Unraveling the Mystery of Cloud Computing

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Application Software Administrator

Who is Laurie Schropp?

- Graduate of University of Washington GO Huskies!! BS in Laboratory Medicine
- Peace Corps Thailand/ Chonburi Hospital
- After 6 years; made the leap from clinical to business/technical
- For the past 30 years built a career at several Medical Software Companies doing the following:
  - Implementing software at large hospitals and cancer centers
  - Writing Technical Documentation
  - Teaching use of clinical software systems
  - Supporting clinical software systems
- Semi-Retired 2 years ago
  - Working in the lending world now
  - System Software Admin

Some Terminology

- Application Software:
  - Computer program designed to carry out a specific task other than one relating to the operation of the computer itself.
  - i.e. Turbo Tax; designed to help end users complete their income tax forms
- System Software:
  - Software designed to provide a platform for other software. System software relates to the operation of the computer itself
  - i.e. Microsoft windows, or MacOS referred to as operating systems.
- Database:
  - an organized collection of data stored and accessed electronically
- Data Center
  - A building or dedicated space within a building used to house computer systems and associated components
    - A great early example of a datacenter is the NASA mission control computer room. Dating back to the 1960s
    - Data Centers have special needs: Air conditioning, Fire suppression, Power supply, Data communications connections and Security devices.

Some Terminology

- IT Infrastructure:
  - Defined broadly as a set of information technology components that are the foundation of an IT service; Physical components, like servers and modems but also various software and network components like VPN software, Operating systems and Firewalls
- Computer:
  - a machine that can be programmed to carry out sequences of arithmetic or logical operations (computation) automatically.
  - PC(Personal Computer)
    - Described as desktop/wired hard drives but the more recent laptops, tablets and even smart phones
- VPN: Virtual Private Network
  - a mechanism for creating a secure connection between a computing device and a computer network, or between two networks, using an insecure communication medium such as the public Internet
- API: Application Programming Interface
  - A way for two or more computer programs to communicate with each other

Cloud Computing

- What is Cloud Computing?
  - Wikipedia Definition

    Cloud computing is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user.

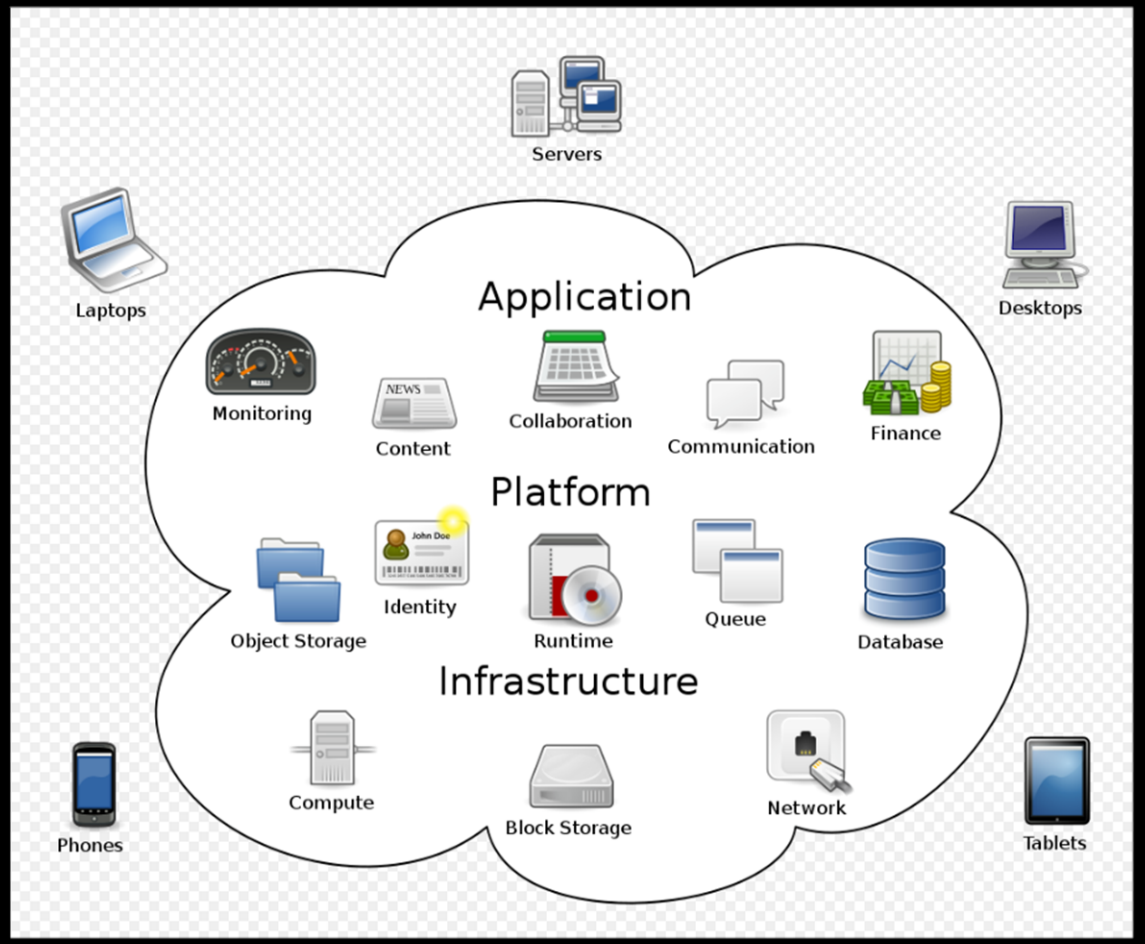
In a nutshell, cloud computing allows the user to access software and store information via the web(internet), without having to store or manage any of it on their own PC

The goal of cloud computing is to allow users to take benefit from all of these technologies, without the need for deep knowledge about or expertise with each one of them

Cloud Computing VS Local Computing
A Comparison

- Tax Software
  - 5 years ago you go to Costco and purchase the TurboTax CD to load on your PC
    - Cloud or Local?
  - You go to your bank online to access their free copy of TurboTax software or you use TaxAct online
    - Cloud or Local?
  - Today, you go to the Costco website and purchase TurboTax, there is no CD, but they provide to you a URL(Website Address) to go to so you can load the software, and an access code to open it with
    - Cloud or Local?

Defining the *Cloud*; Setting the Scene



Cloud Deployment Models

- Private
  - Private cloud is cloud infrastructure operated solely for a single organization, whether managed internally or by a third party, and hosted either internally or externally
    - a private cloud is a service that is completely controlled by a single organization and not shared with others
- Public
  - Cloud services are considered "public" when they are delivered over the public Internet, and they may be offered as a paid subscription, or free of charge
    - public cloud is a subscription service that is also offered to any and all customers who want similar services.
- Hybrid
  - The ability to connect collocation, managed and/or dedicated services with cloud resources
    - A combination of Private and Public Clouds

Public VS Private Cloud

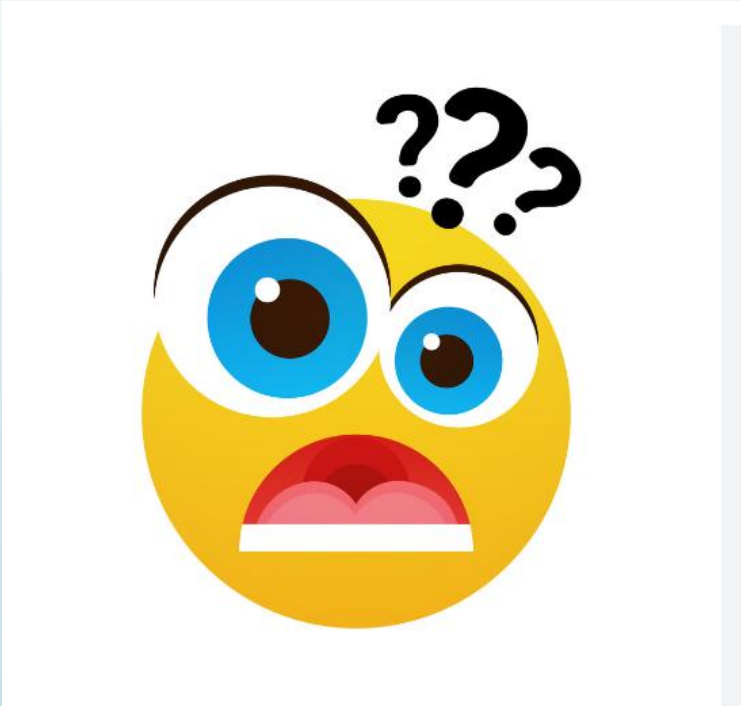
- Public cloud platforms pool resources in distributed data centers around the world that multiple companies and users can access from the internet. Rather than an in-house team, the public cloud providers are responsible for managing and maintaining the underlying infrastructure.
  - Some examples of public cloud providers
    - AWS Amazon Web Service
    - Microsoft Azure
    - Google Cloud
- In a private cloud, computing resources are dedicated and proprietary, and a single organization hosts and manages the system.
  - An example of a Private Cloud would be SCI Solutions
    - The company housed information for over 200 healthcare providers around the country
    - They had their own servers in a dedicated data center
    - They had a dedicated IT staff to manage the servers

History

- During the 1960s, the initial concepts of time-sharing became popularized via RJE (Remote Job Entry)
  - RJE described as the entry/extraction of data from the mainframe computer using remote stations that were not located in proximity to the mainframe
- Full-time-sharing solutions were available by the early 1970s
  - Mainframe style applications
- The term Cloud was used to refer to platforms for distributed computing as early as 1993
  - **The cloud metaphor was used to describe the universe of "places" that mobile agents in the Telescript environment could go**
- In the 1990s, telecommunications companies, who previously offered primarily dedicated point-to-point data circuits, began offering virtual private network (VPN) services with comparable quality of service, but at a lower cost.
  - They began to use the cloud symbol to denote the demarcation point between what the provider was responsible for and what users were responsible for

History:Breaking It Down

What Did She Just Say?



Consider the Following:

- A Cloud; where a single program can go and travel to many different sources of information and create a sort of virtual service
  - Within your healthcare network, you can create an account for yourself
    - Uses an application program designed to create a 'space' for your personal information and provide many services to you
  - Within that space you can:
    - schedule an appointment
      - accessing a piece of scheduling software that schedules the appointments across the healthcare network
    - view lab results
      - accessing a different software program used by your healthcare network that holds your medical record
    - find a specialist
      - accessing a software directory of providers within the healthcare organization
    - Pay a bill
      - Accessing the organizations financial software system
  - All of these services are provided through your single login, but behind the scenes, there are many differing software applications that are designed for specific tasks/needs that form the 'cloud' at your healthcare organization

Some Benefits of Cloud Computing

- Cost Reductions; claimed by many *cloud* providers. While this may be a true statement for large organizations, it is a debatable point to the average single end user
- Device and location independence allows users to access systems using a web browser regardless of their location, or what device they are using
- Maintenance: easier because the data is hosted on an outside server (not your PC or device) there is no need for you to invest in hardware for storage, or to know HOW to maintain the technical aspects of the software.
- Productivity and Performance: users don't have to install application software on their PC. Performance is monitored and maintained by the *cloud* provider. Data is stored on the *cloud* provider servers.
- Availability; improves with the use of multiple redundant sites
  - Large companies often look at this for business continuity planning and disaster recovery

Security and Privacy Concerns with *Cloud* Computing

- Privacy
  - Concerns that the service providers can access data in the cloud at any time
    - Data could be accidently or deliberately altered at any time
  - Many *cloud* providers can share information with third parties if necessary for purpose of law and order without warrant
    - This information is provided in the Privacy Policy that users must agree to prior to using the cloud based service
    - How many people actually 'read' the policy?
      - Some providers at least require that the policy be opened and scrolled through completely before the user is allowed to check the box that they agree to it.
      - How effective is this, if no one actually reads it?

Security and Privacy Concerns with Cloud Computing

- Security
  - Top 3 threats in the cloud are
    - Insecure Interfaces with APIs
    - Data Loss and Leakage
    - Hardware Failure

Together these form ‘shared technology’ vulnerabilities

- Because data from hundreds or thousands of companies can be stored on large cloud servers, hackers can theoretically gain control of huge stores of information through a single attack

Security and Privacy Concerns with Cloud Computing

- Data Ownership
  - There is often a problem of legal ownership of the data
  - Many Terms of Service agreements are silent on the question of ownership
- Risk that end users do not often understand the issues involved with signing on to a cloud service.
  - Most do not read the service agreements prior to accepting
  - With the constant emergence of new services that only work via the cloud (Apple's Siri, or Google Assistant), **it is important to READ the service agreement**

Cloud Considerations

- Security
  - Security can improve in a *cloud* environment due to the centralization of the data and increased security-focused resources by the *cloud* provider
  - Security is often as good as or better than other traditional systems, in part because service providers are able to devote resources to solving security issues that many customers cannot afford to tackle or which they lack the technical skills to address.
  - Security becomes more complex as the data in a cloud environment is distributed over a wider area or over a greater number of devices, all of which need to be monitored and accounted for

Security
Are you prepared?

- Using applications via a cloud environment offers several layers of security complexity. There are 2 sides to every coin
  - The *cloud* provider will do their best to protect the information stored on their servers, as well as protect user logins/personal information.
    - Know that you are relying on the provider to monitor all systems at all times, and prevent hacking and breach of information
  - Users have a responsibility to stay secure on their end as well.
    - Keep your devices/PCs secure using anti-virus software. **Keep your Anti-Virus software up to date**
    - **Keep your Browser and OS software up to date as well**. Browser software contains security related programming that should be kept updated at all times
    - Always "log completely off" of a program that you have accessed via the web before walking away from your device