

UNIVERSITÀ DEGLI STUDI DI FERRARA FACOLTÀ DI INGEGNERIA

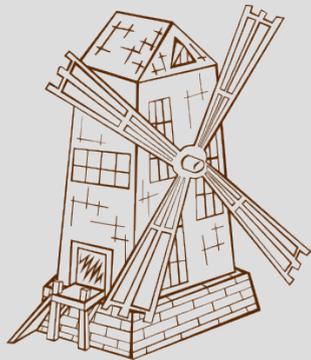


Corso di Laurea in Ingegneria Informatica
e dell'Automazione

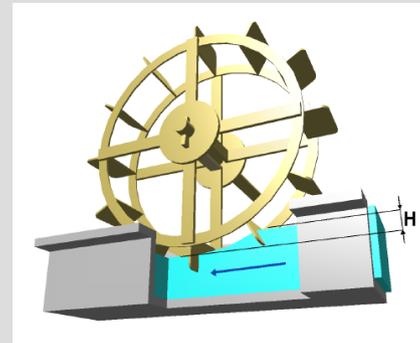
**“Cloud Computing,
infrastrutture innovative
per l'outsourcing
di applicazioni e servizi.”**

Cenni storici

- Evoluzione tecnologia globale nel campo energetico (inizi XX secolo)



[www.clker.com]



[commons.wikimedia.org]

- Nuovo modo di concepire la produzione di energia



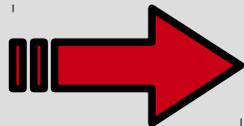
[reliableenergypa.org]

Spostamento Modello Produzione 1/2

- Modello produzione energia in proprio



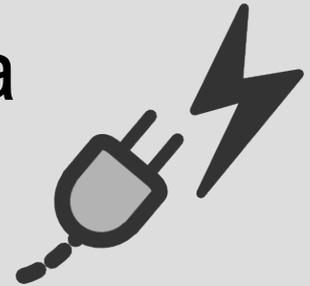
- Modello fruizione energia dalla rete elettrica



- Flessibilità
- Sollevamento dagli oneri gestionali ed economici
- Concentrazione sul *core business*
- Innovazione

Spostamento Modello Produzione 2/2

- Si paga solo quello che si consuma
pay-per-use



[www.clker.com]



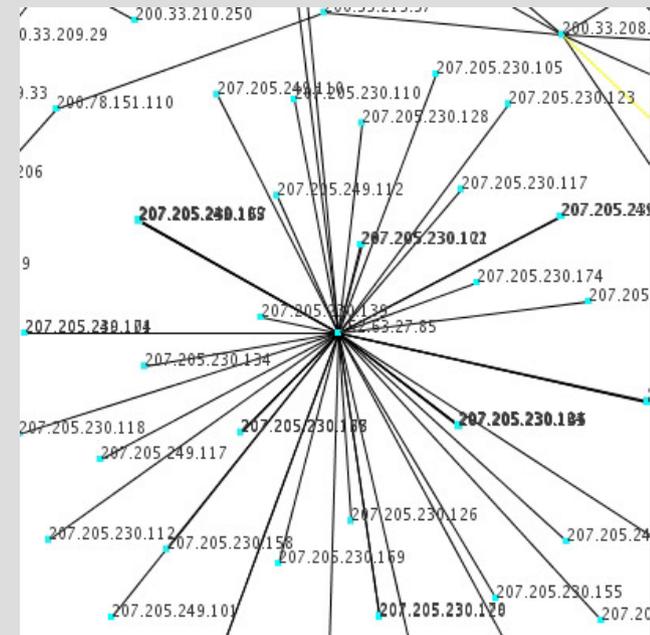
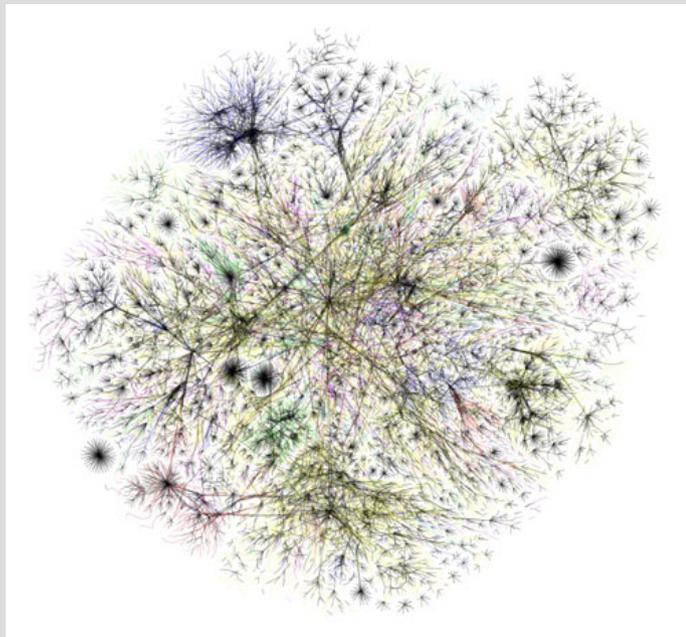
- Ridurre al minimo l'investimento capitale
- Massimizzare le spese operative

Cloud Computing

- “Nuvola Informatica”



Internet



- Insieme di tecnologie e strumenti atti a realizzare servizi distribuiti flessibili su richiesta (*on-demand*).

Consumer Oriented

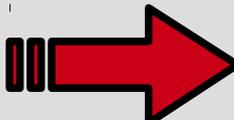
- Cambiamento nella fruizione di servizi e contenuti

- Locale



- Remoto



- Obiettivi principali: 
 - Mobilità e affidabilità
 - Performance

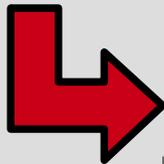
Business Oriented 1/2

- Cloud Computing



- **Outsourcing** (esternalizzazione)

WHAT ?



Dati (Storage, BackUp)

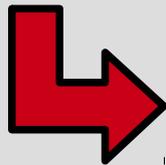
Applicazioni e Servizi
(es.: Unife: mail, docs, calendar)

...

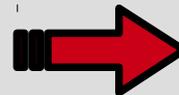
Business Oriented 2/2

- **Outsourcing (esternalizzazione)**

WHY ?



Ridondanza
Fault Tollerant
Load Balancing
Auto Scaling
Rilocations
Pay-per-use
Upgrading



Affidabilità
Disaster Recovery
Flessibilità
UpTime
Deployment Start-Up

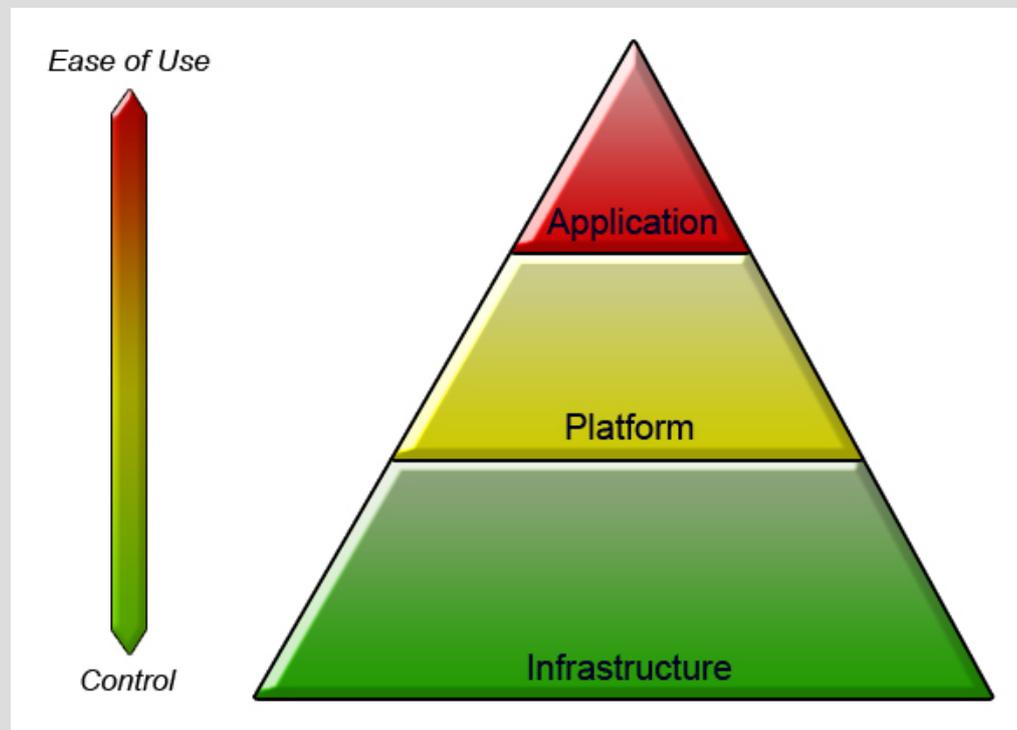
Providers Cloud Computing

- I soliti “noti”, ma non solo....:
 - Google
 - **Amazon**, non solo negozio online...
 - Salesforce.com, Force.com (app aziendali)
 - ... attenzione alle specifiche!



Layers dei Servizi

- SaaS, Software as a Service - AaaS
- PaaS, Platform as a Service - Cloudware
- IaaS, Infrastructure as a Service - HaaS



AWB, Amazon Web Services

- EC2, Elastic Compute Cloud – Server Virtuali
 - CloudWatch
 - Auto Scaling
 - Load Balancing
- S3, Simple Storage Service
- SimpleDB
- CloudFront (Content Delivery Service)
- ...

AWB, *pay-per-use*

- Tabella dei costi per unità dello *storage*

Europe

Storage

- \$0.180 per GB – first 50 TB / month of storage used
- \$0.170 per GB – next 50 TB / month of storage used
- \$0.160 per GB – next 400 TB / month of storage used
- \$0.150 per GB – storage used / month over 500 TB

Data Transfer

- \$0.030 per GB – all data transfer in April 1, 2009 through June 30, 2009 – **3rd Anniversary Celebration!**

(Note: data transfer in will return to its normal price of \$0.100 per GB on July 1)

-
- \$0.170 per GB – first 10 TB / month data transfer out
 - \$0.130 per GB – next 40 TB / month data transfer out
 - \$0.110 per GB – next 100 TB / month data transfer out
 - \$0.100 per GB – data transfer out / month over 150 TB

Requests

- \$0.012 per 1,000 PUT, COPY, POST, or LIST requests
- \$0.012 per 10,000 GET and all other requests*

* No charge for delete requests

GAE, Google App Engine

Google App Engine

[My Account](#) | [Help](#) | [Sign out](#)

mirrorrrr ▾ secureable ▾

[« Show All Applications](#)

Main

[Dashboard](#)

[Quota Details](#)

[Logs](#)

Datastore

[Indexes](#)

[Data Viewer](#)

Administration

[Application Settings](#)

[Developers](#)

[Versions](#)

[Admin Logs](#)

Billing ^{New!}

[Billing Settings](#)

[Billing History](#)

Resources

[Documentation](#)

[FAQ](#)

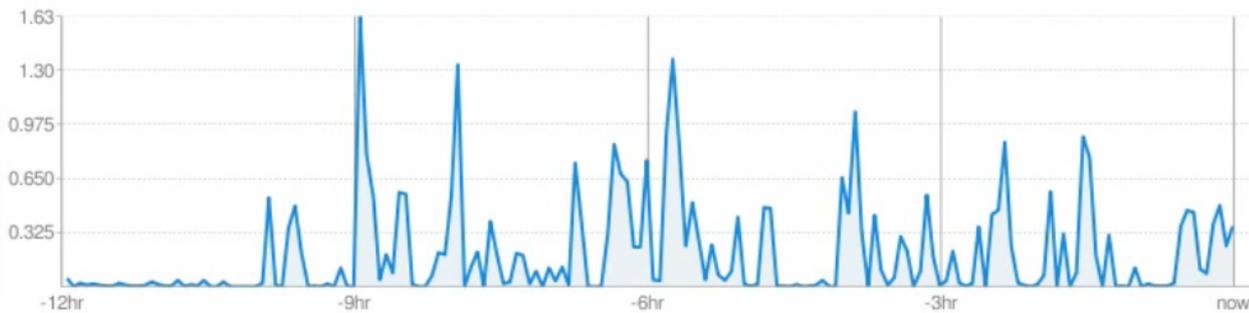
[Developer forum](#)

[Downloads](#)

[System Status](#)

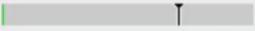
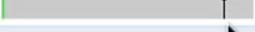
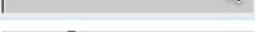
Charts [?]

Requests/Second ▾ all 24 hr 12 hr 6 hr



Billing Status: Enabled - [Settings](#)

Quotas reset every 24 hours. Next reset: 15 hrs [?]

Resource	Usage	Cost / Budget
CPU Time	\$0.10/CPU hour  0% 0.09 of 64.30 CPU hours	\$0.00 / \$1.80
Outgoing Bandwidth	\$0.12/GByte  1% 0.15 of 14.00 GBytes	\$0.00 / \$0.48
Incoming Bandwidth	\$0.10/GByte  1% 0.10 of 11.20 GBytes	\$0.00 / \$0.12
Stored Data	\$0.005/GByte  0% 0.02 of 121.00 GBytes	\$0.00 / \$0.60
Recipients Emailed	\$0.0001/Email  0% 0 of 7000	\$0.00 / \$0.50
↑ = Free quota		Estimated cost for the last 9 hours: \$0.00

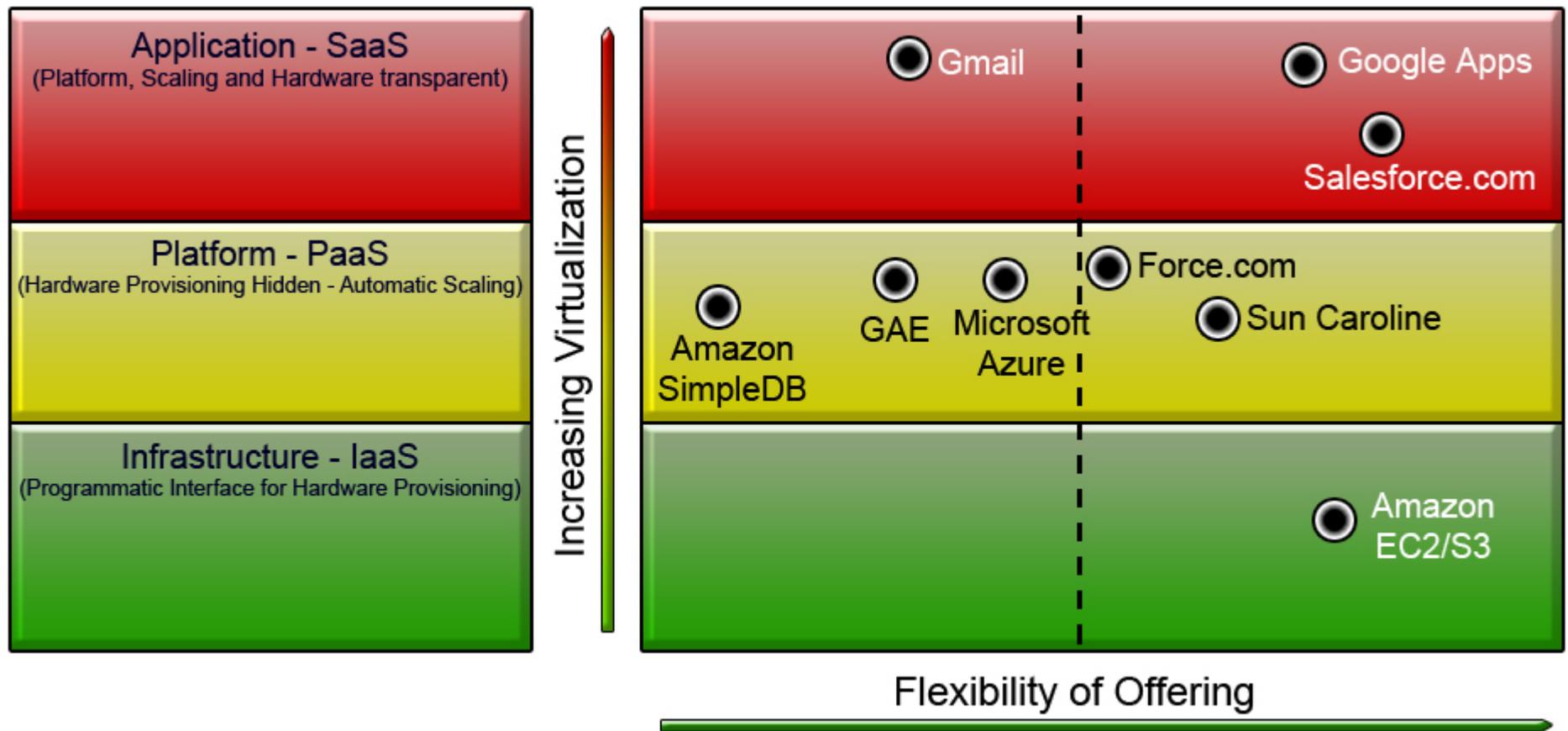
Current Load [?]

URI	Requests last 9 hrs	Avg CPU last hr	% CPU last 9 hrs
/	57	208	4%

Errors [?]

URI	Count	% Errors last 9 hrs
/www.toyokezai.n	2	100%

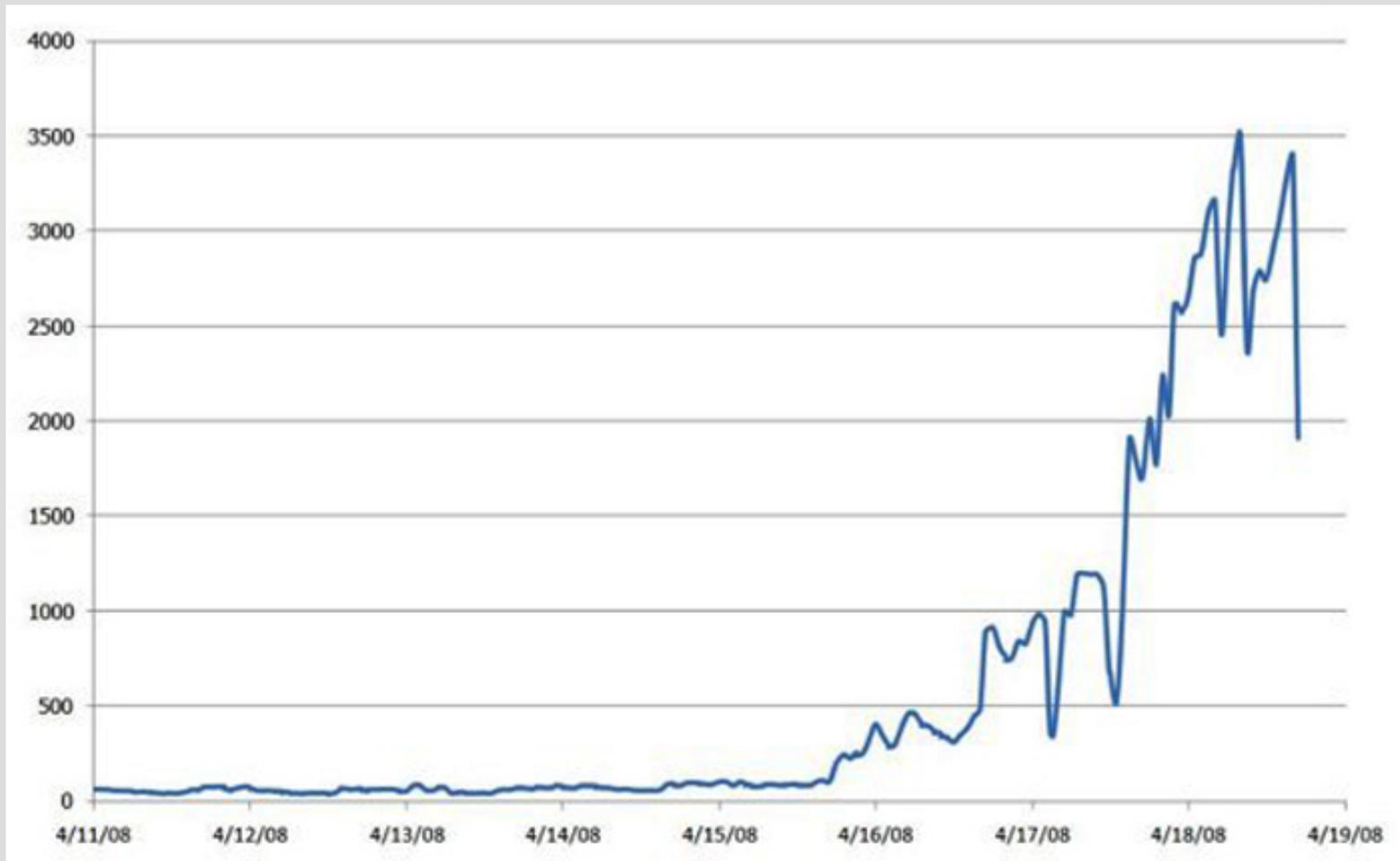
Benchmark



Casi di successo

- Animoto.com

[www.mytestbox.com]



Privacy e dati sensibili

- Perdita diretto controllo sui dati
- Impossibile sapere dove sono fisicamente i dati
- Leggi e Policy diverse per ogni Paese



- Patriot Act, legge federale statunitense
- *Spoofing* di account

Conclusioni e Sviluppi futuri

- Obiettivi:
 - Affidabilità ~ 100%
 - Modello EaaS, Everithing as a Service (*aaS, XaaS) → thin client
 - Point-and-click
- Vincoli:
 - Capacità rete
 - Spazio memorizzazione NON infinito
 - ... settore altamente dinamico ed evolutivo

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