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CLOUD COMPUTING: ROLE AND APPLICATIONS IN LIBRARIES

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Abstract:

Cloud Computing has become an emerging technology that gains wide influence on IT systems, The libraries 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 libraries for achieving economy in information handling. In this context this paper highlights the Advantages cloud computing, challenges over Cloud computing, service models and application of cloud computing in computing in the libraries.

KEY WORDS:

Cloud Computing, Libraries, Information Technology,

INTRODUCTION

In present scenario, web enabled technologies developed on virtual platforms and generating large opportunities and virtual paths to use their services for the various purposes. Nowadays, cloud computing is emerged as one of the most popular virtual technology for libraries to deliver the services in an effective manner (Kaushik and Kumar 2013). Today we are living in the age of information. Information technology plays vital role in library science, for collection, Storage, organization, processing, and analysis of information. The information technology (IT) revolution has led to the digitization of every kind of information (Gantz et al 2010). The digital storage of data facilitates information retrieval, allowing a new wave of services and web applications that take advantage of the huge amount of data available (Jordan, 2011). Cloud computing technology has grown very fast in the last few years in IT sector and shown its high growth rate. With the use of Internet and centralized remote servers, this technology maintains data and applications for providing services (Suthar, 2013). Many internet companies such as Google, Amazon, eBay, and Yahoo are operating such huge datacenters around the world. Cloud computing technology is offering great advantages for libraries to connect their services not only promptly but also in new formats with the flexibilities such as pay as you use model, access anywhere any time and so on. Libraries are using cloud computing technology for enhancing the services by adding more values, attracting the users and cost effectiveness. Technology experts said by 2020, most institutions and companies are going to move to the Cloud which will eliminate the dependency of desktops (Anderson & Rainie, 2010). There is an intellectual contestation of varied interpretations regarding the implication of Cloud computing in the libraries. Vaquero et al. (2009) opines that Cloud computing and web collaboration is two major concepts that underlie new and innovative developments in library automation. Cloud services

allow for more optimal resource utilization, easier access, and more effective cost reduction.

What is Cloud Computing?

If you've used Gmail, Google Docs, YouTube, or Hotmail - you've used cloud computing(Cloud computing, 2010).A cloud environment provides omnipresence and facilitates deployment of file-storage services. It means that users can access their files via the Internet from anywhere and without requiring the installation of a special application. Cloud computing is one of the latest buzzwords in the world of information Technology means key to the definition of cloud computing is the “cloud” itself, but, the exactly meaning of the cloud is that clouded cover computing is a set of web based computing resources that deliver on demand information services to users from any location in the world . According to Wikipedia claimed that the concept of cloud computing was emerged back to the 1960s, when John McCarthy opined that computation may someday be organized as a public utility. Chellappa gave the first academic definition of the term Cloud Computing in 1997 and later on, in the year 2007 the term cloud computing came into popularity and firstly was used in this context when Kevin Kelly opined that eventually we will have the inter-cloud, the cloud of clouds.

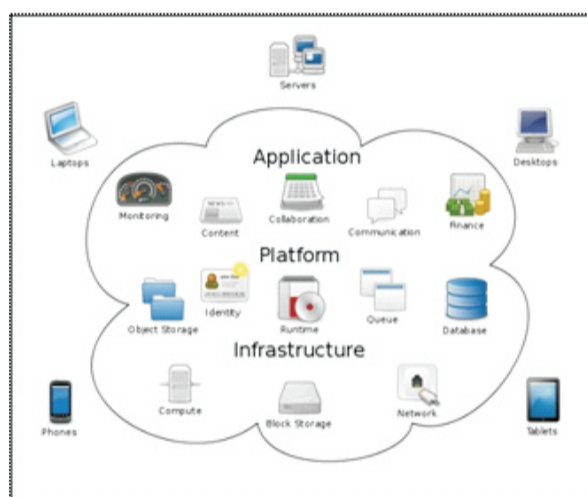


Figure-1: Cloud computing (<http://teconomy.com/wp-content/uploads/2012/08/cloud-computing-diagram.png>)

Cloud includes computing, data storage, different applications, networking, development, and deployment platforms. Cloud computing transfers different computing resources over the Internet as a replacement for keeping data on own hard drive or updating applications for your needs, you use a service over the internet. At another location, to store your information or use its application, by using cloud computing, you can access data at any time through any device, via the internet, to data and files which you have uploaded, or to software applications which you need to use for personal or specialized use (Kaushik and Kumar 2013).

Service models of Cloud Computing

Cloud Providers offer services that can be grouped into three categories

Infrastructure as a Service (IaaS):

Infrastructure as a Service (IaaS) is one of the three fundamental service models of cloud computing alongside Platform as a Service (PaaS) and Software as a Service (SaaS). As with all cloud computing services it provides access to computing resource in a virtualized environment, “the Cloud”, across a public connection, usually the internet. In the case of IaaS the computing resource provided is specifically that of virtualized hardware, in other words, computing infrastructure. The definition includes such offerings as virtual server space, network connections, bandwidth, IP addresses and load balancers. Physically, the pool of hardware resource is pulled from a multitude of servers and networks usually

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distributed across numerous data centers, all of which the cloud provider is responsible for maintaining. The client, on the other hand, is given access to the virtualized components in order to build their own IT platforms.

Platform as a Service (Paas):

PaaS offering supplies an operating environment for developing applications. In other words, it provides the architecture as well as the overall infrastructure to support application development. This includes networking, storage, software support and management services. The customer has the freedom to build his own applications, which run on the provider's infrastructure. To meet manageability and scalability requirements of the applications, PaaS providers offer a predefined combination of OS and application servers, such as LAMP platform (Linux, Apache, MySQL and PHP), restricted J2EE, Ruby etc. Google's App Engine, Force.com, etc are some of the popular PaaS examples.

Software as a Service (SaaS)

In this model, a complete application is offered to the customer, as a service on demand. A single instance of the service runs on the cloud & multiple end users are serviced. Software package such as CRM or CAD/CAM can be accessed under cloud computing scheme. Here a customer upon registration is allowed to use software accessible through net and use it for his or his business process. The related data and work may be stored on local machines or with the service providers. SaaS services may be available on rental basis or on per use basis. Today SaaS is offered by companies such as Google, Sales force, Microsoft, Zoho, etc

Advantages of Cloud Computing

Greater security and accessibility.

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

Lower investment, reduced risk.

Immediate access to the improvements in the resource proposed (hardware and software) and debugging.

Scalability.

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

Cost reduction.

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

Support included.

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

Cloud Computing Challenges

Despite its growing influence, concerns regarding cloud computing still remain. In our opinion, the benefits outweigh the drawbacks and the model is worth exploring.

Some common challenges are:

Data Protection

Data Security is a crucial element that warrants scrutiny. Enterprises are reluctant to buy an assurance of business data security from vendors. They fear losing data to competition and the data

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confidentiality of consumers. In many instances, the actual storage location is not disclosed, adding onto the security concerns of enterprises. In the existing models, firewalls across data centers (owned by enterprises) protect this sensitive information. In the cloud model, Service providers are responsible for maintaining data security and enterprises would have to rely on them.

Data Recovery and Availability

All business applications have Service level agreements that are stringently followed. Operational teams play a key role in management of service level agreements and run-time governance of applications. In production environments, operational teams support Appropriate clustering and Fail over Data Replication System monitoring (Transactions monitoring, logs monitoring and others) Maintenance (Run-time Governance) Disaster recovery Capacity and performance management If, any of the above mentioned services is under-served by a cloud provider, the damage & impact could be severe.

Security

It is clear that the security issue has played the most important role in hindering Cloud computing acceptance. Without doubt, putting your data, running your software on someone else's hard disk using someone else's CPU appears daunting to many. Well-known security issues such as data loss, phishing, botnet (running remotely on a collection of machines) pose serious threats to organization's data and software. Moreover, the multi-tenancy model and the pooled computing resources in cloud computing has introduced new security challenges that require novel techniques to tackle with. For example, hackers can use Cloud to organize botnet as Cloud often provides more reliable infrastructure services at a relatively cheaper price for them to start an attack.[S. Ramgovind, 2010.]

Data Recovery and Availability

All business applications have Service level agreements that are stringently followed. Operational teams play a key role in management of service level agreements and runtime governance of applications. In production environments, operational teams support Appropriate clustering and Fail over Data Replication System monitoring (Transactions monitoring, logs monitoring and others) Maintenance (Runtime Governance) Disaster recovery Capacity and performance management If, any of the above mentioned services is under-served by a cloud provider, the damage & impact could be severe.

Management Capabilities

Despite there being multiple cloud providers, the management of platform and infrastructure is still in its infancy. Features like "Autoscaling" for example, are a crucial requirement for many enterprises. There is huge potential to improve on the scalability and load balancing features provided today.

Role of Cloud computing in libraries

Cloud computing is a completely new in technology and it is known as 3rd revolution after PC and Internet. Cloud computing is an enhancement of distributed computing, parallel computing, grid computing and distributed databases. Among these, grid and utility computing are known as predecessors of cloud computing. Cloud computing has large potential for libraries. Libraries may put more and more content into the cloud. Using cloud computing user would be able to browse a physical shelf of books, CDs or DVDs or choose to take out an item or scan a bar code into his mobile device. All historical and rare documents would be scanned into a comprehensive, easily searchable database and would be accessible to any researcher. Many libraries already have online catalogues and share bibliographic data with OCLC. More frequent online catalogues are linked to consortium that share resources. Data storage cloud be a main function of libraries, particularly those with digital collections storing large digital files can stress local server infrastructures. The files need to be backed up, maintained, and reproduced for patrons. This can strain the data integrity as well as hog bandwidth. Moving data to the cloud may be a leap of faith for some library professionals. A new technology and on the surface it is believed that library would have some control over this data or collections. However, with faster retrieval times for requests and local server space it could improve storage solutions for libraries. Cloud computing or IT infrastructure that exists remotely, often gives users increased capacity and less need for updates and maintenance, and has gained wider acceptance among librarians

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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. Cloud computing has made strong inroads into other commercial sectors and is now beginning to find more application in library science.

Cloud computing in libraries is to deliver library resources, services and expertise at the point of need, within user workflows and in a manner that users want and understand. It will free and ease libraries from managing technology so that they can focus on collection building, improved services, innovations and initiatives practices. The cloud computing model will promote libraries and their users to participate in a network and community of libraries by enabling them to reuse information and socialize around information. It can also create a powerful, unified presence for libraries on the web and give users a local, group and global reach.

Applications of Cloud Computing:

In the field of LIS some major areas' cloud computing services and applications may be applied.

In File Storage

Data storage cloud be a main function of libraries, particularly those with digital collections storing large digital files can stress local server infrastructures. The files need to be backed up, maintained and reproduced for patrons. This can strain the data integrity as well as hog bandwidth. Moving data to the cloud may be a leap of faith for some library professionals.

In Searching Library Data:

OCLC is one of example of cloud computing for sharing libraries data. For instance OCLC World Cat service is one of the popular service for searching library data now is available on the cloud.

In Website Hosting

Website hosting is one of the earliest adoptions of cloud computing as many organizations including libraries preferred to host their websites on third party service providers rather than hosting and maintaining their own 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.

In Library Automation:

For library automation purpose, Polaris provides variant cloud based services such as acquisitions, cataloguing, process system, digital contents and provision for inclusion of cutting edge technologies used in libraries and also supports various standards such as MARC21, XML, Z39.50, Unicode and so on which directly related to library and information science area.

CONCLUSION

Cloud computing in libraries is in development phases in India. Libraries are trying to provide cloud base services to the user but in real sense the libraries are not fully successful to providing this type of services. The Cloud computing offers numerous benefits for different organizations, individuals and in libraries also. There are also privacy and security concerns. 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. Careful attention to design will help ensure a successful deployment. Therefore it is time for libraries think seriously before clubbing libraries services with cloud based technologies and provide reliable and rapid services to their users.

REFERENCE:

1. Anderson, J. & Rainie, L. (2010). The future of Cloud Computing', Pew Internet & American Life Project. Retrieved February 10, 2013, from [http://pewinternet.org/ Reports/2010/The-future-of-Cloud-computing.aspx](http://pewinternet.org/Reports/2010/The-future-of-Cloud-computing.aspx)

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2. Ashokkumar A. Suthar. (2013). An Overview of Using Cloud Computing in Libraries. *Indian Journal of Applied Research*, 3 (6), 303-305
3. Cloud computing (2010). Available at: <http://www.lib.berkeley.edu/CHEM/cloud/> (accessed June 25, 2014).
4. Jay, Jordan. (2011). Climbing Out of the Box and Into the Cloud: Building Web-Scale for Libraries. *Journal of Library Administration*, 51(1), 3-17.
5. John F. Gantz et al., (2007). The Expanding Digital Universe: A Forecast of Worldwide Information Growth Through. Available at: <http://www.emc.com/collateral/analyst-reports/expanding-digital-idc-white-paper.pdf> (accessed June 25, 2014).
6. Kaushik, A. & Kumar, A. (2013). Application of cloud computing in libraries. *International Journal of Information Dissemination and Technology*, 3(4), 270-273.
7. S. Ramgovind, M. M. Eloff, E. Smith. (2010). "The Management of Security in Cloud Computing" In *PROC 2010 IEEE International Conference on Cloud Computing*.
Towards a Cloud Definition. *ACM SIGCOMM Computer Communication Review*, 39(1), 50-55.
8. Vaquero, L., L. Rodero-Merino, J. Caceres & M. Lindner. (2009). A Break in the Clouds:
9. Wikipedia: Cloud computing. Available at: http://en.wikipedia.org/wiki/Cloud_computing (accessed June 25, 2014).



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