A PERSPECTIVE STUDY OF CLOUD COMPUTING IN LIBRARY SERVICES

Mrs. G. Mangai,
Librarian,
C.P. A. College,
Bodinayakkanur.
mangai1974@yahoo.com

Dr. P. Ganesan,
Asst. Librarian
Alagappa University
Karaikudi
gharieni2003@yahoo.com

Kirana Kumar. D
Librarian, Koshys Institute of Management Studies,
Bangalore. kannada_3044@yahoo.co.in

Abstract: Information and Communication Technology (ICT) have forced the libraries to change in its functioning and processing of the information. Libraries have witnessed automation, digital library, open source management, institutional repositories and so on due to advancements in technologies. At present, libraries are moving in advanced level called cloud computing. In cloud computing, the libraries need not have the software, operating system and applications in the premises, which will be available with the service providers. Through this technology, the users can access the information from any part of the world, and helps to save the money, time and resources. The future librarians can provide the services effectively without bothering about the technical problems of software, hardware. In this context, an attempt is made to study about cloud computing, origin, different types, its impact in libraries, advantages and disadvantages.

Keywords: Cloud Computing; Library Services; Information and Communication Technologies; Library automation; Database Storage; Resource Sharing

1. Introduction

In the recent past, advances in Web technology on the Internet have generated immense data and managing these data with the existing database management tools designed in the recent past were different than the today's environment. Changes in the technologies have brought a sea change in the library functioning and processing of information. Continuous changes in the information management have forced the libraries to accept the technological advancements and satisfy the information needs of the users' in many ways[1]. In the present digital environment every library has electronic information. Libraries also have printed form of books and user records. If the library data is available in single place it will help the group of libraries to access the data in one place. This kind of cooperation among the libraries will increase the efficiency of libraries. Sharing of data will increase efficiency and overall cost for sharing the resources. The digitization and integrating the data by eliminating the duplicate data becomes cloud.

Cloud computing will be the one stop solution to share the information virtually emerged as on- demand computing tool for network access in the form of shared computing concept. Nowadays, cloud computing is the key term is being used in the world of Information Technology and it is the new kind of computing where the virtual resources are shared among

the users[2.] Through the cloud computing, it is possible to share the network, servers, software, applications, storage, and services. The user need not buy all the software, hardware, applications, networks and so on and need not depend on the traditional library. Instead, they can log in to the system and get only required services, for which only they have to pay. In this method, the users will pay for what they have used i.e. pay-per-use model.

Cloud computing helps the academic libraries to save the money, time and resources without having the software, OS, hardware in the library premises, which are must to access the information at present. The future libraries may be in the cloud so that libraries can focus directly for materials and services if the libraries hardware and software are directly controlled by the could computing. In this study, the authors have made an attempt to study about the cloud computing, its origin, types, its application in libraries and features.

2. What is cloud computing?

According to Mladen A. Vouk, "Cloud Computing is a service oriented architecture, reduced information technology overhead for the end user, greater flexibility, reduced total cost of ownership, on demand services and many other thing[3]"
Michael Armbrust (et.al) defined 'cloud computing refers to both the applications delivered as services over the Internet and the hardware and systems software in the data centres that provide those services[4.]

2.1 Origins of Cloud Computing

The present state of cloud computing starts with emergence of Internet. The implementation of Virtual Machine came in 1970s, when IBM released VM, allowed distinct computers processing with same environment. In this method, each user will have computer with processor, memory and other peripherals, but majority of the resources will be shared by others. Telecommunication network enabled to start ARPANET (Advanced Research Projects Agency Network), which is the forerunner for the today's Internet. In 1971 first e-Mail was sent. In 1971, CompuServe and Source both went online showing that commercial service providers can also host Internet. 1993, Mosaic, a graphical-based browser emerged and soon after netscape, which was used and managed by average users. During 2000, Salesforge.com is the pioneer in delivering enterprise-class applications over a web site. In 2002, Amazon web services gave option to users to access, store and solution through Internet and in 2006, they went even elastic compute cloud (EC2), in which developers may rent space for running their applications. In 2009, Google and Microsoft delivered applications to common users and business companies in the form of simple services[5.] IBM and SoftLayer were the leading in the cloud-based services.

2.2 Types of cloud computing:

Cloud is not a technology, whereas it is process of utilising the powers of servers in the virtual environment.

Public Cloud
From the name itself, it is identified that public cloud is meant for general public. Through this computing, the resources such as hardware, software, and services are provided to

the public by third party on payment basis. Data access through this clod is safe and free e-Mail service is the best example for public cloud. When the Internet started, e-Mail services, which is nothing but cloud is knowingly or unknowingly started using public cloud.

Private Cloud

In private cloud, cloud service will not be available to the general public and it is meant for the private i.e. internal data centres.

Community Cloud

Community cloud is meant for specific group of people or organizations. Through this method, several community or organization will join together and establish cloud service. In this method, cloud infrastructure may be hoisted by one of the organizations and infrastructure will be shared among the users or organizations.

Hybrid Cloud:

In hybrid cloud, more than one cloud bound together. Hybrid cloud is more useful, which provides more facilities and flexibilities for optimum use of the resources and accomplishing the tasks.

3. Purpose of Cloud Computing in Libraries

Research in cloud computing has devoted much of time to study the issues and problems and technologies are witnessing sea changes because of the emergences of cloud computing. It is a package of computing services and applications on the web. Cloud computing is the alternative to the traditional computing, and in cloud computing, hardware, software and operating systems are rented through Internet. Unlimited number of web-based applications are offered through cloud computing as a concept of pay for use like paying the payment for what we spoke on post paid telephone. In the cloud computing, the user need not bother about infrastructure, installation, maintenance, security and so on, which are looked after by the cloud service provider[6.]

Libraries are witnessing tremendous changes from the very beginning of traditional form. In the beginning, libraries have used floppy disks followed by CD-ROMs (Compact Disk –Read Only Memory) to procure or to provide information service to the users. Now the trend is changed with storage of information on Internet, Digital Library, Library Consortia, Institutional Repositories, etc. Most of the people in near future may not work with their PC-based computers, instead, they will work with web-based online environment, where all the software will be loaded in the domain. People will be free from installing software, purchasing of hardware and services. Now, the latest stage in which libraries rely is on cloud computing, which is latest developments and provides more benefits to the libraries. Through the cloud, libraries can be connected for sharing of information, which is easier. In this computing, the library can pay for what it has used. Since the libraries are moving towards paperless society, librarians have to depend on cloud based computing services, where spending huge amount for hardware, software, networks and services can be minimized. It is also predicted that with short period of time, most of the libraries in India have a chance to join in the cloud computing, there by all the collections, services and systems will be available through cloud. Fig. is an example of cloud computing in libraries.

Fig 1: Cloud computing in Libraries
(Source: Google Images https://www.google.co.in/imghp?hl=en&tab=wi&ei=-zkQVNyKGoi9uATH0oHYCQ&ved=0CAQQqi4oAg)

4. Types of cloud services for Libraries

4.1 Infrastructure as service:

In this method, the service providers will provide the hardware components to the libraries. Servers with available capacity, communication technology and OS for utilising the services will be provided by the vendor and it is the library's part to enter the service level agreement with the third party for hardware requirements. In this way, the libraries need not worry about the capacity of server, platforms, communication technologies to be purchased for providing the service. The cost will be charged by the company what the libraries has used. The librarians job is just uploading the information over the web from any part of the world, and can access the information. In India, companies such as Infosys, Bangalore, TCS, Wipro are some of the companies providing infrastructure as service.

4.2 Platform as service

In this method, the service provider will give software and programming languages to the users. For instance, .NET, JAVA, UNIX environment will be provided by the vendor. In libraries, operating system required for library operations will be provided by the vendor is a platform as a service. Some of the service providers are Windows Azure, Google AppEngine.

4.3 Software as service

Software as service is another service, which will be extended by the vendor on demand. The librarians need not worry about the installation and maintenance of the software, which is major issues for most of the librarians to use the new software. In this method, the librarians can work with software from any part of the world if they have Internet connection.

5. Current trend of Cloud Computing in Libraries

Cloud computing is emerging field in the IT, which is advanced level of distributed computing, grid computing, and distributed databases. In this digital environment, many libraries are sharing the databases with OCLC. In the library, storing of the data is the major task, which needs data server, technology, data backup, maintenance and technical manpower to look after all the network related activities. Moving towards cloud is, the database will be taken over by the cloud company so that the database will be physically available with the cloud company and it is the duty of the librarians to provide service only[7].

Most of the software and hardware vendor companies such as Microsoft, Google, Wipro, Infosys, TCS have already entered in to cloud computing. Whereas libraries are service oriented centres have the major role in procuring the information, organizing and disseminating the same to the users in the right time.

Cloud computing in libraries is at the initial stage and it is predicted that within short period, all the library collection, services, will be through cloud. Libraries are very much interested to provide cloud based computing services to the users, but in the real sense, initial budget, identifying the good service companies and technical skill of the library professional in use of advanced technology were the constraints for any library. OCLC is one of the best example for cloud computing, which has come into force long back itself for sharing libraries data. WorldCat is the OCLC's large database is available through web. OCLC is also providing number of library administration services such as acquisition, cataloguing, circulation and other library activities. Web share management system, provides collaborative platform, through which the libraries can share their resources, services and problems with the library community through clouds.

But, it is real that some of the services like digital libraries, open sources, library websites, usage of web 2.0 , social networks already running in a successful mode. Some of the services like Dura cloud for developing digital libraries/institutional repositories OCLC, Google are also in the cloud computing service. In the present day, many of the commercial and open source organizations have started clubbing the cloud along with their services, but application of cloud is not fully accepted in Indian libraries[8].

5.1. Advantages of could computing in Library Services

Following are the advantages of using cloud computing
1. Service oriented architecture: the cloud is provided which has access to resources, software, networks, applications through web, which is controlled by remotely located data centres.
2. Pay per use model: it works on demand. We can demand the service for certain period like for few days or few weeks
3. Cost effective: The resources, services, software etc are shared by group of institutions by cutting down the individual institutes cost. Comparing to the traditional method of computing, cloud computing billing may be comparatively less

4. Portability: since the service is available over the web, the service can be availed through browser from any part of the world
5. Eco-friendly: since it is pay for use model, consumption of electricity will be minimum. Hence, it helps green computing
6. Adjustable storage: in the traditional system, if the server is less than what we have. The server should be replaced with the new one. In this computing, the storage capacity can be adjusted according to the needs of the institute, since the storage is controlled by the service provider
7. Flexible and Innovative: new technologies will be informed as and when available with the service provider and the service utilized will be more flexible when comparing with the traditional computing
8. Cloud OPAC: Most of the institutes in the world are having the catalogue over the web. These catalogues are available with their institutes local server made it available over the web. If the catalogue of the institutes made it available through cloud, it will be more benefit to the users to find out the availability of materials.
9. When the data comes to cloud, the data becomes cloud, which can be shared among the users. The need for storage in local server, installation, maintenance and backup is removed so that the librarians can concentrate on innovative services[9].

5.2. Limitations of could computing in Library services

Any technology will have its own limitations. Below mentioned are some of the limitations in Cloud Computing.

- ❖ Moving to the trusted cloud computing service will become a challenging task.
- ❖ Security: Library deals with information and has large volume of information. In order to have cloud computing the data has to be uploaded to the cloud machine. Hence, there should be strict service level agreement before entering into the process.
- ❖ Reliability: reliability is the big question in cloud computing. Once entered in to cloud computing, if the companies satisfy as per the service agreements, it will be good. Otherwise there is a chance of having discomfort.
- ❖ Data back up, intellectual property rights are the other problems which has to be taken care before.

6. Conclusion

Though Cloud computing is one of the emerging topics, its implications in libraries is at the initial stage. But, it is going to occupy the libraries within short period since it has more benefits than the traditional computing. Cloud computing in libraries will help the librarians to work more on information services because in cloud based services, librarians have no role on installation, maintenance, problems and upgrading. Though the cloud service has much more flexibilities, there are some issues such as security, legal issues, privacy and trustworthy of the company to be resolved before moving to the cloud service. Therefore, it is the time to the librarians to understand more about cloud services and issues to cope up with the new technology.

References:

1. Kulveen Kaur, "Moving libraries to the cloud", *International Journal of Information Dissemination and Technology* 4, no.1, (2013): 28-30.

2. Tuncay Ercan, "Effective use of clod computing in educational institutions", *Procedia Social and Behavioral Sciences*, 2, (2010): 938-942. <http://ac.els-cdn.com/S1877042810001709/1-s2.0-S1877042810001709-main.pdf?_tid=4cac46e2-38e2-11e4-b622-00000aacb35f&acdnat=1410350712_5d0f7b2be1be0d3aa32ea84fee2b2a0f> (10 Sep. 2014)

3. Mladen A. Vouk, "Cloud computing – Issues, research and implementations", *Journal of computing and Information Technology-CIT* 16, no. 4, (2008): 235-246.

4. Michael Armbrust (et.al), "A view of cloud computing", *Communication of the ACM*, 53, no. 4, (April 2010): 50-58.

5. Matt Smith, "The history and development of cloud computing" <https://blog.aerofs.com/the-history-and-development-of-cloud-computing/> (10 Sep.2014).

6. Mayank Yuvaraj and Ajay Pratap Singh, "Cloud computing research around the globe in different universities: An overview", *International Journal of Information Dissemination and Technology* 3, no. 4, (2013): 230-235.

7. Nandkishore Gosavi, Seetal S. Shinde and Bhagyashree Dhakulkar, "Use of cloud computing in Library and Information Science Field", *International Journal of Digital Library Services*, 2, no.3, (Jul-Sep. 2012): 51-60

8. Anna Kaushik and Ashok Kumar, "Application of Cloud Computing in Libraries", *International Journal of Information Dissemination and Technology*, 3 no. 4, (Oct.-Dec. 2013): 270-73.

9. Matt Goldner, "Winds of Change: Libraries and cloud computing", *OCLC,* (2010) <http://www.oclc.org/content/dam/oclc/events/2011/files/IFLA-winds-of-change-paper.pdf> on (09 Sep. 2014)

About Authors

G. Mangai, presently working as Librarian, Cardamom Planters' Association College, Bodinayakanur, Tamil Nadu. She has qualified MLISc, UGC NET and now pursuing her Phd, in Alagappa University, Karaikudi. She has completed One Year training course on ICT applications to Library and Information Centres from NCSI, IISc Bangalore during 1996-97. She has over 14 years of Professional Experience. She has presented papers in National Conferences.

Dr. P.Ganesan, presently working as Assistant Librarian in Alagappa University, Karaikudi. He was awarded Phd from Bharathidasan University. He has completed One Year training course on ICT applications to Library and Information Centres from NCSI, IISc Bangalore during 1996-97. He has over 16 years of experience in the field. He has worked as Documentation officer in the University of Hyderabad for 6 years. His publication include: 7 Articles in National and International Journals, 20 papers in both National and International Conferences/ Seminars. Another feather on his cap include : Guidance for 25 MPhil students and currently guiding 8 Research Scholars.

Kirana Kumar D: is currently working as Librarian in Koshsy Institute of Management Studies Bangalore. He holds MLIS, Qualified UGC-NET and doing Ph.D (LIS) in Alagappa Univeristy Tamil Nadu. He has over 6 years of Professional experience in the field of Library and Information centers. He has participated and presented papers in various National and International Conferences.