| Original Research Paper | Library |

USEFULLNESS OF CLOUD COMPUTING IN CREATING DIGITAL LIBRARY

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ABSTRACT

Libraries are moving towards cloud computing technology in present time and taking advantages of cloud based services especially in digital libraries, social networking and information communication. Cloud computing technology came up as an advantage for libraries and it is offering various opportunities for libraries to connect their services with clouds. It is an evolving technological paradigm that facilitates conveniently, on-demand network, access to a shared pool of configurable computing resources like network, servers, storage, applications and services that can be presented as a service and released with minimal management effort. Libraries may soon be building and managing their own data centers. This paper presents an overview of cloud computing and its possible applications that can be used with library services in the web based environment. This article may be helpful in understanding the advantages and disadvantages of cloud based services for digital libraries.

| **KEYWORDS** | Cloud Computing, Digital Library |

INTRODUCTION

Cloud Computing is known as third revolution in the field of Information Technology. Cloud computing can transform the way systems are built and the services delivered. It offers a new dimension in computing. Cloud computing is making it possible to separate the process of building an infrastructure for service provisioning from the library of providing end user services. Cloud computing provides people the way to share distributed resources and services that belong to different organizations or sites. Cloud computing is a computing model, not a technology. In this model "customers" plug into the "cloud" to access IT resources which are priced and provided "on-demand". Nowadays libraries are using cloud computing technology for enhancing the services by adding more values. It attracts the users and is cost effective. In the cloud computing environment, clouds are vast resource pools with on-demand resources and a collection of network features.

WHAT IS THE CLOUD?

Cloud computing is receiving a great deal of attention, both in publications and among users, from individuals at home to the U.S. government. Yet it is not always clearly defined. Computing is a subscription-based service where you can obtain networked storage space and computer resources. One way to think of cloud computing is to consider your experience with email. Your email client, if it is Yahoo!, Gmail, Hotmail, and so on, takes care of housing all of the hardware and software necessary to support your personal email account. When you want to access your email you open your web browser, go to the email client, and log in. The most important part of the equation is having internet access. Your email is not housed on your physical computer; you access it through an internet connection, and you can access it anywhere. If you are on a trip, at work, or down the street getting coffee, you can check your email as long as you have access to the internet. Your email is different than software installed on your computer, such as a word processing program. When you create a document using word processing software, that document stays on the device you used to make it unless you physically move it. An email client is similar to how cloud computing works. Except instead of accessing just your email, you can choose what information you have access to within the cloud.

WHAT IS CLOUD COMPUTING?

A definition for cloud computing can be given as an emerging computer paradigm where data and services reside in massively scalable data centers in the cloud and can be accessed from any connected devices over the internet. Cloud computing is outlined because the sharing and use of applications and resources, Information of a network surroundings to urge work evaded concern concerning possession and management of the network's resources and applications. Cloud computing could be an approach of providing varied services on virtual machines allotted on high of an oversized physical machine pool that resides within the cloud.

NIST2 provides a very good definition of cloud computing as cloud computing is a model for enabling 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.' Buyya said that 'Cloud computing is a parallel and distributed computing system consisting of a collection of inter-connected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on Service Level Agreements (SLA) established through negotiation be-tween the service provider and consumers.'

TYPES OF CLOUD COMPUTING

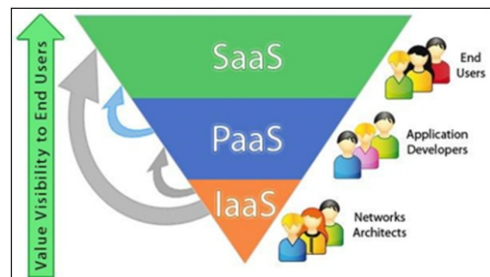**There are three types of cloud computing:-**

Figure: 1

A. Software as a Service (SaaS)

SaaS or software as a service is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network (internet). SaaS is becoming an increasingly prevalent delivery model as underlying technologies that supports Service Oriented Architecture (SOA) or Web Services. Through internet this service is available to users anywhere in the world. Organizations need to pay only for the amount of storage space utilized. SAAS may also be called hosted storage. Examples of SAAS are: Google, Twitter, Facebook, Flicker

etc.

B. Platform as a Service (PaaS)

With PaaS, a computing platform is provided which supplies tools and a development environment to help companies build, test, and deploy Web-based applications. Businesses don't need to invest in the infrastructure required for building Web and mobile applications but can rent the use of platforms such as Windows Azure, Google, AppEngine, and Force.com. Applications which are built using these provider's services, however, are usually locked into that one platform.

C. Infrastructure as a Service (IaaS)

IaaS is one of the fundamental service model of cloud computing alongside PaaS (Platform as a Service). It provides access to computing resources in a virtualized environment "the cloud" on internet. It provides computing infrastructure like virtual server space, network connections, bandwidth, load balancers and IP addresses. The pool of hardware resource is extracted from multiple servers and networks usually distributed across numerous data centers. This provides redundancy and reliability to IaaS.

- Cloud computing is defined to have several deployment models, each of which provides distinct trade-offs for agencies which are migrating applications to a cloud environment. NIST defines the cloud deployment models as follows:

Private cloud: The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.

Community cloud: The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations).It may be managed by the organizations or a third party and may exist on premise or off premise.

Public cloud: The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.

Hybrid cloud: The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

ADVANTAGES OF CLOUD COMPUTING

- Cost efficient
- Representation
- Flexibility and innovation
- User centric
- Connect and Converse
- Openness
- Transparency
- Mobility
- Backup and Recovery
- Availability anytime anywhere
- Storage and Scalability
- Interoperability
- IT Innovation

DISADVANTAGES OF CLOUD COMPUTING:

- Risk of data loss.
- Failure in compliance
- Constant connectivity require
- Lack of Control and Reliability
- Lack of Security, Piracy and Compliance
- Lack of Compatibility
- Unpredicted Cost

USE OF CLOUD COMPUTING IN LIBRARY:

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.

Financial Barriers vs. Cost Savings:

Each library is facing acute shrinkage in budget. Varieties of resources, in all forms (printed and digital) broadened the issue. Purchasing infrastructural facilities recurrently and updating /up gradation of software and hardware is becoming a bothering issue. Cloud computing offers price savings due to economies of scale and the fact that you're only paying for the resources you actually use.

Use of OPAC in libraries

An Online Public Access Catalogue (OPAC) is the best example of cloud computing technology used in the modern or digital libraries. OPAC provides the complete bibliographic details of the collection of a library to its users. A user can retrieve the documents from the OPAC by searching the name of author, title, call number, or ISBN etc. In simple search option user can search the document either by providing the exact key or the first few letters of the search key. A combination of search terms is also possible with the use Boolean operators. In addition the OPAC portal may include other features for users like information about borrowed documents changing their address details, paying fines, reservations, etc.

Building Digital Library/Repositories

Every library needs a digital library to make their resources, in-formation and services at an efficient level to ensure access via the network. Therefore, every library is having a digital library that developed by using any digital library software. For the cloud based digital library software used are Dspace and Fedora Commons.

EXAMPLES OF CLOUD LIBRARIES

1. OCLC
2. Library of Congress (LC)
3. Exlibris
4. Polaris
5. Scribd
6. Discovery Service
7. Google Docs / Google Scholar
8. Worldcat
9. Encore

CONCLUSION

Cloud computing represents an exciting opportunity to bring on-demand applications to Digital Library, in an environment of reduced risk and enhanced reliability. However, it is important to understand that existing applications cannot just be unleashed on the cloud as is. There are some issues related to Control on server, security, privacy, trustworthiness and legal issues which are still not fully resolved. Therefore the libraries should think seriously before clubbing libraries services with cloud based technologies for providing reliable and rapid services to their users.

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