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### **RESEARCH ARTICLE**

## **A STUDY ON CLOUD STORAGE**

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### **ABSTRACT**

*Cloud computing is the emerging technology. Cloud computing provides easy access and high performance computing on the data. Another major challenge that today software companies face, are storage of data at affordable cost and make available all the time. This paper provides the study on introduction to cloud storage and virtual storage architecture.*

### **INTRODUCTION**

Day to day, the usage of data in the computer has been increasing from common man to organization. The question arises where to store the important data, how to share the data, how to access the data globally, how to manage the data, how to make data available all the time, how can all these be achieved with reasonable cost? The answer to all these questions is cloud computing. NIST [1] defines Cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.

### **BENEFITS OF CLOUD COMPUTING**

The factors that make more companies to move cloud are

- Reduces the maintenance cost like no need of licensed software fee for each system, the purchase of new hardware and software is reduced.
- Access to the application can be done anytime, anywhere provided that they should be connected to internet.
- Scalable
- Improves Flexibility
- Disaster Recovery
- As the services are based on "Pay per use", capital expenditure can be reduced

- User Friendly Environment
- Quick Deployment
- Less Energy Consumption

## CLOUD SERVICES [2]

The services of the cloud can be classified into the three categories namely Software as a Service, Platform as a Service, Infrastructure as a Service. All the services are based upon the “Pay-per-use” model.

**Software as Service:** In SaaS, an application is hosted by service provider and then accessed via the world wide web by a client. These are mainly designed for end users. Customers need not install the application on the local computer there by eliminating installation and maintenance cost. The updating of software is taken care by the SaaS provider. Most of the SaaS solutions belong to multitenant architecture. As the software is managed at central location, customer can access to the application at any time and place, the only thing required is access to the web. Some of the SaaS providers are Google Apps, Quickbook overview, Microsoft Office live Business, Amazon, LinkedIn, Workday, Netsuite. Usage of SaaS is beneficiary when there is significant need for mobile or web access like mobile sales management software, significant interplay between organization and outside world like email, applications like tax or billing software used once in a month.

**Platform as a Service:** With this kind of servicing facilities, provided, one can deploy the application without installing the platform on the local system that is software can be deployed in cloud infrastructure. The main benefit of using PaaS is that developer need not worry about the platform updates, storage. These features are taken by PaaS providers. Some PaaS providers provide prebuilt functionality so that users can avoid building everything from the scratch. Some of the PaaS providers also provide online community where developers can share best practices can get ideas, seek advice from others. The implementation of PaaS is different from one provider to another provider. Amazon webservices, Appistry, Appscale, Google, OpenStack, Flexiscale, LongJump are some of the PaaS providers.

**Infrastructure as a Service:** Unlike SaaS and PaaS, IaaS provide hardware resources as service. The resources include memory, servers, networking devices, processing power. These are used to deploy the application. Multiple users can use infrastructure through the use of virtual machines. In order to manage these virtual machines, a governance framework is required, which helps in avoiding uncontrolled access to the users sensitive information. Utilization of this service will help in reducing the initial investment in company’s hardware. The service is based on “pay-per-use” model. Amazon Web Services EC2 and S3 are best examples for IaaS.

## DEPLOYMENT MODEL [3]

The Cloud services can be deployed in any one of the four following ways depending on the customer requirement. Each model has its advantages and disadvantages

1. **Public Cloud:** In this model, general public can access the services, storage, application offered by the provider. Public clouds are owned and managed by the third-party service providers. Flexibility, elastic environment, freedom of self service, pay-per-use, availability, reliability are some of the characteristics of public cloud. The main drawback of this model is lack of high level security. Ex: Amazon Elastic Cloud Compute, Google App Engine, Blue Cloud by IBM.
2. **Private Cloud:** This model provides access to the systems and services within an organization. Industries like finance mainly opt to this model, where security is the

primary concern. Data stored in private cloud can only be shared among the users of an organization. There are two types of private cloud namely, On-Premise Private Cloud, Externally-Hosted Private Cloud .The disadvantage of this model is ,it is difficult to deploy globally. Amazon Virtual Private Cloud, Microsoft Private Cloud are some of the examples of this model.

3. **Hybrid Cloud:** It is the combination of both public and private cloud. Scalability, cost efficiency, Security, Flexibility are the features of Hybrid cloud.
4. **Community Cloud:** Organizations with similar interest and requirements share the cloud infrastructure. It provides better security when compared to public cloud. This may be managed by either internally or third party

### **CLOUD STORAGE**

Cloud storage is a service that maintains data, manage and backup remotely and made data available to users over the network (via internet) .There are many cloud storage providers. Most of the providers provide free space up to certain gigabytes. For ex: DropBox provide free space up to 2GB, Google Drive, Box, Amazon, Apple Cloud provide free space up to 5GB, Microsoft SkyDrive provide free space up to 7GB[4].Customer have to pay amount according to the plan if they cross the free space limit. Features like maximum file size, auto backup, bandwidth, upgrade for limited space differ from one provider to another provider like maximum file size in DropBox is 300MB where as maximum file size in Google Drive is 1TB . By using cloud storage service, customers need not invest on storage devices, even technical support is not required for maintenance, the storage, backup, disaster recovery [5].

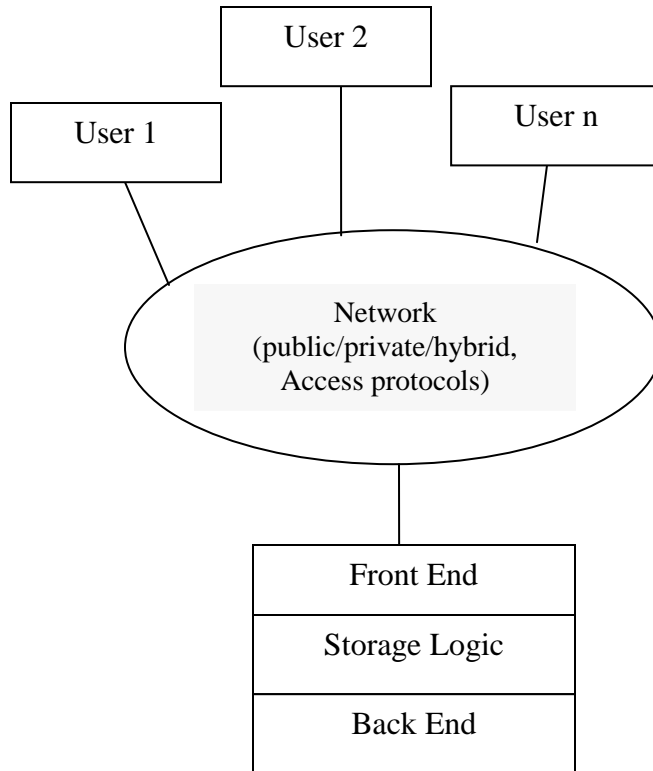
The concept of cloud storage is not worth when the client is able to store and manage the data at low cost when compared through the use of cloud .So, the cloud should be designed in such a way that it is cost effective, autonomic computable, multi-tenant, scalable, available, control, efficient.

### **CLOUD STORAGE STANDARDS [6]**

Storage Network Industry Association <sup>TM</sup> published CDMI in the year 2009.This supports both Legacy and New applications. Cloud storage standards define roles and responsibilities for archiving, retrieving, data ownership. This also provides standard auditing way so that calculations are done in consistent manner. These are helpful to the cloud storage providers, cloud storage subscribers, cloud storage developers, cloud storage service brokers .By using CDMI, cloud storage subscribers can easily identify the providers according to their requirements. Even, the CDMI provides common interface for providers to advertise their specific capabilities so that subscribers can easily identify the providers.

### **GENERAL CLOUD STORAGE ARCHITECTURE [7]**

Cloud storage architecture consists of front end, middleware, back end. The front end can be webservice frontend, file based front end, and even more traditional front ends. The middleware consists of storage logic which implements various features like replication, data reduction, data placement algorithms. The back end implements the physical storage for data.



The access methods for cloud are different from traditional storage as the cloud holds different type of data of different customers. Most of the providers implement multiple access methods.

### **VIRTUAL STORAGE ARCHITECTURE [8] [9] [10]**

An important part of the cloud model is , the concept of a pool of resources that is drawn from upon the demand in small increments .The recent innovation that has made this possible is virtualization. Cloud Storage is simply the delivery of virtualized storage on demand. This architecture is based on Storage Virtualization Model. It consists of three layers namely 1.Interface Layer, 2.Rule and Metadata Management, 3. Virtual Storage Management. In Interface Layer, Administrator and users are provided with the interface modes that may include icommands, client web browsers. The Rule and Metadata Management layer consists of 2 parts- Upper layer and Under layer. The upper layer consists of separate interface for client and admin. Both interface's have different rights. Rule is created from the Operating Transactions. In the client interface, user requests are sent to the Resource Based Services and Meta-Based Services. These services are present in the Under layer. Resource based service control resource scheduling, where as Meta-based Service manages the Meta data. Physical device virtualization and data/ file request load balancing is taken care by the Virtual Storage Management layer. Parameters like bandwidth, rotating speed etc are maintained by URM. System maintains a table holding these parameters and also routing table. After analyzing all resource nodes, system will assemble the collection in logic space and structure a global space at last. If there is data/file

write request, system invokes write operation. Similarly, Replica routing module is invoked when there is need to balance the load. Replica module is implemented by using Fair-Share Replication algorithm. Based on the access load factor, this algorithm will identify the best candidate nodes for replicas replacement.

## CONCLUSION

This paper presents the key technologies and virtual storage architecture in cloud. Cloud storage is more advantageous than traditional storage because of its availability, scalability, performance, portability and its functional requirements. Implementing virtualization in the cloud storage improves the scalability, availability but at the same time providing security in the virtual environment is complex. So apart from virtualization, emphasis should be given regarding security in virtual storage.

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