



*From Grids to Clouds
or
From Clouds to Grids ?
or
Are Grids simply dead ??*

Thierry Priol, INRIA

40 ans
la révolution de l'information

INSTITUT NATIONAL
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EN INFORMATIQUE
ET EN AUTOMATIQUE

 **INRIA**

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Panel “Using and offering services in a cloud”

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How to escape from a world of buzzwords

- From the New Oxford American Dictionary:

- Grids:

- “a number of computers linked together via the Internet so that their combined power may be harnessed to work on difficult problems.”

- Clouds:

- “a visible mass of condensed vapor floating in the atmosphere, typically high above the ground.”

- More seriously

- Grid computing:

- “A fully distributed, dynamically reconfigurable, scalable and autonomous infrastructure to provide location independent, pervasive, reliable, secure and efficient access to a coordinated set of services encapsulating and virtualizing resources (computing power, storage, instruments, data, etc.) in order to generate knowledge” - CoreGRID definition

- Cloud computing:

- “It is a style of computing in which IT-related capabilities are provided “as a service”, allowing users to access technology-enabled services from the Internet (“in the cloud”) without knowledge of, expertise with, or control over the technology infrastructure that supports them.” - from Wikipedia

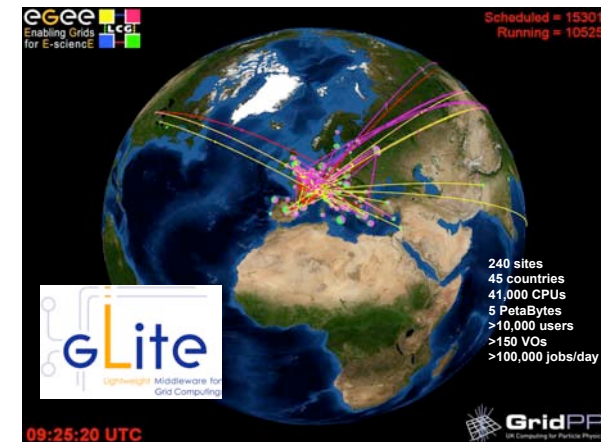
- “An emerging computing paradigm where data and services reside in massively scalable data centers and can be ubiquitously accessed from any connected devices over the internet.” - from IBM

- ...

On the implementation side... less fuzzy...

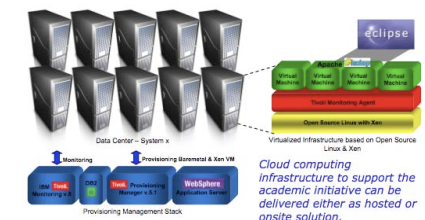
Grids

- Multiple clients / Multiple servers / Multiple administration domains
- Support for Virtual Organizations (VO)
- Usually batch-oriented usage
- Heterogeneous
- Remote deployment of users' codes
- Examples: Egee, TeraGrid, Naregi, CNGrid, ...



Clouds

- Multiple-clients / Single virtualized server / Single administration domain
- Interactive usage once resources are allocated to a user
- Homogeneous
- Remote deployment of virtual machines
- Examples: Amazon EC2, IBM Cloud, Eucalyptus, ...



Some thoughts about Clouds vs Grids

- They share the same vision: FORGET THE END POINT ! full dot !
 - They are both **distributed systems**
 - Make the Internet a computing infrastructure
- Grids are much more complex infrastructures than Clouds today
- They share however some research challenges:
 - Lifecycle management
 - QoS / SLA
 - Monitoring, Accounting, Billing
 - Trust and Security
 - Scheduling,
 - ...

Key requirements

- Large scale data management
- Programming models
 - Extending existing ones or based on new paradigms
- Self-* and autonomic behaviors are required for large scale deployment
 - "You know that you are dealing with a distributed system when you are prevented from getting your work done because a node you never heard of has crashed." by Leslie Lamport
- Infrastructures based on P2P instead of client/server
- Incorporate some Grid features into the Operating Systems
 - see what is being done within the FP6 XtremOS projects
- Embed virtualization into Grid middleware