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Emerging & Innovative Technology Application in Libraries: Cloud Computing Services

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Abstract – Latest technological development has brought a dramatic change in libraries. The libraries have been automated and moving towards to virtual libraries. The profession librarians are also using different platforms in Libraries for information handling. 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 access of the digital resources to the patrons with retrieving facility. Cloud computing can enhance the implementation of digital Library projects by reducing the cost involved in the whole processor and to get connected with all Institutions strictly and efficiently. Cloud Computing provides real time access utilities and user pay for what they use only through various implementation models. Cloud computing offers user centered multilevel services. This paper overviews the basic concept of cloud computing. The use of cloud computing in libraries and how cloud computing actually works.

Keywords: Information and Communication Technology, cloud computing, Library and Information science field, type of cloud.

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INTRODUCTION

We are living in the age of information technology or ICT. Information technology play very important role in library science. Library field facing many challenges due to applications of IT. With the advent of IT, libraries have become automated which is the basic need towards advancement followed by networks and more effort are towards virtual libraries. The emerging trends of digital libraries, e-publications, internet usage, web applications for libraries, consortium practices leads to the further development in library services. The latest technology trend in library science is use of cloud computing for various purposes.

MEANING OF CLOUD COMPUTING

The term cloud refers to internet. Cloud is something which is present at remote location. Cloud can provide services over internet i.e. on public network or on private networks i.e. WAN, LAN. Cloud computing refers to manipulating, configuring and accessing the application online. It offers online data storage infrastructure and application.

Cloud Computing means that instead of all the computer hardware and software you are using sitting on your desktop or somewhere inside your company's network. Cloud computing refers to the many different types of services and applications being delivered in the internet cloud and the fact that in many cases, the devises used to access these services and applications do not require any special applications. Through cloud computing you are able to use software delivered through the internet on the browser without any installation, host an application on the internet set up your own remote file storage and database system and more. Various characteristics, benefits, service models, types of cloud storage, need & usage of cloud computing are discussed in this paper

DEFINITION OF CLOUD COMPUTING

The National Institute of Technology and Standards (NIST) provide the simplest definition for a cloud "Cloud computing is a model for enabling convenient ondemand network access to a shared pool of configurable computing resources (e.g. Networks, Server, Storage, Applications and Services) that can be rapidly provisioned and related with minimal management effort or service provider interaction."

Gartner defines cloud computing as: "A style of computing where massively scalable IT- related capabilities are provided 'as a service' using internet technologies to multiple external customers". Examples of cloud services include

online file storage, social networking sites, web mail and online business applications.

Cloud computing is a buzzword that means different things to different people. For some, it's just another way of describing IT outsourcing others uses it to mean any computing service provided over the internet or a similar network and some define it as any bought in computer service you are use that sits outside your firewall.

Concept of cloud computing evolved in 1950 (IBM) called RJE (Remote Job Entry Process). In 2006 Amazon provided first public cloud AWS (Amazon Web Service).

CLOUD SERVICE MODEL

The cloud computing service models are-

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 model 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. All of above resources are made available to end user via server virtualization.

2) Platform as a Service (PaaS):

Pass offers the run time environment for applications. It also offers development and deployment tools, required to develop applications. It is the set of tools and services designed to make coding and deployment those applications quick and efficient.

3) Software as a Service (SaaS):

This service model allows to provide software applications as a service to the end users. It refers to software that is deployed on a hosted service and it accessible via internet. There are several SaaS applications-

a) Billing Invoicing system

b) Customer Relationship Management applications

c) Help Desk applications

d) Human Resource Solution. SaaS is a rapidly growing market as indicated in recent reports that predict ongoing double digit growth.

USE OF CLOUD COMPUTING IN LIBRARY AND INFORMATION SCIENCE

Libraries are shifting their services with the attachment of cloud and networking with the facilities to access these services anytime, anywhere. Cloud computing offers many interesting possibilities for libraries that may help to reduce technology cost and increase capacity reliability and performance for some type of automation activities. Clouding computing has large potential for libraries. Libraries may put more content into the cloud computing.

The following possible fields were identified where cloud computing services and applications may be applied:

1) Searching Library Data:

Many libraries already have online catalogues and share bibliographic data with OCLC. OCLC is one of the best examples for making use of cloud computing for sharing libraries data. It is offering various services pertain to circulation, cataloguing, acquisition and other library related services on cloud platform through the web share management system.

2) File Storage:

To access many files on the internet cloud computing present number of services such as Flicker, Drop box, Jungle Disk, Google Doc, Sky Drive etc. These services virtually share the files on the web and provide access to anytime, anywhere without any special software and hardware. Therefor libraries can get advantages of such cloud based services for various purposes. LOCKSS (Lots of copies keeps stuff safe), CLOCKSS (Controlled LOCKSS) and portico tools are extensively used for digital preservation purpose by libraries.

3) Searching Scholarly Content:

Currently, Information and Library Network (INFLIBNET) center has been incorporated Knimbus cloud service into its UGC INFONET DIGITAL Library consortium in order to search and retrieve scholarly contents attached therein. Knimbus is cloud based research platform facilities to search and share the scholarly content. It is dedicated to knowledge discovery and collaborative space for researchers and scholars. Knimbus was started its journey in 2010 by the entrepreneurs Rahul Agarwalla and TarunArora to address challenges faced by researchers in searching across and accessing multiple information sources. Knimbus is currently used in over 600 academic institution and R&D labs by scholars, researchers and scientists as well as over 50,000 researchers.

Now Knimbus proposed a free offer to get registered to empower the libraries for dynamic searching and also for single point search interface, maximum the usage of all e-resources, customized search across selected sources reduces noise and highlights relevant content and tools to support the complete research lifecycle.

4) Website Hosting:

This is one of the earliest adoptions of cloud computing as many organizations including libraries preferred to host their websites on third party service providers rather than hosing and maintaining their own service. Google sites serve as an example of a service for hosting websites outside of the library's servers and allowing for multiple editors to access the site from varied locations.

5) Community Power:

Cloud computing technology offers great opportunities for libraries to build networks among the library and information science professionals and interested information seekers by using social networking tools. Twitter and Facebook are most famous social networking services which are play a key role in building community power. This cooperative effort of libraries will create time saving, efficiencies and wider recognition, cooperative intelligence for better decision making and provides the platform for innovation and sharing the intellectual conversation ideas and knowledge.

6) Library Automation:

Polaris provides variant cloud based services such as acquisitions, cataloguing, process system, digital content sand provision for inclusion of cutting edge technologies used in libraries for library automation purpose. Also supports various standers such as MARC 21, XML, Z39.50, UNICODE etc. which directly related to library and information science area.

7) Digital Library and Repository:

Today every library needs a digital library to make their resources, information and services at an efficient level to ensure via the network. Therefore, every library is having a digital library that developed by using any digital library software. Dspace and Fedora are used for building digital libraries and repositories. Dura cloud provides complete solutions for developing digital libraries and repositories with standard interface and open source codes for the both software.

ADVANTAGES OF CLOUD COMPUTING

1. Cost Efficiency: Cloud computing is probably the most cost efficient method to use, maintain and upgrade as explained in.

2. Unlimited Storage: Cloud gives you almost unlimited storage capacity.

3. Backup and Recovery: Most cloud service providers are usually competent enough to handle recovery of information. Hence, this makes the entire process of backup and recovery much simpler than other traditional methods of data storage.

4. Essay Access to Information: Once the users register in the cloud they can access the information from anywhere, where there is an internet connection.

5. Automatic Software Integration: In the cloud software integration is usually something that occurs automatically.

6. Quick Deployment: Cloud computing gives the advantages of quick deployment.

CLOUD COMPUTING CHALLENGES

Cloud computing an emerging technology has placed many challenges in different aspects.

1) Security and Privacy:

Information security and privacy is the biggest challenge to cloud computing. Security and privacy issues can be overcome by employing encryption, security hardware and security applications.

2) Portability:

Applications can easily be migrated from one cloud provide to another. There should not be vendor-lock in. However, it is not yet made possible because each of the cloud providers use different standard languages for their platforms.

3) Interoperability:

Application on one platform should be able to incorporate services from other platform. It is made possible via web services.

4) Computing Performance:

To deliver data intensive applications on cloud requires high network bandwidths which result in high cost. If done at low bandwidth then it does not meet the required computing performance of cloud application.

5) Reliability and Availability:

It is necessary for cloud systems to be reliable and robust because most of the businesses are now becoming dependent on services provided by third party.

PRESENT SITUATION OF CLOUD COMPUTING IN INDIAN LIBRARIES

Cloud computing technology is not fully accepted in the Indian Libraries but they are trying to develop themselves in this area. Libraries are trying to provide users cloud based services but in real fact they are not fully successful owing to the lack of good service providers and technical skills of LIS professionals in the field of library management using advanced technology. But some services such as digital libraries, web documentation and using Web 2.0 technologies are running on successful modes. Dura Cloud, OCLC services and Google based cloud services are good examples of successful cloud in libraries is in development phase.

CONCLUSION

Cloud computing is a dynamic technology. Libraries are moving towards cloud computing technology in present time and taking advantages of cloud based services, especially in building digital libraries. Role of LIS professionals in this virtual era is to make cloud based services as a reliable medium to disseminate library services to their users with ease of use and trustworthiness.

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