3.Graph regarding users published in cloud security in different journals

CONTRIBUTION

Many of the security problems were facing particularly in the domain of cloud because our data is placed over the service provider side and cannot guarantee regarding data encryption. So by taking this issues this made to move research towards this angle.

SECURITY ISSUES AND CHALLENGES IN CLOUD COMPUTING

Privacy is a major factor in cloud computing. Many of the service providers use different techniques for data privacy and making data accessible all the time. There are some more

problems regarding cloud like trust, data privacy and data encryption at server.

Till date regarding the security there are 5 most important security concerns namely

Concern 1: will cloud lose their security by sharing their cloud resources to other companies and there is lack of knowledge where our data is stored and accessed?

Concern 2: can we expect the integrity of the data before and after the sharing of data over cloud?

Concern 3: customers are not sure regarding their data is stored in the server weather the third party encrypts data before making the transaction or else if the company violates the rules and reads the user data. How can a user know that there data was stolen?

Concern 4: who monitors the data encryption and data decryption keys? Weather the service provider or the server itself creates the keys randomly?

Concern 5: if the user needs to use payment gateway mechanism in the cloud server there the data logs should be provided definitely for higher authorities of the companies from the service provider?

SECURITY ARCHITECTURE OF CLOUD COMPUTING

When the cloud was firstly introduced to users many of them got worry regarding the privacy of their data because where the data is not storing is not known to users and the users doesn't have the complete access privileges of their data. So that's task became the challenging task to the users. There is a great problem when the users storing the data weather the data is secured or not the users worrying regarding when they store the sensitive data like medical reports, bank account details information etc., the users worrying regarding data privacy and regarding weather the user data was encrypting by the service provider while data is storing over cloud.

To overcome the security problem in cloud and to make awareness regarding cloud National Institute of Standard and Technology (NIST) with some of the organizations like Cloud Security Alliance (CSA), Internet Engineering Task Force (IETF) and Storage Networking Industry Association (SNIA). All of the association members jointly developed the architecture of cloud security and this architecture was approved by National Institute of Standard and Technology. The architecture was defined below:

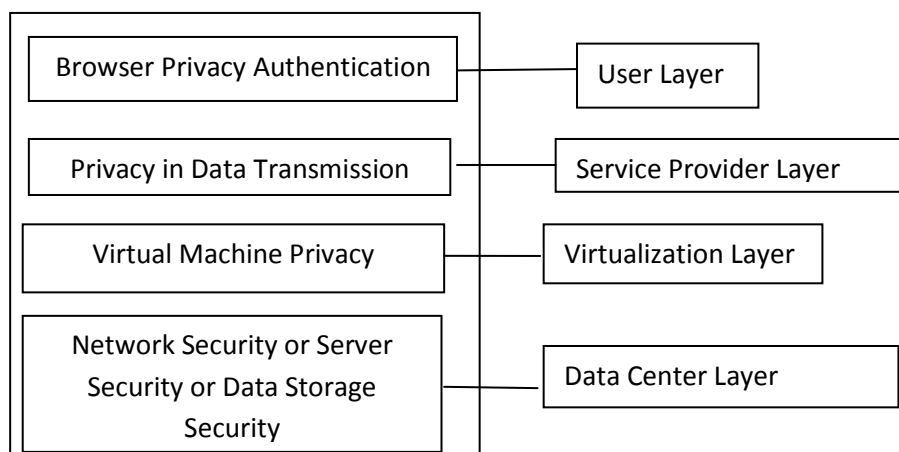


Figure 4.High level Security architecture

SECURITY PROBLEMS IN CLOUD

Cloud computing is widely using in industry and other sectors rapidly. But the security is facing the big problem from when the cloud was introduced. Some of the major security problems of the cloud are:

- Providing access to servers , user data
- Providing access to different applications by making platform independent
- Virtual Machine Privacy
- Data privacy
- Integrity in data
- Data access location
- Data and service available to users all the time
- Information segregation
- Privacy terms and conditions
- Patch management

These are the basic problems of cloud when the cloud got introduced. There are other research oriented problems of the cloud were:

- Understandings of Service Level Agreements (SLA) among user and service provider
- Information management and providing privacy of data in cloud
- Encrypting the data which is stored in cloud
- Transferring of data from one virtual machine to other virtual machine
- Providing access control permissions to users
- Interoperability
- Energy management
- Multitenancy
- Server consolidation
- Service availability to users
- General cloud terms and conditions
- Managing the platform by making platform independent

DISCUSSION

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

There are many benefits in using cloud service such as accessibility, availability, rapid elasticity; flexibility etc., compared to benefits when everything comes to practical there are many problems which should solve. One of them is data security in cloud. Many of the cloud engineers are doing their best task in securing the user data. When the user selects one particular service provider it's the service provider responsible to say to user regarding the security level of their data. In this paper we have focused on different types of security issues. In this paper first we discussed regarding cloud basic concepts and problems of cloud in terms of individual level, research level and co-operate level and also explains the concepts of virtualization and network. Even though there is a need for further survey regarding the cloud security and data encryption while securing data over the cloud. We hope that the basic concepts and problems in cloud helps in better understanding in terms of research.

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