CLOUD COMPUTING IN LIBRARIES: AN OVERVIEW

Suman
Junior Library Assistant
Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana
E-mail:sumanaroragr8@gmail.com

Parminder Singh
Computer Operator
Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana
E-mail:parm146@gmail.com

Abstract

This paper presents an overview of cloud computing. Cloud computing help the integration of organizations or libraries in an easy manner. Cloud computing offers user centered multilevel services. These days most of the Libraries are moving towards cloud computing technology for maintaining digital libraries, and social networking with multiple flexibilities. Various characteristics, benefits, service models, types of cloud storage, need & usage of cloud computing are discussed in this paper.

Keywords: Cloud Computing, web technology

Introduction

Cloud Computing is a web based technology, which is a new form of computing. It is a service provided on the internet or network. It is a server based service, which is very helpful in modern times. Cloud computing requires remote server as well as internet to maintain and organize data and applications. In cloud computing so many computers are connected with a server. The applications are installed in a remote server and all the computers connected to that server location can use all these applications. There is no need to install every application in a single computer. It is one of the most important in the 21st century that offers infrastructure, platform and software as a service and is receiving a great deal of attention among individuals, corporations and Governments. Cloud computing is a conjunction of technologies and tendencies that are making infrastructures and applications more dynamic, more flexible and replaceable. Applications such as e-mail, web conferencing, customer relationship management (CRM) all are tracked in one cloud. Cloud computing is a combination of technology with trends that makes infrastructures and applications more dynamic, flexible and usable. Applications such as e-mail, online banking, web conferencing, customer relationship management (CRM) all are tracked in cloud.

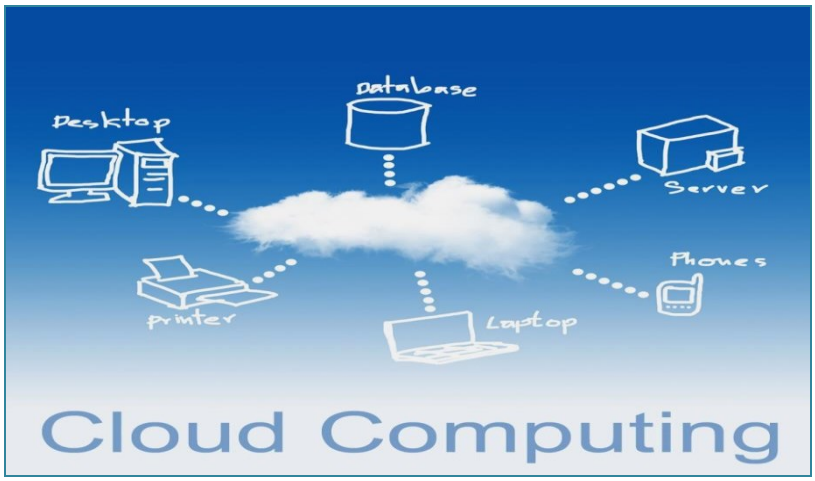
It is also helpful in libraries to maintain the record data, private and delicate data. Cloud computing helps libraries by showing their presence on the web. Libraries are adopting

this technology for electronic journal access, hosting digital libraries, tracking of statistical data and also integrating library hosting too.

Definition

According to **Douglas Gourlay** "People are coming to grips with Virtualization and how it reshapes IT, creates service and software based models, and in many ways changes a lot of the physical layer we are used to. Clouds will be the next transformation over the next several years, building off of the software models that virtualization enabled."

Another Author **Praising Gaw** said about cloud computing is "The way I understand it, "cloud computing" refers to the bigger picture, basically the broad concept of using the internet to allow people to access technology-enabled services. According to Gartner, those services must be 'massively scalable' to qualify as true 'cloud computing'. So according to that definition, every time I log into Facebook, or search for flights online, I am taking advantage of cloud computing."



In cloud computing shared resources, software, and information are provided to remote clients over a network. Cloud computing is a service, wherein Cloud resources are dynamically allocated to multiple users as per demand. The word "cloud" was used for the Internet, Like telephony schematics a cloud-like shape was used to denote a network, which was later used to show the Internet in network diagrams.

Traditionally organizations were used to buy the dedicated hardware and use it, which was termed as CAPEX (Capital expenditures) model, but with the evolution of cloud computing organization are moving away to the OPEX (operating expenditure) model.

Essentials Characteristics of Cloud Computing :

There are some essentials characteristics of cloud computing are as follows:

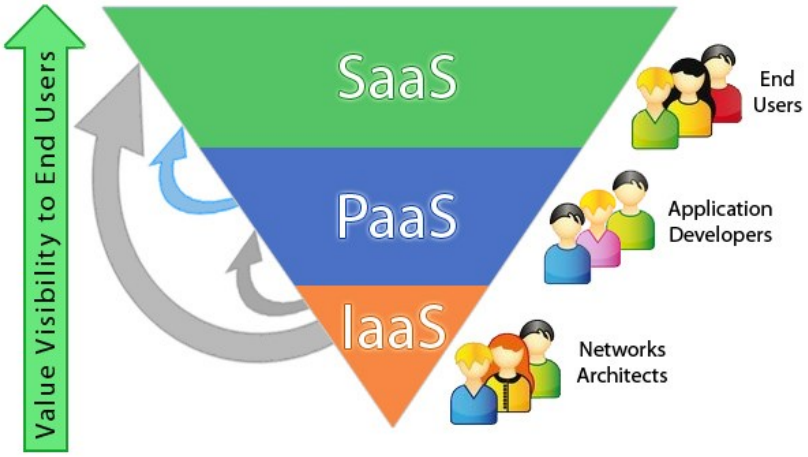
- **On-demand competences**: An organization will secure cloud-hosting services through a cloud host provider which could be user's usual software vendor. Organizations have access to user services and users have the power to

modification cloud services through an online control panel or directly with the provider. According to Gartner Amazon Web Services (AWS), Microsoft, Google, IBM and Salesforce.com are the Cloud service providers that provide on-demand self-services. AWS (NIST) is being used by New York Times and NASDAQ

- Broad network access: Cloud Capabilities can be accessed through standard devices such as mobile phones, laptops and PDAs. These devices can be used from any location
- through a simple online access point. This flexibility is vital for business as employees can keep an eye on their projects, contracts and customers 24 X 7 even when they are on the move or in the office.
- **Resource pooling:** Resource pooling helps a user to use the resources from anywhere at any time. Multiple users can use this facility at a time. This system is most helpful in multilevel national companies, where work is divided in broad categories. And so many departments are involved to do the work. Resource pooling leads to economy in carrying out work.
- **Rapid elasticity:** It is based on our needs. Anytime we can add or remove any type of software. Elasticity is the best option in cloud computing.
- **Measured service:** This service is also very helpful to run an organization. In cloud service this facility shows the measurement of utilization of resources. It has the metering capability which enables to control and optimize resource use. This helps to charge as per usage. According to this measurement one can choose that whether this software is worth or not. One can plan accordingly and can charge from users according to the usage, just like electricity department sell electricity and charge per unit and mobile companies charge for per call or pulse. This type of service provides transparency as both the user and service provider can check and control the use of resources.
- **Benefits of Cloud Computing:**
  Access to data over the Internet has become easier in modern times with the rise in availability of web-enabled devices like smartphones, tablets, laptops, etc. The benefits of shifting an organization or library to the cloud are as follows:
- File sharing is first and foremost benefit of cloud computing with fast accessing. A user can save large files too. Multiple types of files such as photos, videos, presentations, documents can be stored. Back-up facility is also provided by cloud computing.
- It helps to reduce the cost to manage and maintain IT system for running an organization or Library. Libraries can use cloud resources of service providers instead of spending funds for procuring costly systems and equipment.
- Collaboration of projects can also be done, which is cost effective as compared to purchasing software and hardware.
  - When connected to the Internet users can access the stored files from any other device. There is no need of large internal storage system.
  - It is compatible with most computers and operating systems.

Service models:

The following service models are available in the cloud computing technology:



SAAS

Software as a Service (SAAS) is a cloud service providing remote access to software and its functions. Software is hosted remotely Users are not required-to purchase additional hardware. Organizations are not required to handle the installation, set-up and often daily upkeep and maintenance. SAAS is often referred to as software-on-demand and it can be termed as using it on rent rather than purchasing it. With traditional software applications, it is required to purchase the software package and install it on the computer before being able to use it. The software is used to store, back-up and transfer the data There is widespread usage of SAAS because there are usually no starting costs involved. Organizations need to pay only for the amount of storage space utilized. SAAS may also be called hosted storage. Examples of SAAS are: **Google, Twitter, Facebook, Flicker etc**.

Benefits: No additional hardware costs**,** pay for what you use**,** Automated Updates**,** Accessible from any location

PAAS

Platform-as-a-Service **(**PAAS) can be defined as a computing platform in which web applications can be created quickly and easily without the need of purchasing and maintaining the software and infrastructure required for it. In this hardware, operating systems, storage and network capacity are hired over the Internet. In PAAS, the virtualized servers and associated services are rented by the customers to run the existing applications or to develop and test new applications. It is a software distribution model in which hosted software applications are made available to customers over the Internet. With PAAS, it becomes feasible to change and upgrade the operating system features frequently.

Benefits: Don't have to invest in physical infrastructure, Teams in various locations can work together, Security, Adaptability

IAAS

In Infrastructure as a Service (IAAS) cloud computing infrastructure servers, storage, network and operating systems are delivered as an on demand service. In IAAS, the equipment used to support operations, including storage, hardware, servers and networking components. are outsourced by organizations. The equipment is owned by the service provider and the responsible for housing, running and maintaining it also lies with the service provider. The client typically pays on a per-use basis.

Benefits: On-demand self-service, Broad network access, Measured Service

Types of cloud storage :

✓ **Public cloud storage**

In public cloud storage, data is stored in data center maintained by a separate service provider outside the enterprise. The enterprises backup their data in public cloud storage and gets freedom from maintaining hardware and software resources needed for storage of data. Live data generated by applications running on an enterprise's premises can also be stored in public cloud storage.

✓ **Personal cloud storage**

In personal cloud storage, data of an individual is stored in the cloud and this data can be accessed from anywhere. It is subset of public cloud storage. It is also called mobile cloud storage as in this type of cloud storage the stored data is synchronized and shared across multiple devices like tablet computers and mobile phones.

✓ **Private cloud storage**

In private cloud storage, the infrastructure in the organization's data center is typically managed by the storage provider. Private cloud storage helps in maintaining security and performance concerns while providing the benefits of cloud storage.

✓ **Hybrid cloud storage**

Hybrid cloud storage is a mixture of public and private cloud storage, In this storage the critical data is stored in the enterprise's private cloud while other data is stored a public cloud storage provider.

Need of Cloud Computing in Libraries

In modern libraries cloud computing is being popularized. These days there are so many libraries, which are automated. Computer technology is required for running the libraries. Different software's are being used by libraries for automation. All these software's are being run by a license, which libraries need to purchase from a vendor. It is very costly and no organization can purchase it separately for so many computers. To solve this problem cloud computing helps a lot. There are so many incidents when hardware fails of

a computer system. All the data lose from the computer which is very harmful. It becomes very tedious to solve this problem. All the software's are stored in a remotely located server and other computers are connected to that.

Cloud computing services such as acquisitions, cataloguing, process system, digital contents and provision for inclusion of cutting edge technologies used in libraries and also supports various standards such as MARC21, XML, Z39.50, Unicode and so on which directly related to library and information science area.

Use of OPAC in libraries

An Online Public Access Catalogue (OPAC) is the best example of cloud computing technology used in the modern or digital libraries. OPAC provides the complete bibliographic details of the collection of a library to its users. A user can retrieve the documents from the OPAC by searching the name of author, title, call number, or ISBN etc. In simple search option user can search the document either by providing the exact key or the first few letters of the search key. A combination of search terms is also possible with the use Boolean operators. In addition the OPAC portal may include other features for users like information about borrowed documents changing their address details, paying fines, reservations , etc.

Conclusion

Cloud computing builds on decades of research in visualization, distributed computing, utility computing, more recently networking and web software services. It implies a service oriented architecture, reduced information technology overhead for the end user, great flexibility, reduced total cost of ownership, on demand services and many other things.

The cooperative effect of libraries using same shared hardware, services and data rather than hosting hardware and software on behalf of individual libraries can result in lowering the total costs of managing library collections and exchanging the both library users experience and library staff workflows. Cloud computing can make libraries greener by sharing computing power thus reducing carbon footprints. It can also create a powerful, unified presence for libraries on the web and give users a local, group and global reach. Cloud computing is not a new technology but a new form of computing. Libraries are on the path to apply cloud based applications in order to enhance their services very effectively and efficiently.

References :

- **Akintomide,** O. A. (2013). Cloud Computing : The third revolution in IT. Library Progress (International), 33(I), Jan-June 77-94.
- **Buyya,** Raj Kumar (2014). Cloud Computing : Principles and Paradigms. New Jersey, John Wiley.
- **Goldner,** M.R. (2010). Wind of change: Libraries and cloud computing. BIBLIOTHEK Forschungund praxis, 34(3), 270-275.

- http://cloudcomputing.sys-con.com/node/612375 (accessed on 15.08.2014)
- http://www.isaca.org/groups/professional-english/cloud-computing/groupdocuments/essential%20characteristics%20of%20cloud%20computing.pdf (accessed on 14.08.2014)
- http://www.webopedia.com/TERM/S/SaaS.html (accessed on 17.08.2014)
- http://www.interoute.com/what-paas(accessed on 17.08.2014)
- http://www.interoute.com/what-iaas(accessed on 17.08.2014)
- **Paul,** Prantosh Kumar (2012). Cloud computing : Issues and challenges emphasizing its application in information networks and its subsystems in the perspective of developing countries. International journal of Information Dissemination and Technology, 2(1), Jan-Mar 31-33.
- **Reeca,** Karen (2012). Libraries and the cloud: Evolution not revolution. Panlibus Magazine, 23, 8-14