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# Cloud Computing Model for Accession of data Through Virtual Computing Lab: An Overview

Aqueel Ahmed A. Jalil[#1], Dr. Santosh S. Lomte[*2], Sanjay Y. Azade[*3]

[1]*Department of Computer Science, Radhai Mahavidyalaya, Aurangabad, Maharashtra, India.*
*ansari_aqueelahmed@rediffmail.com*
[2]*Principal, Dr. Seema Quadri institute of Engg. and Technology,Aurangabad, Maharashtra, India*
*santoshlomte@hotmail.com*
[3]*Department of Computer Science & IT, Dr. G.Y. Pathrikar college of Computer Science and IT, Aurangabad, Maharashtra, India*

***Abstract***— In this era of research we focused on cloud computing models i.e. PaaS, IaaS and SaaS, storage management and devices used in cloud. In this research work firmly concentrated on how data is accessed via cloud and how it is used by various devices. We proposed the characteristics of cloud computing services models as well as data capturing is an important aspect i.e. done through web 2.0 interface, which is used to access the communication capabilities from within the cloud. For accession of data we adopt storage reference model.

***Keywords***— SaaS, IaaS, PaaS, Virtual Computing Lab., Cloud computing, data accession.

## 1. Introduction

### 1.1 Cloud computing

Cloud computing is computing in which large groups of remote servers are networked to allow centralized data storage and online access to computer services or resources. Clouds can be classified as public, private or hybrid.[1,14] It can be summarized in the following figure:

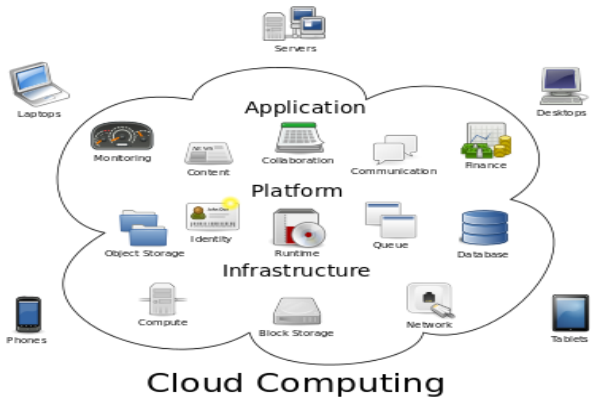


Figure 1: Cloud Computing

### *A. Service Models of Cloud Computing*

Cloud computing is a computational process in which services are delivered over a network using computing resources. The name 'cloud' symbolises an abstraction for complex infrastructure it contains in system diagrams. There are three main types of service models: [1]

- Software as a Service (SaaS).
- Platform as a Service (PaaS).
- Infrastructure as a Service (IaaS).

Business models using software as a service, multiple application software and databases are provided to users. Infrastructure and platforms on which applications run are managed by cloud providers. Saas is also called as "on-demand software" and is priced on pay-per-use basis. Saas allows a business to reduce IT operational costs by outsourcing hardware and software maintenance and support to the cloud provider. This enables the business to reallocate IT operational cost from hardware /software and personnel expenses, for achieving other IT goals. A web browser or a light-weight desktop or mobile application Is required for accessing cloud-based applications by end users. Servers at a remote location are required to store business software and user's data. The improved manageability and less maintenance, and enables IT more rapidly to meet fluctuating and unpredictable business demand.[2]

*Paradigm shift :* Infrastructure as an asset
*Characteristics:* Usually platform independent; infrastructure costs are shared and thus reduced; service level agreements (SLAs); pay by usage; self-scaling.
*Key terms:* Grid computing, utility computing, compute instance, hypervisor, cloud bursting, multi-tenant computing, resource pooling.
*Advantage:* Avoid capital expenditure on hardware and human resources; reduced ROI risk; low barriers to entry; Streamlined and automated scaling.
*Disadvantages and risks:* Business efficiency and productivity largely depends on the vendor's capabilities;

potentially greater long-term cost; centralization requires new/ different security measures.[1,10]

*A.a Software-as-a-Service (SaaS)*

'On-demand software' generally called as Software-as-a-Service is a software delivery model in which software and associated data are hosted on the cloud. Using a web browser SaaS is accessed by users. Now a day's many business applications use SaaS as a common delivery model including accounting, collaboration, Customer Relationship Management (CRM) and service desk.
Paradigm shift: Software as an asset (business and consumer)
*Characteristics:* SLAs; UI powered by "thin client" applications; cloud components; communication via APIs; stateless; loosely coupled; modular; semantic interoperability
*Key terms:* Thin client; client-server application
*Advantages:* Avoid capital expenditure on software and development resources; reduced ROI risk; streamlined and iterative updates
*Disadvantages and risks*: Centralization of data requires new/ different security measures. [1,10]

*A.b Platform-as-a-Service (PaaS)*

It is another type of service model of cloud computing which provides a computing platform and solution stack as a service. In this model user or consumers creates software using tools or libraries from the providers. Consumer also controls software deployment and configuration settings. Main aim of provider is to provide networks, servers, storage and other services. PaaS offers deployment of applications by reducing the cost and complexity of buying and maintaining hardware and software and provisioning hosting capabilities. There are various types of PaaS vendors which offer application hosting and a deployment environment along with various integrated services. [12, 13] The services offer scalability and maintenance management. In 2010, SaaS sales reached 10 billion $ and increased to 12.1billion $ in 2011 i.e. 20.7% up from 2010. By 2015 SaaS revenue will be more than double from 2010 scale according to Gartner Group and may reach upto 21.3$ billion. Customer Relationship Management (CRM) leads to be the largest market for SaaS . SaaS revenue within CRM market was forecast to reach $3.8 billion in 2011, up from $3.2 billion in 2010.The term 'software as a service' is considered to be the part of the nomenclature of cloud computing, along with platform as a service and infrastructure as a service and Backend as a service (BaaS)
*Paradigm shift:* License purchasing
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In Accordance of various researchers the following table shows the comparative study of these computing models:

### *A. Cloud Infrastructure Components*

Cloud infrastructure consists of servers, storage, network, management software, and deployment software and platform virtualization.

- Hypervisor

Hypervisor is a firmware or low-level program that acts as a Virtual Machine Manager. It allows to share the single physical instance of cloud resources between several tenants.

- Management Software

Management Software helps to maintain and configure the infrastructure.

- Deployment Software

Deployment software helps to deploy and integrate the application on the cloud.

- Network

Network is the key component of cloud infrastructure. It allows connecting cloud services over the Internet. It is also possible to deliver network as a utility over the Internet, i.e., the consumer can customize the network route and protocol.

- Server

Server helps to compute the resource sharing and offer other services such as resource allocation and de allocation, monitoring resources, security, etc.

- Storage

Cloud uses distributed file system for storage purpose. If one of the storage resources fails, then it can be extracted from another one which makes cloud computing more reliable

### *B. Benefits of Cloud Computing*

- Cloud Computing has numerous advantages. Some of them are listed below:
- One can access applications as utilities, over the Internet.
- Manipulate and configure the application online at any time.
- It does not require installing a specific piece of software to access or manipulating cloud application.
- Cloud Computing offers online development and deployment tools, programming runtime environment
- Through Platform as a Service model.
- Cloud resources are available over the network in a manner that provides platform independent access to any
- Type of clients.
- Cloud Computing offers on-demand self-service. The resources can be used without interaction with cloud
- Service provider.
- Cloud Computing is highly cost effective because it operates at higher efficiencies with greater utilization. It just requires an Internet connection.
- Cloud Computing offers load balancing that makes it more reliable.

Compute clouds allow access to highly scalable, inexpensive, on-demand computing Resources that run the code that they're given. Three examples of compute clouds are,

- Amazon's EC2
- Google App Engine
- Berkeley Open Infrastructure for Network Computing (BOINC) [3].

Compute clouds are the most flexible in their offerings and can be used for sundry purposes; it simply depends on the application the user wants to access. You could close this book right now, sign up for a cloud computing account, and get started right away. These applications are good for any size organization, but large organizations might be at a disadvantage because these applications don't offer the standard management, monitoring, and governance capabilities that

These organizations are used to. Enterprises aren't shut out, however. Amazon offers enterprise-class support and there are emerging sets of cloud offerings like Terremark's Enterprise Cloud, which are meant for enterprise use.

## 2. Implementation for Retrieving Information on Cloud

### *A.* The *Cloud Storage :*

One of the first cloud offerings was cloud storage and it remains a popular solution. Cloud storage is a big world. There are already in excess of 100 vendors offering cloud storage. This is an ideal solution if you want to maintain files off-site. Security and cost are the top issues in this field and vary greatly, depending on the vendor you choose. Currently, Amazon's S3 is the top dog.

### *B. Cloud Applications*

Cloud applications differ from compute clouds in that they utilize software applications that rely on cloud infrastructure. Cloud applications are versions of Software as a Service (SaaS) and include such things as web applications that are delivered to users via a browser or application like Microsoft Online Services. These applications offload hosting and IT management to the cloud. Cloud applications often eliminate the need to install and run the application on the customer's own computer, thus alleviating the burden of software maintenance, ongoing operation, and support.

Some cloud applications include,

- Peer-to-peer computing (like BitTorrent and Skype)
- Web applications (like MySpace or YouTube)
- SaaS (like Google Apps)
- Software plus services (like Microsoft Online Services)

### C. *Virtualization*

In a nutshell, virtualization is software that separates physical infrastructures to create various dedicated resources. It is the fundamental technology that powers cloud computing.

"Virtualization software makes it possible to run multiple operating systems and multiple applications on the same server at the same time," said Mike Adams, director of product marketing at VMware, a pioneer in virtualization and cloud software and services. "It enables businesses to reduce IT costs while increasing the efficiency, utilization and flexibility of their existing computer hardware." [4].

The technology behind virtualization is known as a virtual machine monitor (VMM) or virtual manager, which separates compute environments from the actual physical infrastructure.

Virtualization makes servers, workstations, storage and other systems independent of the physical hardware layer, said John Livesay, vice president of InfraNet, a network infrastructure services provider. "This is done by installing a Hypervisor on top of the hardware layer, where the systems are then installed."

How is virtualization different from cloud computing? Essentially, virtualization differs from cloud computing because virtualization is software that manipulates hardware, while cloud computing refers to a service that results from that manipulation.

"Virtualization is a foundational element of cloud computing and helps deliver on the value of cloud

computing," Adams said. "Cloud computing is the delivery of shared computing resources, software or data — as a service and on-demand through the Internet."

Most of the confusion occurs because virtualization and cloud computing work together to provide different types of services, as is the case with private clouds.

The cloud can, and most often does, include virtualization products to deliver the compute service, said Rick Philips, vice president of compute solutions at IT firm Weidenhammer. "The difference is that a true cloud provides self-service capability, elasticity, automated management, scalability and pay-as you go service that is not inherent in virtualization."

What are the advantages of a virtualized environment over the cloud?

To best understand the advantages of virtualization, consider the difference between private and public clouds.

"Private cloud computing means the client owns or leases the hardware and software that provides the consumption model" With public cloud computing, users pay for resources based on usage. "You pay for resources as you go, as you consume them, from a [vendor] that is providing such resources to multiple clients, often in a co-tenant scenario."

A private cloud, in its own virtualized environment, gives users the best of both worlds. It can give users more control and the flexibility of managing their own systems, while providing the consumption benefits of cloud computing.

On the other hand, a public cloud is an environment open to many users, built to serve multi-tenanted requirements, Philips said. "There are some risks associated here," he said, such as having bad neighbors and potential latency in performance.

In contrast, with virtualization, companies can maintain and secure their own "castle," Philips said. This "castle" provides the following benefits:

Maximize resources — Virtualization can reduce the number of physical systems you need to acquire, and you can get more value out of the servers. Most traditionally built systems are underutilized. Virtualization allows maximum use of the hardware investment.

Multiple systems — With virtualization, you can also run multiple types of applications and even run different operating systems for those applications on the same physical hardware.

IT budget integration — When you use virtualization, management, administration and all the attendant requirements of managing your own infrastructure remain a direct cost of your IT operation.

## 3. Communications in the Cloud

For service developers, making services available in the cloud depends on the type of service and the device(s) being used to access it. The process may be as simple as a user clicking on the required web page, or could involve an application using an API accessing the services in the cloud. Telcos are starting to use clouds to release their own services and those developed by others, but using Telco infrastructure and data. The expectation is that the Telco's communications infrastructure provides a revenue generating opportunity.

When in the cloud, communications services can extend their capabilities, or stand alone as service offerings, or provide new interactivity capabilities to current services. Cloud-based communications services enable businesses to embed communications capabilities into business applications, such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems. For "on the move" business people, these can be accessed through a smart phone, supporting increased productivity while away from the office. These services are over and above the support of service deployments of VoIP systems, collaboration systems, and conferencing systems for both voice and video. They can be accessed from any location and linked into current services to extend their capabilities, as well as stand alone as service offerings.

In terms of social networking, using cloud-based communications provides click-to-call capabilities from social networking sites, access to Instant Messaging systems and video communications, broadening the interlinking of people within the social circle.

### Accessing through Web APIs

Accessing communications capabilities in a cloud-based environment is achieved through APIs, primarily Web 2.0 RESTful APIs, allowing application development outside the cloud to take advantage of the communication infrastructure within it.


*Figure 2: Web 2.0 Interfaces to the Cloud*

These APIs open up a range of communications possibilities for cloud-based services, only limited by the media and signaling capabilities within the cloud. Today's media services allow for communications and management of voice and video across a complex range of codecs and transport types. By using the Web APIs, these complexities can be simplified and the media can be delivered to the remote device more easily. APIs also enable communication of other services, providing new opportunities and helping to drive Average Revenue per User (ARPU) and attachment rates, especially for Telcos.

## 4. Media Server Controls

When building communications capabilities into the "core of the cloud," where they will be accessed by another service, the Web 2.0 APIs can be used, as well as a combination of SIP or VoiceXML and the standard media controlling APIs such as MSML, MSCML, and JSR309. The combinations provide different capability sets, but with MediaCTRL being developed in the Internet Engineering Task Force (IETF), it is expected that MediaCTRL will supersede MSML and MSCML and have an upsurge in availability and more developments after it is ratified. JSR309 is a notable choice for those seeking Java development, as it provides the Java interface to media control. Whether businesses are deploying communications services for access from outside of or within the cloud, the environment is one that supports the speedy development and rollout of these capabilities.

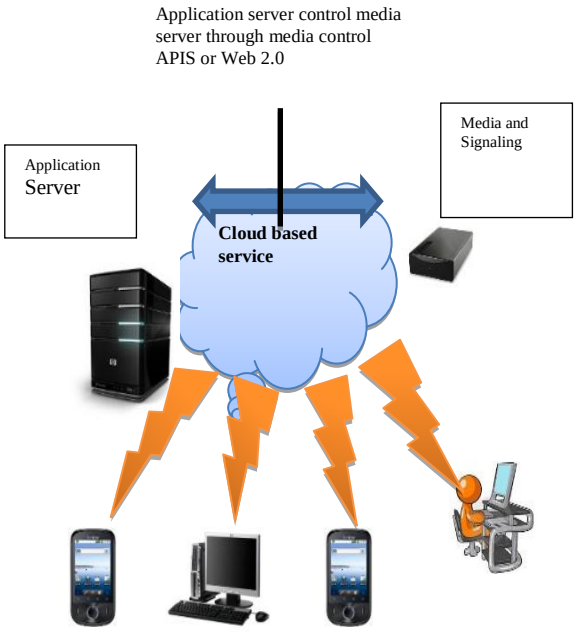


*Figure 3: Accessing the Communications Capabilities from within the Cloud*

## 5. Cloud Storage Reference Model

The appeal of cloud storage is due to some of the same attributes that define other cloud services: pay as you go, the illusion of infinite capacity (elasticity), and the simplicity of use/management. It is therefore important that any interface for cloud storage support these attributes, while allowing for a multitude of business cases and offerings, long into the future. The model created and published by the Storage Networking Industry Association™, shows multiple types of cloud data storage interfaces able to support both legacy and new applications. All of the interfaces allow storage to be provided on demand, drawn from a pool of resources. The capacity is drawn from a pool of storage capacity provided by storage services. The data services are applied to individual data elements as determined by the data system metadata. Metadata specifies the data requirements on the basis of individual data elements or on groups of data elements

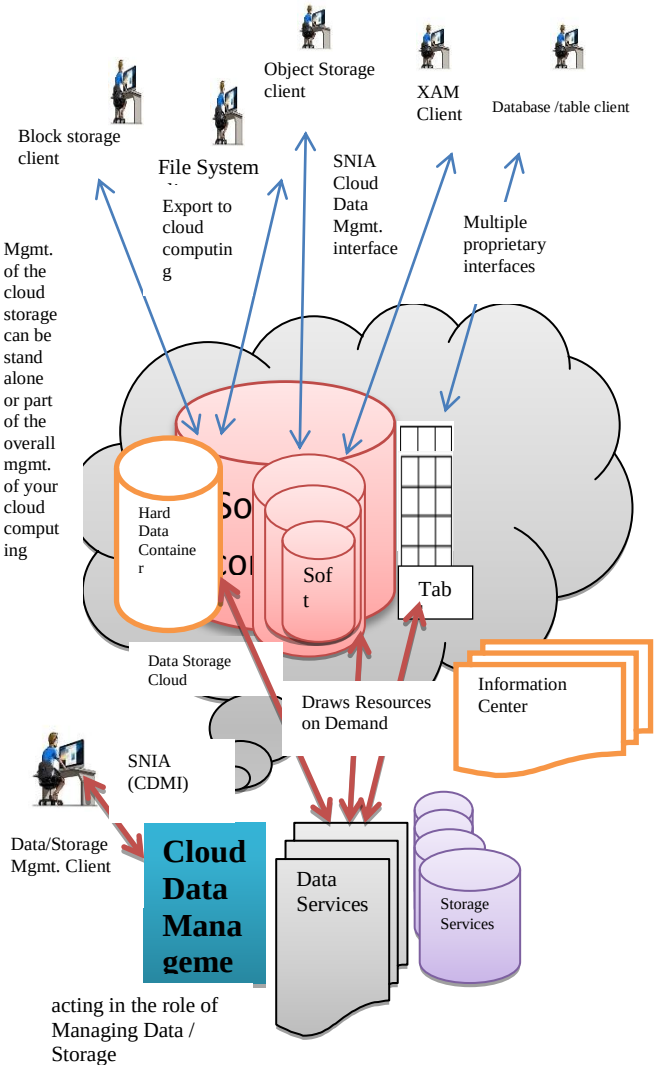


Figure 4 : Cloud Storage Reference Model

(containers). As shown in Fig 4, the SNIA Cloud Data Management Interface (CDMI) is the functional interface that applications will use to create, retrieve, update and delete data elements from the cloud. As part of this interface the client will be able to discover the capabilities of the cloud storage offering and use this interface to manage containers and the data that is placed in them. In addition, metadata can be set on containers and their contained data elements through this interface. Figure 4.Cloud Storage reference model It is expected that the interface will be able to be implemented by the majority of existing cloud storage offerings today. This can be done with an adapter to their existing proprietary interface, or by implementing the interface directly. In addition, existing client libraries such as XAM can be adapted to this interface as show in Figure 4. This interface is also used by administrative and management applications to manage containers, accounts, security access and monitoring/billing information, even for storage that is accessible by other protocols. The capabilities of the underlying storage and data services are exposed so that clients can understand the offering. Conformant cloud offerings may offer a subset of either interface as long as they expose the limitations in the capabilities part of the interface.

## 6. Conclusion

Hence the conclusion of this research work is to introduce the concept of cloud computing which comes from the network diagrams illustrating the Internet as a cloud, where it is not possible or not important, to know the information path. While the main reasons for adopting services based on cloud computing are cost saving, flexibility and start-up speed, there are still doubts about the security guarantees and the portability and integration options offered by this model of services.

The services offered in any of the cloud computing models (platform, infrastructure or software as a service) are closely related to mobility and, therefore, depend heavily on the continuity of the connectivity, the quality of the service and the security offered by the networks for an optimal user experience.

The accession of data is done through data accession model which is more flexible and easy to use by the user and most important thing is that it provides the data accession in high speed and produced the result as per requirements. But in this concept of data virtualization and accession of data through this cloud computing is not enough speed and resources used in cloud. In future it may speed up the accession of data and having more accurately utilizes the devices.

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