Cloud Computing Based ICT Library Services

Dr. Pallavi Mundhe* **Ganesh Sagre ****

* **Librarian,**
Marathwada Sanskritik Mandal's College of Physical Education,
Aurangabad, Maharashtra, India

** **Librarian,**
MGM Institute of Technology,
Aurangabad, Maharashtra, India

QR Code

Abstract: - *Cloud computing is a new technique of storing and accessing data as well as software. The paper deals with various aspects of uses of cloud computing - definition, historical background, types of cloud computing, advantages, and limitations.*

Keywords: Cloud Computing, Libraries, Digital resources, ICT,

Introduction

Information communication technology (ICT) plays a very important role in library science. The library field is facing many challenges due to application software and remote access servers. Libraries have become automated which is the basic need towards improvement followed by networks libraries. The emerging trends of digital libraries, e-publications, internet usage, web tools are advantageous for libraries, in library services.

The most recent technology in library science is use of cloud computing, the new technology that uses the internet, application software and remote access servers to save resources. The Cloud computing technology allows users to access much more efficient computing by centralized storage space, memory and processing. In libraries, cloud computing is used to create a digital library and to automatically maintain operations using third party services for software and hardware.

Cloud computing refers to applications delivered as a package over the internet and the systems

software in the digital centers that provide services. The digital centers, hardware and application software is what we can call a 'cloud'. The example of cloud computing is web e-mail providers like Gmail, Hotmail and Yahoo! They store e-mail messages on their own servers. Users can access their e-mail from computers and other devices connected to the Internet. These services are free to all users, beyond any extra storage capacity and advanced services available at a cost.

A History of Cloud Computing

- In the 50s mainframe computers were huge, occupying entire rooms. Due to the cost of buying and maintaining mainframes, organizations could not afford to purchase one each. The solution was 'time sharing' in which many users shared access to data and CPU time. The term 'time sharing' is the premise of cloud computing in the 1950s
- 1960s : J.C.R. Licklider developed the ARPANET (Advanced Research Projects Agency Network) – the network that became the basis of the internet. His vision was for everyone on the globe to be interconnected and accessing programs and data at any site, from anywhere.
- 1970s: IBM released an OS called Virtual Machines that allowed admin to have many virtual systems or Virtual Machine on a single physical node. The Virtual Machines OS took the 50s 'time sharing' model to the next level and most of the basic functions of any virtualisation software that you see at the moment can be traced back to this early Virtual Machine operating system.
- In 2002 Amazon created Amazon Web Services (AWS), providing an advanced system of cloud services from storage to computation.
- In 2006 Amazon introduced the Elastic Compute Cloud (EC2) as a commercial web service. The EC2 let small companies rent computers on which they could run their own computer applications.
- Google and Microsoft entered the playing field. The Google app Engine bring low cost computing and storage services.

What is 'Cloud Computing'

Cloud computing is a method for delivering IT services in which resources are retrieved from the Internet through web based tools and applications, as singular to a direct connection to a server. According to NIST "Cloud computing is a model for enabling ubiquitous, convenient, on demand network access to a shared pool of configurable computing resources e.g. applications, networks, storage, services and servers etc. That can be rapidly provisioned and released with least management effort or service provider interaction.".

Different Types of Cloud Computing Services

There are various services used for delivering in different Cloud computing based library services as below

1) Infrastructure as a service (IaaS)
2) Platform as a Service (PaaS)
3) Software as a Service (SaaS).

1) *Infrastructure as a Service (IaaS):*

This service provides access to fundamental resources such as physical machines, virtual machines, virtual storage etc. The customers install or develop its own operating systems, software and applications on demand. Exp. Amazon, IBM, Web services, HP, Google services etc.

2) *Platform as a Service (PaaS):*

Paas as services helps in computer platforms applications. It also offers development tools, over the internet without managing the software and hardware at the end users. To meet scalability and manageability requirement of the app., PaaS providers offer a predefined combination of OS and application servers, Linux, Apache, MySql and PHP, Google's App, etc are some of the popular PaaS examples.

3) *Software as a Service (SaaS):*

Applications or software is delivered as a service to the customer who can access the program from any online device. Some of these Web-based applications are free such as Hotmail, Google Apps, Skype, on a subscription basis. It refers to software that is deployed on a hosted service and it accessible via internet. The related data wok may be stored on local machines ore services providers.

Characteristics of Cloud Computing

- ***Self-Service Provisioning***: End users can spin up computer resources for almost any category of workload on demand.
- ***Elasticity:*** company can scale up as computing needs increase and scale down again as demands decrease.
- ***Pay Per Use***: Compute resources are measured at a coarse level, enabling users to pay only for the resources and workloads they use.
- ***Workload Resilience***: Cloud service providers often implement unnecessary resources to ensure flexible storage space and to keep users significant workloads running often across various global regions.
- ***Migration Flexibility***: Organizations can progress assured workloads to or from the cloud or to different cloud platforms as desired or without human intervention for better cost savings or to use new services as they emerge.

Advantages and Disadvantages Cloud Computing in Library Service

Cloud computing like any other technology also has its strength and weaknesses, which needs to be taken into consideration before implementing this new technology as follow.

Advantages

- Adjustable storage
- Automatic and secure data backup
- Cloud OPAC
- Cost reduction
- Greater security and accessibility
- Lower investment, reduced risk
- Portability
- Scalability
- Support included

Disadvantages

- **Privacy** loss is a big concern when we talk about cloud based services.
- **Latency** an obvious issue is the time taken for the user system to interact with machines in the cloud.
- **Security** Cloud computing is fully Internet based and all cloud based computing uses and stores data using the same network which makes it vulnerable to attack by hackers
- **Complexity** While cloud services enhance and ease library performance they are initially complex to understand
- **Need for Constant connectivity** One of the major drawbacks of every cloud service is the need for constant connectivity with Internet

Example of Cloud Libraries

- Discovery services
- Google Documents
- Google scholar
- Library of congress
- OCLC
- Scribd
- Worldcat

Cloud Computing and ITC Based Library Services

Following are the most common services by cloud computing

***Collection Online*:** access to subscribed databases, including bibliographic records, full- text articles, e-books etc.

***Library web*:** sites leading to selective online documents and resources.

***Catalogue*:** Online catalog with web-interface and remote accessibility.

***Circulation*:** Online access to e-books online renewal of checked-out materials.

Reserve: Online accessible electronic reserve.

Instruction: Online instruction; in-person instruction with online components.

***Interlibrary Loan & Document Delivery*:** Online ILL request and articles delivery via e-mail in addition to traditional delivery.

***Reference*:** Online reference including simple e-mail reference and real-time virtual reference.

Conclusion

Cloud computing is a global technology. Libraries are moving towards cloud computing technology in present time in digital library resource to improve information sharing. Cloud computing is a pay per use model to facilitate on demand access to configurable resources through its architectural layers such as Infrastructure as a service (IaaS), Platform as a service (PaaS) and Software as a service (SaaS). Cloud computing have various benefits such as the reduced cost ease of maintenance, sharing of resources, etc. Therefore it is time for libraries think acutely for libraries services with cloud based technologies and provide reliable and rapid services to their users.

Bibliogrphy

1. A brief history of cloud computing. (n.d.). Retrieved January 5, 2018, from https://www.slideshare.net/Oneserve/a-brief-history-of-cloud-computing-33889054
2. Announcing Amazon Elastic Compute Cloud (Amazon EC2) - beta. (n.d.). Retrieved January 5, 2017, from https://aws.amazon.com/about-aws/whats-new/2006/08/24/announcing-amazon-elastic-compute-cloud-amazon-ec2---beta/
3. Cloud computing - Wikipedia. (2018). Retrieved January 5, 2018, from https://en.wikipedia.org/wiki/Cloud_computing
4. Cloud Computing. (n.d.). Retrieved January 5, 2018, from https://www.investopedia.com/terms/c/cloud-computing.asp
5. Regalado, A. (2011). Who Coined "Cloud Computing"? - MIT Technology Review. Retrieved January 5, 2017, from https://www.technologyreview.com/s/425970/who-coined-cloud-computing/
6. What is cloud computing? - Definition from WhatIs.com. (n.d.). Retrieved January 5, 2018, from http://searchcloudcomputing.techtarget.com/definition/cloud-computing
7. What is the significance of the term "Cloud" in Cloud Computing? (n.d.). Retrieved January 5, 2018, from https://www.quora.com/What-is-the-significance-of-the-term-Cloud-in-Cloud-Computing
8. What is the significance of the term "Cloud" in Cloud Computing? (n.d.). Retrieved January 5, 2017, from https://www.quora.com/What-is-the-significance-of-the-term-Cloud-in-Cloud-Computing
9. When Did Cloud Computing Start. (n.d.). Retrieved January 5, 2018, from http://allstartchoices.blogspot.in/2017/11/when-did-cloud-computing-start.html