



Background

Cloud Computing

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Background

Historically, as hardware requirements grew companies would:

- Host their own servers and pay for network access
- Outsource to an IT service provider

Challenges with this:

- Expensive
- Not Elastic (Contractually fixed service levels)
- High entry barriers



Cloud Computing

Characteristica that identifies a cloud service:

- Offered by a third party
- Available when needed
- Dynamically scalable
- Low initial investment to get started
- Pay for what you use, when you use it
- Easily accessible



Five Main Principles

- Pooled Computing Resources
- Virtualised Computing Resources
- Elastic Scaling up or down as needed
- Automated creation/deletion of virtual machines
- Resource usage billed only as used.

...

- Note that *most* of these are oriented towards the underlying technology.
- Together, they enable a cloud provider to offer the service at a lower cost than for a company to host the servers themselves.
- Ends up in the ability to offer the last bullet.
- Network?
- Access API
- Storage + Databases



Cloud Benefits

- Lower Initial barrier: Capital expenses → Operational expenses
- Responsiveness: You do not have to wait for procurement of new servers.
- Security: Dedicated staff whose sole business is to care about security issues
 - (Is this true for all types of cloud services?)
-



\b[A-Z]A{2}S\b

- IAAS Infrastructure As A Service
- PAAS Platform As A Service
- SAAS Software As A Service
- FAAS Framework As A Service
- AAAS Application As A Service

Also:

- DAAS Private Clouds



Some popular Cloud Providers

- Amazon EC2 (IAAS)
- DigitalOcean (IAAS)
- Microsoft Azure (IAAS)
- Microsoft OneDrive (PAAS?)
- Microsoft Office Online (AAAS)
- Google Drive (PAAS?)
- Google Docs (AAAS)
- Google App Engine (PAAS)
- Rackspace (IAAS)
- Gmail/Yahoo/Outlook (AAAS)



Reasons for using the Cloud

- Need more Capacity
 - Computing Power
 - Storage capacity
 - Burst-rate capacity
 - ...
- Don't want to specialise on Server Maintenance
 - HW Repairs and Replacements
 - OS upgrades
 - Round-the-clock maintenance
- Higher Reliability / Availability
- Built-in and immediate Scalability (up as well as down)
- Easier(?) Software Licensing



Challenges when Developing Cloud Applications

- Understand your needs: What service level do you require (How many servers, for how long? How often?)
- Understanding your quality requirements. Why are you going to the cloud?
 - Hint: It is often more than one quality requirement that is important.
- Designing a scalable software architecture
- Setting up automated deployment of your application
- Setting up equivalent and automated development / test / stage / deployment environments.
- Setting up automated Provisioning and Orchestration
- Defining your database needs, selecting the right database, and design a (cloud-) scalable database design.
- Security! Despite all the fancy promises, if you opt for IAAS or PAAS, you need to take care of this yourself!



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Challenges when Developing Cloud Applications

Also:

- What is the value of existing infrastructure? How does this influence your cost/value calculations?
- Are your software licenses “cloud friendly”?
- Are you aware of the legal, regulatory, and standards that are relevant for your application



Characteristica of a Cloud Platform

