

# APPLICATIONS OF CLOUD COMPUTING IN DIGITAL LIBRARIES WITH REFERENCE TO IMPROVE THE FUNCTIONALITY

**Prof. Shilpa Shantaram Pawar**

Librarian, Indira College of Commerce & Science, Pune, MS

## ABSTRACT

*This research paper discusses how cloud computing solutions could be beneficial to libraries in three basic areas: technology, data and community. Cloud computing is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand, like the electricity grid. Library automation has helped to provide easy access to collections through the use of computerized library catalogue such as On-line Public Access Catalog (OPAC). Cloud Computing helps to provide easy accessibility of the digital resources to the patrons with retrieving facility.*

**Key words:** Cloud Computing, Digital Library, Library Automation, Library Community, Internet Etc.

**Cite this Article** Prof. Shilpa Shantaram Pawar, Applications of Cloud Computing in Digital Libraries with Reference to Improve the Functionality. *International Journal of Library & Information Science*, 5(2), 2016, pp.1–6. <http://iaeme.com/Home/issue/IJLIS?Volume=5&Issue=2>

---

## INTRODUCTION

The academic, special and public libraries always get lower budget sanctioned amount and that become an obstacle in their growth. Library has been neglected sector in the academic discourse. Due to the financial constraints libraries have to plan their strategies with minimum resources. The new technologies required sufficient funds but institutions neglect the financial demands made by the libraries. Instead of becoming assets libraries are becoming liabilities. Libraries need to develop their income by various innovative methods. They never go beyond their traditional approach while studying for this research it is found that more than 90% libraries managed their own digitized collection by using the local management software for digital libraries.

They never go for using the cloud computing technology. The cloud computing reduces capital and operations costs. Need not required to make large up-front capital investment on data centers. It facilitates pay as you go (only pay for required space which you need) also allow integration with existing IT assets (Software + Services).

## **NEED FOR RESEARCH**

1. To look specifically at how cloud computing can be employed by libraries and what need to be considered before moving into a cloud computing solution.
2. Dr. Ranganathan's fourth principle very much applied when we say Cloud Computing. Save the time of reader by providing information anytime anywhere.
3. We should be able to design our services in such a way that a user gets it 24x7, with good internet connectivity.
4. More efficient and speedy distribution of library services with lower cost.
5. Simultaneously multiple users can use provided resources and services.
6. Constant performance monitored by the service provider.

So now, it is time for librarians to concentrate on providing proactive services and move from general service to personalize information services to the users for the benefit of academic community rather than hunting for technology to deliver the services.

## **OBJECTIVES**

1. To review about digital libraries.
2. To analyze the functional components and functionality of digital libraries.
3. To study the prerequisites for libraries before applying cloud computing
4. To provide solution of Cloud Computing for Digital Libraries.
5. To judge the use of cloud computing for digital libraries.

## **SCOPE**

Scope of the study is limited to academic libraries with special reference to digital libraries.

## **IMPORTANCE OF STUDY**

The libraries have been automated, networked and now moving towards paper less. This paper overviews the basic concept of cloud computing used in digital libraries. Latest technological development has brought a dramatic change in library science. Information technology has impacted positively on library, information system and services they provide for users. Now libraries may soon be building and managing their own data centers. The Provision of library and maintenance of infrastructure for Web based digital library faces several challenges. The cloud computing entails the reduction of in house datacenter's and Information Technology infrastructure capability. Universities and Colleges are the core of innovation through their advanced research and development. They may benefited greatly by implementing the digital library with cloud computing, including cost cutting.

The concept of digital library is nothing new, but cloud computing has brought new opportunities for the advancement of digital library. Cloud computing has already proved its necessity, which has considered as the upcoming pattern of computing in

coming days. This research emphasize on the issue of cloud computing and its role for digital libraries.

### **Prerequisites for applying cloud computing in libraries**

- The need to disclose their vast collections on the Web.
- Libraries can agree to share pools of data for cooperative collection building, cooperative preservation or digitization. Cooperative sharing of materials etc. and with massively aggregated data new services can be created such as recommender services based on a broad base of usage data

### **What is Digital Libraries?**

A digital library is a collection of digital documents or objects. This definition is the dominant perception of many people of today. A digital library as an organized and focused collection of digital objects, including text, images, video and audio, with the methods of access and retrieval and for the selection, creation, organization, maintenance and sharing of collection.

Digital libraries differ significantly from the traditional libraries because they allow users to gain an on-line access to and work with the electronic versions of full text documents and their associated images. Many digital libraries also provide an access to other multi-media content like audio and video.

### **Benefits of Digital Libraries**

Digital libraries bring significant benefits to the users through the following features:

1. Improved Access: Digital libraries are typically accessed through the Internet and Compact Disc-Read Only Memory (CD- ROM). They can access virtually from anywhere and at any time.
2. Improved Preservation: Since the electronic documents are not prone to physical wear and tear, their exact copies can easily be made, the digital libraries facilitate preservation of special and rare documents and artifacts by providing access to digital versions of these entities.
3. Wider Access: It can also meet the requirements of a larger population of users easily by creating multiple copies of the requested documents.
4. Improved Information Sharing: through the appropriate metadata and information exchange protocols, the digital libraries can easily share information with other similar digital libraries and provide enhanced access to users.

### **Functional Components of Digital Library**

Following are the common functional components of digital libraries.

1. Selection and Acquisition: includes the subscription of database and the digitization or conversion of documents to an appropriate digital form.
2. Organization: the metadata (bibliographic information / Data about Data) to each document being added to the collection.
3. Indexing and storage: Indexing and Storage of documents and metadata for efficient search and retrieval.

These mentioned components are the important characteristic of digital library, which differ it from other collections of online information.

## What is Cloud Computing?

Anyone connected to the Internet is probably using some type of cloud computing on a regular basis. Whether they are using Google's Gmail, organizing photos on Flickr or searching the Web with Bing they are engaged in cloud computing.

Cloud computing is a new technology model for IT services that many organizations are adopting. It allows them to avoid locally hosting multiple servers and equipment and constantly dealing with hardware failure, software installs, upgrades and compatibility issues. For many organizations, cloud computing can simplify processes and save time and money.

## THE NIST DEFINITION OF CLOUD COMPUTING

Cloud computing is a model for enabling ubiquitous, convenient, on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of three deployment models i.e. Private cloud, public cloud and hybrid cloud and following **essential characteristics of Cloud computing** i.e.

1. Rapid Elasticity
2. Measured Service
3. On demand self service
4. Everywhere network access
5. Resource Pooling

Following are the **types** of Cloud Computing:

- Software as a Service (SaaS): The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. E.g.: Google provides **Google Docs** as a SaaS.
- Platforms as a Service (PaaS): The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider.

E.g.: Microsoft provides **Windows Azure** platform for software development.

- Infrastructure as a Service (IaaS): The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications.

E.g.: Elastic Cloud Compute (**EC2**) is an infrastructure service provided by Amazon.

## Use of Cloud Computing for Digital Libraries

1. Digital material can be sorted, transmitted and retrieved quickly.
2. Access to electronic information is cheaper than its print counterpart when all the files are stored in an electronic warehouse with compatible facilities and equipment.
3. Digital texts can be linked, thus made interactive: besides, it enhances the retrieval of more information.
4. The library community can apply the concept of cloud computing to amplify the power of cooperation and to build a significant, unified presence on the Web. This approach to computing can help libraries save time and money while simplifying workflows.

## Applications of Cloud Computing in Digital Libraries with Reference to Improve the Functionality

5. The real underlying value of “cloud + clients” is that it transparently makes software, data, and computing available everywhere. Libraries can make their resources available on any private or public clouds which may think fit according to their budget. It helps to provide easy accessibility of the digital resources to the patrons.
6. Another great benefit of data stored in the cloud is the opportunity for collaboration and cooperative access of intellectual recourses.
7. When library systems are deployed as open cloud solutions then the library community itself can step up to create extensions to their core services and more importantly share them throughout the community using cloud solutions. This makes it possible to integrate two services once and reuse it across the community.

In the light of the above said advantages it is natural today to find more information being digitized and uploaded into the Internet in order to make correspondingly accessible globally with the help of cloud computing technology.

### **OPPORTUNITY FOR LIBRARY COMMUNITY WITH CLOUD COMPUTING**

Libraries have a somewhat unique opportunity with cloud computing to create an online information community network. Such communities are of two type's i.e. The internal community of libraries collaborating within a single institution and across institutions, and the next is external community of libraries and information seekers.

The cooperative efforts of libraries will create scale savings and efficiencies, bring wider recognition for libraries. Provide cooperative intelligence for better decision making and provide the platform on which libraries can innovate.

#### **Real World examples of library cloud solutions**

1. OCLC's World Cat, the first example of this, is now forty years old and predates both the Web and cloud computing.
2. The National Library of Australia's (NLA) Trove.
3. The Hathi Trust is building a repository of digitized books and journals from major research libraries in the United States.

### **FINDINGS**

Libraries may put more and more content into the cloud. Using cloud computing user would be able to browse a physical shelf of books, CDs or DVDs 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 Online Computer Library Center.

### **SUGGESTION**

To initiate the activity with the help of library community and take benefits of inter library cooperation and resource sharing with the help of cloud computing technology.

## FURTHER STUDY

- With concern to Virtual Library it is more effective in respect of utilization of cloud computing technology for digital libraries.
- Benefits of Application of Cloud Computing for Digital Libraries w.e.f. cost and human resource workflow of the library.
- Need of Skilled persons for handling digital libraries with the use of cloud computing technology

## CONCLUSION

Libraries have the opportunity to improve their services and relevance in today's information society. Cloud computing is one avenue for this move into the future. It can bring several benefits for libraries and give them a different future. The cooperative effect of libraries using the same, shared hardware, services and data can result in lowering the total costs of managing library collections and enhancing the both library user's experience and library staff workflows. The vision is to use cloud computing to deliver library resources, services and expertise at the point of need, within user workflows and in a manner that users want and understand.

## REFERENCES

- [1] Jotham M. W. (2015), Opening Libraries To Cloud Computing: A Kenyan Perspective, *Library Hi Tech News*, 32(3), Pp. 21.
- [2] Patel A. And Others (2011), Comparative Study and Review of Grid, Cloud, Utility Computing and Software as A Service For Use by Libraries, *Library Hi Tech News*, 28(3), Pp25.
- [3] Goldner M. R. (2010), Winds of Change: Libraries and Cloud Computing, *BFP*, 34, Pp. 270–275.
- [4] Vora S.B. And Anandache J. G. (2014), Data Backup on: Cloud Computing Technology In Digital Libraries Perspective, *Journal of Global Research In Computer Science*, 5(12), Pp. 12–16.
- [5] Peter Mell and Timothy Grance (2011), *Computer Security*, Nlist Special Publication 800-145, Pp. 2.
- [6] Michael A. and Others (2010), A View of Cloud Computing, *Communications of The ACM*, 53(4) Pp. 54–58.
- [7] Google App Engine. [Http://Code.Google.Com/Appengine](http://Code.Google.Com/Appengine).
- [8] Cloud Computing Architecture in Digital Library Available At: [Http://En.Wikipedia.Org/Wiki/ Cloud Computing](http://En.Wikipedia.Org/Wiki/Cloud%20Computing).
- [9] S.L.Mohammed Sajeer, Technology and Services for Library Automation. *International Journal of Library & Information Science*, 1(1), 2012, pp.69–80.
- [10] Naveen C. L and Nagesh R, Status and Problems of Library Automation in Govt. First Grade Colleges of Hassan District, Karnataka: A Study. *International Journal of Library & Information Science*, 5(1), 2016, pp.28–35
- [11] *International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)* 1(6), August 2012