The Adoption of Cloud Computing Technology for Library Services in the National Open University of Nigeria Library
By
Okwoli Mercy Enefu, Dr. Ezra S. Gbaje and Dr. Baba S. Aduku

Abstract

The study investigated the rationales for the adoption of cloud computing technology for library services in NOUN Library. Issues related to the existing computer network available in NOUN library such as LAN, WAN, rationales for the adoption of cloud computing in NOUN library such as the need to disclose their collections on the web, simplifying work flow and to meet the information need of large number of student spread all over the country, Objectives of this study include among others identifying how NOUN library provides its information services and access to its students who are spread across the nation. Two research questions were raised, among which are: the existing computer network available in NOUN library and the rationales for the adoption of cloud computing in NOUN library. Qualitative research method was adopted; Focused group method, NOUN University Librarian and four IT staff were used as sample size of the study. Guided interview constituted the instrument for data collection, while descriptive method was used to analyze the data collected. The finding revealed that LAN, WAN, CAN, Internet and Network were the existing computer networks in NOUN library another finding of the study shows that NOUN library use cloud computing to provide library and information services to its students who are spread across the country where access to information must not be location specific. NOUN Library should adjust the usage and cost of its IT services in an efficient way. NOUN library can experience cost reduction and flexibility of cost management.

Introduction

There is a great deal of debate about what cloud computing is, or is not. Hayes (2008) defined "cloud computing as a kind of computing which is highly scalable and use virtualized resources that can be shared by the users. Users do not need any background knowledge of the services before using it. Moreover, a user on the internet can communicate with many servers at the same time and these servers exchange information with one another. Basically, data and adoption in the cloud are available through the internet; it can also be accessed from everywhere and from any device with internet connectivity.

Stroh et al, (2009) defined "cloud computing as "the computing software and services that can be accessed via the internet rather than residing on a desktop or internal server." Gartner (2012) defined 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 technologies. "In various presentations Klynveld Peat Marwick Goerdeler (KPMG) broke this into four different types of cloud computing, namely: Infrastructure, Platform, Applications and Services. Infrastructure is buying Space/ times on external servers, Examples are Amazons, A3, and Bungee. Platform on the other hand, is an existing software platform in which one can build its own application on, such as Facebook. While Application is a software application accessed with a Web browser, examples are Google Docs, Salesforce.com,

whereas, Service is a ready to use services accessed with a Web browser such as ADP. Mell and Gance (2011) defined each of the three services models thus: Software as a Service (SaaS) which allows users to use the provider's applications on a cloud through a web browser, while Platform as a Service (PaaS) allows users to deploy their own applications on the provider's cloud infrastructure under the provider's environment. Infrastructure as a Service (IaaS) allows users to control and manage computing resources.

Cloud computing can transform the way information systems are built and services delivered. This provides library with an opportunity to extend its impact to its users anywhere anytime. 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 environment. As Geoffrey (2013) pointed out, the interesting thing about cloud computing is that it did not start as a technology for the business enterprise, but was driven by the public with services like Facebook and Flickr.

Education today is becoming completely associated with Information Technology (IT) on content delivery, communication and collaboration. The need for server, storage and software are highly demanding in the Universities, For example, the

National Open University of Nigeria (NOUN), that provides its services via online, operates an e-learning Management System known as ILEARN for lectures and notes. It also operates a digital library known as INFORMATION GATEWAY which offers Multimedia tutorials. Whong (2014) remarked that the primary purpose of University libraries is to support University functions of teaching, learning, research and community services in ways consistent with and supportive of the institution's mission and goals.

According to Tuncay (2010), library can benefit from using cloud computing technology by increasing computing performance, storage capacity, universal accessibility and cost reduction. This can help library in terms of fixed and maintenance cost reduction in the IT investment of both hardware and software as well as computer services. With cloud computing, libraries may prevent financial waste, better track staff activities, and avert technological headaches such as computer viruses, system crashes, and loss of data. When cloud computing is used in the library, this will likely have a significant impact on library services. According to Spreeuwenberg (2012), with cloud computing, it becomes easier to access data with several devices. Especially for mobile devices, this can be really useful since the only thing that is needed is an internet connection. Libraries are shifting their services to cloud computing technology to facilitate its services anywhere and anytime. In libraries, the following have been identified as possible areas of applying cloud computing: Building Digital Library/Repositories, Searching Library Data, Web Site Hosting, Searching Scholarly Content, File Storage, Building Community Power and Library Automation.

Nevertheless, the biggest benefit of the adoption of cloud computing technology is that one does not "buy" the cloud as purchases for software and hardware and hitherto being made for library automation. Much like a common utility, one just pays for what was used, and then turn it off when one is done. The ability to have a server somewhere, to not have to worry about it, turn it up as needed, and pay for only what is used attracts a lot of people to cloud deployment (Creeger, 2009), Library community can apply cloud infrastructure to amplify the power of cooperation and to build a significant, unified presence on the Web. This approach to computing can help libraries save time and money while simplifying workflows. To date, the main focus of libraries moving into the cloud has been due to, the need to disclose their vast collections. (Gbaje and Aliyu 2014).

Statement of the Problem

There are challenges still facing libraries in Nigeria today despite the availability of computerization and automation of library resources. Nok (2006) explains that, some of these challenges include: unreliable WAN/LAN connections that are usually exposed to effects of fire, storms and vandalization, shortage of computer literate staff in the libraries, poor state of power generation, poor maintenance and update culture and poor funding of libraries. Adegbore (2010) further explains that hardware breakdown, software problems, unreliable and epileptic power supply, inadequate funding, staff training deficiency and planned obsolescence of commercial software are part of the challenges facing automation of libraries. Gbadamosi (2012) posits that band with subscription, daily and routine maintenance of computer set and lack of steady funding of library services are some challenges facing library automation.

According to Goldner (2012) libraries can take advantage of cloud computing to get out of technology headache such as hardware breakdown, software problems, staff training deficiency and focus on collection building, patron services and innovation. Geoffery (2013) also added that with the adoption of cloud computing technology in libraries, data can be easily shared among users, and the need for local storage, maintenance and backups will equally be a thing of the past for libraries. Breeding (2012) pointed out that libraries can also take advantages of cloud computing to build digital libraries/repositories, search library data, host website, search scholarly content, store files, build community power and improve library automation.

With these challenges facing automation of library resources, the National Open University of Nigeria Library adopted cloud computing in the provision and management of its resources. More importantly the nature of the institution is that of Open and Distance Learning. This implies that learning is relatively virtual and online. Hence most of the resources are electronic and web-based. Unlike conventional universities where teaching and learning is situated in a centralized place, National Open University of Nigeria has 69 Study Centres scattered across the nation and its students are spread across the nation. Consequently the library in order to provide its services and access to its users, need to secure a platform where access must be unfettered and not location specific.

This study examined the rationales for the adoption of cloud computing technology in NOUN library and

how its adoption has help solve the challenges of library automation. And to also find out how NOUN library is able overcome the fear of eliminating staff and concerns over high subscription of cloud computing adoption

Research Questions
The study will answer the following research questions:
1.   What are the existing computer networks available in NOUN Library?

2.   What is the Rational for adopting cloud computing in NOUN Library?

Objectives of the Study:
The broad objective of the study is to examine the adoption of cloud computing technology for library services in NOUN library. The specific objectives are:
1.   To determine the existing computer networks available in NOUN Library.

2.   To determine the Rationales for adopting cloud computing in NOUN Library.

Literature Review
Library network is a collective or co- operative activity of linking members/users to the resources hosted on computers by means of telecommunication connections. Lihitkar (2012) asserted that a network is developed when a group of libraries and information centers have common interest to exchange information through computer and communication technology. Dhenavandah & Tamizhchelvan (2014) identified classification of Networks based on Utility criterion: Resource sharing network, Data sharing network communication and data exchange network. Resource sharing network main purpose is sharing of resources and other applications that are subordinate in nature, data sharing network provides access to unique databases from workstations situated at distance apart, while communication data exchange network allows users to exchange data, graph or documents and to communicate with each other using such devices as electronic mail, bulletin board etc.

The state of library's networking system depends on the availability and quality of electrical power and the type and distribution of electrical wiring in the library through computer network observed by Eric (2012). Computers operate better and last longer when the computer network that powers the library is continuous and of consistent voltage. Many libraries, especially academic libraries need sufficient supply

of network to withstand the additional demand made by the computers asserted by Kessler (2013). Furthermore, networks cables may not be the correct gauge to withstand the additional load caused by computers being connected to the library's networking system according to Eric (2012). One reason why many libraries decide to install computer network in libraries is to overcome the challenges and issues of poor computer networking that may require the library to refurbish the existing network system or add a whole new network supply system which reduces the amount of electrical wiring needed. Also, computers, especially those connected to a local area network (LAN), require a grounded electrical system to operate smoothly and trouble-free. Again, this is less costly if done to one or two computer in the library rather than to the entire library.

The computer network used during the last several decades in libraries has made a massive shift from traditional concepts of "the library". The catalyst for this shift has been the computer network asserted by Kessler (2012). The computer network has been developed to provide access to information promised by traditional library work. Today, developments like high-capacity networks and broadband communications offer physical access to data to average users on a level never dreamed of by the inventors of the paper-and-cardboard book or the library card catalog. And yet intellectual access to that data appears to be impeded, by lack of organization and by the inability of average users to find useful information within it.

Ineffectual hand wringing often characterizes the response of the profession traditionally concerned with the provision of information in the library community. Mark (2014) asserted that reaction of "information-overloaded" results to the recent history of the interaction between libraries and the computer. Network is a system of interconnected computers for sharing information and resources that may involve two or more computer in a single office or several computers in different units across a library or across so many in a country. Networks include: Local Area Network (LAN), Wide Area Network (WAN) and World Wide Web (WWW). With computer networks, library can access and see information from different locations and download for users need.

Krubuand Osawam (2011) noted that the impacts of computer networks are felt by libraries in every aspect. They further added that computing technology, communication technology, and mass storage technology are some of the areas of

continuous development that reshape the way libraries access, retrieve, store, manipulate and disseminate information to users. Gbaje and Aliyu (2014) however lamented that unfortunately, in developing countries particularly Nigeria, libraries started automating with an underdeveloped information and telecommunications infrastructure which include inadequate computer network. Similarly, the use of open source library automatism software often sees as a panacea for library automation in developing countries has been very gradual in Nigeria. Reason being the dearth of its skills required for both development and maintenance of open source software, it is expensive and high storage capacity which are poorly developed or beyond the financial reach of most academic libraries.

Creeger (2009) cited in Gbaje and Aliyu, (2014) asserted that cloud computing comes into focus when there is the need to increase capacity or add capabilities of computer without investing in new infrastructure, training new personnel or licensing new software that can be built on the existing network in the library.

Several types of computer network can be characterized by their size as well as their purpose in the library. The size of the network can be expressed by the geographic area they occupy and the numbers of computer that are part of library network. Eric (2012) also posited that networks can cover anything from a handful of devices within a single library to millions of devices spread across the entire globe. Some of the different computer networks based on size are: Personal Area Network (PAN), Metropolitan Area Network (MAN), Storage Area Network (SAN), Enterprise Private Network (EPN) and Virtual Private Network (VPN).

A network as asserted by Lihitkar, (2012) can be kept entirely private by restricting some communications to the connection within the network. This means that those communications never go over the internet. Geoffrey (2012) posited that one approach to libraries having private network is to build an enterprise private network (EPN) and it is use to connect multiple locations and the library can also use it to control its services and data.

The diagram below explains how users on the internet can communicate with many servers at the same time and these servers exchange information among one another, and this information can also be accessed from everywhere and from any device with

internet connectivity based on the existing computer network available in the library.

Technology progresses, new application emerge that offer specialized functionality on a mobile device such as phones or tablets. Often, these apps include social aspects where users share information online ascertained by Burckhardet, al (2013). The capability of sharing data between devices is typically achieved by developing web services. Increasingly, such services are deployed in the cloud, hosted environment that offer virtualized storage and computing resources.

Some many reasons were provided for the acceptance of cloud computing technology in the libraries. Goldner (2012) pointed out that libraries moving into the cloud have been discovery services, the need to disclose their vast collections on the Web. Combining systems into a cloud environment reduces the carbon footprints, making libraries greener these improvements can be grouped into three basic areas: technology, data and community. Each offers some general and some unique opportunities for libraries. Looking first at the technology that most current library systems employ several benefits of cloud computing solutions surface include:

Cloud computing solutions at their essence are built on current technology and should be architected to allow for technology shifts. Looking at the explosion of mobile devices one sees how businesses, organizations, and libraries operating in a cloud environment are able to adapt and deliver their services to the new devices much more quickly and less expensively.

The mainstay of libraries is the library management system (LMS, also known as the integrated library system or ILS). Library management systems were developed before the Internet and Web existed and is generally closed proprietary systems. It has been

difficult and costly for these closed systems to take advantage of new technologies as they emerge. It is also challenging to integrate to external systems and libraries must rely on their vendors to do any such integration. Over time libraries have needed to add more systems to manage their changing collections which moved from strictly physical collection management to a combination of physical, licensed and digital collections. Since each of these systems has stood alone integrating them has been difficult and at times not possible.

First would be the possibility of open service oriented architecture. Many cloud solutions offer this type of openness with published application program interfaces (APIs) that any programmer can take advantage of. This means if a new service or technology emerges libraries will not always be dependent on a vendor or other third party to start taking advantage of these services and technologies Geoffery (2013). Existing library systems have used is a set of routines, protocols and tools for building software applications. APIs to connect to external services but they have remained closed proprietary systems making it hard to integrate them into external services. This makes it possible to integrate two services once and re-use it across the community with the help of cloud computing.

Libraries can equally get out of the business of technology such as hardware breakdown, software problems and focus on collection building, patron services and innovation posited out by Goldner (2012). Servers can be decommissioned and no longer require replacement every five years (or less). Staff no longer has to maintain the complex software stack necessary to run local systems and worry about compatibility of the tack during upgrades. Instead technical skills can be re-deployed for extending cloud services into their environment and their environment into other cloud services.

Geoffery (2013) added that when data is stored in the cloud, it offers several advantages such as common data can now be easily shared among services and users. The need for local storage, maintenance and backups is removed. Agreements can be forged to share data that normally would be considered private to a single library or organization. He also added that libraries can achieve Web scale when they massively aggregate data and users, sometime a cloud environment makes possible.

Like the advantages of technology deployed and accessed as cloud solutions, data storage in the cloud brings many benefits for libraries. The easy one to recognize is the same data being stored hundreds and thousands of times across libraries. Consider how many copies of the cataloging data there are for a serial publication such as the Economist. And if a change is needed to the cataloging data to keep it current each library must perform that change. When this data is maintained in the cloud, maintenance and backup of this data is now done once and if a change is needed, once one library performs the change all share it.

Another rationale for the adoption of cloud computing is the opportunity for collaboration and cooperative intelligence Breeding (2012). Libraries can agree to share pools of data for cooperative collection building, cooperative preservation or digitization, cooperative sharing of materials, etc. And with massively aggregated data new services can be created such as recommender services based on a broad base of usage data.

In addition, cloud computing allows pooled of resources that customers draw from usually in remote data Centre. Services can be scaled larger or smaller; and use of a service is measured and customers are billed accordingly. Different services can be provided by cloud computing company over the Internet. According to Han (2012) three main service models of cloud computing includes**:**

Methodology
This study adopted the qualitative methodology approach. Qualitative research is defined as "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss & Corbin, 1990). According to Creswell (2003), qualitative research takes place in the natural setting. He states that the qualitative researcher often goes to the site (office) of the participants to conduct the research. This enables the researcher to develop a level of detail about the individual or place and to be highly involved in actual experiences of the participants.

The population of this study consists of five (5) members of National Open University of Nigeria Library. The target population of the study includes the University Librarian and the (4) staff of the Information Technology (IT) unit of the National Open University of Nigeria Library who are responsible for the administration of cloud computing technology.

Purposive sampling technique was used to select four 4 staff of the Information Technology unit and the

University Librarian of the National Open University of
Nigeria Library. According to Crossman (2012) '' a purposive sampling is very useful for situations where you need to reach the targeted sample quickly and the sampling is not proportional in nature''.
Therefore, the subject of the study is made up Four (4) Information Technology (IT) staff and the University Librarian of the National Open University of Nigeria Lagos Main library.

The instruments used to collect data for this study were direct observations, semi-structured, unstructured interviews and the use of digital

recorder to record the interview process. The semi-structured interview involve the researcher personally interviewing staff of the Information Technology (IT) unit, based on a structured set of questions that have been prepared before the interview. This enabled the researcher to explain or elaborate on any question that is not well understood by the respondents.

Findings and Discussion
Response Rate
The entire five (100%) target respondent in the Information Technology unit and the University Librarian of NOUN library participated in the semi-structured and structured interviews.

Table 1: Response Rate

S/N	National Open University of Nigeria Library	Category of Staff	Sample Size	Response rate
1.		University Librarian	1	1
		Staff of Information Technology unit	4	4
Total			**5**	**5**

A hundred percent response rate was achieved for the structured and semi-structured focus group interviews. This high response rate was achieved because of the fact that the population was very small, and the researcher had to formally seek for permission from the University Librarian, who instructed the staff of the Information Technology unit to give the researcher all the necessary support and cooperation in the data collection exercise.

The entire respondents in the Information Technology Unit and the University Librarian of NOUN library participated in the structured and semi-structured interview.

Findings
In this section, data collected in respect to the two research questions raised in the study were presented, analyzed and discussed using descriptive and statistics analysis. This involved the description of the rationales for the adoption of cloud computing technology for library services in NOUN library as derived from the interview administered.

Existing Computer Networks Available in NOUN Library
The first research question raised in this study sought to determine the availability of the existing computer network in NOUN Library.

Table 2: **Existing Computer Networks available in NOUN Library**

NOUN LIBRARY	INDICATIONS
Local Area Network (LAN)	√
Wide Area Network (WAN)	√
INTERNET	√
Campus Area Network (CAN)	√
Storage Area Network (SAN)	X
Metropolitan Area Network (MAN)	X
Enterprise Private Network (EPN)	X
NETWORK	√
Virtual Private Network (VPN)	X
Personal Area Network (PAN)	X

Key: √ = Applicable   x = Not Applicable

From the table 2, it is obvious that LAN, WAN, Internet, CAN, and Network are the existing computer networks available in NOUN library. This therefore made the researcher to conclude that SAN, MAN, EPN, VPN and PAN are not applicable to NOUN Library. This finding agrees with Lihithar (2012) who stated that "Local Area Network (LAN), Wide Area Network (WAN) and internet can be kept entirely private by restricting some communications to the connection within the network. The implications of the availability of SAN, MAN, EPN, VPN and PAN is that information using such connections might not be accessible, retrievable or store in NOUN library which might limit service delivery in that aspect.

Furthermore, the researcher also attempted to determine the speed of internet line in NOUN library via the adoption of cloud computing technology and respondents agreed with the option YES.

The researcher also attempted to determine the cloud devices that NOUN library use for its library services in line with this, others possible options were made available for the respondents. Details of the finding is shown on table 3

Table 3: Devices use for cloud computing in NOUN Library

NOUN LIBRARY	INDICATIONS
PC	√
Laptop	√
Mobile Phones	√
Smart Phones	√
Desktops	√

Key: √ = Applicable   x = Not Applicable

It is shown that all devices indicated (table 3) are available for use in NOUN Library. The finding agrees with Burckhardet, al (2013) who stated that "as technology progresses, new application emerge that offer specialized functionality on a mobile device such as phones or tablets. Often, these apps include social aspects where users share information online. The capability of sharing data between devices is typically achieved by developing web services. Increasingly, such services are deployed in the cloud, hosted environment that offer virtualized storage and computing resources". It implies that library services will be more robust and efficient in NOUN library. Similarly, the researcher also attempted to find out what areas NOUN Library implements cloud computing. In line with this, possible options were

made available for the focus group. Details of the finding are shown on table 4.

Table 4: Areas of Implementation of Cloud Computing in NOUN Library

Areas of Implementation of Cloud Computing in Noun Library	Indications
Cataloging And Metadata Storage, Retrieved And Generation	√
Hosting And Or Distributing Special Collection	X
Acquisitions	√
Cloud-based Electronic Resources	√
Budgeting Payroll Or Accounting	x

Key: √ = Applicable   x = Not Applicable

Cloud computing has been implemented by NOUN Library in cataloguing, metadata storage, retrieval and generation. Likewise, Acquisitions and cloud-based electronic resources has also been implemented in NOUN Library. But not in hosting and or distributing special collection and budgeting payroll or accounting. This implies that if change is needed for the cataloguing data to keep it current, once one library implements it, NOUN library will only copy it and tag it. Also in the aspect of Hosting and or Distributing special collection and Budgeting payroll or accounting, library services in that aspect will not be effective in NOUN library, this findings agrees with Goldner (2012).

The second research question is to determine the rationales for the adoption of cloud computing in NOUN Library. Hence, the researcher investigated the reason why NOUN Library has to go to the cloud. In line with this, several possible options were made available for the respondents.

Table 5: Rationales for the adopting cloud computing in NOUN library

Rationales for the adopting of cloud computing in NOUN Library	Indications
Need to disclose their vast collections on the web	√
Amplify the power of cooperation with other developed library	√
To build a significant, unified presence on the web	√
Save time	√

Save cost	√
Simplifying workflows	√
Makes work more effective and efficient	√
Local storage, maintenance and backup is removed	√
Opportunity for collaboration and cooperative intelligence	√
Cloud computing is the latest trend	√
To meet the information need of large number of student spread all over the country	√
Make work faster and much easier	√

Key: √ = Applicable   x = Not Applicable

Table 5 shows that all the options above are the rationales for the adoption of cloud computing in NOUN Library. The finding agrees with Goldner (2012) who stated that the rationales behind library going cloud computing is "to disclose their vast collections on the web, amplify the power of

cooperation with other developed library, build a significant, unified presence on the web, save time, save cost, simplify work flow, makes work more effective and efficient, local storage, maintenance and backup is removed, NOUN library also see cloud computing as also the latest trends". This implies that cloud computing has promoted time saving, efficiencies, wider recognition, and cooperative intelligence for better decision –making in NOUN library. It also creates a platform for innovation and sharing of intellectual conversations, ideas and knowledge.

Furthermore, the researcher attempted to find out how the adoption of cloud computing technology has help NOUN library to improve its quality of services to its users. The detail of the finding is in table 6.

Table 6: Quality of Services Using Cloud Computing

Quality Of Services Using Cloud Computing in NOUN library	Poor	Low Quality	Moderate	High quality
Cloud- based mailing services	x	X	√	X
Cloud-based forums	x	X	√	X
Cloud –based social networking	x	X	√	X
Cloud-based information collection	x	X	√	X
Cloud-based calendar services	x	X	X	X
Cloud-based file sharing service	x	**X**	√	X
Cloud based- video services	x	X	X	X
Cloud-based software and supplication	x	X	X	X
Cloud-based storing and supplication	x	X	√	X
Cloud-based operating services	x	X	X	X

Key: √ = Applicable   x = Not Applicable

The finding on table 6 shows that cloud-based calendar service, cloud-based video services, cloud-based software supplication and cloud-based operating service, are not applicable in NOUN library in improving quality services to its patrons. The implication of this is that quality services using such cloud services might not be fully achieved. The researcher therefore concluded that for efficient library services, NOUN library should ensures that

all these services are applicable in its library. The implication of this is that the quality services in that aspect might not be fully achieved.

Having seen the extent of the adoption of cloud computing in NOUN Library, options were made available for the respondents in (table7) to identify the extent of the adoption of cloud computing in NOUN library.

Table 7: Extent of the adoption of cloud computing in NOUN library

Extent of the adoption of cloud computing	Low Quality	Moderate	High Quality
Web-mail services	X	√	X
Store personal photos	X	√	X
On line application	X	√	X
Store personal video	X	√	X
Pay to store computer file online	X	√	X
Back-up hard drive to an online site	**X**	**X**	√

Key: √ = Applicable   x = Not Applicable

Table7 reveals that cloud computing is used for web-mail services in NOUN library, NOUN library also use to store personal photos, online application and storage of personal video, pay to store computer file online and back-up all applicable in NOUN library. The finding agrees with Goldner (2013) that stated that library community can apply the concept of cloud computing to amplify the power of cooperation and build a significant, unified presence on the web.

Table 8: Layer of cloud computing services in NOUN library

Layer of cloud computing services	Indications
Free software as a service (SaaS), i.e. Google apps, Skype, hotmail	√
Paid subscription Software as a Service, (PaaS) i.e. Sale force	X
Platform as a Service (PaaS) – Enables end users to build their own applications online i.e. window Azure, Google App, Engine and force. com	√
Infrastructure as a service (laaS)- Provides Computing Power and file storage i.e. Amazon cloud, Rackspace, Zyinga	X

Key: √ = Applicable   x = Not Applicable

The findings in table 9 shows that free software as a service (SaaS) which is the Google apps, Skype, Hotmail are the layers of cloud computing in NOUN library. Platform as a Service (PaaS) which enables end- users to build their own applications online, Examples; Window Azure, Google App, Engine and Force.com are the layer of cloud computing used in NOUN Library. The finding agrees with Breeding, (2012) who stated that different individuals or institutions using the services can configure their software as needed, customize the branding, color schemes and navigation controls and to set functional preferences and policies according to local needs. It implies that NOUN library will not be able to enjoy

some services that Infrastructure as a Service provides.

The researcher equally determined the cloud computing deployment model used in NOUN library for its library services.

Table 10: Cloud computing Deployment models in NOUN Library

Cloud Computing Deployment Models	Indications
Public cloud	√
Private cloud	√
Community cloud	X
Hybrid cloud	X

Key: √ = Applicable   x = Not Applicable

Table 10 shows that only public and private cloud computing deployment models are in use in NOUN Library for its services according to the respondents due to financial constraint. The finding agrees with Kart et al (2009) who stated that libraries can exploit public and private cloud for e-mail services, searching scholarly contents, for building of community power, file sharing and networking of information. He equally stated that "private clouds make it possible in theory for libraries IT provider to let go of more complex, risky, and value- laden IT activities". It implies that NOUN library using private cloud can configure their software as needed customize the branding color scheme and navigation. NOUN library is relieved from burdensome responsibility of the software.

The major findings of the study include the following:
1. The study discovered that Local Area Network, Wide Area Network, Internet, Campus Area Network, and Networks were the existing computer networks available in NOUN library.

2. The rationales for the adoption of cloud computing in NOUN library is to provide information to its students who are spread across the country and to equally make the information accessible and not location specific.

Conclusion

Arising from the findings of the study, it can be concluded that NOUN Library adopt cloud computing to provide library and information services to its students who are scattered all across the country where access to information must be unfettered and not location specific. And to enable NOUN Librarians to get out of technology headaches such as computer viruses, system crashes, and loss of data, but save time, money, while simplifying workflow.

Recommendations

Based on the findings of this study the following recommendations were made:

1. The National Open University of Nigeria in collaboration with the University Librarian should provide WAN in each Study Centre's with fast internet connection which will connect multiple locations to NOUN Headquarter Library and equally use it to control its services and data.
2. National Open University of Nigeria Library should incorporate community and hybrid cloud deployment model to its library services in order to benefit from all that cloud computing deployment models offers and to eradicate the fear that usually associated with sensitive file leakage, lost or crash of software, malfunction or malware associated with laptop or desktops

References

Ambrose, et al; (2010).An Empirical investment of cloud computing for Personal Use. Proceeding Paper 24, Retrieved from http/aise1.org.on the 6/8/14.

Armbrust, M. el at; (2010) A View of Cloud Computing: Clearing the clouds away from the true potential and obstacles posed by this computing capability. Communications of the ACM.Vol.53 No.4.Pp 50-58

Breeding, M; (2012).Cloud Computing for Libraries Chicago: ALA Tech source Pp1–8.

BrymanA. & Bell E; (2007).Business Research Methods.Oxford University Press. Retrieved

Creeger M; (2009). Cloud Computing: An overview. A summary of important cloud computing issues distilled from Association of Computing Machinery (ACM) CTO Roundtables. Retrieved 4/08/2014 from http://queue.acm.org/detail.cfm?id=1554608

Creswell W.J; (2003). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 2nd Ed. Thousand Oaks, CA: Sage Publications

Galvin, D. and Sun, M; (2012) Avoiding the Death Zone: Choosing and Running a Library Project in the Cloud Emerald Group Publishing Limited Vol. 30. No3 Pp. 418-427

L.R; (1981).Educational Research: Competencies for Analysis and Applications. – 2nd ed. Columbus: Charles E. Merrill Publishing Company and A. Bell and Howell Company.Cloud Computing Exit Strategy"

Gbaje, E. S. Aliyu. M; (2014) Cloud computing opportunities for Academic Libraries Nigeria. Jewel Journal of Librarianship: Vol.6 (1).

Goldner, M; (2010) Winds of Change: Libraries and Cloud Computing, Multimedia Information and Technology, Vol. 37 No 3, pp 24-28.

Hayes, B; (2008) Cloud Computing, Communication of the ACM, Vol. 15, pp 9-11http://csrc.nistgov/organisations/fisseg/2009 - onference/prelentational/fissea09_day3_cloudcomputing.pdf

Kumar, et al; (2012) Application of Cloud Technology in Digital Library in IJCSI International Journal of Computer Science Issues Vol. 9, Issue 3, No 1 PP 374-378.

Liu, and Cai; (2012), Embracing the Shift to Cloud Computing: knowledge and Skills for Systems Librarians, Emerald Group Publishing Limited Vol. 29. No 1 pp.22-29.

Lofland, J., &Lofland, L. H; (1995).Analyzing social settings: A guide to qualitative observation and analysis. Belmont, CA: Wadsworth

Maxwell, J. A; (1996).Qualitative research design: An interactive approach.Thousand Oaks, CA: Sage Publications.

Mell, P. and Gance, T; (2011),'The NIST definition of cloud computing', available at:http//csrc.nist.gov/publications/nistpubs/800 -145/SP800-145,pdf

Ordi, T. O; (2006).Principles and Management of Library Science Kaduna: Palord (Nig) Ltd, Pp 1-25.

Romero, N.L; (2012). Cloud Computing in Library Automation: Benefits and Drawbacks, Bottom Line; Managing Library Finances Vol. 25 1ss3, Pp 110-114.

Stroh,& Kumar;(2009) The Cloud is Ready for you, Are you ready for Cloud?Retrieved

from;www.booz. Com/media/file/Cloud-is-Ready for- You.Pdf

Tuncay.W; (2010) Effective use of cloud computing in Educational Institution   Vol. 2' Pp 938-942.

Yang, S. Q; (2012) Move into the Cloud, Shall We? In Library Hi Tech News, Emerald Publishing Limited pp. 4-7.