

How Worthy is Cloud Computing for Libraries

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Abstract

This paper attempts to demystify the intricacies involved in cloud computing. Models of cloud computing and its effective implementation for mid-sized organization is emphasized. Lastly, it has been attempted to explore how cloud computing can extend Library services for better sustainability.

Keywords: Cloud Computing, SaaS, PaaS, IaaS, Hybrid Cloud, Social Cloud, Private Cloud.

1. Introduction

Terminological turmoil and changing dynamics of computing technology had been so rapid at its journey could be traced back from 1960 when John McCarthy predicted that someday computing would be organized as a public utility. In the early 90s, Ian Foster coined the term 'Grid computing', which talked about technologies that would make computing power available 'on demand' to consumers. At present, both these statements suddenly make sense when we hear the word cloud computing and the technologies that have made it a reality.

Simply put, cloud computing is a set of technologies that allows computing applications and data to be exposed as a set of services from a pool of underlying resources. The user doesn't have to worry about the technologies in the pool. As Wikipedia puts "Could computing users can avoid capital expenditure (CapEx) on hardware, software, and services when they pay a provider only for what they use. Consumption is usually billed on a utility

(for example, resources consumed, like electricity) or subscription (for example an annual subscription to a newspaper) basis with little or no upfront cost."

The CyberOptic Group describes cloud computing as: "Essentially, cloud computing enables computer software and hardware resources to be accessed over the Internet without the need to have any detailed or specific knowledge of the infrastructure used to deliver the resources, much like a utility model. You really don't need to know what the phone company or electric company does on their end to enable calls and allow the lights to go on when you flip the switch; and, you really don't want to know as long as when you plug into it, it works".

As opposed to hosting and operating resources locally, cloud computing refers to delivery of information technology resources over the internet. These resources include applications and services, as well as the infrastructure on which they operate.

2. Benefits of Cloud Computing in General

2.1. Scalability

Scalability refers to real time adjustment of resources. Cloud computing enables to scale up or



down IT requirements of organizations quickly and efficiently, without hampering productivity. It cuts down the time involved in buying & setting up additional hardware, software & other necessary resources every time a new service is required.

2.2. Reduced Infrastructure Cost

As said earlier that resources can be adjusted dynamically, a lot of cost related affairs like administration, maintenance and be reduced. It also helps cut down unnecessary capital expenditure as one has to pay only for the duration of use the service for.

2.3. Effective Utilization

As in cloud computing the total IT infrastructure is as a pool of resources, it reduces wastage of resources to a great extent and improves utilization.

3. Models of Cloud Deployment

There are basically three types of cloud-public, private, and hybrid.

3.1. Public Cloud

Public clouds are external clouds, usually provided by a service provider. All resources (hardware, software, service, applications) are being offered by the service providers. The public cloud follows the 'pay as you go' model. The benefits of moving to a public cloud are many, with the key one being that one doesn't have to worry about managing the underlying IT infrastructure-no security patches or updates to apply, no software upgrades, etc. All these are the service provider's concern.

3.2. Private Cloud

A private cloud refers to having one's own, private cloud computing infrastructure. A private cloud is more suited for a large enterprise because of

investment on IT infrastructure, data center, apps, etc. It provides better control over the entire process of information processing. This helps to reduce costs, improves response time, and provides greater flexibility.

3.3. Hybrid Cloud

This type of cloud refers to a cloud computing environment that consists of internal/ external providers, viz. a mix of private and public clouds. In this mode, secure and critical applications are hosted in the private cloud while not so critical ones are hosted in the public cloud. A very good example of this is cloud bursting, wherein the organization for its normal usage uses its own infrastructure but moves to the cloud for peak loads.

4. Types of Cloud Services

Whether it's public, private, or hybrid, one can avail a range of services in cloud computing environment. These can be divided into three parts namely SaaS, IaaS, and PaaS.

4.1. Software as a Service (SaaS)

This is the most familiar and prolific cloud service of all. It provides any software application as a service through the cloud. Free email services are being the most notable example of this type. Right now, there is whole range of software applications available through SaaS, be it ERP, CRM, workflow systems, document management, and much more. All these software are installed in the service provider's space and the users pay as they use the same. This could be on a subscription model, wherein they pay an annual or a monthly fee for the services. Everything is accessible from a web browser, so the users don't need anything more than that.

4.2. Infrastructure as a Service (IaaS)

As the name implies, IaaS is a service delivery model in which an organization is given control over different resources and applications. These resources comprise of storage, hardware, servers, networking components, etc. The consumer need not manage or control the underlying cloud infrastructure in this service model. On demand principle is used in this case as the infrastructure is provided to the user as per his requirements.

4.3. Platform as a Service (PaaS)

This component of cloud computing can be defined as a set of software and product development tools that allows developers to create applications on the provider's platform. In other words it allows you to build applications that are delivered to users through the Internet and are run on the provider's infrastructure. Cost effectiveness is one of the prime benefits of PaaS as organizations don't need to spend extra for buying and managing the underlying hardware and software. PaaS offerings include facilities for application development and design, testing, deployment and hosting. Web service integration, database integration, security, storage, etc that comes under application services is also included. The prime example is Microsoft's Azure.

5. Cloud Computing and LIS

The above benefits are mostly applicable to libraries and other small-to-mid-sized organizations. Effective planning and decision regarding implementation is the most important factors for its success.

5.1. Financial Barriers vs. Cost Savings

Each library is facing acute shrinkage in budget. Varieties of resources, in all forms (printed and

digital) broadened the issue. Purchasing infrastructural facilities recurrently and updating / up gradation of software and hardware is becoming a bothering issue. Cloud computing offers price savings due to economies of scale and the fact that you're only paying for the resources you actually use.

5.2. Rigidness vs. Flexibility and Innovation

Risks can be taken for creative and innovative ideas as the new application will run on provider's infrastructure. Libraries don't have to decide about the bandwidth, traffic etc. Creation and configuration of virtual server for storing digital resources would be easier as the script would be run under providers own machine. As Whitfield Diffie points out that in the long run the cloud might be more restricted and rule-bound than traditional IT. He compares the cloud to public transportation providers such as airlines which rely more on rules and fixed schedules than privately-owned planes.

5.3. Cloud OPAC and Cloud ILS

As of now the libraries are providing Union catalogue services through consortia approach, is still in it's infancy. As now more and more LMS vendors are offering cloud-hosted versions of their tools, it is strongly expected that OCLC's cloud-based ILS tools that complement their existing cataloging tools (e.g. WorldCat and FirstSearch). Unified search engine and catalogue retrieving tools may help global user to access more information in real time, satisfying the fourth law of LIS.

5.4. Cloud types and LIS

There are too much hype and optimism surrounding cloud computing. Lots of gray areas are still there which needs to be addressed promptly for

implementation of cloud computing in LIS. Concerns about security, privacy and reliability are the most important among them. To mitigate the fears above the libraries choose to go for hybrid cloud model. This hybrid model would let libraries maintain more control over the applications and data stores that contain sensitive, private information about patrons. Fine tuning and adjustment of resources can also be done quickly.

6. Conclusion

Right now libraries can cooperate with another for infrastructure, bandwidth and services of professionals. Still the picture of this type of resource sharing is rather hazy. Financial resource sharing by the libraries needs proper policy support by the decision making bodies. Alternately, if enough libraries express interest, a big company may be approached to create a Library Cloud. Otherwise the pioneering service providers like OCLC might build library-centric cloud services on top of cloud infrastructure leased from one of the more established players.

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