

Cloud Computing – a simple Explanation

Jere Minich
Program Director
Lake-Sumter Computer Society
Leesburg, Florida

Overview for today

- 1. What is Cloud Computing.? (acronym = CC)
- 2. Strengths & Free CC.
- 3. Why Business Needs CC.?
- 4. Types of CC.
- 5. How CC works.?
- 6. Positive/Advantage of CC.
- 7. What is CC like.?
- 8. Access, Security, Privacy, Public Records.
- 9. CC & Me; Service & Infrastructure
- 10 Benefits
- 11. A look into the future
 - Google, Ajax, Mobile, BYOD.

42 –Slides-most- Black & White – Available as: Power Point 2007, PDF, Wordpad.

Cloud Computing concept background with a lot of icons: tablet, smartphone, computer, desktop, monitor, music, downloads and so on



Cloud Computing Complex



Inside Look



A view of the Microsoft data center in Dublin, Ireland.



Another view of the Microsoft data center in Dublin, Ireland.



Cloud computing is where:

- software applications,
- processing power,
- Data
- or artificial intelligence

are accessed over the Internet.

Cloud computing is:

- the ability to employ a number of:
 - computers,
 - hardware,
 - software,
 - and servers - a computer program running to serve the requests of other programs,
- to serve your computing needs remotely
 - without actually owning or running the software and hardware.

Cloud computing is:

- A much-needed technology that provides:
 - resources over the Internet,
 - which are:
 - extremely accessible
 - and informative as a service
- to those who use Cloud Computing.

The strength of cloud computing is:

- that it is instantly scalable;
 - in other words:
 - more computers can be;
 - added to
 - or removed from
 - the cloud at any time,
 - without impacting the operation of the cloud.
- Therefore:
 - there are virtually unlimited:
 - processing
 - and storage capabilities
- to any user.

There are numerous **free** cloud computing services, like:

- Hotmail,
- Gmail,
- Yahoo! Mail,
- YouTube
- Facebook
- Microsoft
- Google,
- Amazon,
- IBM.
- there are also a number of options that users can purchase on-demand to meet their specific needs.

Why Businesses Need Cloud Computing

- Government agencies, the military, research laboratories, and universities use:
 - supercomputers to perform complex tasks such as:
 - analyzing climate change,
 - solving medical problems,
 - ensuring our national security.
- Cloud computing: (which makes trillions of calculations per second)
 - is intended to provide similar power.
- Users can estimate:
 - the risk in businesses ventures,
 - store patients' medical information,
 - and analyze sales data
- by making use of the Internet. 'Cloud Computing'

Types of Cloud Service

- As a rule, this concept involves some combination of:
 - platform as a service (PaaS),
 - compute and storage resources scale automatically to match application demand
 - software as a service (SaaS),
 - cloud providers install and operate application software
 - and infrastructure as a service (IaaS).
 - providers offer computers – as physical or more often as [virtual machines](#) –, raw (block) storage, firewalls, and networks
 - For the typical business, overall computing costs remain the same.
 - and the provider of the service absorbs the upfront costs,
 - spreading them out over time.

How Cloud Computing Works

- Accessed through the Internet:
 - the off-site cloud computing is usually provided by a third party,
- and less technological skill is needed for the user's in-house implementation.
- This should be weighed against:
 - possible security risks,
 - along with loss of access and control.

Positive/Advantages of Cloud Computing

- Those who use cloud computing achieve:
 - location and device independence,
 - Mobile devices
 - they can use a web browser to access various systems
 - from any site
 - with a variety of devices.
 - Computer
 - Tablet
 - Smart Phone

Some Other Advantages to Using Cloud Computing

- Costs and resources are shared in a sizable pool of cloud computing users,
 - the infrastructure is centralized by the provider,
 - resulting in lower costs for them.
 - Because of its reliability at multiple sites,
 - provides business continuity
 - helps to ensure disaster recovery for the user.
 - Resources are provided on a “scalability” basis,
 - the system is closely monitored,
 - businesses do not have to plan for when peak loads will be needed.
 - Providers are able to devote their resources to resolving security problems,
 - which many businesses could not afford to do.
 - Better utilization of resources,
 - more efficient systems often result in improved long term use of the user’s computer system.

What Cloud Computing is Like

- Most individuals who surf the Internet are already familiar with cloud computing:
 - although they may not know it.
- If you've ever used:
 - a Web-based email,
 - stored and shared photos online,
 - looked something up on Wikipedia,
 - stored data with Microsoft (Skydrive)
- you've entered "the cloud."

Cloud Access

- **Access files across PC or Mac**
 - installed on all your computers, you'll have automatic access to the latest version of your files wherever you are.
- **Simple sharing with anyone**
 - Share even large files and photos with your friends.
 - All they need is a web browser—
 - no worrying about attachment limits or what software they have.
- **Mobile access**
 - Photos and files in the folder on your PC are automatically available on your phone.
 - Get the app or just use the phone's browser.

With cloud computing

- your information is “hosted remotely”:
 - instead of taking up space on your hard drive
 - and necessitating a complex matrix of:
 - servers,
 - bandwidth,
 - networks,
 - hardware,
 - software
 - and storage space.

Security – A big question

- Since -there is no one single location where the information is stored.
 - This actually increases its security.
 - The same safeguards and roadblocks apply as to any Web site you visit for personal reasons:
 - layers of security packets,
 - passwords
 - and authentication
 - are all required before you can access information that may be sensitive.

Security

- every application you use can be custom-built to your specifications,
 - it becomes easier to encrypt and safeguard this Information.
- Applications are stored on a server:
 - eliminating the need to install any software for users to be able to use a program.
 - These applications can be accessed and used from any web browser.
 - Example – go anywhere on get on Facebook.
- Everything is updated in real-time
 - everyone who's authorized to access the information can view the latest results and statistics immediately,
 - without performing complicated analysis.

Cloud Security

- issues fall into two broad categories:
 1. Security issues faced by cloud providers:
 - organizations providing
 - [Software-](#),
 - [Platform-](#),
 - or [Infrastructure-as-a-Service](#) via the cloud)
 2. Security issues faced by their customer

Cloud Security and privacy

- **Identity management** - Every user will have its own identity management system to control access to information and computing resources.
 - Cloud providers either integrate the customer's identity management system into their own infrastructure,
 - or provide an identity management solution of their own.
- **Physical and personnel security** - Providers ensure that:
 - physical machines are adequately secure
 - access to these machines
 - and relevant customer data is:
 - not only restricted
 - but that access is documented.
 - Cloud providers assure customers that they will have:
 - regular and predictable access to their data and applications.
- **Application security** - Cloud providers ensure that applications available as a service via the cloud are secure by implementing:
 - testing and acceptance procedures for outsourced or packaged application code.
 - It also requires [application security](#) measures be in place in the production environment

Cloud Security

- **Privacy** - providers ensure that all critical data:
 - credit card numbers, for example
 - are masked
 - and that only authorized users have access to data in its entirety.
- Digital identities and credentials must be protected.
 - as should any data that the provider collects or produces about customer activity in the cloud.
- **Legal issues** - providers and customers must consider legal issues, such as:
 - Contracts and E-Discovery, (discovery in civil litigation which deals with the exchange of information in electronic format)
 - the related laws, which may vary by country

Public records

- Legal issues may also include:
 - records-keeping requirements in the public sector,
- where many agencies are required by law to retain and make available [electronic records](#) in a specific fashion.
- This may be determined by legislation, or law may require agencies to conform to the rules and practices set by a records-keeping agency.
- Public agencies using cloud computing and storage must take these concerns into account.

I understand this concept, but how is it affecting me, my family?

- Software as a Service:
 - is not strictly a Cloud Computing concept.
- It's simply the idea that a web platform such as Google Docs can give:
 - people all the functionality of software installed on their computer,
 - without the need to install anything beyond a browser.

benefits from the cloud because the cloud makes it very scalable. (Changing use and price)

The idea behind platform as a service:

- is that resources are made available for building whole applications as components,
 - rather than programs to be written.
 - Widgets,
 - web editors,
 - pre-built shopping carts,
 - whatever pieces you need could be offered by a single vendor for the user to mix and match at will.
 - The vendor provides enough infrastructure to support :
 - easy scaling
 - changing charges,
 - cloud-fashion,
 - for your personal use.

Infrastructure

- as service is where cloud computing is currently strongest and showing the most innovation.
- This is something like Amazon's Elastic Compute Cloud, that allows you to ramp up virtual servers in a short time to meet transitory demand.

*How is the average end-user affected by cloud computing?
Is the average person who sits down to surf the Web
participating in cloud computing?*

- If cloud computing is done right, it should be completely transparent to the end user.
- They should never know if there is one computer behind the scenes or a thousand.
- They should never have to think about what continent the software is hosted on or see a delay because of increased demand.
- If someone writes a Google app, they aren't "participating" in cloud computing.
 - They're just using an app, no different from any other as far as they are concerned.

3 Big Benefits

- 1. Presence.
 - I can access this document from the computer I am sitting in front of now.
 - If it lived in Google Docs, I could get to it from any computer with an Internet connection.
- 2. cost.
 - With Google docs, I don't have to pay for Microsoft Word.
 - With Amazon EC2 or S3, I don't have to buy a lot of hardware or hire people to maintain it.
 - These are non-trivial costs that are being avoided.
- 3. redundancy.
 - By definition a cloud vendor has lots of resources available for use.
 - If a hard drive or two, or even a server or two, fail in their cloud infrastructure, there is enough redundant capacity to take up the slack so that end users won't even notice.
 - Improving uptime without a commensurate increase in end user cost is part of what the cloud is about.

Google & Cloud

- Cloud computing from [Google Docs](#):
 - a suite of free online office applications that includes:
 - a word processor
 - a spreadsheet,
 - to **‘Wolfram | Alpha’**, a "decision engine" that can perform sophisticated calculations.
 - Answer questions,
 - do math,
 - instantly get facts,
 - create plots,
 - calculators,
 - unit conversions,
 - scientific data and statistics,
 - help with homework—and much more.
 - the iPhone app Shazam can recognize what song is playing on the radio:
 - but it isn't the iPhone that is doing the heavy lifting
 - the app is simply transmitting the information to 'the cloud' (Shazam servers on the Internet) to break down the music and find the song.

Asynchronous Javascript And XML.

- **AJAX** has allowed for better and more intuitive web applications, the web page can be more responsive and act more like an application without always requiring us to click on links and reload the page.
 - **web mashups** - allow for unique and interesting new combinations of applications,
 - the **social web** has put us into the web as active participants,but it is [cloud computing](#) that is taking the web to the next level by turning it into a platform.

The Final Analysis

- In the end, this means:
 - we won't be tied to a specific operating system like [Microsoft Windows](#)
 - we won't need an expensive computer.
 - we can rely on the Internet to power the applications
 - while we access it through a relatively cheap 'terminal' of a computer.

the tip of the iceberg

- Google is leveraging its '**Chrome browser**' and turning it into an operating system
 - in order to create cheap "terminals" capable of access the web and running sophisticated applications through the rise of cloud computing.
- And [HTML 5](#), the new web standard currently being worked on, will allow for even more sophisticated applications.

A Look into the near Future

- On February 7, 2012, Google launched *Google Chrome Beta* for 'Android 4.0' (Ice Cream Sandwich) devices.
 - Since April 2009, each Android version has been developed under a codename based on a dessert or sweet treat. These versions have been released in alphabetical order: [Cupcake](#), [Donut](#), [Eclair](#), [Froyo \(frozen yogurt\)](#), [Gingerbread](#), [Honeycomb](#) and [Ice Cream Sandwich](#).
- In March 2012 Google announced it was working on a version of Chrome for both the 'Metro' and desktop versions of 'Windows 8'.
 - Windows 8 will employ a new user interface based on Microsoft's Metro design language.
 - The Metro environment will feature a new tile-based Start screen similar to the Windows Phone operating system.
 - Each tile will represent an application, and will be able to display relevant information such as:
 - the number of unread messages on the tile for an e-mail app
 - the current temperature on a weather application.

Mobile Cloud Computing exists:

- when tasks and data are kept on the internet
 - rather than on individual devices,
 - providing on-demand access.
- [Alibaba Group](#) launched cloud computing-based operating system July 2011. (China Based Company)
 - The Aliyun operating system will feature cloud services such as:
 - email
 - Internet search and support for web-based applications.
- Users are not required to download or install applications onto their mobile devices.

Definition

Mobile cloud computing

- a combination between:
 - **mobile network**
 - and **cloud computing**,
- thereby providing optimal services for mobile users.
- In mobile cloud computing, mobile devices do not need a powerful configuration:
 - (e.g., CPU speed and memory capacity)
- since all the data and complicated computing modules can be processed in the clouds.

Example: Mobile Healthcare

- Telecommunication technology in the medical field helped diagnosis and treatment become easier for many people.
- This can help patients regularly monitor their health and have timely treatment.
- Also, it leads to an increase in accessibility to healthcare providers, more efficient tasks and processes, and the improvement of the quality of the healthcare services.
- It also has to face many challenges (e.g., physical storage issues, security and privacy, medical errors).

Mobile Healthcare (Continued)

- Cloud computing is introduced as a solution to address aforementioned issues.
 - Cloud computing provides the convenience for users to help them access resources easily and quickly.
 - It offers services on demand over the network to perform operations that meet changing needs in electronic healthcare applications.

Example: Mobile Computing

- As mobile computing has become more popular over the past decade, it has been under continuous development with advances in:
 - hardware,
 - software
 - and network.
- With mobile computing we can check:
 - our email messages,
 - our bills,
 - our bank accounts
 - and our other private information
- just by using a mobile phone or laptop anywhere.
- All the functionalities obligate each exchange of data to make it safe and immune from any attack.
- Mobile computing services have simplified our lives. (??)

A cloud client

- consists of:
 - computer hardware
 - and/or software
- that relies on cloud computing for application delivery.
- A Partial List.....
- [Android \(operating system\)](#), [Baidu Yi](#), [Cherrypal](#), [Google](#), [Chrome](#), [Chromebook](#), [Chromium \(web browser\)](#), [Cirtas](#), [Cloud storage gateway](#), [CloudBook](#), [Comodo Dragon \(web browser\)](#), [CyanogenMod](#), [GOS \(operating system\)](#), [Internet OS](#), [Iphone](#), [Joli OS](#), [Legacy-free PC](#), [MIUI](#), [Netbook](#), [Nettop](#), [OG-OS](#), [OMFGB](#), [Ophone](#), [Plug computer](#), [Replicant \(operating system\)](#), [SRWare Iron](#), [StorSimple](#), [Windows Phone](#), [Zonbu](#)

Business Outlook

- **Mobile computing appears to be a driving force behind cloud adoption in enterprises.**
- while cloud computing delivers cost savings,
 - it only amounts to a few pennies (relatively speaking)
- providing better connectivity to employees' mobile devices is the reason companies are so interested in cloud computing.

Bring Your Own Device (BYOD)

- describes the recent trend of people bringing personally-owned mobile devices to their place of work or **school**.
- Mobile devices are now found:
 - in the hands of most children,
 - school leaders are using that to their advantage by:
 - incorporating devices that students already own into classroom lessons and projects.

Pros of BYOD in Schools

- 1. Students MORE likely to have remembered devices than pencils etc
- 2. Can use the device THEY have chosen to complete set tasks.
- 3. Technology is ubiquitous outside the school gates. Why not inside too?
- 4. If BYOD is not allowed, then we're teaching to the lowest common denominator
- 5. When students use their own devices, they take care of their own 'training.'
- 6. Usage of BYOD is seen as a privilege & students stay on task.
- 7. BYOD offers potential cost savings since fewer school devices are needed.
- 8. BYOD allows student & teacher to swap roles.
- 9. BYOD offers learning opportunities at times the students choose.

Pros of BYOD in Schools

- 10. BYOD creates emotions such as enthusiasm, vitality, and zest all of which are related to curiosity.
- 11. Reduces expenditure on stationery.
- 12. BYOD extends the tech resources already provided by school.
- 13. BYOD encourages purposeful choice of appropriate tools/apps.
- 14. BYOD in school provides opportunity for teaching respectful/appropriate use.
- 15. On average BYOD can help keep pace with ever-updating tech.
- 16. New horizons may become apparent when students are choosing their paths.
- 17. BYOD could be pivotal in supporting independent learning.
- 18. BYOD offers a way of delivering e-book

Cons of BYOD in Schools

- 1. Students leave chargers at home. Devices run out of power.
- 2. Exacerbates issues of inequity of access.
- 3. Students forget to bring devices.
- 4. Technical infrastructure may need addressing before implementation. Expensive.
- 5. BYOD will encourage students to be 'off task.'
- 6. Pens & paper don't require infrastructure.
- 7. Applications/tools are not common to all platforms.
- 8. BYOD runs up against many schools' 'ban em' policies. (Mobile Devices)
- 9. Planning for a lesson with devices whose capability you don't know needs more care & thought.
- 10. Expensive personal devices increase possibility of theft.

Cons of BYOD in Schools

- 11. Many teachers aren't flexible or willing enough to take risks trying BYOD.
- 12. Emphasis of tech support will need to shift from network to user .
- 13. Teachers will need instructional PD in getting the most from BYOD.
- 14. Teachers may find themselves troubleshooting tech instead of guiding learning.
- 15. Parents may not be comfortable with paying for device/access for use in school.
- 16. Some students may be unhappy mixing school work on their personal device.
- 17. Accessing school network can present problems w/ WiFi/Proxy settings etc
- 18. Currently, BYOD doesn't help prep for external exams.
- 19. Tech can become a status symbol to flaunt.
- 20. Greater opportunities for plagiarism exist with BYOD

How to manage tech change in a BYOD and cloud world ?

- Good Question.
- The End.....
- Jere Minich
- ProgramLSCS@gmail.com