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Cloud Computing in Libraries: An Overview

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ABSTRACT

Nowadays cloud computing is providing lot of facilities for library and its staff. Cloud is a other phenomena in the history of services, which are offered over the internet. It has perfectly changed the route of use of the power of computers irrespective of any geographic location. Cloud computing comes in several different forms. In order to reduce the cost and avert duplication of infrastructure hardware, resources, software, manpower use of emerging technologies like server virtualization. These days cloud computing increasing their area day by day. This paper describe an overview of cloud computing and its possible applications that can be clubbed with library services on the web based environment.

1. Introduction

In current scenario, web based technologies developed on virtual platforms and generating number of opportunities and virtual paths to use their services for the different purposes. There are so many way of using this technology. For example, use of software applications, storing data. Etc Accessing computing power or platform to build applications is also the example of such services. From e-mail, to word processing or photo sharing or video sharing there are so many services one can choose from. Cloud computing technology is providing great advantages for libraries to provide their services not only promptly but also in new formats with the flexibilities such as pay as you use model, access any where any time and so on. Nowadays libraries try to using cloud computing technology for improving the services by adding more values, to attract the users and cost effectiveness. Libraries are using computers for running services such as website or portal, Integrated Library Management Software (ILMS),digital library or institutional repository, etc. It involves investment on software, hardware and staff to maintain these facilities and undertake backup and upgrade as and when new version of the software gets released. This new concept of cloud computing and libraries has generated a new model called cloud libraries. Though the usages of cloud computing may vary with the libraries services nature, and information needs but most common usages of cloud computing with in libraries can be development of digital libraries, acquisition, storages, corporate cataloging and sharing the e-resources on virtual environment on the web. Cloud computing based services provide a means for libraries to free resources on information technologies and focus on libraries" core competencies-manage, organize and disseminate information

2. Cloud computing meaning?

Cloud computing is a new term for libraries. Most of instructions, individuals and organizations are adopting this technology model for IT services. Cloud is a kind of computing technology which facilitates in sharing the services and resources over the internet rather than having these services and resources on local servers/ nodes or personal devices. Cloud 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. In cloud model, organizations need to buy or pay for only those services which are to be needed by the originations. This concept was emerged back to the 1960s, when John McCarthy opined that computation may someday be organized as a public utility. Cloud computing is a very flexible model. In it, users can also prepare or build their own application which can also be used by others through internet. Actually it provides a common computing platform.

3. Different types of Cloud Computing:-

Cloud computing model has three different types of services viz. Software as a service, Platform as a service and Infrastructure as a Service.

- ***Software as a Service***

Software as a Service is a service in which applications and softwares are provided to the users as a service. So we know it popularly as software on demand. The program can be accessed online via any suitable client such as a web browser. In this model, users are provided the access of the applications through subscriptions. The softwares are provided in a pay as- you-go model, where the user has to pay only for the applications or software which s/he is going to use or at no charge. Example of such services is Google Apps, etc. It is hosted centrally and scope for customization or control of applications or softwares is little. However, there are benefits like the user has no worry about, installing, hosting, upgrading, or maintaining the applications software. In addition, the user has low initial costs, and access to support services.

- ***Platform as a Service***

Platform as a Service is a service which provides platform or environment to allow the developers to build the required softwares or application and the users have the access simply through a web browser over the internet. Softwares are deployed and configuration settings are done by users. All types of enterprises, irrespective of its size, are adopting this service as it is very hassle free, no worry about the

maintenance of hardware of software infrastructure. In this programme, the enterprises are helped in building, deploying and testing web based applications. The organizations need not to invest for the infrastructure they require for building mobile applications and web. They have to simply rent the use of platforms of vendors such as Google AppEngine, Force.com and Windows Azure. However, there is a disadvantage that the applications or software which are built using these vendor's services, are usually locked into that one platform. It is based on subscription model. Users only pay for what they use. Users can focus on innovation instead of complex infrastructure.

• ***Infrastructure as a Service***

Infrastructure as a Service is also called as Hardware as a Service. In this pay as you go service model, the user is offered both storage and computing power services. It includes virtual service space or a platform. It also includes network connections, storage, IP and bandwidth. The cost of the services is on computing basis, the user pay for bundle of services chosen. The example can be taken from Amazon web services. Amazon web services provide Simple Storage Services for data storage and elastic compute cloud for computing resources. Amazon web services are being used by organizations for many purposes viz. to run high performance computing simulations, for content delivery etc. It is also being used to host or backup the organization's web, to host their media collections and many other services

4. Characteristics of Cloud computing

• ***Multi-tenancy: -***

The model of cloud computing any application supports multi-tenancy - that is multiple tenants at the same instant of time. The system permit several customers to share the infrastructure allotted to them without any of them being aware of the sharing. This is done by stimulating 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.

• ***Linearly Scalable:-***

Cloud 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.

• ***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 backup of the application ready to take over without interruption. There are several copies of the same application - every 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.

• ***Service-oriented:-***

Cloud systems are all service oriented - i.e. the systems are such that they are created out of other discrete services. Many such distinct services which are self-sufficient 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.

• ***SLA Driven:-***

Usually businesses have contract on the amount of services. Scalability and accessibility issues cause clients to break these contracts. But cloud computing services are SLA driven such that when the system experiences peaks of load, it will automatically adjust itself so as to comply with the service-level agreements. The services will create additional instances of the applications on more servers so that the load can be easily managed.

• ***Virtualized:***

The applications in cloud are fully decouple from the basic hardware. The cloud computing environment is a fully virtualized environment.

• ***Flexible:***

A cloud service isflexible. They can be used to serve a large variety of workload types - varying from small loads of a small user application to very heavy loads of a commercial application

5. Advantages of Cloud computing in libraries

1. Cost saving
2. Flexibility and innovation
3. User centric
4. Openness
5. Transparency
6. Interoperability
7. Representation
8. Availability anytime anywhere
9. Connect and Converse

6. Examples of Cloud libraries

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

7. Enhancement of Library Services by the Use of Cloud Computing

• ***E-books Lending Service:-***

Cloud platform is now becoming very popular to lend the E-Books and other E-Resources.

• ***Union Catalogue/OPAC:-***

With the help of Cloud Computing network libraries can use same platform and give access to their collection on one dais. Through cloud computing formation of union catalogue becomes very easy.

• ***Document Download Service:-***

If allow access in the network, anyone can download documents very easily

• ***Digital preservation:-***

Digitization work can be done centralized and so one can avoid repetition of such time consuming work. Libraries can preserve the collection is digital form in the form of archives.

• ***Article Delivery Service:-***

Cloud computing can be used for document delivery service (DDS) to the user by the libraries. Most of the publishers are already using this technology for providing access to libraries.

• ***Current Awareness Service(CAS):-***

It become very easy for the user to provide current awareness service(CAS)with cloud computing.

• ***Document Sharing:***

Document sharing has become easy with the help of cloud computing.

• ***Bulletin board service:-***

We can provide easily new services on bulletin board with this technology.

• ***Information Common:-***

Information common like content pages, cover pages, bibliographical data, question papers, syllabus, and other reading material we can share on one platform. It helps in civilizing economy of library and avoids duplication of library acquires.

• ***Collection Development:-***

We can use this technology for collection development. Duplications can be easily avoided and alternate resources can be found and made accessible to patron.

• ***File sharing:-***

To share various files in electronic form become very easy with the help of cloud computing.

• ***Information Discovery:-***

With the help of this technology we can easily provide a podium to store all information that one can access anytime from anywhere; so information detection and searching become easy and it is very useful for anyone.

8. Conclusion

Cloud computing builds on decades of research in virtualization, utility computing, more recently networking and web software services. In today's global competitive market, companies must innovate and get the most from its resources to succeed. Cloud computing infrastructures are next generation platforms that can offers terrible value to companies of any size. They can help companies obtain more efficient use of their IT hardware and software investments and provide a means to accelerate the implementation of innovations.. Libraries in the west countries have beforehand been using the cloud computing technology for their resources. Slowly the awareness about this technology is spreading in other parts of the earth and with the use of ICT and internet; library professionals are sharing their library resources with others on the podium. Thus this technology will be of enormous use to libraries, if handled with supreme care and awareness about its disadvantages.

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