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# CLOUD COMPUTING: AN EMERGING TECHNOLOGY

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**Now a day's maintenance of infrastructure for Web based digital library faces several challenges. It has attained the full fledge status. Libraries may soon be building and managing their own data centers. This model would be helpful for the libraries to maintain and more control over the applications and data stores that contain sensitive, private information about patrons. This paper highlights the problems faced with digital library and developmental efforts to overcome those problems. Infrastructure virtualization and cloud computing are particularly attractive choices which is challenged by both growth in the size of the indexed document collection, new features and most prominently usage. Cloud Computing is applying or to be a part of university library, the paper also describes the current status of user service models in university libraries. Then it proposed to improve current user service model with Cloud Computing. Some issues like data location, mobility and availability also discuss in this paper.**

**Key words:** digital library, cloud computing, libraries

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## INTRODUCTION

In the third revolution of computers technology, after personal computers and internet a completely new technology emerges i.e. a Cloud Computing. Cloud Computing is the improvement over Distributed Computing, Parallel Computing, Grid Computing and Distributed Databases. Cloud Computing is capable of integrating collecting large Quantities of information and resources stored in personal computers, mobile phones and other equipment, and putting them on the public cloud for serving users. The basic principle of Cloud Computing is making tasks distributed in large numbers of distributed computers but not in local computers or remote servers. Digital library is a development-oriented hardware and software integration platform, through technical and the product integration, each kind of carrier digitization carries on the effective deposit, and the organization provides the network of the effective service. The high grade information service are provided by Digital library technology but simultaneously also expose all sorts of questions unceasingly, because the zones of different current economic condition limit presented the development not balanced phenomenon, the regional resources shared with difficulty, form each one information isolated island or the resources are redundant, create the resources the waste, satisfied the aggregate demand with difficulty, the cloud computing

possibly provides a good plan day by day for this kind offs phenomenon (Bansode and Pujar, 2012).

## CONCEPT OF CLOUD COMPUTING

In the field of information technology, a new technology comes into existence, i.e. Cloud computing. It is a new technology model for IT services, which many now organizations and individuals are adopting. It allows them to avoid locally hosting and operating multiple servers over an organization's network and constantly dealing with hardware failure, software installation, upgrades, backup and compatibility issues and also enables them to save cost. In other words, it refers to "the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a metered service over a network, typically the internet" (Colayer, 2009).

The basic emphasis of this model is that organizations buy and pay for the services instead of investing on hardware and software. Cloud computing technology is a way which also helps to increase the IT requirements quickly and also accommodate the changes in demand very easily. In other words, it enables organizations to add or remove hardware/software as per the needs just by requesting the service provider to do so.

## TYPES OF CLOUD COMPUTING

Cloud computing IT model has wider meaning as it essentially has three different types of services viz.

(I) SaaS, (II) PaaS (III) IaaS.

- ***SaaS (Software as a Service)***

Saas is popularly known as "software on demand". Here, licenses are provided by the service provider, for an application to customers 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 Apps, Sales force, etc. In this, applications the software is delivered as a service to the end user, who can access the program online using a web browser or any other suitable client. There is usually little customization or control available with these applications. However, subscribers benefit from low initial costs, have access to (usually 24/7) support services, and needn't worry about hosting, installing, upgrading, or maintaining the software (Fox, 2009).

- ***PaaS (Platform as a Service)***

PaaS applications are also referred to as on-demand, Web based, or software as a service (or SaaS) solutions. Cloud computing are also known as 'platform as a service' (or PaaS). It has evolved to include platforms for building and running custom applications. In this, a computing platform supplies tools and a development to the environment to help organizations to build, test, and deploy web-based applications. It helps organizations not to make investment in the Infrastructure required for building web and mobile applications, but can rent the use of platforms such as Windows Azure, Google App Engine, and Force.com. Applications which are built using these provider's services are usually locked into that one platform. This service is delivered the way utilities like water and electricity are supplied, users have to simply 'tap in' and take what they need without worrying about the complexity and like its utility. PaaS is based on a Metering or subscription model so users only pay for what they use. With PaaS, one can focus on innovation instead of complex infrastructure (Kroski, 2009).

- ***IaaS (Infrastructure as a Service)***

IaaS also referred as HaaS or (Hardware as a Service) offers both storage and computing power services. In this, application the basic emphasis is that clients buy those resources as a fully out sourced service instead of purchasing servers, software, data-center space or network equipment.

It delivers computer's infrastructure i.e. a platform Virtualization environment as a service along with raw (block) storage and networking. Suppliers typically provide bill for such services on a utility computing basis; the amount of resources consumed (and therefore the cost) will typically reflect the level of activity. The best example of this service is Amazon's web services viz. Simple Storage Services (S3) for data storage and elastic compute cloud (EC2) for computing resources. Organizations are using Amazon's web services to host or backup their websites, for content delivery, to run high performance computing Simulations, to host media collections and many other services. IaaS is priced on a pay-as-you-go model enabling clients to scale up or down the operations depending on their needs at any given time and pay only for what they use (Fox, 2009)

## APPLICATIONS OF CLOUD COMPUTING IN LIBRARIES

According to Fox (Michael, 2010) *"one of the key pressures that pushes libraries to cloud solutions and proves to be an impediment to the migration is the availability of IT support services".*

Libraries have its own importance, and place in field of

education. Now in fast growing field of information technology, libraries attain certain prominent position to experiment with cloud computing given their service-oriented mission and need to find appropriate solutions using limited resources. He also observes that “goals and policies of organization might also force libraries in making use of cloud computing services”. These factors make SaaS and PaaS approaches appealing for libraries.

However, according to *Kroski,*(Kroski, 2009)) “libraries are experimenting with all types of cloud computing services including that of infrastructure services, i.e., IaaS”. Libraries are using cloud computing in number of areas starting from federated search, website hosting, digital libraries, library automation, etc. Some of these are:

***Automation***

The word “automation” has been derived from Greek word “automate” means something, which has power of spontaneous motion or self-movement .Automation is an area where most of the libraries keen to start in order hasten day-to-day operations. Automation is technology of automatic working in which the handling method, the process and design of professional material are integrated ((Shokeen and Singh, 2012)). Now, automation in libraries is being undertaken on locally hosted servers using different types of commercial and open source integrated library management software and managed either by internal IT or library staff. However, now many of the software vendors and third party services offering hosting of this service (SaaS approach) of the cloud computing to save libraries investing on hardware. Apart from cost-benefit, the libraries will be free from undertaking maintenance such as software updates, backup, etc. For example vendors such as Ex-Libris, OSS Labs are offering this service on the cloud. This is the effort to achieve an automatic and self-regulating chain of processes.

***Digital Library Services***

Digital libraries are made up of a number of digital objects. In others they may be multimedia information, such as an image, graphic, animation, sound, musical performance, or video. Modern libraries owing to changing format of information, so they have become part of Digital libraries or institutional repositories. The digital library services are presently being offered by libraries mostly using locally hosted open source software such as D-Space, E-Prints, and Fedora Commons etc for providing open access to scholarly resources. Apart from adding resources, this also involve libraries to maintain the servers, undertake backup and carry on regular updates as and when the new version of the software is released, thus putting lot of pressure on the library or IT staff. To relieve the libraries in undertaking this kind of work, vendors are now offering digital library services of the cloud computing using SaaS approach. For example vendors such as Dura space, OSS Labs, etc., are offering this service.

***Office Applications***

Word processing, spread sheets, power point presentations, etc are the various office applications used by Libraries at present by using Microsoft Office on the local computers. However, now owing to cloud computing there are many applications like Google, Microsoft, etc. which are made freely available on the internet by companies. Google Docs, a free office applications suite available on the internet may be used in the libraries to undertake office operations, which also allows storing and sharing of resources with other colleagues, who can remotely work on the documents irrespective of their geographical location.

***Storage***

Libraries require space to store the electronic files and documents. The documents could be official correspondence, full text documents, bibliographic records, tutorials, etc. At present, these are stored and accessed using personal desktops or from servers which are locally hosted.

**Search Services**

Libraries have already migrated key services such as Open URL providers, and federated and pre-indexed search engines on the cloud computing either by using commercial or open source solutions.

**Website hosting**

Website hosting is one of the earliest adoptions of cloud computing as many organizations including libraries; they preferred to host their websites on third party service providers rather than hosting and maintaining their own servers. This is owing to either organization’s not having the required bandwidth of Internet (with static IPs) or technical manpower to maintain the servers.

Google sites serves 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.

**Cloud Computing: Role of Libraries and Librarians**

Cloud computing plays a prominent role in a modern libraries. There are many roles of libraries and librarians

toward cloud environment, but few of them are listed below (Shokeen and Singh, 2012).

- Provide access to physical collections, especially unique items.
- Help to design information services, through these may be delivered by others.
- Deliver user education and users services.
- Collaborating in research (designing, ontologism, organization, information, understanding users etc).
- Publishing from unique library collections.
- New tools and Services.
- Managing a notation.

## ADVANTAGES AND DISADVANTAGES OF CLOUD COMPUTING

Like any other technologies, cloud computing too has its advantages and disadvantages as compared to locally hosted services.

### Advantages

Some of the advantages of cloud computing are:

• ***Cost saving***

Cloud computing technology is paid incrementally. It offers price savings due to economies of scale and the fact that organizations such as libraries are only paying for the resources they actually use. So, cloud computing is saving costs for organizations [(10).]

• ***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 procure any hardware to run the servers.

• ***Increased storage***

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

• ***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, when new version is released. When the server is updated everyone using the service and also get access to the new version without updating anything.

• ***Flexibility***

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

• ***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.

• ***Shared resources***

One of the important components of cloud computing is that one can share the resources. It allows people within and outside the organization to have access to the resources. A group of libraries can come together and can put their resources at one place, which in turn will enable them to provide access to more number of resources to their end users.

### Disadvantages

Following are some of the main disadvantages of cloud computing are:

• ***Data security and privacy***

The biggest concerns about cloud computing are security and privacy, especially if the organizations are dealing with sensitive data such as credit card information of customers. If the proper security model is not yet in place, then the data stored on the cloud is vulnerable to attacks from viruses, theft, etc. In addition to that, since the services are offered over the Internet. It is very difficult to assess the physical location of servers and software and security audit is hard to undertake. Also, there is a risk of data loss owing to improper backup and systems failure.

• ***Network connectivity and bandwidth***

The cloud computing is offered over the Internet, if the connection goes down due to any reason then the organizations suffer from loss of data connectivity till the time it is set. Also the service requires more bandwidth, as it may not work on low-speed Internet connections.

• ***Dependence on outside agencies***

The cloud computing services being offered by third party services over the Internet, it is virtually difficult to have

any control on the maintenance levels and the frequency. Also it is tough to assess the contingency procedures of the service provider in regard to backup, updates, restore and disaster recovery [11]. Migration to other service provider is also an issue, if the uniform standards are not followed by the host.

• ***Limited flexibility***

Flexibility may be limited in terms of special customization as services of the cloud will be common for all the customers.

• ***Cost***

Initially the cost could be higher, but may reduce depending on the usage of services. However, organizations may end up paying higher charges in the future.

• ***Knowledge and integration***

Deeper knowledge of cloud computing is essential as working of the service is totally dependent on the service provider. Similarly, integration is an issue as it will be difficult to integrate equipment used in data centers to host data with that of peripheral equipments in the organization such as printers, USB drives, etc.

## CONCLUSION

Cloud computing is a completely new emerging technology in the computer. It is a new innovation in field if information technology. Technology emerged owing to the developments in internet and associated technologies. Organization should be careful about handling the hosting some of their services because it is in the evolving stage. However, this technology has certain advantages, which definitely help organizations such as libraries in managing their services, which will relieve library staff from managing the servers. Due to lack of Support from IT departments or for not having IT facilities within the organizations, Library professionals many a times find it difficult to manage the technologies. This kind of situation always hinders library professionals in undertaking automation of library activities, developing digital library services, etc.

## REFERENCES

Bansode SY, Pujar SM (2012). Cloud computing and libraries. DESIDOC Journal of Library and Information Technology 32. (06) (November): p. 506-512.

Colayer (2009). What is PasS. http://ex.colayer.com/_cached/link_what is PasS/link what is PasS.html(accessed on 29 Dec. 2011

Fox R (2009). Libraries in a cloud. OCLC Sys. Serv. 25 (03) p. 156-61.

Kroski E (2009). Library cloud atlas: a guide to cloud computing an storage. Stacking the Technology Library Journal.

Michael A (2010). A view of cloud computing. Communication of the ACM, 53 (04)p. 50-58.

Shokeen NS, Singh A (2012). Cloud computing: An emerging model for library automation. Journal of Library Association. 48. (03). (July-Sept.): p. 5-11.

Scale M-S (2009). Cloud Computing and collaborating and storage. Library Hi-Tech News. 26.(9). P.10-13.

Mitchell E (2010). Cloud computing and your library. Journal of web librarian ship. 4 (1). P.83-86.