Introduction to Cloud Computing
I am here to help
buzzetti@us.ibm.com
Historic Waves of Economic and Social Transformation
Industrial Revolution
Age of Steam and Railways
Age of Steel and Electricity
Age of Automobiles and Oil
Age of Communication & Information
If computers of the kind I have advocated become the computers of the future, then computing may someday be organized as a public utility just as the telephone system is a public utility... The computer utility could become the basis of a new and important industry.

—John McCarthy, MIT Centennial in 1961

Cloud
Economics
Risk Management
Time to Market
Information Society
Characteristics
Self Service
Broad Network Access
Carpools Only

2 or more persons per vehicle

Resource Pooling
Rapid Elasticity
Measured Service
Service Models
while (n < (document) {
    n++;
    calc = ev
    i++
    j++
}

SaaS
IaaS
Deployment Models
Private Cloud
Public Cloud
Community Cloud
Hybrid Cloud
Building Blocks
Virtualization
Service Management
Web 2.0
How is it different?
Delivery Model
Business Model
Technical Model
Examples
Systemz Mainframe RT @fragtag: IBM zEnterprise launch event on YouTube: http://wp.me/p1fDS-9e
11 hours ago via Twitter · Comment · Like · @IBM_System_z on Twitter
3 people like this.

Systemz Mainframe what does the new z196 give clients? Up to 90% improvement in performance with CICS and DB2 10 #systemz
11 hours ago via Twitter · Comment · Like · @IBM_System_z on Twitter

Systemz Mainframe are you ready for today? I know I am...
11 hours ago via Twitter · Comment · Like · @IBM_System_z on Twitter

Daniela Graeser Nasci pronta!
7 hours ago · Like

Facebook
IBM SmartCloud Enterprise

Explore our Infrastructure as a Service


IBM SmartCloud Enterprise is an agile cloud computing infrastructure as a service (IaaS) designed to provide rapid access to security-rich, enterprise-class virtual server environments, well suited for development and test activities and other dynamic workloads. Ideal for both IT and application development teams, IBM SmartCloud Enterprise delivers cloud-based services, systems and software to meet the needs of your business.

Purchase options

Reserved capacity
Reserve access to a pool of virtual machine resources at discounted hourly rates.

Pay as you go
Add and delete virtual machine resources as you need them, at the standard usage rates.

Learn more

Join our webcast

Big Data on the Cloud: A better path to deeper business insight
Amazon Elastic Compute Cloud (Amazon EC2)

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers.

Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change. Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use. Amazon EC2 provides developers the tools to build failure resilient applications and isolate themselves from common failure scenarios.

This page contains the following categories of information. Click to jump down:

Amazon EC2 Functionality
- Service Highlights
- Features
- Instance Types
- Operating Systems and Software

Pricing
- Resources
- Detailed Description
- Intended Usage and Restrictions

Amazon EC2
Getting Started
Buy or build ?
Business Plan
Know your costs
Define Service Catalog
Define your SLA
Barriers to Adoption
Security
### British Columbia Tax

For details, see pages 1 to 4 in the forms book.

#### Income

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<th>Description</th>
<th>Amount</th>
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<td>$70,000</td>
</tr>
<tr>
<td>2</td>
<td>If line 1 is more than $65,000</td>
<td>$85,000</td>
</tr>
<tr>
<td>3</td>
<td>If line 1 is more than $60,000</td>
<td>$90,000</td>
</tr>
<tr>
<td>4</td>
<td>If line 1 is more than $55,000</td>
<td>$95,000</td>
</tr>
</tbody>
</table>

#### Tax Credits

Amount from the federal amounts claimed on Schedule 1.

<table>
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<tr>
<th>Form</th>
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<tbody>
<tr>
<td>5009</td>
<td>$8,000</td>
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### Compliance
Reliability
Budgeting
Customization
It's New
It's Magic
My two cents
Backup
• Describes how to build a cloud using TSAM and Linux on System z.
• Focuses on Infrastructure as a Service.
• Only uses things that ship with the products.
• We are working on the next version currently
Cloud Computing and SaaS

- SaaS is a software application delivery model where a software vendor develops a web-native software application and hosts and operates (either independently or through a third-party) the application for use by its customers over the Internet. Customers do not pay for owning the software itself but rather for using it.

- Software as a Service has been around for a while now and actually precedes the newer term Cloud Computing.

- Delivering software applications is just one capability of cloud computing. Not all SaaS offerings can be classified as cloud enabled. However, if an SaaS offering is written in such a way that it is "massively scalable," then that SaaS offering could be considered a form of cloud computing. (source: Gartner)
  - Many SaaS vendors are now re-positioning their offerings as 'Cloud' offerings in order to participate in the cloud hype...even if their offering is not "massively scalable"

- Cloud Computing is great for the SaaS model as it can further reduce the costs associated with producing and delivering a SaaS application.

- Examples
  - GMail
  - Salesforce.
Platform as a Service

- **Definition:** includes all the systems and environments comprising the end-to-end life cycle of developing, testing, deploying and hosting web applications delivered as a service over the Internet.

- **Examples include:**
  - Mosso, PHP, .NET, Java, Rails, Python, other?
  - Google App Engine, Python
  - SalesForce – Proprietary
  - Morph - Ruby on Rails
  - Heroku - Ruby on Rails

- **Benefits:** Quickly launch new applications for a relatively low cost. Other benefits include limited scalability and reduced cost of operations (e.g., no system administrators needed).

- **Disadvantages** can include porting development time costs for existing applications as not all applications come straight over.

- **Billing for these services varies.** It can be by the hour, request, CPU cycle, or other creative ways. Some even help you do pass through billing for your customers; like Mosso. But, the defining factor in pricing of Application Platform Clouds is that they generally strive to be robust, simple, and easy to load your application into when you are ready.
Infrastructure as a Service

- **Definition:** IaaS is a pay-for-what-you-need-when-you-need-it information technology delivery and service model. It is a technology service delivered over the Internet that provisions the resources such as servers, connections, storage, and related tools necessary to build an application environment from scratch on-demand. A common characteristic is a high degree of flexibility in what resources are provisioned.

- **Examples of IaaS providers:**
  - Amazon Web Services - Extremely flexible Build your own w/ many add-ons
  - VMWare - Build your own
  - Elastra - Up an comer build and manage your own IaaS
  - Tera - Sexy GUI based IaaS/PaaS building tools
  - Xen - Build your own
  - XCalibre - Very interesting and can do Linux or Windows
  - Nirvanix - All about cloud storage, very interesting subset similar to Amazon S3
  - EngineYard - Rails only Build your own
  - Joyent - Build your own on Solaris w/ Java/PHP/Rails/Python

- **Benefit:** Rapid provisioning of computing resources All the details of provisioning, racking, stacking, cabling, and more are completely abstracted away from you.

- **Disadvantage:** Difficult to move from one cloud to another in some cases.

- **Billing for these services is usually incremental by use and can get complex with tiered on-demand pricing that can be difficult to track in real time. Pricing is usually well defined but can be rather difficult to forecast in some cases. It can vary to the minute depending on levels of use, tiers of service, and other interesting combinations.
So What Is Different About Cloud Computing?

**Delivery Model**
- Traditional Computing: Buy assets and build delivery architecture
- Cloud Computing: Buy external service

**Interface Model**
- Traditional Computing: Internal network or intranet
- Cloud Computing: Via the Internet using standard Internet IFaPs (IP, HTML, HTTP)

**Business Model**
- Traditional Computing: Pay for fixed assets and administrative overhead
- Cloud Computing: Pay directly based on usage or indirectly (e.g., subsidized by advertising)

**Technical Model**
- Traditional Computing: Single tenant
- Cloud Computing: Scalable, elastic, dynamic, multi-tenant

Source: Gartner
What Trends Are Driving The Cloud Computing?

**Infrastructure Technologies:** Virtualization, Automation, SLAs

**Application Technologies:** Grid, MapReduce, Hadoop, SOA, Web 2.0

**Data Intensive Applications:** From massively parallel (e.g. Google) to large data files (e.g. You Tube)

**Computing & Network Appliances:** Special servers designed to handle specific tasks are blurring the lines between Network and Data Center

**Open IT:** Open Technologies, APIs, protocols, data formats, software platforms / data (e.g. Creative Commons, Open Data License)

**Business Agility:** Enter new markets, Deploy new application services. Stay ahead of competition.

**Broadband:** Growth in Internet bandwidth enabling ubiquitous connectivity. Increased reliability and functionality embedded in the network.

**Utility Computing:** Get as much computing power as you need when you need it, pay for only what you use.

**Network Cloud**

**Computing Cloud**

**Industrialization of IT:** Standardization, and commoditization (e.g email). Falling costs of storage.

**Mobility:** Explosion of form factors, cell phones/connected devices, Proliferation of sensors

**New Business Models:** Advertising, Services, Subscription

**Web Applications and Platforms:** Mashable applications and services built on Web Oriented Architecture (e.g. REST, RSS/ATOM)

**Data Center Pressures:** Growing costs of power and space, server sprawl

**Source:** Gartner, Thomas Weisel Partners, Merrill Lynch, IBM MI
Barriers To Adoptions

- **Security & Privacy** – Many companies and governments are uncomfortable with the idea of their information being located on systems that they do not control. Authentication and access right technologies will become increasingly important.

- **Compliance Issues** – Complying with Sarbanes-Oxley, HIPPA and other regulations may prohibit the use of clouds for some applications.

- **Reliability** – High availability will be a key concern. IT departments will worry about a loss of control should outages occur. Thus mission critical applications for large enterprises will probably not be run in the cloud.

- **Cloud Management** - Service Monitoring / Reporting / Management Technologies immature

- **Costs** – Economies of Scale only go so far, unless customer is willing to trade data or advertising views for services

- **Customization May Be Difficult** - Large Enterprises are used to fully customizable environments. Some clouds may not offer that capability.

- **It’s Something New** – As with anything new, conservative oriented companies will hesitate to adopt clouds. Issues of security, trust, chargeback, & sharing will limit adoption by these types of companies

- **Organization / Culture** – Clouds have the potential to significantly reduce IT labor costs. IT organizations may be reluctant to encourage their companies to move to the new cloud computing model

- **Budgeting** – Clouds will have a significant impact in how companies budget for and spend money on Information Technology.

Source: Gartner, Forrester, CHQ MI
The Historical “Stack” Will Slowly Evolve To Compute Clouds.

“As a Service” Offerings handle client needs for specific on demand IT components.

Everything as a Service: Using SOA and SaaS businesses will have an opportunity create more dynamic services that enrich our everyday lives and improve how we do business.

SaaS – Software as a Service: Delivery model where a software vendor develops a web-native software application and hosts and operates (either independently or through a third-party) the application for use by its customers over the Internet.

Hardware as a Service: provides computing capacity and storage delivered online

Storage as A Service: combines a computing interface with online storage over the network as a service

Platform As A Service: On demand web-based operating systems and applications, such as SaaS, for 3rd party developers

Compute Clouds: provide a high performance infrastructure that delivers simplified services through innovative business models

- Clouds for Startups & SMBs
- Public Clouds
- Enterprise Clouds
- Capital Market Clouds
- Language Translation Clouds
- Shopping Mall Clouds
- Social Networking Clouds
- Government Clouds
- Gaming / Metaverse Clouds
- Research Clouds
What? Why? How?