Important role of Cloud Computing in the field of Library Science

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ABSTRACT

Nowadays, the most important thing for user is Information and Communication Technology play an important role in the major field of Libraries. A Library which is a system of organized knowledge staff services and users will find it equally accommodating to improve its surroundings in the Internet based epoch. In way to the best service deliver possible Librarians should be willing to take advantage of utile the resources. Cloud computing is a recent concept has emerged as a ray of hope at a stage when Libraries are facing straining work in adjusting to the ever increasing amount of Information gathered in different formats. Cloud computing as an emerging style of computing that involves various technologies and provides virtual and information technology related services over the Internet. 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. This paper shows and highlights the use of cloud computing in Libraries with respect to its concepts, types and general applications.

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

I. INTRODUCTION

The latest technology trends in Library science is use of cloud computing for various purposes and for achieving economy in Library function. Due to the ITC libraries became automated that is an initial step towards modernization. With the help of this moving towards the library without walls. Since cloud computing is a new and core area the professionals should be aware of it and also the application of cloud computing in Library Science. As an emerging style of computing, cloud computing delivers virtual computing resources, including computer hardware, networking equipment, software, data storage and services through the cloud (Internet) to end users. It has made strong inroads into other commercial sectors. The cloud computing which offers user centered personalized services, leading to greater satisfaction among users. This Paper explores the role of cloud computing in the field of Library Science.

II. WHAT IS CLOUD COMPUTING?

Cloud computing is a type of computing technology which facilitates in sharing the resources and services over the Internet rather than having these services and resources on local services/notes or personal devices. It has become popular in past few years, especially in the IT and business area. Cloud is accepted as a synonym for the Internet although the definition cloud computing itself is still not uniform. One of the key concept of cloud computing is that processing of more than thousands times the data need. As and when the amounts of data increases, the cloud computing services can be used to managed the load effectively and make the processing tasks easier. In the era of enterprises services and personal computer.

The Cloud is also not about having a dedicated hardware server in residence, strong data on a home or office networks doesn't count as utilizing the cloud. For it to be considered cloud computing, you need to access your data or your programs over the Internet, or at the very least, have that data synchronized with other Information over the Internet.

III. DEFINATION OF CLOUD COMPUTING?

David, 2009 "In the world of computing, clouds have always served a metaphorical – almost- mystical role. They have traditionally used to represent the Internet in a networked environment in diagramming and mapping operations."

Goldner , 2010 "It didn't start as a technology for business enterprise, but was driven by the public with services like Flicker ,Facebook etc. "

IV. CHARACTERSTICS OF CLOUD COMPUTING:

As given by NIST Cloud Computing has a variety of characteristics, with the main once being:

a) **On-demand self-service:** A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

b) **Broad network access:** Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., **mobile** phones, tablets, laptops and workstations).

c) **Resource pooling:** The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state or datacenter). Examples of resources include storage, processing, memory and network bandwidth.

d) **Rapid elasticity:** Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

e) **Measured service:** Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth and active user accounts). Resource usage can be monitored, controlled and reported, providing transparency for the provider and consumer.

V. TYPE OF CLOUD:

There are 3 major types of cloud services:

a) Software as a service (SAAS): SAAS is also known as software on demand. In this, software is made available as a service to the end user, who can access it through the internet. Thus the customer does not need to maintain that application. The service provider licenses an application to customer either as a service on demand, or through a subscription, in a 'pay as- you- go' model, or at no charge. Some of such services are Google App, Sales force, etc.

b) Platform as a Service (PAAS): PAAS supplies all resources required to build application and services completely from the internet without having to download or install s/w. PAAS services involve design, development, deployment; hosting, collaboration, database integration and security but lack of interoperability and portability provide demise to the application of PAAS.

c) Infrastructure as a Service (IAAS): IAAS is a standardized, highly automated offering, where computing resources, complimented by storage and networking capabilities are owned and hosted by a service provider and offered to customer's on-demand. Also known as hardware as a service, IAAS offers hardware, server space, network equipment, memory, and CPU cycles etc on rent to organizations.

VI. LIMITATIONS OF CLOUD COMPUTING INTO THE LIBRARY:

a) Cloud data storage can be used to store and preserve the lot amount of information generated and hosted by a library. With the rapid increase of web based contents, licensed resources, born digital documents, media collection, digitized materials, bibliographic data, and digital repositories , finding enough storage space on the local server for large digital file has become a critical issue for library administrations.

One of the significant features of cloud storage is cost effectiveness as a library needs to pay only for the cloud space that its data actually requires and does not need to pay for storage overhead in advance. There is also no need or cost for file storage equipment, server setup and maintenance, staff time, power usage and backup. Due to the scalability and flexibility of cloud computing, cloud storage can be easily scaled to meet a library's changing storage needs.

b) Cloud computing affect libraries' IT infrastructure many times, the foundation of the libraries system. We know that an IT unit within the library always takes on heavy duties and holds high responsibility for an entire library. Generally, a library allocates a large amount of its budget to build up its infrastructure, such as computing abilities, networking equipment, and storage; however, IT resources are not effectively used among the ILS and various digital initiatives.

c) Cloud computing play an important role in transforming the integrated libraries systems (ILS) that provides core services for a library and is comprised of an online public access catalog, a cataloging module, a circulation module, an acquisition module, a serials control module, and a reporting module.

d) Cloud computing service can enhahance library service and facilities internal library work. Cloud computing helps libraries share what they have with patrons quickly and innovatively and push libraries' information resources and services to end user. Today, social networking tools can be used to improve library service in different ways. Social networking tools, such as facebook, twitter, you tube, and flicker are becoming popular in the library environment. One of the key benefits is that the more these work flows are industrialized and served by network-level applications, the more time and effort libraries can assign to other intellectual endeavors.

VII. IMPORTANT ROLE OF CLOUD COMPUTING IN LIBRARY:

Cloud computing system may be divided into 2 ways: The front end and the back end. They connect to each other through a network, usually the Internet. The front end is the side the computer user, or client, sees. The back end is the "cloud" section of the system. On the back end there are various computers, servers and data storage systems that create the "cloud" of computing services. A central server administers the system, monitoring traffic and client demands to ensure everything runs smoothly. It follows a set of rules called protocols Servers and remote computers do most of the work and store the data.

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. Cloud computing has large potential for libraries. Libraries may put more and more content into the cloud. Using cloud computing users would be able to browse a physical shelf of books, CDs pr 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 OCLC. More frequent online catalogues are linked to consortium that share resources.

 Like any other technology cloud computing too has its advantages and disadvantages.

VIII. ADVANTAGES:

- **Flexibility:** Cloud computing offers much more flexibility than other local network computing systems and saves time plus cost for organizations. It is possible for organizations like libraries to expand the services anytime, by requesting for an additional space on other servers.

- **Cost Saving:** Cost computing technology is paid incrementally thus saving costs for organizations. It offers price savings due to economies of scale and the fact organizations such as economies of scale and the fact that organizations such as libraries are only paying for the resources they actually use.

- **Increased storage:** Cloud can hold more storage than a personal computer or the servers available in the libraries or organizations and it is possible to extend as per the need.

- **Better mobility**: The staff and the users of the library can connect to the library servers from any place or from wherever they are, rather than having to remain present at their desks by having a PC and internet access.

- **Highly automated:** The IT or library staff need not have to worry about keeping the software up-to-date. The cloud service provider takes care of updating software as and when new version is released. When the server is updated everyone using the service also get access to the new version without updating anything on their end.

- **Shared resources:** One of the important components of cloud computing is that one can share the resources. It allows people within and outside the organizations to have access to the resources. A group of libraries can come together and can put their resources at one place, which in number of resources to their end users.

- **Easy on installation and maintenance:** No longer having to worry about constant server updates and other computing issues, organizations will be free to concentrate on innovation and the IT staff may concentrate on other tasks. There is no need to produce any hardware to run the servers.

IX. DISADVANTAGES OF CLOUD COMPUTING:

Besides the promises it holds cloud computing have the following challenges associate with it:-

- **Security and privacy:**

  Security and privacy is the biggest concern about cloud computing. Since the data management and infrastructure management in cloud is provided by third party, it is always a risk to handover the sensitive information to such providers. Although the cloud computing vendors ensure more secure password protected accounts, any sign of security breach would result in loss of client and businesses.

- **Lock –in:**

  It is very difficult for the customers to switch from one cloud computing service provider to another. It results in dependency on a particular CSP for services.

- **Isolation failure:**

  This risk involves the failure of isolation mechanism that separates storage, memory, routing between the different tenants.

- **Management interface compromise:**

  In case of public cloud provider, the customer management interfaces are accessible through the internet.

- **Insecure or incomplete data deletion:**

  It is possible that the data request for deletion may or may not get deleted. It happens either because extra copies of data are stored but are not available or disk destroyed also stores data from other tenants.

X. CONCLUSION

Cloud computing enables innovation by alleviating the need of innovators to find resources to develop, test, and there innovations available to the user community. Innovators are free to focus on the innovation rather than the logistics of finding and managing resources they enable the innovation.

Library staff needs to investigate cloud computing, to identify its potential advantages, and disadvantages, and to explore the areas in which cloud computing can meet the needs of individual institution. They should be aware that cloud computing does have the potential of improving library services and workflows, but cloud services are not library services themselves.

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