

Cloud Computing: Impact on Your Library

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1st section – What is Cloud Computing

Cloud computing

noun

1. The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.

What does it really mean?

- Your photos, files, and music are saved on a computer somewhere other than your computer
- You can access your images, files, and music from any computer, anywhere in the world.
- You can share your files easily by providing links/URLS
- You can access same information from any kind of device: computer, tablet, or smartphone.
- You can use any kind of software, whether it is for word processing, creating slideshows, or photo editing, without having to download or install it on your computer.
- The software is updated automatically
- You can increase or decrease services depending on your need

Disadvantages of Cloud Computing

- Possible downtime where you are unable to access your files online
- The security of your files is in another company's hands
- There is a cost involved
- If your Cloud host has their own proprietary software or formats for storing information, can you get your information back if you choose to move.
- Some cloud hosts do not have a good history of customer support
- Companies sometimes get bought out or go under. You need a backup plan.

Architecture

How does cloud computing work?

Your cloud host, the company housing all your files, needs to have the following:

- Enough servers not only to house your information, software, & networks, but extras to take over incase one server goes down.
- Backup servers to house copies of your files, just in case there is a problem, this is referred to as "Redundancy", which is a good thing.
- A central server administering and monitoring the other servers, as well as monitor security
- Software, known as Middleware, to help your computers communicate with their servers
- Internet connectivity with high bandwidth to handle all the computer traffic and data

For your library to use cloud computing, you need the following:

- A cloud host. This is a company that provides whatever cloud services you need

- A reliable internet connection
- Some kind of device, whether it is a computer, tablet, or smartphone that can access the internet
- (Optional) server to house copies of email or files.

The Types of Cloud Computing Services

Software as a Service (SaaS)

You are provided access to application software often referred to as on-demand software. You don't have to worry about the installation, setup and running of the application. Service provider will do that for you. You just have to pay and use it through some client.

Benefits of the SaaS model include:

- Easier administration
- Automatic updates and patch management
- Compatibility: All users will have the same version of software.
- Easier collaboration, for the same reason
- Global accessibility.

Examples:

Google docs, Microsoft-office 365, Prezi.com

Platform as a Service (PaaS)

Your computing platforms, such as operating system, programming language execution environment, database, web server etc., are all based in the Cloud.

PaaS has several advantages for developers.

- Operating system features can be changed and upgraded frequently
- Teams can work together on software development regardless of distance
- Services can be obtained from diverse sources that cross international boundaries.
- Initial and ongoing costs can be reduced by using a single vendor
- Multiple projects can use the same developers

Examples:

- AWS Elastic Beanstalk,
- Heroku
- Salesforce.com
- Google App Engine
- IBM.

Infrastructure as a Service (IaaS)

Your library out-sources the equipment used, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it.

Characteristics of IaaS include:

- Utility service and billing model.
- Automation of administrative tasks.

- Dynamic scaling.
- Desktop virtualization.
- Policy-based services.

Examples:

- aws.amazon.com : EC2, S3
- cloud.google.com
- www.windowsazure.com
- www.hpcloud.com
- www-935.ibm.com/services/us/en/cloud-enterprise/index.html
- rackspace.com

Development as a service (DAAS)

Development as a service is using a company to create or develop applications for your library all done online.

Examples:

Cloud9IDE <https://c9.io/> – For java script developing

IBM ; Almaden Research Center – software

Northwoods: <http://www.northwoodsoft.com/Software-Development/Software-Development-Services.htm>

Identity as a Service (IDaaS)

IDaaS is using a service to manage you online identity such as logins, passwords, and software licenses. It also can control user and computer accounts.

Examples:

OpenID.net

Google.com

Verisign.com

AOL.com

Twitter.com

Yahoo.com

FaceBook.com

Paypal.com

Compliance as a Service CAAS

These are companies that assist you in complying with various regulations or privacy guidelines. If you work in a hospital setting. You might be familiar with AthenaHealth.

Other examples:

- [Bankserv.com](http://bankserv.com) – For Banks
- ClearPoint PCI – for Credit Cards
- FedCloud – For government

2nd section – Security and Cloud Computing

Security Overview

Types of common cyber crime are: Hacking, Identity Theft, Spamming, Viruses.

These cause

- The loss of intellectual property and business confidential information
- The loss of sensitive business information, including possible stock market manipulation
- Service disruptions

- The additional cost of securing networks, insurance, and recovery from cyber attacks
- Reputation damage to the hacked company

Cloud Services Providers spend billions in securing their data. They afford more protection than an individual library.

Among the types of security your library can use are:

- A firewall to act as a barrier to between the public Internet and any private network (like at your enterprise).
- Encryption to protect your sensitive data from hackers; only the computer that you send it to should have the key to decode the data.
- Scan all files with anti-virus software.
- Know who in the library is accessing what files and software
- Consider providing your own back up for emergencies

What to keep out of the Cloud

- Anything that actually requires hardware to run i.e. an HVAC system that has to be plugged in.
- Anything critical that you could not function without
- Electronic door access
- Financial systems

3rd section – Cost

Pricing Models

Your price may vary depending on whether you are for-profit or educational. Also the types of service and number of people accessing the information will alter the rate.

A good comparison chart can be found at:

<http://www.techrepublic.com/blog/the-enterprise-cloud/side-by-side-comparisons-of-iaas-service-providers/5717/>

Types of Plans

Pay-as-you-go: You pay for what you use. Good For applications with short-term, spiky, or otherwise unpredictable usage, a pay-as-you-go pricing model, where you pay only for what you use, and with no upfront commitment

Upfront or Pre-payment: You pay for what you think you will use in advance: For applications with steady state or otherwise predictable usage, you should be able to make a low, one-time, upfront payment and get a significant discount to the hourly rate and a capacity reservation in the cloud. This can be done monthly, by semester, by the year.

Avoiding Unneeded Expenditures

Here are some steps to avoid surprises.

- Figure out how much you will most likely use in a month
- Check Usage against any bills or statements

- Try to negotiate a good price break
- Go On A "Diet." Cut back on usage if you cannot afford the bill.
- Look for waste: Computers running overnight, people not logging off the system.

Computing Cost of Ownership

There is more to cost of ownership than the price of the equipment or the subscription to the cloud host. Your operational costs consist of some of the following factors:

- Labor = Salary + benefits
- Utilities
- Rent
- Software / licensing

Figure your costs:

1. Monthly Labor Cost: $\text{Salary} + \text{Benefits} \times \% \text{ of time spent on task} = \text{labor cost}$.
2. Adjustments: $\text{Salary} + \text{Benefits of temporary help} \times \text{time spend on task} = \text{added cost}$
3. Utilities: $(\text{wattage of equipment} \times \text{hours running}) \text{ divided by } 1000 \times \$ \text{ charged per KH} = \text{electric cost}$
4. Rent: $(\text{Length} \times \text{Width of room}) \times \$ \text{ per sq foot} = \text{rent}$
5. Software/Licensing: Any fees charged per software license or subscription

4th section – Cloud Service Providers

Data Storage

- Box.com – 10gb free, 100 GB for \$5 / mo
- Dropbox.com – starts at 2GB-16 gb Free, 200GB for \$200/yr
- Google Drive – 5 GB free, 200 GB for \$120/ year
- Microsoft Skydrive – 7 gb free, 200 GB for \$100/year
- SugarSync.com – 5gb free, 100 gb for \$100/year

Productivity Software

- Apple iCloud - word processing, Spreadsheets, Presentation, calendars software – Free Beta
- IBM – Lotus live – complete software package - \$5 / per user / Month
- Google Drive – word processing, Spreadsheets, Presentation, calendars software – Free
- Microsoft Office 365 – complete office package – Educational, Govt & non-profit discounts start at \$0 to \$3.50 per user per month
- Zoho.com – complete office products, plus calendars, invoices, finance – starting at \$0 - \$35 per user / month

Webmail

- Amazon – SES – Simple Email Services – Free if you have an EC2 account or \$.10 per thousand messages
- Elasticemail.com – email hosting - Starting at \$.08 / thousand messages
- Rackspace.com – Email hosting - \$2 / mailbox / month
- Zoho Mail – email hosting – lite version is free for 5 mailboxes

Communication

- Adobe Connect – online meeting – \$45 / \$55 per month, Educational discounts available
- IBM Lotus LiveMeeting – Web conferencing - <http://www.meetingconnect.net/lotuslive/>

- Panterra networks – Cloud Phone system - <http://www.panterranetworks.com/products/voice/index.php>
- RingCentral – Cloud Phone System - <http://www.ringcentral.com/>
- YouSendIt.com – 2 gb free, 5gb \$10 / for sending & tracking files w/ return receipts

Media Streaming

- Flickr.com – upload photos and video – Free 1 TB of storage
- Sproutvideo.com – video hosting – accounts range from \$10 - \$750 / month
- Vimeo.com – video hosting – accounts range from \$0-\$200 / year
- Vzaar.com – Video hosting – accounts range form \$20 - \$400 / month – free 30 day trial
- Wistia.com – video hosting – accounts range from \$0-\$300 / month

Mobile Cloud

The mobile cloud is Internet-based data, applications and related services accessed through smartphones, laptop computers, tablets and other portable devices. You can find mobile apps at iTunes and Google Play/

Some great cloud apps:

Box	Mobile office	Skydrive
Dropbox	365	Zoho
Google Drive	RingCentral	

5th section – Transitioning the Library to the Cloud

Planning for Change

If you are considering moving your library to the cloud, here are issues to consider:

- Which applications or services are considering moving to the cloud? These could include:
 - Software many in your library use such as word processing, spreadsheets etc
 - Email services
 - Storage for your documents
- Do a cost analysis to see if it is worth moving to the cloud
- Decide on which vendor you will use. Some of the determining factors will include:

○ Security	○ Cost
○ Performance	○ Billing Flexibility
○ Compliance	○ Vendor Lock-in
○ Support	

Things to consider for preparing for the cloud

- Who will be involved with planning & preparation
- Compatibility of hardware & software
- Are software tools or other assistance available for move
- How much data needs to be weeded or converted to new format
- How much times will your staff be tied up preparing for the move?
- Who will train the staff once the new service is in place
- What new roles or tasks will your IT now cover

Maintenance

- How often does the cloud host perform maintenance on the service or servers?
- Does the Maintenance require the service to go down?
- Monitor your bills and usage

Archiving

There are two types of archiving.

- Private – only those with logins and passwords have access
- Public – everyone can access the information

There are a number of Cloud Archiving services available. When choosing a service, you want to consider:

- Are they compliant with regulations your organization must follow
- Should the archive reside in the public or private cloud space
- How will they notify you of a security breach
- How easy is it to move your data to a different service
- Is the company gets sold, can you get your data back

Other reading

Above the Clouds: A Berkeley View of Cloud Computing

<http://www.cs.columbia.edu/~roxana/teaching/COMS-E6998-7-Fall-2011/papers/armbrust-tr09.pdf>

MSP TV Finance: *Getting Ready for Cloud Computing: Pricing Cloud Services*

<http://www.msptv.net/whitepapers/channel-112911-wp.pdf>

Rackspace: *Cloud U: Planning a Move to the Cloud*

http://broadcast.rackspace.com/hosting_knowledge/whitepapers/planning-a-move-to-the-cloud.pdf

Server Calculator:

<http://networking.ringofsaturn.com/Tools/serverpowerusage.php>