INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

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STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

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SCOPE FOR FURTHER RESEARCH

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APPENDIX/ANNEXURE

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STUDY OF CHALLENGES INVOLVED IN CLOUD COMPUTING FOR LIBRARIES

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ABSTRACT

With the latest development of technology, today Library Science has got its impact on information system and services they provide for users. Yet there is confusion about exactly what cloud computing offers to digital libraries. This paper overviews the basic concept of cloud computing and how it is different from other types of computing. It also discusses cloud computing solutions could be beneficial to libraries in three basic areas: Technology, Data and Community Power. The paper also focuses on at how a cloud implementation of CiteSeer is feasible solution for library operation and growth.

KEYWORDS
Cloud computing, CiteSeer.

I INTRODUCTION

*L*ibraries have been using cloud computing services for over a decade. Online data bases are accessed as cloud applications.
Cloud computing [2] has several features like information retrieval systems, particularly digital libraries and search engines, efficient resources use etc.These features are useful for digital libraries, repositories and search engines.

The paper discusses how the cloud computing can be employed by libraries and challenges involved in the solution of cloud computing.

1.1 WHAT IS CLOUD COMPUTING?
Cloud computing is a type of computing that depends on sharing computing resources rather than having local servers devices to handle the applications.
The main goal of cloud computing is to apply the high performance computing power to perform normal computing operations with tremendous speed.
Cloud computing is different from other methodology which acts on demand service where the user can get continuously updated services with other web applications.

1.2 CHARACTERISTICS OF CLOUD COMPUTING
The main characteristics of cloud computing are shared infrastructure which allows user to use the cloud services,storage,applications and networking technologies regardless of local availability. It allows to use of metering for billing the information they have actually used.[4]
Following are the characteristics of cloud computing:

OPENNESS	:	Services and data are made available to support greater Interoperability.
Extensibility	:	Platform can easily accommodate the addition of new services and applications.
Data richness	:	Library can interact with and expose a wide variety of information about purchased, licensed, and digital content through this platform.
Collaboration	:	Libraries can connect the collective power of the community of libraries to innovate and share solutions.

Basically, cloud computing is categorized into two parts. One is client side, which demand for the various services, storage, and applications. And other part is the back end of the system; i.e. a cloud server, networks, storage systems.
All of them are bound to follow set of rules called protocols to ensure the proper services demanded by the use of client.

1.3 DEPLOYMENT OF CLOUD COMPUTING
The deployment of cloud computing can be done in various models. The models are as follows:[1]
1.3.1 SaaS: Software as a Service: User or customer is allowed to use the application hosted in the cloud.
1.3.2 PaaS: Platform as a Service: Customers purchase the platform in cloud wherein they can deploy their own software and applications.
1.3.3 IaaS: Infrastucture as a Service: Customer purchases the rights to control and manage the system in terms of operating system, applications, storage and network access.
The above models can be explained in terms of following table**:**

TABLE 1.3.1

Type	What it is	Examples
Infrastructure	Buying space/ time on external servers	Amazon A3 Bungee
Platform	An existing software platform to build your own applications on	Facebook
Applications	Software applications accessed with a Web browser	GoogleDocs Salesforce.com
Services	Ready to use services accessed with a Web browser	ADP

The Table illustrates that there are varying definition of cloud computing.
Many cloud services actually incorporate two or more of these types. For example Google Docs provides infrastructure as well as applications.

II CLOUD COMPUTING SOLUTIONS FOR LIBRARIES
Real problems of libraries can be solved by cloud computing solutions.
It amplifies the power of cooperation and to build a significant, unified presence of the web. Such improvement can be grouped into three basic areas: Technology, Data and Community Power.[3]
2.1 TECHNOLOGY: Most library computer systems are built on pre-web technology which is harder and more costly to integrate. Information seekers work in common web environments and distributed systems make it difficult to get the library into their workflow. How cloud computing is advantageous for library?
Answer is, with cloud based computing work done in one place echoes through the rest of the system and is available to all. The benefit of shared data and a cooperative platform encourages innovation and pools the creativity of many participants or users.[2]

Amazon in 2002 was one of the first companies to open up its technology for other organizations to use and build services on. Today, through its cloud services, 1 million businesses with more than 150000 developers are buiding innovative applications by adding their software applications with Amazons[3].

2.2 DATA: When data is stored on cloud can be easily shared among services and users. No need for local storage, maintenance and backup. Libraries can share pool of data for cooperative collection building, cooperative preservation or digitization. With massively aggregated data new services can be created such as recommender services based on a broad base of usage of data.

2.3 COMMUNITY POWER: Libraries have a somewhat unique opportunity with cloud computing to create an on line information community network.

When Google approached large research libraries to digitize their collections, the agreements allowed the libraries to have a digital copy of each book or journal storing all on common Hathi Trust and single point access to all.

This is real world example of using cloud-based services to enable the technology, data aggregation and community of shared needs and values to create on incredibly useful service for library users.

III ADVANTAGES OF CLOUD COMPUTING FOR LIBRARIES

Cloud computing offers many interesting possibilities for libraries that may help to reduce technology cost and increase capacity, reliability and performance.

3.1 Advantages [4]

- Cost saving
- Flexibility & Innovation
- User centric
- Openness
- Transparency
- Interoperability
- Representation
- Availability any time
- Connect and converse
- Create and collaborate

3.2 Examples

- OCLC
- Polaris
- Discovery services
- Google Docs/ Google Scholar
- World cat
- Encore

IV CHALLENGES AND CONCLUSION

Cloud based services are more useful for libraries still there are certain questions/ challenges to be addressed or look after.

➢ Does this service has built in scalability, reliability and security in terms of technical and legal?
➢ Is it multi-tenancy?
➢ Owner of data store and rights to library to leave the service
➢ Can it be open service and integrated to external services?

With the current challenges of cloud infrastructure, CiteSeer Library search engine provides autonomous citation , indexing, full text indexing and extensive document metadata from documents crawled from the web across computer and information sciences and related fields.

Infrastructure virtualization and cloud computing are particularly attractive choices for CiteSeer[2]. CiteSeer is an application instance of SeerSuite, a framework for building digital libraries , repositories and search engines. SeerSuite uses state of art , machine learning methods for automated metadata extraction, autonomous , citation, indexing, author disambiguation and other features.

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