Cloud Computing for Libraries

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Abstract: - *Cloud computing is internet based computing that offers services -hardware and software or platform by third party and one can use from remote location. This paper discusses need, implication, initiatives of cloud computing in the library and library services.*

Keywords: Cloud computing, Service models

1.Introduction

ICTs are providing a lot of opportunities to libraries. Cloud computing provides new avenues for libraries to offer services using hardware or software or platform of third party sources, thus saving on cost and maintenance. The word 'cloud' is used as a metaphor for internet, the phrase cloud computing means a type of Internet-based computing. Cloud computing can be defined as the set of hardware, networks, storage, services, and interfaces that combine to deliver aspects of computing as a service. It includes the delivery of software, infrastructure, and storage over the Interne based on user demand.

2. Definition of cloud computing

Cloud computing is an internet based computing on demand provision for shared resources, software and information, internet based computing. Gartner Group defines cloud computing as a 'style of computing in which massively scalable and elastic it enabled capabilities are delivered as a service to external customers using internet technology. (www.gartner.com)' Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software and information, are provided to computer and other devices as a utility over the internet (wiki). Cloud computing gives an opportunity to use more than

one service from more than one location, and in cloud environment we can use multiple resources from multiple location via multiple network for multiple user.

Cloud computing is rather a new approach to use of shared computing resources, a substitute having local servers handles applications. A large number of computer servers and other resources are grouped together and offer their combine capacity on a demand and pay per use basis. The end user usually does not have any idea where the servers are positioned; they just only login to their required application and start working (rpath.com) Hua (2010) defines cloud computing as a paradigm shift whereby details are abstracted from the users who no longer have need of, expertise in, control over the technology infrastructure "in the cloud" that supports them. Cloud computing describes a new supplement consumption and delivery model for IT services based on the internet, and it typically involves the provision of dynamically scalable and often visualized resources as a service over the internet.

3. Service models of cloud computing:

Cloud computing provides services in three categories and these are: software-as-a-service (SaaS), Platform-as-a-Service (PaaS),

Infrastructure-as-a-Service (PaaS).

3.1. Software-as-a-service:

In a SaaS environment, the capability provided to the consumer is to use the provider's application running on the cloud infrastructure. The applications are accessible from various client devices such as the web browser (e.g. web based

e-mail) or a programme interface. The consumer does not manage or control the underlying cloud infrastructure including network, server, operating system, storage or even individual application capabilities, with possible exception of limited user specific application configuration settings. In this model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. Cloud users do not manage the cloud infrastructure and platform where the application runs. This eliminates the need to install and run the application on the cloud user's own computers, which simplifies maintenance and support. In the context of library the SaaS example is electronic Journal Subscription System

3.2. Platform-as-a- Service

In this model the capability is provided to the consumer to deploy their own software and applications using programming languages, libraries, services and tool supported by providers. The consumer does not manage or control underlying infrastructure including network, server, operating system and storage, but control over the deployed application and possibly configuration settings for application hosting environment.

3.3 Infrastructure-as-a-Service

The capability provided to the consumer is for processing, storage network, and other fundamental computing resources whereas consumer is able to deploy and run arbitrary software, which can include operating system and applications. The consumer does not manage and

control the cloud infrastructure but has control over the operating system, storage and deployed applications, and possibly limited control of select networking components. (E.g. host firewall)

4. Advantages of cloud computing

4.1. Cost efficient:

Enterprises can reduce the capital cost by paying for cloud computing service rather than purchase the software and hardware. Cloud computing provides convenient rental of computing resources: users pay service charges while using a service but need not pay large up-front acquisition costs to build a computing infrastructure. In outsourced and public deployment models, cloud computing allows the customer to request, receive, and later release as many resources as needed.

4.2 Flexibility

One of the advantages of cloud computing is flexibility, users can access stored data anywhere in the world, but the thing is you need a computer/laptop/smart phone/Android /Blackberry and other applicable devices with internet connections. Staff can access the data and files outside the office at any time.

4.3 Backup and recovery

Most cloud service providers are usually competent enough to handle recovery of information. Hence, this makes the entire process of backup and recovery much simpler than other traditional methods of data storage.

4.4 Automatic Software Integration.

In the cloud, software integration is usually something that occurs automatically. This means that Cloud users don't need to take additional efforts to customize and integrate their applications as per own preferences. This aspect usually takes care of itself.

4.5 Speed and Scalability

There is no need to purchase and setup hardware manually when using the cloud computing method. Cloud computing provides a rapid deployment model that enables applications to grow quickly to match increasing usage requirements. Depending upon their needs the user can quickly scale up or scale down.

4.6 Storage Capacity

Increased Storage Capacity is another benefit of the cloud computing, as it can store more data as compared to a personal computer. So it saves us from the upgrading computer memory that helps reduce the cost for companies and users.

4.7 Shared resources

Cloud computing allows people within and outside the organisations 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.

5. Disadvantages of cloud computing

5.1 Require constant internet connection

If you do not have an Internet connection, you cannot access anything from the server in cloud computing, even your own data. A low-speed Internet connection, such as that found with dial-up services, makes cloud computing painful at best and often impossible. Web-based apps often require a lot of bandwidth to download. In other

words, cloud computing is not for the slow connection.

5.2 Security and privacy

The big problem concern to cloud computing is security especially if the organisations 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. Privacy is another area of concern. If a user can log in from any location to access data and applications, it's possible the user's privacy could be compromised.

5.3 Depend on outside agency

Cloud computing services are provided by the third party. When data is stored on a remote server it is difficult to have any control on the maintenance, backup, access, control, levels and the frequency and data migration.

5.4. Unpredictable cost

Pay as you go means that cost of computing will be different for every month/ year.

5.5 Data ownership

Data ownership can be a major hurdle in cloud computing, especially if you have a lot of data to handle. As of yet there is no clarity about the ownership of data. There may not be an exact answer to a basic question of who owns the data maintained by a cloud storage service, whether it is the uploader or the storage provider of data. As a result, cloud providers create their own terms and conditions, which at times may seem arbitrary.

6. Impact of Cloud computing in libraries

The services in modern libraries increasingly focus on users' needs, but the ultimate goal of libraries is offer appropriate, comprehensive and multi-level services for users. The libraries cannot fulfil all the needs of present users with their own library resources due to the increasing cost to maintain and create, upgrade IT infrastructure. Cloud computing is a proper solution to use their limited resources to serve and fulfil the requirements of their clients. Cloud computing helps libraries to reduce the technology cost in order to expand and enhance the library services as well as create new services. Cloud computing gives an opportunity for libraries to acquire high-end technology, with proper hardware and software in the available budget.

Cloud computing impacts on information cloud. Peoples are finding the information on their laptops, cell phones, tabs etc. as and if they needed. Cloud computing facilitates the user to find and access the information over the network. Cloud computing provides the remote space to store, share, and use the data with other libraries. It will be beneficial for users to fulfil there their needs and utilisation of resources. A library can use the cloud computing services for website hosting, office automation, library automation; access the e- resources, search services, data storage, digital library services.

7. Cloud computing Initiatives for Libraries

Cloud service providers for businesses include Amazon, Apple, Cisco, Critix, IBM, Jjoynet, Google, Microsoft etc. Libraries have already

begun to adopt cloud services. Cloud computing initiatives relevant to libraries are initiated by organisations and business houses, which are in the business of integrated library software, digital libraries, search engines, etc. some of them are:

7.1. Ex Libris

Ex-Libris is leading library software vendor from USA. It provides the cloud service with software and hardware support to the library and information centres. It is available for all types of libraries and also for the consortia. To provide worldwide cloud-based services; it has opened data centres at various locations. The company promises to adhere to data security, updates, and standards in implementing cloud services to safeguard the interests of customers.

7.2 OCLC webscale

OCLC has started cloud service to libraries as Web-scale Management Services; libraries will be able to share data, applications and workflow improvements with peer institutions, end users and partners. OCLC has web-scale delivery and circulation, print and electronic acquisitions, cataloguing and license management components. Its world share management services (WMS) allows libraries to manage entire collection management life cycle in a cloud-based application.

7.3 Dura Cloud

Duraspace provides open source repository solutions to the libraries to enable them to share scholarly literature using DSpace and Fedora Commons. DuraCloud with Dspace and Fedora provides digital preservation support services in

the cloud, which is cost effective and simple for libraries. The cloud solutions offered include online backup, preservation and archives, media access, online sharing, and cloud broker.

7.4 Polaris Library System

Polaris is one of the cloud services provided to libraries. The company also provides standard acquisition and processing system. Also, with a Polaris ILS Client License, the library can integrate various PC and print management systems at no extra cost. The systems uses number of well know standards like MARC 21 for bibliographic data, XML, Z39.50 for information retrieval, Unicode etc.

7.5 SeerSuite

It was developed as a result of extensive research and development with goal of enabling effective disseminates scientific information and literature. SeerSuite provides the underlying application software for creating academic software engines and digital library such as CiteSeerX.

7.6 LibLime

LibLime is a distributed cloud computing data centre, hundreds of libraries are able to alleviate their internal IT support needs. No software is installed on desktops and no servers are required in the libraries.

8. Conclusion

Cloud computing is the new opportunity for the library to move into the future. Libraries can amplify the power of cooperation and build a significant, unified presence on the web. Library professionals experience difficulties to maintain

IT infrastructure within the organisation and also cannot maintain their own database. Cloud computing offers facilities to the library to use the hardware and software of third party thus it saves the cost and time, it helps for maximum satisfaction of users' needs and enhances the staff workflow.

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