Article

CLOUD COMPUTING: TODAY'S HOPE FOR INFORMATION SECURITY IN NETWORKED LIBRARIES

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Abstract

Library environments are increasingly dependent on computer technology. Many libraries of all sizes have discontinued the use of card catalogs and have decreased the acquisition of hard copies of information resources in favour of electronic version of the same. Yet, it was observed that library's serve, the hub of library's networked milieu, is feared to be vulnerable to environmental threats, unauthorized usage, malicious software and technical failure, and thus face problems of securing her e-collections and providing access to them. Hence, this paper was set to appraise the efficiency of one of the recent technological tools in the world referred to as cloud computing for achieving a library's information security in the networked setting. Thus, it is shown that cloud services, preferentially the models of infrastructure, platform and services, in a community, private or public deployment, provided by a good vendor, would not allow environmental usage software and technical threats to befall the quantum of information of the library in a networked environment.

Keywords: Cloud computing, information security, Library, Networking security.

Introduction

Today, library environments are increasingly dependent on computer technology. Many libraries of all sizes have discontinued the use of card catalogs and have decreased the acquisition of hard copies of information resources in favor of electronic versions of the same. These electronic versions are accessible via terminals within and outside library buildings. In this networked environment, where information resources are in their soft copies and accessed via computer systems running on Local Area Networks (LAN) or Wide Area Networks (WAN), with Internet connectivity linked to a server, security of the information is a vital issue. Leslie (2012) posits that the server, in this case the library's server, is feared to be vulnerable to environmental threats, unauthorized usage, malicious software and technical failures. Thus, this is a problem that networked libraries face in terms of securing e-collections and providing access to them. So, it is on this premise that this paper is set to appraise the efficiency of one of the recent technological tools in the world referred to as cloud computing for achieving a library's information security in the networked setting (Goldner, 2011; Mitchell, 2012; Kilbourn, 2012; Reece, 2012). Hence, this paper shall navigate from showing a bird's eye view of what cloud computing is, examine cloud computing vis-à-vis the security of information databases in networked libraries, the prospects of the cloud in securing library information database resources and eventually concludes, proffering valued recommendations for libraries, particularly the Nigerian libraries.

Cloud Computing: A Bird's Eye View

Cloud computing is a term that has been given varying definitions by different people and organizations. It is indeed an emerging concept in the Information Technology (IT) industry. It has many names which include: grid computing utility on-demand computing, et cetera. Wyld (2009) opines that one of the hindrances to the development and adoption of cloud computing is the lack of understanding of what it is. Thus, he defined cloud computing as a core single element on which computing services are delivered over the Internet, on demand, from a remote location, rather than residing on one's own desktop, laptop, mobile device, or even on an organization's servers. For an organization like library, it involves entering into agreement with a provider to deliver applications, computing power, and storage via the web. Furthermore, McKinsey and Company (2009) deine cloud computing as hardware-based services offering computing, network, and storage capacity, Plummer et al. (2008) cited the view of Gartner Research where cloud computing was defined as "an alternative delivery and

acquisition model for IT-related services" and "… a style of computing where massively scalable IT-enabled capabilities are delivered "as a service" to external customers using Internet technologies". National Institute of Standards and Technology (NIST), Commerce, defines and describes cloud computing as "a model for enabling ever-present, suitable, on-demand network access to a shared pool of configurable computing resource (e.g., networks, servers, storage, application and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" (Mell and Grance, 2011). Consequently, cloud computing has appeared to be the best evolution that IT has brought to information professional after the Personal Computer (PC) and the Internet.

There are different types of service models in cloud computing. Britto (2012), Monaco (2012) and Goldner, (2011) have opined that the cloud offers services to clients in the forms of application (owing to software which is accessed with the web browser), platform (building on an existing application) and infrastructure models (buying space/time on external servers). It is also important to note that the cloud, as it sounds abstract, is not referred to as an unaccountable space in the sky, where information may be imagined floating insecurely, rather it is a business model in the IT industry that is managed by vendors. It is simply the cloud, because no hardware device is required to get information stored, preserved and shared. Probably, a pause to think of what happens with e-mail boxes in the Yahoo network, where the client does not save the inbox, spam and send message folder on hardware let alone require an external device to compose a new message reflects to what cloud computing offers. More to it, in a case where a Yahoo clients' PC crashes, the data on the Yahoo cloud is still there, accessible to the client through any other computer with Internet access anywhere. This is the same with the networking experience in Facebook, Google Docs, Twitter, Amazon, to mention but a few. These networking companies use cloud-enabled computing services. On the area of reliability, vendors invent security measures that malicious software and other cyber crimes cannot alter. Thus, many cloud vendors now encrypt documents in other to ward-off unauthorized access to clients' information, and so forth.

Cloud Computing and the Security of Information Database in Networked Libraries
Researchers are still worried on the safety of the cloud to information sharing, transmission and storage. Winkler (2011) maintained that cloud security is determined by the deployment model. He presented four deployment models of cloud services. They are private, public, hybrid and community models. Private model is cloud

infrastructure operated solely for a single organization, whether managed internally or by a third-party and hosted internally or externally (www.csrc.nist.gov/publications /nistpubs./). Undertaking a private cloud project requires a significant level and degree of engagement to virtualize the business environment, and it will require the organization to reconsider decisions about existing resources. When it is done right, it can has a positive impact on an organization's business, but every one of the steps in the project raise security issues that must be addressed in order to avoid serious vulnerabilities (www.content.dell.com/). Public cloud models ensure that the applications, storage, and other resources are made available to the general public by a service provider. For institution clients, such as libraries, these services are offered on a pay-per-use model. Generally, public cloud service providers like Amazon, Microsoft and Google own and operate the infrastructure and offer access only via Internet (en.wikipedia.org/wiki/cloud-computing/). But the fear is that individual institutions, unlike in the private cloud, have no physical control over their service equipment nor do they control access to their database themselves should the vendor become fraudulent. Meanwhile, community cloud shares infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.), whether managed internally or by a third-party and hosted internally or externally. It is this kind of service that Goldner (2011) recommends for libraries. However, the costs and spread over fewer users than a public cloud), so only some of the cost saving potential of cloud computing are realized. On the other angle, hybrid clouds are a composition of two or more clouds (private, community or public) that remain unique entities but are bound together, offering the benefits of multiple deployment models.

Be that as it may, Sanchati and Kulkarni (2011) speculate that the cloud services would never be comparable with the services of hardware devices. Whereas data in a hardware device (e.g. server) is lost when an organization loses control over it, clouds – with the help of its virtualization technologies on which is run, give clients back that control, from data center to endpoint delivery. Thus, while cloud computing is without risk, it is obvious that it offers a number of compelling advantages for organizations, which libraries can reap through community, private or public deployments as the case maybe. Yet, the unreliability of the vendor should never be overlooked.

The Prospects of Cloud Computing to Information Security in Networked Libraries

Goldner (2011) has examined critically the prospects of cloud computing to libraries. In his article, he puts forward that the library community would not only apply the concept of cloud computing to amplify the power of cooperation and to build a significant and unified presence on the Web, but will surely avoid locally hosting multiple servers and equipment and constantly deal with hardware failure, software installs, upgrades and compatibility issues. No doubt, this approach to computing can help libraries save time and money while simplifying workflows. Furthermore, another view point that prompts a possible adoption of cloud services in libraries is essentially the improvement opportunities it provides in technology, data and community contexts.

To the first context-technology-cloud computing provides application services that enable clients to depend not only on vendors when new services and technology come up. Besides, libraries can get out of the business of technology and focus on collection building, patron services and the likes. Servers can be decommissioned and no longer require replacement within few years of use, amongst other things. To the second context – data improvements – libraries that store their data in the cloud enjoy several advantages. Apart from easy sharing of data, the need for local storage, maintenance and backups is removed completely. The problems of having to store and backup the same data hundreds and thousands of times in or across libraries are removed. For example, if a library is to store its data, consider how many copies of the cataloging data to keep it current a library or each library or each library, if in a collaborating setting, must perform that change. Thus, 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.

From the foregoing, it is imperative to note that cloud computing holds potential security gains for library's information resources. The threats of hackers, viruses, rat cutting server cables and other havocs that can accidentally cause a delete or loss of server files are overcome in cloud services. Furthermore, in a specific approach to the library's information security fears itemized in the beginning, adopting cloud computing services in networked libraries check against.
- Environmental threats like severe weather storm which can cause outages or knock servers' offline.
- Unauthorized users through firewalls and intrusion-detection systems which have the potentials of protecting outside users from changing the library's data

or accessing confidential information of the library, which more often than not come from an organization's own employees.

- Technical failure like damage to the equipment that stores, processes and transmits information. This kind of damage can range from someone outing over and disconnecting the cable, server crashing, and so forth.

- Malicious software that all computers, especially those connected to the Internet, are vulnerable to. Hence, attacks, viruses, worms, Trojans and other malware that can exploit weaknesses and damage data are checked effectively in cloud computing than in per system installation kind of protection.

In summary, recent research has shown that cloud services, preferably, the models of infrastructure, platform and services, in a community, private or public deployment, provide by a good vendor, would not allow any of the above narrated threats to befall the quantum of information of a library in a networked environment (Fanburg and Leslie, 2012). In fact, a good cloud storage vendor will provide far better security than one would likely have in-house.

I think it is very necessary to provide research and examples of libraries (different types) especially in developed countries that use cloud. Provide also the requirements or the steps to using cloud in the library including companies which can provide cloud services.

Conclusion and Recommendation

This article defines cloud computing and shows how it is different from other types of computing. It also discusses how cloud computing solutions could be beneficial to libraries in three basic areas: technology, data and community. There is no doubt that cloud computing, especially to librarianship as a practice, is a new technology model for IT services which many businesses and organizations around the globe are adopting. It allows them to avoid locally hosting multiple servers and equipment and constantly dealing with hardware failure, software installs, upgrades and compatibility issues. For many organizations, which the libraries of today are expected to emulate, cloud computing has simplified many official network processes for them and they have saved their time and money. If cloud computing services are adopted and applied in libraries in Nigeria, security of scholarship goals in academic libraries, research and innovation mission in special libraries, social and community development pursuit in

public, and teacher-pupil performance through school libraries, shall all be attained to an appreciable state, thus paving way for an increased development of the Nigerian society.

To this note therefore, this research recommends that libraries in Nigeria, through their parent institutions, should make a case for the adoption and application of cloud computing services towards an effective networking of libraries which is the present move of all stakeholders in the library industry of Nigeria today, particularly in the academic sector. So, it is worthwhile of the Nigerian Library Association, the Librarian Registration Council of Nigeria, and Librarians in top positions and Managers of libraries to make concerted efforts towards the actualization of this position.

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