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# A study on Cloud computing in libraries

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**Abstract**: Now the world very essential need in cluding not only education and everything to move only clouding computing a vital role and unavaidable. The cloud also focuses on maximizing the effectiveness of the shared resources. Cloud resources are usually not only shared by multiple users but are also dynamically re-allocated per demand. This can work for allocating resources to users; developing model is private cloud, community cloud public cloud, hybrid cloud. While librarians are largely consumers of cloud computing services, an understanding of their operations is important for effective and efficient use. This includes the advantages and disadvantages or challenges involved.

**Keywords***: cloud computing, IT techonology, Clouding computing services*

**Purpose** : To discuss issues involved in navigating the modern information environment where the relevance of cloud computing is unavoidable. This is a way of shifting from the hardware and software demands of storing and organizing data, to information access concerns. This is because with the exponential growth in information sources and all accompanying complexities, the limited capacity of libraries to host their own in its entirety necessitates opting for alternatives in the cloud.

**Authority**

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**Purpose and Scope**

Cloud computing is an evolving paradigm. The NIST definition characterizes important aspects of cloud computing and is intended to serve as a means for broad comparisons of cloud services and deployment strategies, and to provide a baseline for discussion from what is cloud computing to how to best use cloud computing. The service and deployment models defined form a simple taxonomy that is not intended to prescribe or constrain any particular method of deployment, service delivery, or business operation.

**Audience**

The intended audience of this document is system planners, program managers, technologists, and others adopting cloud computing as consumers or providers of cloud services.

**The NIST Definition of Cloud Computing**

Cloud computing is a model for enabling ubiquitous, 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. This cloud model is composed of five essential characteristics**,** three service models, and four deployment models.

**Essential Characteristics**

*On-demand self-service.* A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

*Broad network access.* Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).

*Resource pooling.* The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth.

*Rapid elasticity.* Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

*Measured service.* Cloud systems automatically control and optimize resource use by leveraging a metering capability1 at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

**Service Models**

*Software as a Service (SaaS).* The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

*Platform as a Service (PaaS).* The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. 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-hosting environment.

*Infrastructure as a Service (IaaS).* The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

**Deployment Models**

*Private cloud.* The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

*Community cloud.* The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

*Public cloud.* The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

*Hybrid cloud.* The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

Cloud Computing is a completely new IT technology and it is known as the third revolution after PC and Internet in IT. To be more specific, Cloud Computing is the improvement of Distributed

Computing, Parallel Computing, Grid Computing and Distributed Databases. And the basic principle of Cloud Computing is making tasks distributed in large numbers of distributed computers but not in local computers or remote servers. In other words, by collecting large quantities of information and resources stored in personal computers, mobile phones and other equipment, Cloud Computing is capable of integrating them and putting them on the public cloud for serving users.

Digital library is a development-oriented hardware and software integration platform, through to technical and the product integration, each kind of carrier digitization, carries on the effective deposit and the organization, provides the network the effective service. After Digital library technology popularization, provided the high grade information service but simultaneously also to expose all sorts of questions unceasingly, because the zones of different the current economic condition limit presented the development not balanced phenomenon, the regional resources shared with difficulty, form each one information isolated island or the resources are redundant, create the resources the waste, satisfied the aggregate demand with difficulty, the cloud computing possibly provides a good plan day by day for this kind of phenomenon.

**Cloud Computing Advantages**

* Cost reduction. Ability to increase or decrease the consumption of hardware or software resources immediately and in some cases automatically.

*Scalability. "Pay as you go" allowing a more efficient control of expenditures.

* Lower investment, reduced risk. Immediate access to the improvements in the

resource proposed (hardware and software) and debugging.

*Support included. Enjoyment of the most advanced security procedures, availability and performance of providers with experience and knowledge in this type of service.

* Greater security and accessibility. Access to resources from any geographical point and the ability to test and evaluate resources at no cost.

**Automation and Cloud Computing**

In the field of library automation there are several commercial suppliers already offering various adaptations of their products which make the use of the cloud possible to a lesser or greater extent. The problem is that many of these solutions are not really systems designed by and for Cloud Computing, but rather adjustments of, and patches for their commercial developments that enable them to continue selling their traditional products while claiming to offer reductions in cost and more modern management. The report drawn up by Breeding, Marshall "Automation Marketplace 2012: Agents of Change" in April 2012, is an in-depth study on the status of the different versions of commercial software, i.e. owner, open source etc. and among those products, it highlights those that already offer the "open cloud" service. This article does not aim to compare these products, but rather to focus on what items should be studied for the purpose of deciding whether to use an open source application, and determining how to purchase or contract this type of solution: (Peter Mell, and Timothy Grance, 2011) The first and foremost priority is an in-depth study of all applications currently being used in the institution. It is necessary to know which type of data is being considered and which kind of applications are already available in the institution as well as the applications which are least user data sensitive. It should be clear that it is important to start off with those applications that affect our users and their personal data the least and especially, the indiscriminate use of such information. (Nuria, Liloret Romero 2012) : Even when purchasing so called "classic" software caution is required about the type of contract being entered into, and in the case of cloud computing even more caution is needed. It is important to have a clear understanding of the risks.

Entailed and to enter into a contract in which these risks are fully covered. (Rupesh,Sanchati and Gaurav Kulkarni (2011) The possibility of backing out of the services should be ensured. Libraries need to be able to retrieve their information and contract a new "cloud computing" as necessary (Chris peters, 2010) The internet provider must be very reliable because if libraries do not have access, all their work could be lost. Clearly, a portion of the amount saved on cloud computing should be spent on fiber optic solutions, the improvement of bandwidth, server security, the expansion of backup services etc. If solutions for these services are not found in advance the transfer to cloud-computing services could be suicidal for both employees and users. (Matt, Goldner, 2010) Before deciding on a payment method, each institution has to undertake an in-depth analysis to determine which is most suitable. There are different payment methods for the use of cloud computing services, and the one to be used will depend on the services to be contracted by the institution. Most common are the following payment methods: . "Pay-as-you-go" is the standard payment method for Cloud Computing hardware and software services. In this case you only pay for what you use, CPU usage, megas used, the use of a SW, etc., or for potential use, e.g. in the case of payments made by users accessing the hardware software platform.

"Subscription" or payment for potential use of software or hardware is another payment method, i.e. the payment of a fixed price over a certain period-of-time (month, quarter or year). You can use the service as often as you want without limitations. There are different possibilities: User – The amount payable depends on the number of users who use the tool, and user names are not typically in transferable; Functionality – Payment for the use of one feature in particular; Flat rate – Payment of a fixed amount and no limitation on the number of users or use of resources. Any of these

payment methods must be studied, taking into account the total number of users in the institution. It is even of interest to request a preliminary study from the various providers that have been contacted, comprising different estimates, depending on the payment method chosen, so as to determine which is of most interest to use. In many cases the choice of one or another payment method itself can lead to significant cost savings, extending

beyond which "cloud computing" providers or services are chosen. (Creeger,M., 2009) The cost of increasing scalable storage options should be known in advance. Many providers offer very competitive prices at first, but then successively increase their rates to a much higher amount. A provider which at first seems less economical future might actually turn out to be cheaper if the initial cost is compensated in the future. As previously discussed, if the pay as you go method is chosen. it is better to choose a provider whose future rate increases are lower than to choose one whose original rate is very low. (Zhu Huijuan, 2009) It is essential to verify which future software and hardware updates are and are not covered. Since updates are automatic, it might be assumed that they are covered, but it is important to read the small print to determine the extent to which they are actually covered and for how many years. It must be borne in mind that unlike when purchasing commercial products for use, in the case of cloud computing "you are buying a service rather than a product". This is not a product that can be inventoried and used although it is obsolete, and consequently, if the institution stops paying or terminates its contract, it could be left without all of its work. Therefore, this is something that must be understood from the beginning when taking a decision on this item.

(8) The remote access policies must be very clear ¡ and employees should be able to use the services from anywhere, which can make the time they have to be physically located in the center etc. much more flexible. For this reason, the access levels assigned to each user must be clearly defined so good good access policies can be created. (9) Energy savings are key in the use of "cloud computing" since much less energy is used than in traditional data centers, meaning that costs on other items in the institutions can be reduced.

**Conclusion**

The borderless nature of information makes questions of standardization and interoperability worthy of continuous discussion, and essential to come up with practical solutions in accessing, protecting and securing information and knowledge assets. While librarians are largely consumers of cloud computing services, an understanding of their operations is important for effective and efficient use. This includes the advantages and disadvantages or challenges involved. Even in technologically backward or inefficient environments, librarians need to be knowledgeable about these issues so that they can maximize what limited services and resources they have and, at the same time, be prepared to handle discontinuous change caused by information technology developments. Potentially, the cloud gives access to the vast majority regardless of where they are geographically located, but the challenge in some developing world areas is with inadequate IT infrastructure, data centres, and applications. However, academic libraries continue to evolve and librarians are at the forefront in maximizing the advantages of cloud services for supporting academic research purposes.

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