Chapter 4
Libraries and Cloud Computing Models:
A Changing Paradigm

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ABSTRACT

Cloud computing is a new breed of service offered over the Internet, which has completely changed the way one can use the power of computers irrespective of geographic location. It has brought in new avenues for organizations and businesses to offer services using hardware or software or platform of third party sources, thus saving on cost and maintenance. It can transform the way systems are built and services delivered, providing libraries with an opportunity to extend their impact. Cloud computing has become a major topic of discussion and debate for any business or organization which relies on technology. Anyone connected to the Internet is probably using some type of cloud computing on a regular basis. Whether they are using Google's Gmail, organizing photos on Flickr, or searching the Web with Bing, they are engaged in cloud computing. In this chapter, an attempt has been made to give an overview of this technology, its connection with libraries, the models in which libraries can deploy this technology for providing services and augment the productivity of library staff and case studies.

INTRODUCTION ABOUT CLOUD COMPUTING

Cloud computing is a new technology which is an improvement of distributed computing, parallel computing, and grid computing. The basic principle of cloud computing is making tasks distributed among large number of computers but not in local computers or remote servers. This is a dynamic model, based on pay-per-use (subscription) or scalable system in which configuration of resources (hardware, platform/services) can be graded to suit the needs of the users for optimum utilization of resources. In simple words, it is a subscription-based or pay-per-use real time service over the Internet.

The vendors of this model also guarantee the utilization of these virtually interconnected resources by employing customized-service-level agreements (SLAs). According to Doerksen (2008), cloud computing is the user-friendly version of grid computing. However, Buyya, Yeo, and Venugopal (2008) have given much more elaborate definition which reads that cloud computing is a kind of "parallel and distributed system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources, based on SLA established through negotiation between the service provider and consumer."

Cloud computing takes the concept of virtualization even further by adding a couple of additional twists. In a cloud computing environment, the organization running an application neither typically own the physical hardware used for the applications nor usually know exactly from where the computation work of the applications is being processed. Cloud computing provides an organization with appreciably more flexibility and scalability to satisfy computing needs. Thus cloud computing means sharing and use of applications and resources of a network environment to get work done without concern about ownership and management of the network's resources and applications. This is a way to increase capacity or add capabilities without investing on new infrastructure, training new personnel, or licensing new software.

Characteristics of Cloud Computing

1. Self Healing
2. Multitenancy
3. Linearly Scalable
4. Service-oriented
5. SLA Driven
6. Virtualized
7. Flexible

CLOUD COMPUTING AND LIBRARIES

Libraries have been in transition since their inception as they are directly affected with environmental changes. There was a time, when biggest library used to be the one with largest collection and they were serving their users mainly with their own resources in an almost isolated manner. Then came an era of computers where libraries started getting connected with other collaborating libraries through networks and consortia for mutual advantage of sharing the resources at divided/shared cost with a shift of emphasis from acquisition to access. Emergence of electronic resources has an added impact on libraries which forced them to prepare to face different kinds of challenges from users to meet their multidimensional requirements.

Now, there is a new phase when libraries are adopting and utilizing the computing resources and services that are not even owned by it. Cloud computing and Web collaboration are emerging as two major concepts, supporting innovative developments in library automation. Cloud computing is emerging to help libraries to offer much improved services by strengthening the power of cooperation among libraries and showing their combined presence on Web. This will certainly help to enhance the efficiency of libraries by enabling them to access information through large global network of cooperating libraries and eliminating the IT related problems, thereby saving time, money and manpower. With these developments, heterogeneous resources are accessible to anyone, anywhere because of the application of domain independent software. Evidence of the library's active online or digital clients can be observed in the growing online social networks. In addition, forming of communities of interest among Web users indicate a growing movement toward Web collaboration which allows users without knowledge of the underlying Internet's infrastructure, to create content and have a contribution to what is

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