

Cloud Computing and Nation-wide Academic Library Information System (NALIS): A Conceptual Approach

J.N. Gautam

Professor

School of Studies in Library and Information Science
Jiwaji University
Gwalior (MP).

Govind Singh

Research Scholar

School of Studies in Library and Information Science
Jiwaji University
Gwalior (MP).

e-mail: gov.s1987@gmail.com

Abstract

Dwindling budgets, escalating costs and varied information needs has forced libraries to seek into the option of cloud computing. This emerging technology is a new nexus in the domain of computing & seems to be a big hope for modern libraries. A nation-wide academic library information system (NALIS) is possible by leveraging the advantages of cloud computing. NALIS will interlink few or all academic libraries of its coverage and support them to build high quality digital libraries with diversified contents and share the thus built digital libraries with other member libraries under its cloud. This paper is an attempt to conceptualize an integrated nation-wide cloud computing model for academic libraries of higher education. The paper also points out the potential services which can be provided by NALIS cloud.

Keywords: NALIS, Cloud Computing, Digital Libraries, Academic Libraries.

Introduction

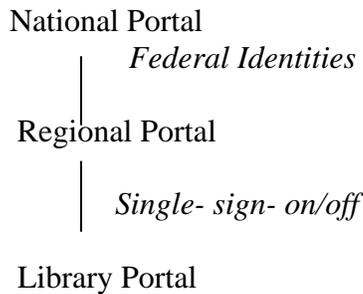
Cloud computing is a form of computing where users can access resources located on the remote storage by using a web browser. The resources may be in the form of Software or application (s), Storage and back-up, operating systems, processors, hardware components etc. These resources are delivered to users by a service provider in the form of some service(s). Thus cloud computing is borrowing of resources on utility basis from a provider instead of direct investment on the same on user front. For the reason it can also be called as utility computing. Cloud basically refers to a collection of connections, services and softwares over the network. Remote hosting and virtual processing are two inherent features of cloud computing. Hardware and software for such computing are availed by the service provider on agreement (licence) or on other basis. After use the resources are automatically returned to the cloud. These services are channelized and used over internet in real time.

All academic libraries of higher education are almost same in their interests, so from economy and service point of view these may be unified to form a cloud of libraries (NALIS).

NALIS Model: Conceptually, the whole NALIS cloud will be an open big-scale federation of digital libraries consisting a number of applications in and between the libraries integrated. It will consists of three levels architecture-

- 1-Central National Academic Library-Information (NALI) Management Center
- 2-Regional NALI center and,
- 3-Local Level Center

Each centre will be represented by portal system and each portal function in coordination to other via standard protocols and interfaces.



The Central NALI Management Center will responsible for administration and control the entire cloud using members’ identities. It will host the central platform to endow services for end users. The Regional NALI center will comprise a gamut of well defined Software as a service (SaaS) applications hosted by few or all Regional NALI centers. The NALI libraries at the user can deploy these SaaS services free of cost and provide corresponding services to their users. NALI Local center will have a number of standalone applications and which can be deployed for creating and developing local digital libraries.

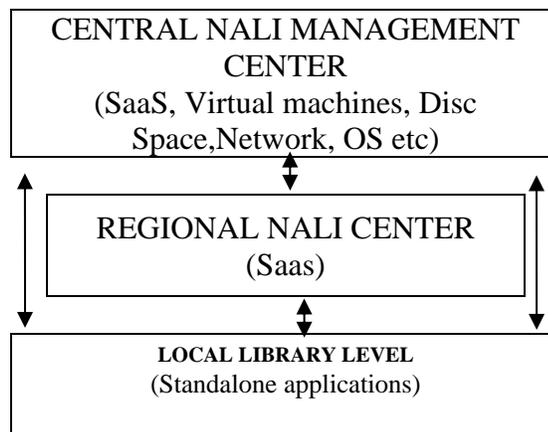


Fig: NALIS Model Architecture

Thus, each NALI center following some standards and specifications will involve complex processes in coordination with other and function as hierarchical platform to host a number services for end users i.e. students, teachers and researchers.

The NALI Management center will provide significant infrastructure using virtualization techniques (IaaS- such as network, disc space, powerful virtual machines, operating systems etc.), Software (SaaS) and data (Data as a service). So, union catalog and catalog search system (For books books, journals, theses, dissertations, teachers notes, students notes journal articles, preprints, audio, video, pictures etc.) , centralized identity management system (for libraries and their members), cross linking mechanisms (for navigation in the cloud), data transfer/exchange system, open universal resource locator (OURL) system, metasearch system etc will be prominent applications of this platform .

The NALI regional centre as software as a service (SaaS) platform will consist Identity Management System (IMS) as a basic application. All other SaaS applications like ILL and Document Delivery System, Digital Collection Management System, Virtual Reference System, Website Resource Navigation System, Electronic Reserve Management system etc. will be integrated with IMS SaaS functionality.

The local level as a platform will consist individual applications. The major applications at this platform will be standalone- Identity Management System, Open Uniform Resource Locator (OURL), Linking system, Union Database Search (Such as Union Catalog) System, Virtual Reference System, ILL and Document Delivery System, Metasearch system, Electronic Reserve System, etc. The member libraries of the NALIS may use the NALI local level platform for building their own digital libraries. The standalone applications of NALIS local center can be linked with one another and with other applications in member libraries. These applications can also be integrated with the applications of NALIS regional center and NALI management center to render diverse nature of services.

Services

Certain protocols, routines and tools (APIs) may ensure the interoperability between NALIS platforms. Total four types of interoperability may be possible. These are: between applications of the same platform, between applications in NALIS local platform and NALIS regional platform, between NALIS local platform and NALIS management center and between NALIS regional platform and NALIS management center platform. Such integration may result a number of cloud services both for member libraries and the end users.

(A)Services for end-users

1-ComprehensiveCentralized Information and Knowledge Search Services: A group of applications may facilitate the libraries union cataloging of millions of diverse items spread over the member libraries. The end user may search the union catalog and reach the material linked with (Full text, abstract, physical holding etc.). NALIS Cloud computing solutions may offer an uniform access interface, where one can search or access a good range of library collection from single point whether bought or licensed, print or electronic and audio or video. The uniform access interface may enable search of all kind of information in the cloud such as bibliographic data, dissertation, theses, pictures, audio and video material, conference papers, scholarly web

pages preprints etc in the cloud. The uniform access platform may promote the use of library resources, guide and answer the users through quality navigation throughout the cloud. As the result users may grip several information retrieval methods.

2- Entrusted Search and Delivery of Material: The tools of NALIS will integrate professional librarians, so users from individual libraries can solicit the desired information to these professionals; in turn they can find and deliver the required material. The librarians may take help the professional integrated search tools, reference databases created for the purpose, professional collaboration, union databases, imported collection, centrally located member collections etc. to render delegated services.

3-Web 2.0 Services: The communication services will comprise blogs, wikis/Wikipedia, live streaming media, reviews and tagging; RSS feeds, instant messaging etc. Web blog or Weblog may be used as a lightweight publishing tool and also a place for debate and interaction amongst library staff and the user under NALIS unified cloud. Thus end user may be benefitted by the commentaries/description (may be publicity, outreach services, promotion, announcement, dissemination of information, real-time reference service etc.) made on blogs. Similarly, wikis may serve as good communication tool to enable interaction among librarians and patrons. Under unified cloud like NALIS both blogs and wikis may evolve in multimedia environment making the communication more sophisticated. Tagging will enable ‘tagged cataloging’; this type of cataloging will make a better sense for users, so it will result into better retrieval for users. Instant Messaging (IM) may serve for real-time text communication via IM applications, so effective virtual reference may take place through IM. Similarly other web 2.0 applications function better in NALIS.

4-Collaboration of Users with Librarians: All NALIS cloud member libraries can form a knowledge base, and which can be used for collaboration of users with librarians. The knowledge base may serve for virtual reference, automated answering of questions, answering to frequently asked questions (FAQs), and resolving other problems of end users.

5-Centralized Acquisition and Services: NALIS member libraries may keep some of their full-text digital material together in central location. The end users may get retrieval from this collection in the form of direct download, print on demand, pay-as-you-go, ILL etc. Similarly digital material procured from outside sources may also be kept in central location to Serve the same purpose.

6-Institutional Repositories: Institutional repositories are knowledge reservoirs of high academic significance. Besides self generated contents, NALIS cloud services may be applied to build and enrich the institutional repositories. Academies with similar interest can share their repository contents with each other with variable control. This will aid in the quality of teaching, learning and research of institutions.

7- Expert Advice: In integrated national network of academic libraries the reference librarian can help the end users in a number of ways. They can introduce latest reference and bibliographic tools, SDI services, help in identifying physical and electronic resources for the need of users etc.

Retrieval services fostering science and technology research may also be shaped out by librarians.

(B) Services for Member Libraries

1-Information/Data Exchange Interfaces: NALIS will provide points for meeting and interacting of hardware, software, humans and a combination of these properties at different levels. A group of application interfaces will be amalgamated and embedded in member digital libraries of NALIS. On the contrary, these APIs will mash up the local services in national central portal .

2-Software Services: A number of software applications (SaaS) can be hosted by regional centers and which can be freely used by member libraries. These applications will support various functions like Inter library loan, document delivery, virtual reference, centralized acquisition, user identity management, metasearch etc.

3-Infrastructural Service:

The national centre will provide Virtual machines, Disc Space, Network, OS etc for member libraries and these can be used by member libraries for different purposes.

4-Data Transfer services: The national cloud academic libraries will provide mechanisms for ‘to and fro’ transfer of data in networks. Member libraries will be able to access collections such as harvested full text resources, union catalog and other metadata records from central location. Conversely, these libraries can provide their local collection to central location via standard protocols.

5-Skill Development Services: NALIS can host a platform for member services. Professionals in these member libraries can learn and evaluate themselves .Online training courses and delivery of concerned learning resources is also possible in country wide network of academic libraries.

6- Operation Related Services: NALIS centers will consist a group of applications on SaaS platform. These applications will provide union cataloging, unified consulting service, cooperative acquisition, Entrusted Search and Delivery of Material and other services for member libraries.

Conclusion

Today libraries are facing severe budget constraints, on the other hand users demand is increasing in folds day by day. In such libraries has hard to ignore the advantages of cloud computing. It seems to be is a big hope for modern libraries. Cloud computing can cut down the library costs dramatically one way and can provide a broad spectrum of convenient web based library services on the other. It is inevitable because of its special potential and important features.

Academic libraries are more or less similar in their interests, so an integrated electronic network of nation’s academic libraries (NALIS) of higher education is possible using the advantages of web maturity and allied technologies.

A nation-wide cloud computing model will have three level architecture; each level can be represented by portal system containing predefined intercalated applications on SaaS platform.

National Academic Library and Information system (NALIS) will be capable of rendering a number of services both for member libraries and the end users.

Cloud computing in libraries is in infancy stage and facing a number of engineering and technical problems especially in India. A NALIS will need joint efforts of library professionals and information engineers and their cumulative experience to bring it to reality. It is strongly suggested that library professional should connect each other and share useful information, personal success stories, alerts, risks, new adoptions, solutions, good recommendations etc within professional community to make a successful, easier, economic, productive, effective and user-centric cloud of academic libraries of the nation.

References

1. Bimol, Sanasam, Saikia, M and Devi Pushparani. Achiving Knowlwdge Management through Cloud Computing: A Case in Higher Education. Proceedings of the 8th INDIACom; 2014 International Conference on Computing for sustainable Development.2014. 257-262.
2. Wang, Xiang and Hung, Jie. What Cloud Computing means to Libraries and Information Services. *Journal of Library and Information Science*. 37(2).October, 2011. 166-74.
3. Bansode, S Y and Pujar, S M. Cloud Computing and Libraries. *DESIDOC Journal of Library and Information Technology*. 32 (6). November 2012.509-10.
4. Saxena, Karunesh and Khan, Azimuddin. Cloud: The new vistas of computing for higher Education and Research .*University News*. 50(16).April 16-22, 2012. 18-19.
5. Wikipedia (2012). Cloud Computing. http://en.wikipedia.org/wiki/cloud_computing
6. Singh, Shashiprabha and varalakshmi, RSR. Cloud Computing: A Promising Economic Model for Libraries and Information Centres. *DESIDOC Journal of Library and Information Technology*. 32 (6). November 2012.527-28.
7. Brittoo, Marwin (Jan 2012).Cloud Computing in Higher Education. *Library Student Journal (Open Access, ISSN 1931-6100)*. 3-5
8. Bleeding, M. The advance of computing from ground to the cloud. *Computer in Libraries*.29 (10). 2009. 22-25.
9. Sanchit, Rupesh and Kulkarni, Gaurav. Cloud computing in Digital and University Libraries. *Global Journal of Computer Science and Technology*.11 (2). 2012. 37-42.
10. Hayes, B. Cloud computing. *Communications of ACM*. 15 (7). 2008. 9-11.
11. Parihar, Santosh. Cloud computing. *KIIT Souvenir*. 2010. 81.
12. Han, Y. On The Clouds: A new way of Computing. *Information Technology and Libraries*.29 (2). 2010. 87-62.
13. Jangra, Banta Singh and Malik, Neeraj. Cloud Computing Emerging Era. *National Conference on Advanced Computing Technologies*.2013.5-7.
14. Wenqing, Wang and Ling, Chen. Building the new Generations China Academic Digital Library: A Review and Prospectus. *D-Lib Magazine*. 16 (16). May/June 2010.3-4.
15. Kaur, Sawant. Cloud Computing is having an infinite credit line!.*IETE Technical Review*. 29 (6). Nov-Dec 2012. 438-40.

