Cloud Computing
An Elephant In The Dark

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no, its a throne!

its a trunk, dudes!

its a hose!

nah, mate its a fan!
What is Cloud Computing?
Is it virtualisation?
Is it a self-service portal?
Is it on-demand computing?
Is it automation?
Is it Anything as a Service (XaaS)?
Infrastructure Challenges

- Predictability
- Time to provision
- Poor disaster recovery
- Backup
- Physical infrastructure
Options?

- **Aftermarket extension's**
  - Marginal gain
  - Increase cost

- **Refresh infrastructure**
  - Same service
  - Same challenges

- **Move to a Cloud model**
  - Validated infrastructure
  - SLA driven
  - Reduce cost
  - Service improvement
We’ve redefined Cloud Computing to include everything that we already do. I don’t understand what we would do differently other than change the wording of some of our ads.

- Larry Ellison (Oracle CEO)
It’s stupidity. It’s worse than stupidity: it’s a marketing hype campaign. Somebody is saying this is inevitable - and whenever you hear somebody saying that, it’s very likely to be a set of businesses campaigning to make it true.

- Richard Stallman
History
Many users shared powerful mainframes using dummy terminals.
➤ Stand-alone **PCs**.
PCs, laptops, and servers were connected together through local networks.
The Internet: a global network of local networks.
Grid computing: shared computing power and storage through a distributed computing system.
- **Cloud computing**: shared resources on the Internet in a scalable and simple way.
- **Cloud Computing** refers to both:

  1. The applications delivered as services over the Internet,
  2. The hardware and systems software in the datacenters that provide those services.

  The datacenter hardware and software: called **Cloud**

  The services: called **Software as a Service (SaaS)**.
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The datacenter hardware and software: called Cloud

The services: called Software as a Service (SaaS).
The service being sold is **Utility Computing**.

- E.g., Amazon Web Services, Google AppEngine, and Microsoft Azure
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**Cloud Computing** is the sum of **SaaS** and **Utility Computing**.
The **NIST** definition:

- Five characteristics
- Three service models
- Four deployment models
Cloud Characteristics
Cloud Characteristics

On-demand self-service
Ubiquitous network access
Location transparent resource pooling
Rapid elasticity
Measured service with pay per use

[http://aka.ms/532]
A consumer can **unilaterally** provision **computing capabilities** without **human interaction** with the service provider.
- Available over the network.
- Accessed through mobile phones, laptops, ...
Cloud Characteristics - Resource Pooling

- Provider’s computing resources are pooled to serve consumers.
- Location transparent
Capabilities can be rapidly and **elastically provisioned**, in some cases automatically.
Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer.
Cloud Service Models
Cloud Service Models

SaaS

PaaS

IaaS

[http://aka.ms/532]
Assume, you just moved to a city and you are looking for a place to live.
What is your choice?
What is your choice?

- Built a new house?
What is your choice?

• Built a new house?
• Buy an empty house?
What is your choice?

- Built a new house?
- Buy an empty house?
- Live in a hotel?
Let’s built a new house!
Let’s built a new house!

You can fully control everything your like your new house to have.

But that is a hard work.
What if you buy an empty house?
What if you buy an **empty house**?

You can **customize** some part of your house.

But never change the original architecture.
How about live in a **hotel**?
How about live in a **hotel**?

Live in a hotel will be a good idea if the only thing you care is enjoy your life.

There is **nothing you can** do with the house except living in it.
Let’s translate it to

Cloud Computing
Service Models

▶ Infrastructure as a Service (IaaS): similar to build a new house.

▶ Platform as a Service (PaaS): similar to buy an empty house.

▶ Software as a Service (SaaS): similar to live in a hotel.
IaaS - (1/2)

- Vendor provides **resources**, e.g., processing, storage, network, ...

- Consumer is provided customized **virtual machines**.

- Consumer has **control** over the resources.
IaaS - (1/2)

- Vendor provides resources, e.g., processing, storage, network, ...
- Consumer is provided customized virtual machines.
- Consumer has control over the resources.
- Example: Amazon Web Services (AWS), Rackspace, ...
System architecture
Vendor provides development environment.

- Tools and technology selected by vendor.
- Control over data life-cycle.
Vendor provides development environment.
  - Tools and technology selected by vendor.
  - Control over data life-cycle.

Example: Google app engine, Microsoft Azure
System architecture
Vendor provides applications accessed over the network.
Vendor provides applications accessed over the network.

Example: Google Docs, Salesforce.com
System architecture
- Web Service and Web 2.0
- Viewing the Internet as a computing platform.
- Running interactive applications through a web browser.
Cloud Deployment Models
Cloud Deployment Models

[http://www.atomrain.com/it/technology/cloud-deployment-models]
- Infrastructure is made available to the general public.
- Owned by an organization selling cloud services.
Private Cloud

- Infrastructure is operated **solely for an organization**.
- Managed by the organization or by a third party.
Community Cloud

- Supports a specific community.
- Infrastructure is shared by several organizations.
Hybrid Cloud

- Infrastructure is a composition of two or more clouds deployment models.
- Enables data and application portability.
Summary
A Page To Remember
Questions?