

What is Cloud Computing



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Definition of Cloud Computing

- ▶ **Cloud computing** is a marketing term for technologies that provide servers, outside of the firewall, for:
 - Computation
 - Software Applications
 - Data access
 - Storage services
-that do not require end-user knowledge of the physical location and configuration of the system that delivers the services.



Cloud Computing Deployment Models

- ▶ **Public Clouds**
 - Available to everyone
- ▶ **Private Clouds**
 - Limited access
 - Within one business enterprise
- ▶ **Community Clouds**
 - Limited Access
 - Organizations that have shared concerns
 - e.g., mission, security requirements, policy, and compliance considerations
- ▶ **Combination of Public and Private Clouds**

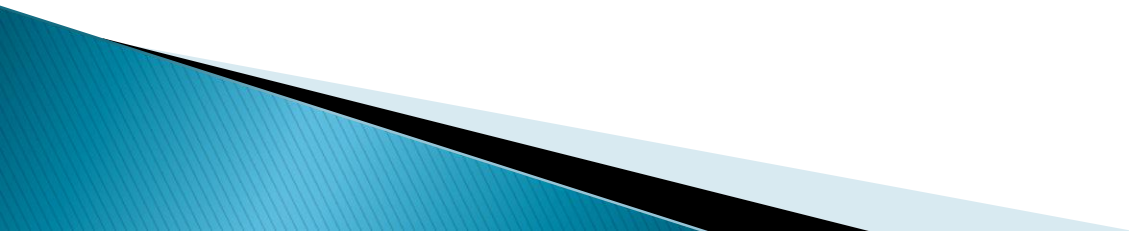
Essential Characteristics of Cloud Computing

- ▶ ***On-demand self-service.*** A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.
- ▶ ***Broad network access.*** Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).
- ▶ ***Resource pooling.*** The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth.
- ▶ ***Rapid elasticity.*** Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.
- ▶ ***Measured service.*** Cloud systems automatically control and optimize resource use by leveraging a metering capability¹ at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

Cloud Computing

Alternate Definition for most of us

- ▶ Cloud Computing is doing a function on the Internet that you have done or could have done locally on your computer



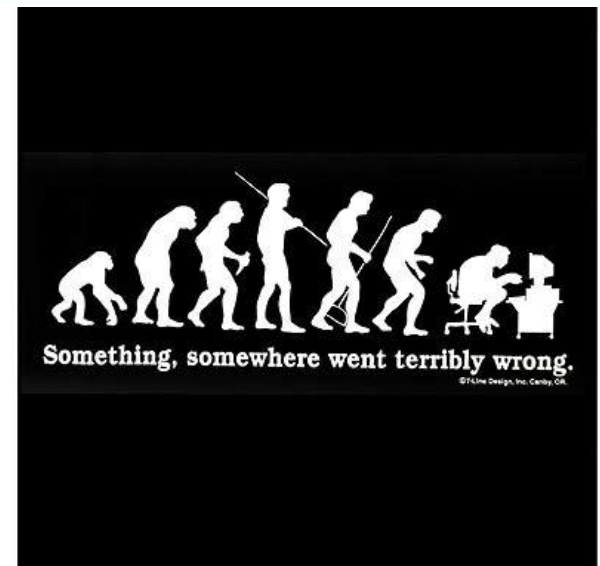
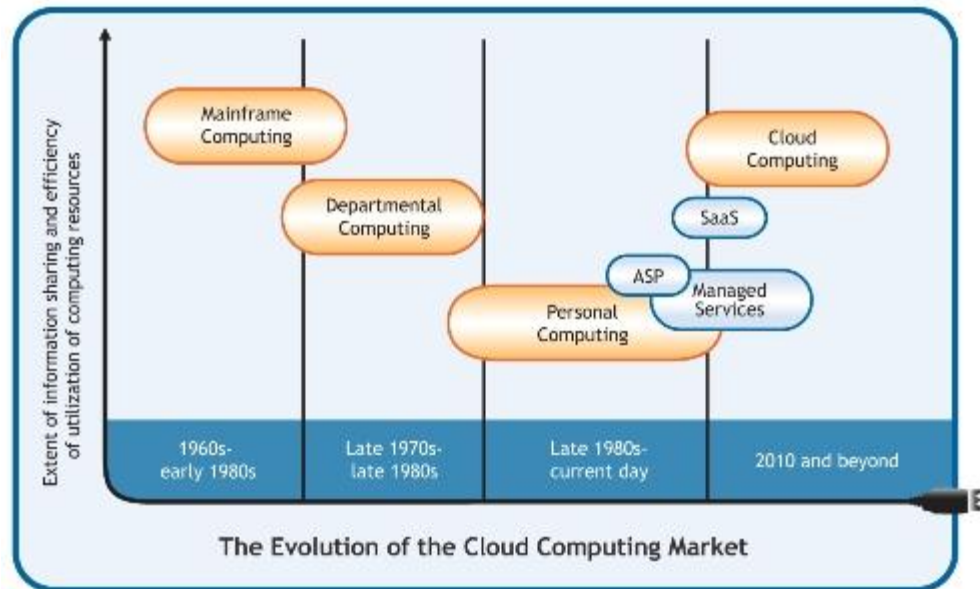
Basic Types of Cloud Computing Services with Representative Examples

- ▶ **Backup of Data**
 - Acronis on-line backup
 - Google Picasa web
- ▶ **Sharing of Data between Computers**
 - Dropbox
 - Sugarsync
 - Apple iCloud
 - Microsoft Skydrive
 - Google “Drive” (in the near future)
- ▶ **Remote Computation Power**
 - Apple iPhone 4s – siri
- ▶ **Software as a Service (SaaS)**
 - Cloud9 Analytics
 - Google Docs
 - Google Gmail, Yahoo E-mail, HotMail
- ▶ **Combination of the above**
 - Google Chrome Operating System
- ▶ **Whole Desktop on the Cloud**
 - On Live Desktop, <http://desktop.onlive.com/>



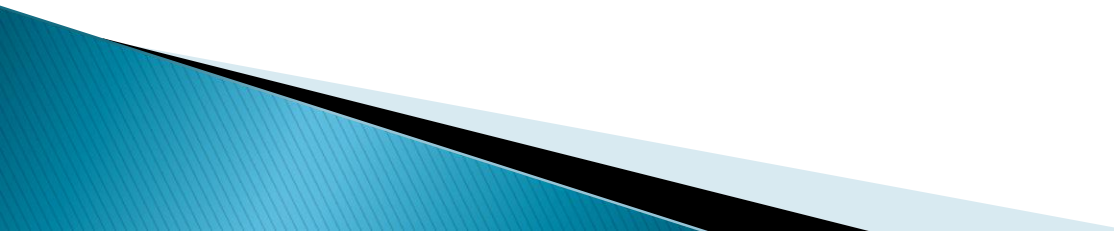
Evolution (Back to the Future)

- ▶ Stand Alone Mainframe
- ▶ Terminal connected to Mainframe
- ▶ Terminal with communication to Mainframe
- ▶ Mainframe connected to other Mainframes
- ▶ Mainframes connected via the Internet to other Mainframes
- ▶ Stand Alone Personal Computers
- ▶ Personal Computers connected to the Internet
- ▶ Personal Computers interacting with Cloud Computers



Cloud Computing

Back to the Future

- ▶ “Every decade or so (more like 30 years), the computer industry's pendulum swings between a preference for software that's centrally located and programs that instead reside on a user's personal machine”
 - ▶ “It's always a balancing act, but today's combination of high-speed networks, sophisticated PC graphics processors, and fast, inexpensive servers and disk storage has tilted engineers toward housing more computing in data centers”
- 

Growth of Cloud Computing

- ▶ According to Forrester Research, cloud computing will grow from the \$41 billion business it was in 2010 to \$241 billion in 2020
- ▶ IBM on Cloud Computing
 - IBM SmartCloud
 - http://www.ibm.com/cloud-computing/us/en/?cmp=usbrb&cn=20110914&cr=blog_referral&ct=usbrb301&cn=huffpost_cloud/



80% of the Fortune 500 use IBM cloud computing capabilities.

OnLive Desktop

- ▶ Desktop in the cloud
- ▶ 5 Megabyte cloud App for iPad
 - 2 GB of Storage
 - Full Windows 7 Operating System
 - Full access to Office products and IE
 - High Speed data access, 1 Gigabyte/sec
 - Access anywhere
 - No virus contamination
 - All updates done on server
 - More information
 - <http://www.nytimes.com/2012/02/23/technology/personaltch/onlive-desktop-plus-puts-windows-7-on-the-ipad-in-blazing-speed-state-of-the-art.html?ref=technology>
 - <http://desktop.onlive.com/>
 - \$5.00 /month



OnLive Desktop

- ▶ Future version
 - Run any application
 - \$10 /month
 - OnLive to
 - Android tablets
 - iPhones
 - iPod Touches
 - Macs
 - PCs
 - and even to TV sets

Demonstrations of Cloud Computing

▶ **Dropbox**

- for Data Sharing between computers
- Solar usage spreadsheet example

▶ **iCloud**

- for backup and sharing iPhone Apps and Data

▶ **Picasa/YouTube**

- for backup a sharing photos or videos

▶ **Gmail**

- for Sharing Mail between computers

▶ **iPhone 4s – siri**

- for providing large processing and data for the iPhone

Future PC Club Meetings

- ▶ Videos (each 1 hour)
 - IBM 100th Anniversary Sam Palmisano – IBM Chairman of the Board
 - Interview with Walter Isaacson on Steve Jobs
 - Video commemorating Steve Jobs
- ▶ Windows 8