CONFERENCE PAPER

NO.7

FACULTY OF EDUCATION

AHMADU BELLO UNIVERSITY, ZARIA

Proceedings of

Multicultural African Conference 2013

Theme:

RESOURCE MOBILIZATION, MANAGEMENT

OR ACCESS AND QUALITY EDUCATION IN AFRIC

June 11 - 14, 2013

FACULTY OF EDUCATION
Ahmadu Bello University, Zaria-Nigeria

Proceedings of Multicultural African Conference 2013

Theme:

Resource Mobilization, Management for Access and Quality Education in Africa

June, 2013

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Ahmadu Bello University Press Limited, Zaria,
Kaduna State, Nigeria.
Tel.: 069879121, 08065949711.
E-mail: abupresslimited2005@yahoo.co.uk
Website: www.abupress.org

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Editorial

Faculty of Education has since its establishment in 1968 consistently pursued the ideals of mission and vision of Ahmadu Bello University Zaria as a world class university. It is engaged in imparting contemporary knowledge, using high quality facilities and multi-disciplinary approaches to advance the frontiers of learning through teaching, research and dissemination of high quality knowledge through journals, conference proceedings, magazines, books and monographs amongst others.

This first conference proceeding on multi-cultural African conference 2013 by the present administration, is a manifestation of her commitment toward meeting the yearning and aspiration of our academic community and it is further aimed at fostering National and International integration and promotion of African tradition and cultures, through series of publications to reach our wider audience.

Articles in this Conference Proceeding cut-across ethnic, geopolitical and religious boundaries and fairly represent African scholarly works of authors from reputable institutions. Articles in this edition is therefore intended to contribute toward teaching, training, re-training and will serve as a manual for production of teachers and students with necessary competence and skills for research and academic scholarship.

It is therefore hoped that our audience will benefit immensely from this collection of scholarly works of academicians and researchers drawn from reputable institutions across Africa.

Thank you.

Dr. Obeka S.S. (Very Revd.)
Editor-in-Chief.

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CLOUD COMPUTING PROSPECTS AND CHALLENGES FOR NIGERIAN ACADEMIC LIBRARIES

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Abstract

There is a rapid growth in the development and use of Information Technology in Nigeria resulting to digital savvy library patrons, who expect that library resources and services to be automated so that they can enjoy the library services remotely. With poor Information Technology infrastructure, servers, storage application, inadequate IT skilled librarians and cost, library automation has been a challenge for many academic libraries. Cloud computing offers the opportunities to provide library patrons with library and information services hereto would have been impossible This paper examine the prospect of cloud computing particularly Software as a Service (SaaS) a nomenclature of cloud computing and challenges in its adoption for the management of Library resources. The paper concludes that adoption of cloud computing for library automation is will no doubt make library automation cheaper and more affordable to many academic libraries, hence the recommendation for its adoption.

Introduction

Over the past decades the use of computers and information technologies in libraries has evolved from managing internal operations to providing access to information in many forms and different locations. Apart from automating some of their services and adding computers which students could use to search catalogue, online databases, e-books, e-journals, and other e-resources on the Internet, some academic libraries have enhanced the value of some existing information resources by digitizing their indigenous materials. Library automation as defined by Faisal and Surendran (2008) is the application of computers to perform traditional library housekeeping activities such as acquisition, circulation, cataloguing, and reference and serials control. It can be argued that automation also extended to the digitization process facilitates access to digitized local content, and any other use of information technology to manage and facilitate access to library information and services. Sanchati and Kulkarni (2011) posited that the ultimate goal of modern library is to offer appropriate comprehensive and multi-level services models such as world wide web (WWW), File Transfer Protocol (FTP) and Bulletin Board Service. By combining computing and communications technology, access perspectives shifted from local collections to remote collections, thus removing geographic and time constraints on library services. Without any contradiction it can be affirm that Information Technology has been the driving force for library development.

Library automation in developed countries was built on highly developed information and telecommunications infrastructure (Borgman, 1997). Unfortunately, in developing countries particularly Nigeria, libraries started automating with an underdeveloped

information and telecommunications infrastructure, which no doubt affected the pace of library automation. Academic Libraries in Nigeria have depended on Integrated Library System (ILS) imported from developed countries like United Kingdom and United States of America. These ILS are very expensive to purchase, maintain, implement and deploy mainly due to lack of funds and IT skilled personnel. Efforts by developing countries including Nigeria to decrease their dependence on foreign ILS by locally developing ILS software that meets local demand has not yielded any obvious results.

Similarly, the adoption and use of Open Source Library automation software which is often seen as a panacea for library automation in developing countries has been very gradual in Nigeria. Apart from the IT skills requirement for open source software deployment and maintenance, open source solutions is strongly anchored on National Information infrastructure and expensive server with high storage capacity, all of which are poorly developed or beyond the financial reach of most academic libraries.

Cloud computing comes into focus when there is the need for increase capacity or add capabilities of computer on the fly without investing in new infrastructure, training new personnel, or licensing new software. Cloud computing encompasses any subscription-based or pay-per-use service that, in real time over the Internet.

Overview of cloud computing

Cloud computing represents a paradigm shift in provision of dynamic scalable infrastructure for application services, data and file storage. Cloud services allow individuals and libraries to use software and hardware that are managed by third parties at remote locations. Examples of cloud services include online file storage, social networking sites, webmail, e-learning platform and online business applications. Creeger (2009), asserts that with Cloud Computing users can access database resources via the Internet from anywhere, for as long as they need, without worrying about any maintenance or management of information technology infrastructure. According to the United States of America National Institute of Standards and Technology (NIST, 2011), cloud computing is defined as "*a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.*

The characteristics of cloud computing include on-demand self service, broad network access, resource pooling, rapid elasticity and measured service. On-demand self service means that customers can request and manage their own computing resources. Broad network access allows services to be offered over the Internet or private networks. Cloud computing allows for pooled resources that customers draw from usually in remote data centres. Services can be scaled larger or smaller; and use of a service is measured and customers are billed accordingly. Different service can be provided by cloud computing company over the Internet. Three main service models of cloud computing include:

i. Software as a Service (SaaS): In a Software as a Service model, a pre-made application, along with any required software, operating system, hardware, and network are provided. SaaS delivers a single application through the browser to thousands of customers using a multitenant architecture. On the customer side, it means no upfront investment in servers or software licensing; on the provider side, with just one app to maintain, costs are low compared to conventional hosting. *Breeding (2011),*

asserted that most software-as-a-service offerings involve many organizations or individuals sharing a single instance of the software, where all updates and enhancements can be applied once and for all. The different individuals or institutions using the service can configure their view of the software as needed to customize the branding, color schemes, and navigational controls and to set functional preferences and policies according to local needs. Since the service provider takes care of enhancements, upgrades, and patches, users are relieved from this burdensome responsibility as it would apply to local software.

ii. Platform as a Service (PaaS): In PaaS, an operating system, hardware, and network are provided, and the customer installs or develops its own software and applications. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application

iii. Infrastructure as a Service (IaaS): The IaaS model provides just the hardware and network; the customer installs or develops its own operating systems, software and applications. The hardware and other basic services are provided through virtual machine accessible through a wide area network or internet. Under this model, the IaaS service provider owns the equipment and is responsible for housing, running and maintaining it, and the client organization typically pays on a per-use basis.

According to the Office of Privacy Commissioner Cannada (2010) Cloud services are popular because they can reduce the cost and complexity of owning and operating computers and networks. Supporting this assertion Armbrust, et al., (2010) posits that cloud computing has some distinct benefits such as cost reduction, efficient resource utilization and flexible and elastic provisioning.

Statement of Problem

There is no doubt that in the digital age for an academic library to effectively provide information services such as: Library website services; Library management software/Integrated Library Systems; Institutional Repository services; Document delivery services; Serial management services; Office Utility software application package, they need information and communication infrastructure such as computing infrastructure, *networks, servers, storage facilities, license applications packages and Information skilled librarians.* Providing and maintaining this computing infrastructure have over the years proof to be challenging for the library basically due to lack of IT skilled staff, finance and poor National Information and telecommunication Infrastructure. This is supported by many studies some of which include, Gbaje (2007); Adebore, (2010); Ayofe and Lawal (2010;). These challenges have been persistent for the past 15 years, this paper therefore explores the use of cloud computing to help Academic libraries leapfrog in its efforts to automate its process to meet the library and information needs of its Internet savvy patrons.

Application and Prospects of Cloud Computing in Academic Libraries

The Internet has provided the development platform and the operating system to availed many people with remote services that are beyond the platform of personal computers. Cloud computing as an innovation enables less wealthy libraries with inadequate Information Technology infrastructure and skilled librarians to receive the same utility as was previously available only to more wealthy libraries with developed Information Technology infrastructure and skilled IT librarians.

Library Management Software/Integrated Library Systems run on a web server and according to Turner (2009), a web server typically has three tiers to it: The physical infrastructure, the operating system platform, and the web application software being run. A cloud container may contain one, two or all of these layers. Currently some Library automation software companies are providing Library management software as a service to libraries. These services remove any configuration IT infrastructures hassle, technological skills to keep the library management software up and running from the library. The libraries just upload their data and the site is us and running almost immediately.

Since cloud users do not have to invest in information technology infrastructure, purchase hardware, or buy software licences, the benefits are low up-front costs, rapid return on investment, rapid deployment, customization, flexible use, and solutions that can make use of new innovations. Mitchell (2010), posited that libraries have been adopting cloud-based solutions for different services including electronic journal access management, statistics tracking, digital library hosting, and even integrated library system (ILS) hosting. Supporting this position Breeding (2011) also posited that an increasingly large proportion of libraries are entering into full-service hosting arrangements with their ILS vendors, trading the costs of purchasing and maintaining local equipment for an all-inclusive monthly or annual fee. These hosting arrangements tend to be labeled as software as a service which results in efficiencies for both the vendor and the library. SaaS allowed libraries to make strategic choices about the allocation of resources and to offer better service than would be possible if relying on in-house solutions. Some other benefits to libraries include scalability, reliability, and efficiency. Scalability means that cloud computing offers libraries unlimited processing and storage capacity. This is particularly important for digitization projects in the library where storage space is of essence. The application of cloud computing in the library can enable access to applications and documents anywhere in the world via the Internet. It is also considered efficient because it allows for sharing computing infrastructure hence carter for the shortage of IT skilled staff as well as free up resources to focus on innovation and core library services. Similarly, as custodians of intellectual property, cloud computing can promote the compliant of intellectually property so libraries do not have to buy and use pirated software. In addition, because cloud systems are virtualised there are a number of natural advantages: backups are much easier to create and the risk associated with hardware failure is minimized (Turner 2009).

Companies that offer Cloud computing services for libraries include; Several specific examples of companies that offer cloud computing services for libraries include; Electronic Online Systems (ESO) http://www.eosintl.com/eos-web/, Ex Libris also announced a new offering, VoyagerPlus, a cloud-based library automation service based on the Voyager ILS, Innovative Interfaces http://sierra.iii.com/, http://www.cybrarian.in/Default.aspx http://www.osslabs.biz . Other examples include Evergreen ILS and Islandora, the hybrid repository system based on Drupal and Fedora Commons, running under Amazon Web Services, and the Koha ILS running in a private cloud maintained by LibLime/PTFS.

Challenges of adopting cloud computing in Academic Libraries

Cloud computing can be financially advantageous for libraries as you pay for what you want to use and spend significantly less for local IT services and software. One downside, is that Cloud computing is dependent on Internet connectivity, bandwidth, and power supply. Data privacy and data security is another concern in the adoption and use of cloud computing. This is because all library data will be hosted and on a server outside the library.

Conclusion and Recommendation

Cloud computing the technological revolution of the twenty-first century, could go a long way towards enabling academic libraries in Nigeria to leapfrog in the automation of library and information services. It offers significant advantages in both information technology infrastructures and cost of library automation. Its adoption and use will enable academic libraries with small budget, poor information technology infrastructure and inadequate IT skilled staff attain their dream of automating their services to meet the yearning of growing digital savvy patrons.

In view of the above the paper recommends that Academic libraries to begin to exploit and adopt cloud computing services for their library automation project.

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