

USE OF CLOUD COMPUTING IN THE FIELD OF LIBRARY AND INFORMATION SCIENCE

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Abstract:

In these times technological development has brought a dynamic change in various fields. So, library and information science is not exception to it. Information technology impacted positively on library and information system and services they provide for users. The libraries and information system have been automated, networked and now moving towards paper less or virtual libraries. To gather challenges in the profession librarians are also applying different platforms in Library science filed for attaining economy in information handling. This paper presence the concept of cloud computing a newly develop in area. The use of cloud computing in libraries and information field and how cloud computing actually works to explain in this communication.

Key words: Cloud Computing; libraries; Cloud Models, Applications in Library Systems

1.0 Introduction:

Now a day we are living in the age of information. Information Technology (IT) is very vital role in field of library and information science i.e. Collection, Storage, Organization, Processing, Analysis and Transfer of information. The field of library facing many challenges in the profession due to applications of IT. The new ideas and concepts are being added to ease the practices in the libraries is also accepting various new technologies in the profession as they suit the present information handling and they satisfy needs of at present knowledge society. The TI advance, libraries have become which is the basic need towards followed by networks and more effort are virtual libraries. The emerge and growth of e- publication, internet usage, digital libraries web tools applications for libraries, consortium leads to the next development in LIS profession. The upgraded Technology trend in LIS in use of Cloud Computing for various purposes and for their achieving economy in library functions. The cloud computing is a new and core area the professionals should be aware of it also the application of cloud computing in LIS.

1.1 What is Cloud Computing?

Cloud computing is a new technology model for IT services which many organizations and individuals are adopting. Cloud computing can transform the way systems are built and services delivered, providing libraries with an opportunity to extend their impact. Cloud Computing is internet based computing where virtual shared servers provide software, infrastructure, platform devices and other resources and hosting to customers on a pay-as-you-use basis. All information that a digitized system has to offer is provided as a service in the cloud computing model. Users can access these services available on the "Internet Cloud" without having any previous know- how on managing the resources involved.

1.2 Definition of Cloud Computing :

Wikipedia define Cloud computing is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand. According to National Institute of Standards and Technology (NIST) "Cloud computing is a model for enabling ubiquitous, 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." We have lots of compute power and storage capabilities residing in the distributed environment of the cloud. What cloud computing does is to harness the capabilities of these resources and make available these resources as a single entity which can be changed to meet the current needs of the user. The basis of cloud computing is to create a set of virtual servers on the available vast resource pool and give it to the clients. Any web

enabled device can be used to access the resources through the virtual servers. Based on the computing needs of the client, the infrastructure allotted to the client can be scaled up or down. One of the key concepts of cloud computing is that processing of 500 times The data need not be 500 times harder. As and when the amount of data increases, the Cloud computing services can be used to manage the load effectively and make the Processing tasks easier. In the era of enterprise servers and personal computers, Hardware was the commodity as the main criteria for the processing capabilities depended on the hardware configuration of the server.

1.3 Origin of Term Cloud Computing:

The origin of the term cloud computing in computing is unclear. The word "cloud" is commonly used in science to describe a large agglomeration of objects that visually appear from a distance as a cloud and describes any set of things whose details are not further inspected in a given context. In analogy to the above usage, the word cloud was used as a metaphor for the Internet and a standardized cloud-like shape was used to denote a network on telephony schematics. Later it was used to depict the Internet in computer network diagrams. The cloud symbol was used to represent networks of computing equipment in the original ARPANET by as early as 1977 and the CSNET by 1981 both predecessors to the Internet itself.

In modern sense "Cloud computing" appeared as early as 1996, with the earliest known mention in a Compaq internal document The popularization of the term can be traced to 2006 when Amazon.com introduced its Elastic Compute Cloud. In July 2010, Rackspace Hosting and NASA jointly launched an open-source cloud-software initiative known as Open Stack. The Open Stack project intended to help organizations offering cloud-computing services running on standard hardware.

On June 7, 2012, Oracle announced the Oracle Cloud. While aspects of the Oracle Cloud are still in development, this cloud offering is poised to be the first to provide users with access to an integrated set of IT solutions, including the Applications (SaaS), Platform (PaaS), and Infrastructure (IaaS) layers.

2.0 Characteristics of Cloud Computing:

Flexible: Agility for organizations may be improved, as cloud computing may increase users' flexibility with re-provisioning, adding, or expanding technological infrastructure resources

2.1 Self Healing: Any application or any service running in a cloud computing environment has the property of self healing. In case of failure of the application, there is always a hot backup of the application ready to take over without disruption. There are multiple copies of the same application - each copy updating itself regularly so that at times of failure there is at least one copy of the application which can take over without even the slightest change in its running state.

2.2 Cost reductions : Cost reductions are claimed by cloud providers. A public-cloud delivery model converts capital expenditure to operational expenditure. This purportedly lowers barriers to entry, as infrastructure is typically provided by a third party and need not be purchased for one-time or infrequent intensive computing tasks. Pricing on a utility computing basis is "fine-grained", with usage-based billing options. As well, less in-house IT skills are required for implementation of projects that use cloud computing.

2.3 Multi-tenancy: With cloud computing, any application supports multi-tenancy - that is multiple tenants at the same instant of time. The system allows several customers to share the infrastructure allotted to them without any of them being aware of the sharing. This is done by virtualizing the servers on the available machine pool and then allotting the servers to multiple users. This is done in such a way that the privacy of the users or the security of their data is not compromised.

2.4 Performance: Performance is monitored by IT experts from the service provider, and consistent and loosely coupled architectures are constructed using web services as the system interface.

Linearly Scalable: Cloud computing services are linearly scalable. The system is able to break down the workloads into pieces and service it across the infrastructure. An exact idea of linear scalability can be obtained from the fact that if one server is able to process say 1000 transactions per second, then two servers can process 2000 transactions per second.

2.5 Service-oriented: Cloud computing systems are all service oriented - i.e. the systems are such that they are created out of other discrete services. Many such discrete services which are independent of each other are

combined together to form this service. This allows re-use of the different services that are available and that are being created. Using the services that were just created, other such services can be created.

2.6 Reliability: Reliability improves with the use of multiple redundant sites, which makes well-designed cloud computing suitable for business continuity and disaster recovery.

Security: Security can improve due to centralization of data, increased security-focused resources, etc., but concerns can persist about loss of control over certain sensitive data, and the lack of security for stored kernels. Security is often as good as or better than other traditional systems.

3.0 Types of Cloud Computing:

Cloud computing are four types:

1. Public cloud
2. Private cloud
3. Hybrid cloud
4. Community cloud

3.1 Public Cloud:

Public cloud sells service to any one on the internet. Amazon is one of the public cloud providers. Customer has no information about the location of the cloud. Infrastructures are shared between organizations.

3.2 Private Cloud:

It is different from public cloud because it provides data to limited number of people. Private clouds are expensive but it is considered more secure than public clouds.

3.3 Hybrid Cloud:

This is combination of public and private computers. It has qualities of both public clouding Private clouding. In this type of cloud sensitive data is stored in private cloud and other data is in public cloud.

3.4 Community cloud:

Community Cloud shares infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.), whether managed internally or by a third-party, and either hosted internally or externally. The costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realized.

Service Provider by Cloud Computing:

Infrastructure as a Service (IaaS):

This model provides the entire necessary infrastructure like computers, hard-disks, networks-storage, computing resources etc. to a company in the virtualized form. User can access the resources; run software's & performs deployment without bothering about the management of Infrastructure. The service provider is solely responsible for the maintenance and management of equipments on-service.

Platform as a Service (PaaS):

This model provides a platform to run different applications. It could be considered as the most important model of cloud computing as it is intermediate between the IaaS & SaaS.

Software as a Service (SaaS):

This Model enables the use of different software applications by the end user over the internet. All the management & cost factors related to software like licensing, updates etc are handled by the service provider only.

4.0 Mobile "backend" as a service (MBaaS):

In the mobile "backend" as a service (mBaaS) model, also known as backend as a service (BaaS), web app and mobile app developers are provided with a way to link their applications to cloud storage and cloud computing services with Application Programming Interfaces (APIs) exposed to their applications and custom Software Development Kits (SDKs). Services include user management, push notification, integration with social network service and more. This is a relatively recent model in cloud computing, with most BaaS startups dating from 2011 or later but trends indicate that these services are gaining significant mainstream traction with enterprise consumers.

4.1 Monitoring as a Service (MaaS):

Outsourcing of security service to a third party security team.

Communication as a Service (CaaS):

Allow for certain messaging tools viz voice over IP (VOIP), Instant Messages (IM) and Video Conferencing.

5.0 Cloud Services in Library and Information System:

Library is the collection of different resources. The way new additions are made in the library, it is very difficult to manage everything with traditional management system. New technologies are available to manage & distribute the resources. Cloud computing uses the concept of centralizing the data on the internet further making it available to user, anytime anywhere. Virtualized shared resources allow multiple users to access the resources simultaneously. It reduces the dependency of installation, maintenance, failure of ICT infrastructure etc. Web repositories like E-journals & digital libraries etc are created so that users can access the global resources, helping the researchers/ educational professionals.

5.1 Advantages of Cloud Computing in Library and Information Service:

5.1.1 Cost saving: Ability to increase or decrease the consumption of hardware or software resources immediately and in some cases automatically.

5.1.2 Scalability: “Pay as you go” allowing a more efficient control of expenditures.

Lower investment, reduced risk: Immediate access to the improvements in the resource proposed (hardware and software) and debugging.

5.1.3 Support included: Enjoyment of the most advanced security procedures, availability and performance of providers with experience and knowledge in this type of service.

Greater security and accessibility: Access to resources from any geographical point and the ability to test and evaluate resources at no cost.

5.1.4 Portability: since the service is available over the web, the service can be availed through browser from any part of the world.

5.1.5 Adjustable storage: In the traditional system, if the server is less than what we have. The server should be replaced with the new one. In this computing, the storage capacity can be adjusted according to the needs of the library, since the storage is controlled by the service provider.

5.1.6 Cloud OPAC: Most of the libraries in the world are having the catalogue over the web. These catalogues are available with their libraries local server made it available over the web. If the catalogue of the libraries made it available through cloud, it will be more benefit to the users to find out the availability of materials.

Some Cloud Computing of LIS:

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

6.0 Conclusion:

Library and information science 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. So, this time for library and information think seriously for libraries and information services with cloud based technologies and provide reliable and rapid services to their users. Another role of LIS professionals in this virtual era is to make cloud based services as a reliable medium to disseminate library and information services to their users with ease of use and save the time of users.

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