Systems & Technology Group

# Cloud Computing

## *Fact or Hype*

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## Agenda

- **What is Cloud Computing?**
- **Why has it “appeared”?**
- **Separate the Business Model & the Technology Model**
- **What is “real” in Cloud Computing?**
- **Where will it go?**
- **What is (why) the hype?**
- **Conclusion**

## What is Cloud Computing?

- **Many “descriptions”… no definition.**
- **The word “cloud” hides many positive attributes.**
- **Perceived “benefits” define Cloud Computing.**
- **Discriminate between financial benefits, and performance benefits.**
- **Gartner says industry is approaching the TOP of the HYPE curve (bell shape).**
- **One key issue is “Who is selling What to Whom”.**







## Cloud computing attributes

| Common Attribute | Details |
|---|---|
| Flexible pricing ✘ | **Utility pricing, variable payments, pay-by-consumption and subscription models make pricing of IT services more flexible** |
| Elastic scaling ✓ | **Resources scale up and down by large factors as the demand changes** |
| Rapid provisioning ✓ | **IT and network capacity and capabilities are – ideally automatically – rapidly provisioned using Internet standards without transferring ownership of resources** |
| Advanced virtualization ✓ | **IT resources from servers to storage, network and applications are pooled and virtualized to provide an implementation independent, efficient infrastructure** |
| *Standardized offerings* ? | ***Uniform offerings readily available from a services catalog on a metered basis*** |

## What constitutes Cloud Computing?

- **Separate the Business models (pricing schemes etc.) from the solution model.. Which is the main innovation!**
- **If the software you are using, runs on computing infrastructures which have the following attributes:**
  - **Large heterogeneous pools** of computing resources.
  - **Automated**, demand triggered **provisioning** of hardware, software, applications and highly automated operations and system management.
  - **A usage accounting** system with fine granularity to feed any desired business / charging model.
  - Sophisticated levels of **virtualisation** for servers, storage, network and workload along with **a service management** envelope supporting the interaction with the business users

**Key words that UNIQUELY constitute Cloud Computing in RED above!**







## The persistent problem areas of IT

- **Technical Issues:**
  - Computing resources “not enough”
  - Additional resources also “not the solution”
  - Low utilisation
  - Too many versions and platforms (and software stacks)
  - Heat energy and data centre space running out or running away!
  - Too many skills and variants to manage
  - Legacy co-existence
- **Non-Technical issues:**
  - System, applications, users, problem reports, versions, management.
  - SLA’s fluctuate all the while.
  - Cost reduction (or optimisation) is pervasive.
  - Too many “NEW” solutions, technologies, business models to “TRY”.
  - Fundamental focus on supporting Business is diluted.

# Wish-list

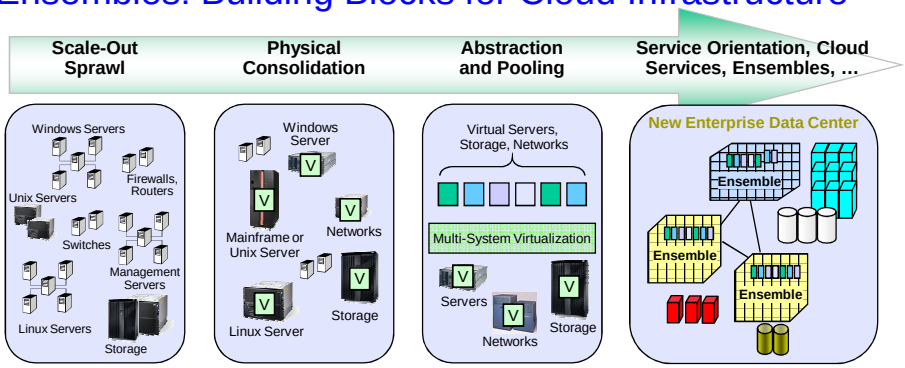
- **Minimise Application's waiting for compute platform.**
- **Automatic increase or decrease of compute resources depending on traffic, including additional copies, load balancing etc..**
- **Increase efficiencies of investments deployed.**
- **Choose the most appropriate program architecture, development environment, deployment topology etc. on the basis of the functionality.**
- **Deliver increasingly more demanding SLA's to users, including availability, recovery, performance, reliability, archives access etc..**
- **Applications can be run "any where",**
- **Can be "moved" in response to increased or decreased traffic,**
- **"Compute Power" could be provisioned near-instantly, without additional investments, and without sizing for peak-loads.**
- **New applications need not "wait" for infrastructure to be available.**
- **IT resource usage and chargeback was on actual usage basis, rather than "full charge" for a set of equipment.**
- **Solutions were available for co-existence of legacy systems and more modern technology based applications.**
- **The CIO could reduce both planned as well as unplanned investments, while increasing the IT throughput to the Business.**







# Ensembles: Building Blocks for Cloud Infrastructure



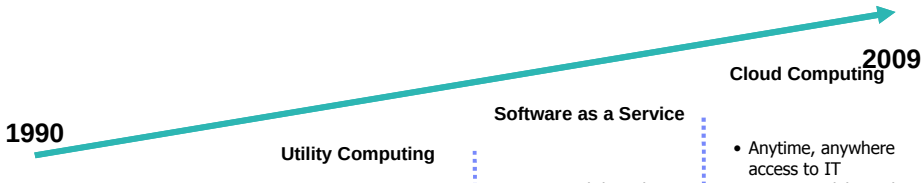

**Ensembles designed to provide …**

- IT Simplification – simplify configuration & management
- Agility – rapid deployment, self service …
- Resiliency – availability, disaster recovery …
- Security – trusted computing
- Workload Management – increase utilization across the pool
- Storage – capacity management, availability, backup
- Efficient infrastructure – better energy efficiency, higher utilization levels …

**Ensembles designed to simplify deployment of …**

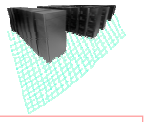
- Test and development
- Service oriented architecture
- Software as a service
- Information as a service
- Utility computing services
- Hosted client services
- Virtual worlds
- IT consolidation

# Is Cloud Computing Something New?




**Grid Computing**

- Solving large problems with parallel computing



**Evolved technology**

**Utility Computing**

- Offering computing resources as a metered service

**Pure Business Model**

**No new technology**

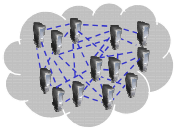
**Software as a Service**

- Network-based subscriptions to applications

**New Business Model**

**New program architecture**

- Anytime, anywhere access to IT resources delivered dynamically as a service.



**previous Business Models**

**New program architectures AND new Technologies**



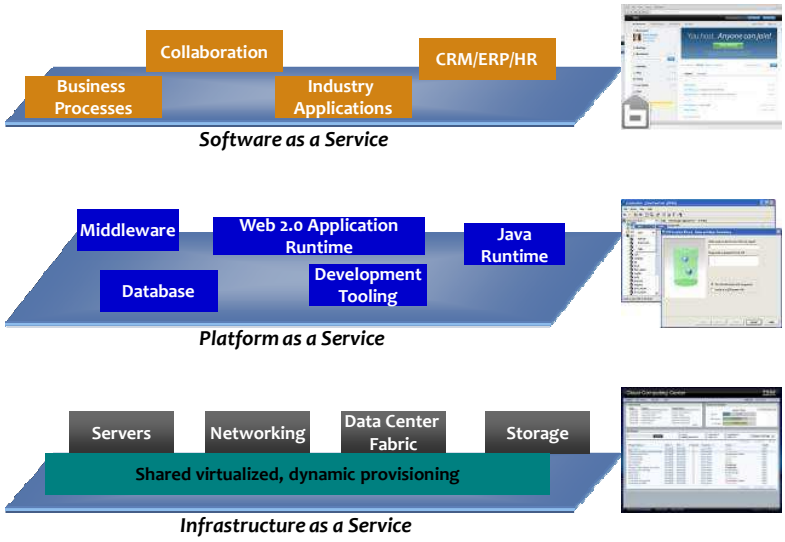




# Technology v/s Business Model

- **Technology**
  - **Evolution from known, stable, reliable technologies**
    - **Distributed computing, virtualisation, GRID, parallel computing, automation, provisioning..**
  - **Products, skills, industry commitment to basic ingredients**
  - **Universities and Research organisations very active in all the technologies and their variants as well as alternate approaches.**
- **Business Model**
  - **Reduce cost of IT / Infrastructure**
  - **A conversion of all IT Domains to "services".: Applications, storage, platforms, network bandwidth etc etc**
  - **Segmentation of Out Sourcing model**
  - **Reach the tail-end market – the small companies as well as intense individual users, who are not yet part of industry's "main" revenue stream.**
  - **Capitalise on the hype while it lasts**
  - **Make money from spare capacity of compute resources**
  - **Offer additional services and / or products to existing customers to acquire larger wallet share.**
  - **Different financing and payment models (pay-per-use is flavour of the era!)**

## The layers of IT Services in cloud computing










## What IT Services workloads are we seeing move to cloud delivery?

1. Single virtual appliance workloads
2. Test and Pre-production systems
3. Mature packaged offerings, like e-mail and collaboration
4. Software development environments
5. Batch processing jobs with limited security requirements
6. Isolated workloads where latency between components is not an issue
7. Storage Solutions/Storage as a Service
8. Backup Solutions/Backup & Restore as a Service
9. Some data intensive workloads if the provider has a cloud storage offering tied to the cloud compute offering

## What IT Services workloads may not be ready for cloud delivery today?

1. **Workloads which depend on sensitive data normally restricted to the company**
   - Employee Information - Most companies are not ready to move their LDAP server into a public cloud because of the sensitivity of the data
   - Health Care Records - May not be ready to move until the security of the cloud provider is well established
2. **Workloads composed of multiple, co-dependent services**
   - High throughput online transaction processing
3. **Workloads requiring a high level of auditability, accountability**
   - Workloads subject to Sarbanes-Oxley, for example
4. **Workloads based on 3rd party software which does not have a virtualization or cloud aware licensing strategy**
5. **Workloads requiring detailed chargeback or utilization measurement as required for capacity planning or departmental level billing**
6. **Workloads requiring customization (e.g. customized SaaS)**







## IBM's Cloud Labs Supporting Clients Worldwide

IBM is building a Cloud presence TODAY to …

- Realize high values for businesses and governments
- Create the next generation skills and training for future workforce


***Technology Incubation, Customer Engagements, In-Market Experimentation***

# Cloud computing in action

**iTRiCiTY**

**Cloud computing now fastest growing area of hosting business by providing a 99.99% uptime guarantee.**

*"IBM cloud technology with unmatched Service Management capabilities are reliable, fully resilient across multiple centers and compliant to business rules and regulations allowing iTRiCiTY to provision fast and fully compliant IT resources while reducing costs."*

**Neighborhood Centers of Houston**

**Operational and supporting local neighborhoods with critical services within 24 hours of a major hurricane leveraging Information Protection Services from IBM.**

*"IBM cloud services were critical in our community recovery efforts following Hurricane Ike. The benefits of cloud services reach far beyond disaster recovery. Better data protection -- demonstrating that we are good stewards of information -- has become a selling point for us in willing contracts"*

**Wuxi Cloud Computing Center**

**This Cloud with on-demand virtual computing resources allows 200,000 software developers to share a cost efficient IT environment when they need them, for as long as they need them, from any device, anywhere that has network connectivity.**

*"A milestone in service oriented computing."*

**Transzap**

**Leading SaaS provider of ePayable, digital data, and spend analysis solutions, needed to meet 100% YTY growth requirement with an easy to scale and secure solution.**

*"The IBM z9 provides the stability and scalability needed to accommodate Transzap's triple digit volume growth in a SaaS environment. "*







# Challenges Facing Cloud Computing

- **Security**
- **Network Access –Network Isolation – VPNs and VLANs go only so far**
- **Hypervisor Security**
- **Latency**
- **Business processes often multi-stage**
- **Storage location is also important**
- **Availability**
- **No control over Cloud providers environment**
- **Configuration, visibility and control of HA are more difficult**
- **Mostly locked into a few "Clouds" today**
- **Compliance - Sarbanes-Oxley, HIPPA, etc.**
- **Laws of the land w.r.t data archive, storage location, privacy, governmental access etc.**
- **License Management**
- **"Cloud ready applications"**

## Where is CC headed? (just a teaser list)

- This computing model will grow when more applications are built to take advantage of the topology.
- Consolidation of some of the functions required to deliver CC into either the OS or a topology management middleware.
- Greater extent of standardisation, and greater interoperability features.
- Stricter security and compliance expectations: including limitations on geographical distribution of data storage.
- Will expand, if SOA takes off in the SaaS model along with micro-payment services.







## Myths of Cloud Computing

- **CC is a "User centric interface… makes the cloud infrastructure transparent to the user…"!**
  - Really? Who is the user who will interact with the cloud?
- **In CC: "Applications reside in massively scalable data centres… resources can be dynamically provisioned and shared.."**
  - Mostly true… but good virtualisation, service management and automated provisioning can deliver the same features... It is NOT special to CC!
- **Lowers costs:**
  - Probably! If you are an non-contiguous user of those resources!
- **PaaS or IaaS or SaaS (IT services) delivered over the internet!**
  - Not a necessary condition to create CC.
- **IT function will cease to exit / there will be only one giant cloud / blah blah blah**
  - A large number of such "future" predictions have disappeared because we innovate!

## Myths of Cloud Computing

- **Next Generation distributed computing..**
  - True… kind of! The key is application architecture that can be deployed on a cloud.
- **Everything is a Service.**
  - This is a Business model statement – not a technology statement.
- **Access their applications through any connected device from anywhere!**
  - This is a description of the internet! Not of CC.
- **Self-service!**
  - Again by who? Business users? Or IT users?
- **Infrastructure Outsourcing**
  - Like eating ONLY at hawker centres!
- **CC is a Infrastructure Management Mechanism.**
  - Confusing content with style!







## In Conclusion..

- **Technology or products or just new business models looking for problems to solve!**
- **Be clear that your problem or pain came first, and the appropriate solution was cloud computing!**
- **It is entirely possible that existing solutions address your pain more effectively than Cloud Computing.**
- **Remember: There are many definitions of cloud computing, and hence many products and solutions are labelled as CC!**