

LIBRARIES AND CLOUD COMPUTING TECHNOLOGY: AN OVERVIEW

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ABSTRACT: - *The paper presents an overview of the basic concept of cloud computing, definition of cloud computing, models of cloud computing, use of cloud computing in libraries and how cloud technology help libraries to provide a reliable & rapid service to its users.*

INTRODUCTION

Cloud Computing is a New technology model for IT services which many businesses and organizations are adopting. It allows them to avoid locally hosting multiple servers and equipment and constantly dealing with hardware failure, software installs, upgrades & compatibility issues.

Cloud computing technology continues to grow at a rapid rate with new applications and architecture. It is used to practice of storing, accessing and sharing data, applications and computing power in cyberspace. This technological development has brought a dramatic change in every field and libraries are not exception to it. Libraries have also started

adopting this technology as cost effective tool which involves delivering hosted service over the web. Budgetary provision for building collection development and procurement of computing resources and peripherals have been reducing gradually, so the cloud computing is the best option for the libraries to solve the above mention problem.

Cloud computing is the latest buzzword in the world of technology. It is a method where you use a remote server on the Internet to process and store your data. This means you can do anything from accessing a simple word document to send an E-mail or carry out complicated multimedia task. This is all done efficiently using the cloud computing from your own desktop.

DEFINITION OF CLOUD COMPUTING

Cloud computing means storing and accessing data and programs over the internet instead of your computer's hard drive. The cloud is just a metaphor for the Internet. It goes back to the days of flowcharts and presentations that would represent the gigantic server-farm infrastructure of the Internet as nothing but a puffy, white cumulus cloud, accepting connections and doling out information as it floats (Griffith, 2016).

Buyya defined "cloud computing is a parallel and distributed computing system consisting of a collection of inter – connected and virtualized computers that are dynamically provisioned and Presented as one or more unified computing resources based on service level agreements (SLA) established through negotiation between the service provider and consumers"

HISTORY OF CLOUD COMPUTING

Cloud computing new in technology and it is known as 3rd revolution after PC and Internet. Cloud computing is an enhancement of distributed computing, parallel computing, grid computing and distributed databases. Among these, grid and utility computing are known as predecessors of cloud computing.

The word " Cloud " is commonly used in science to describe a large agglomeration of objects that visually appear from a distance as a cloud and describes any set of things whose details are not further inspected in a given context

(Hassan,2014). The old programs that drew network that drew network schematics surrounded the icons for servers with a circle, and a cluster of servers in a network diagram had several overlapping circles, which resembled a cloud (Schmidt, 2014).

In analogy to the above usage, the word cloud was used as a metaphor for the Internet and a standardized cloud –like shape was used to denote network on telephony schematics. Later it was used to depict the Internet in computer network diagrams. With this simplification, the implication is that the specifics of how the end points of a network are connected are not relevant for the purposes of understanding the diagram.

The cloud symbol was used to represent network of computing equipment in the original ARPANET by as early as 1977 and the CSNET by 1981 both predecessors to the Internet itself (NSF,1981).

The core concept of cloud computing is quite simply, that the vast Computing resources that we need will reside somewhere out there in the cloud of computers and we will connect to them and use them as and when needed. Computing can be described as any activity of using and/or developing computer hardware and software. It includes everything that sits in the bottom layer, i.e. everything from raw compute power to storage capabilities. Cloud computing ties together all these entities and delivers them as a

single integrated entity under its own sophisticated management.

CHARACTERISTICS OF CLOUD COMPUTING

The National Institute of Standards and Technology's definition of cloud computing identifies "five essential characteristics" as given below

- On – demand self – service: A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.
- Broad network access: Capabilities are available over the network and accessed through standard mechanism that promote use by heterogeneous thin or thick client platforms (e.g. mobile phones, tablets, laptops, and workstations)
- Resource pooling: The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.
- Rapid elasticity: Capabilities can elastically provision and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear

unlimited and can be appropriated in any quantity at any time.

- Measured service: Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g. storage, processing, bandwidth, and active user accounts Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

MODELS OF CLOUD COMPUTING

1. Infrastructure as a service (IAAS)

This service models comprises a wide range of features, services and resources which support to build a virtual infrastructure for computing. Iaas refers to online services that abstract the user from the details of infrastructure like physical computing resources, location, data partitioning, scaling security, backup etc. Iaas Cloud often offer additional resources such as a virtual – machine disk – image library, raw block storage firewalls, load balancers, IP addresses, virtual local area networks(VLANs), and software bundles (Amies & Ning, 2012).

2. Platform as a service (PAAS)

In Paas models, cloud providers deliver a computing platform, typically including operating

systems, Programming Language execution environment, database, and web server. It is service model helps in generating the computing platform to run the software and other tools over the internet without managing the software and hardware at the end of user side.

3. Software as a service(SAAS)

In this model, users can avail the facilities to access and use any software available with cloud vendors. In the Saas model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. The cloud users need not to manage the cloud infrastructure and platform on which the application as running.

USE OF CLOUD COMPUTING IN LIBRARIES

The mainstay of Libraries is the library management system, also known as the integrated library system. Library management system was developed before the Internet and Web existed and are generally closed proprietary systems. It has been difficult and costly for these closed systems to take advantage of new technologies as they emerge. The cloud computing technology continues to grow at a rapid rate with new applications and architecture. It is used to practice of storing, accessing and sharing data, applications and computing power in cyberspace. This Technological development has brought a

dramatic change in every field and libraries are not exception to it. Libraries have also started adopting this technology as cost effective tool which involves delivering hosted service over the web, Budgetary provision, for building collection development and procurement of computing resources and peripherals have been reducing gradually, so cloud computing is the best option for the libraries to solve the above mention problem.

CLOUD COMPUTING TECHNOLOGY AND LIBRARIES

Libraries are shifting their services with the attachment of model provides online email application, free services, limitless storage, and remote access from any computer or device with an Internet connection.

Cloud computing technology came as a boon for libraries and is offering various opportunities for libraries to connect their services with cloud. Libraries may put more and more content into the cloud. Using cloud computing user would be able to browse a physical shelf of books, CD or DVD or choose to take out an item or scan a bar code into his mobile device. All historical and rare documents would be scanned into a comprehensive, easily searchable database and would be accessible to any researcher. Many libraries already have online catalogues and share bibliographic data with OCLC. More frequent

online catalogues are linked to consortium that share resources.

Cloud computing, also on demand computing, is a kind of Internet based computing that provides shared processing resources and data to computers and other devices on demand, and the data storage cloud be a main function of libraries, particularly those with digital collections storing large digital files can stress local server infrastructures. The files need to be backed up, maintained, and reproduced for patrons. This can strain the data integrity as well as hog bandwidth. Moving data to the cloud may be a leap of faith for some library professionals. It is a new technology and on the surface it is believed that library would have some control over this data or collections. However, with faster retrieval times for libraries. Cloud computing or IT infrastructure that exists remotely, often gives users increased capacity and less need for updates and maintenance, and has gained wider acceptance among librarians.

Examples of cloud libraries i.e. Library of congress (LC), OCLC, Worldcat , Polaris, Discovery Service, Encore, Google Docs/Google scholar, Scribd, Exlibris.

ADVANTAGES OF CLOUD COMPUTING

1. Cost Effectiveness
2. Reliability
3. User centric

4. Openness
5. Transparency
6. Interoperability
7. Representation

DISADVANTAGE OF CLOUD COMPUTING

1. Security
2. Vendor Lock-in
3. Outage and Downtime

CONCLUSION

Cloud computing implies a service oriented architecture, reduced information technology overhead forth end-user, great flexibility, reduced total cost of ownership, on demand services and many other things. In today's global competitive market, companies must innovate and get the most from its resources to succeed. It increases profitability by improving resource utilization. Costs are driven down by delivering appropriate resources only for time those resources are needed. Libraries are moving towards cloud computing technology in present time and taking advantages of cloud based services especially in building digital libraries, social networking and information communication with manifold flexibilities but some issues related to security, privacy, trustworthiness and legal issues were still not fully resolved.

Therefore it is time for libraries think seriously before clubbing libraries services with cloud based technologies and provide reliable and rapid services to their users.

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