Cloud Computing

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In the virtual services era the term “cloud computing” has worked its way into the lexicon. The challenge for hospital librarians lies in determining if this new way of computing has implications for hospital library services. This article provides an overview of some cloud computing elements that may address that challenge.

What, exactly, is cloud computing? The answer to this question is as varied as those you ask. Mell and Grance with the Information Technology Laboratory of the National Institute for Standards and Technology (NIST) offer the following definition: “Cloud computing is 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. “ (1) The Office of the Vice president for Information Technology at Indiana University defines cloud computing as something that occurs off-site, “…cloud computing services are run outside the walls of the customer organization, on a vendor’s infrastructure with vendor maintenance.” (2) If an institution or company says they are operating “in the cloud” this means they have a portion of their computing service and storage needs being handled by a trusted third party. Instead of a firm’s IT department buying new servers to address increased software and storage issues, they turn to another company that specializes in providing these services for a fee. This way, the firm is not saddled with the additional expenses associated with more hardware or software (i.e., electricity, cooling, space allocation, updates and upgrades, etc.).

Anyone who uses Google Docs or uploads photos to sites like Flickr or presentation slides to Slideshare has experienced cloud computing. Some medical library resources and services contain cloud-based functionality if saving citations or search strategies on the resources’ server is an option. Today’s social networking and social media applications utilize cloud computing services to deliver content to users. A person with an Internet-capable smart phone or mobile tablet and access to a wireless hotspot can log in to their Google Mail account virtually anywhere. In a September 2008 Pew/Internet Data Memo, Associate Director John B. Horrigan noted that 69% of Americans who are online use software that is located on the web. (3) That percentage will only increase over time.

To use the cloud for computing services means you remain the owner of your information but someone else is responsible for storing it and maintaining its security. Cloud computing can also mean you only use the service or services you need when you need them. Many providers of cloud-based services offer varying pricing models for their clients who want to utilize certain “as a service” products for a specific project or length of time. Understandably, this raises issues of security, access, integrity of the storage facility and equipment, long-term reliability of the third-party vendor, etc. However, it is not necessary to place all of an institution’s resources into the cloud. One can utilize particular services to meet specific needs. Three of these services that may be of interest to hospital librarians are Infrastructure as a Service (IaaS), Software as a Service (Saas), and Platform as a Service (PaaS). There are also different “types” of cloud models: private, public, community and hybrid. (1) Utilizing one or more of these cloud types might determine the type of service an institution uses.

Infrastructure as a Service

Utilizing Infrastructure as a Service (IaaS) means a third party provider runs the networking or storage processes for an institution or company on their hardware. The client retains ownership and rights to the applications and data, but no longer has to provide the hardware necessary for the processes to run. Hospitals employ elaborate computing infrastructure to handle communication, office productivity products, billing, medication inventories, and other processes. Hospital libraries, too, have records, resources, and catalogs that must be reliably stored and safeguarded. The computing equipment necessary for these tasks requires energy to operate and keep cool, wiring and cabling for connectivity, etc., along with information technology (IT) professionals to manage it all. An organization might be interested in contracting with a third-party provider for IaaS to lessen the burden on internal IT resources and personnel.

Oftentimes the companies that excel in delivering large-scale cloud computing services have their own extensive network of servers. Jaeger, et. al., observe that “…technology companies have built increasingly large data centers, which consolidate a great number of servers (hundreds, if not thousands) with associated infrastructure for storage, networking, and cooling…” (4) Google and Amazon are examples of technology firms that have enormous data centers to handle their volume of searches and retail transactions. While a third party service provider might not be as huge as these two companies, it may still have access to data centers or “server farms” around the country or even overseas.

Software as a Service

Most people have experienced the cloud’s Software as a Service (SaaS). The most common SaaS is the personal email account. If an individual has a Yahoo, Hotmail or Gmail account, they are using the cloud’s SaaS function. Google Docs and Flickr are other examples of applications based in the cloud. It is possible to create, store and access documents, images, calendars and other materials from any computer with reliable internet connectivity. On a larger scale, a company may be interested in a “pay-as-you-use” contract, using applications only as needed for peak production times or institution-wide processes. If an institution is looking for ways to reduce their budget for buying software and lessen the burden of maintaining the updates, patches and add-ons, using an SaaS model could be an attractive alternative.

Platform as a Service

Platform as a Service (PaaS) is a more abstract service to envision. Youseff, Butrico and Da Silva provide their definition of this service model, “The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider.” (5) Basically, using PaaS means the client institution runs applications they have developed in-house on a third-party provider’s computing platform. The “platform” may be a programming language such as SQL or other application provider interface (API) that the provider maintains. PaaS differs from SaaS in that the applications originate with the institution, not with the provider. This means an institution can develop their custom applications and have a PaaS provider maintain the underlying computing programming environment necessary for the applications to run.

Cloud Computing Models

Just as there are different services available in cloud computing, there different models for delivering those services. Mell and Grance (1) identify the following four cloud “deployment” models:

*Private Cloud*. “The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.” This internal cloud could be likened to an institution’s intranet. It is used for institution-specific tasks or communication.

*Community Cloud*. “The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns.” A community cloud might be analogous to a magnet hospital system. The entities in the hospital system have the same healthcare mission and work in concert to provide medical services for a geographic location.

*Public Cloud*. “The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.” Large technology companies that have huge data centers and numerous servers at their disposal are in the position to offer public cloud services. An institution may contract with a third-party provider to utilize a portion of the computing power to run services or applications the general public may wish to access.

*Hybrid Cloud*. “The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability…” A hybrid cloud might be employed by an institution where some activities require companion sites to share data and processes to achieve goals, while other computing needs are internal and specific to the institution alone. This model might be employed in the magnet hospital scenario. The combined entities share computing resources to fulfill their mission to provide healthcare services, yet each site also has a private, internal cloud system to monitor inventory or personnel data.

The Cloud and Hospital Librarians

A hospital librarian may wonder how knowing about cloud computing is of use in their particular setting. Cloud-based services are another way library patrons are interacting with information. More healthcare workers use some kind of smart phone or mobile tablet to conduct on-the-fly searches, save brief notes, or other tasks. Exposure to the basics of cloud computing provides the hospital librarian with a point of reference. The librarian now knows what hospital residents means when they come to the library and ask if a PDF can be saved to a Google document, or if citations can be saved to a web-based reference manager application. Familiarity with this way of storing and retrieving information enhances the hospital librarian’s position within the institution because he or she is the “go to” person when questions such as these arise.

 While the decision whether or not an institution has an interest in or will adopt some or all cloud computing models or services may not cross a hospital librarian’s desk, awareness of trends and developments in the way information is stored, managed and delivered is part of the library milieu. As the digital and physical worlds continue to merge, people expect and increasingly rely on information access around-the-clock. Cloud computing is yet another option for institutions to explore.

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