



CLOUD COMPUTING ARCHITECTURES

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Why Cloud Computing Fascinates IT



Developers

- Why won't IT support this?
- Why can't I use the versions I want?
- Why can't I get better availability?
- How can I pay for what I need?
- How quickly can I get more servers?



Deployers

- Why do we have so many versions of everything?
- Where can I cut costs?
- How can I do finer grain provisioning?
- Where do we enforce security, regulation and audit?

Two Perspectives

Massively scalable,
highly parallel
computing

Pay as you go,
virtual data center

Explosion of unstructured data

Changing economics: opex vs. capex

Defining Concepts



From Grids to Clouds

Distributed Resource Management

Typical HPC grid: Grid engine controls resource management and scheduling. Workloads are DRM-aware (e.g. Sun Grid Engine, Platform LSF, TIBCO GridServer)

Dynamically Scaling Platform

S/W infrastructure platform controls resource and thread management. Workloads written for platform (e.g. Gigaspaces XAP, Paremus, Terracotta)

Virtualized Resource Management

Self-service RM and scheduling (could be delegated to a framework). Workloads encapsulated within VMs (e.g. Amazon EC2, Joyent, Rackspace Mosso)

Cloud Service Models

Software as a Service

Applications offered on-demand over the network
(Oracle CRM On Demand, salesforce.com)

Platform as a Service

Developer platform with built-in services
(Google App Engine, Azure, Force.com)

Infrastructure as a Service

Basic storage and compute capabilities offered
as a service (AWS, Rackspace Mosso)

Cloud Ownership Models

Public



You don't know who else is on the same servers, networks and disks that you are

Hybrid



e.g.: A private cloud operated out of the resource pool of a public cloud

Private

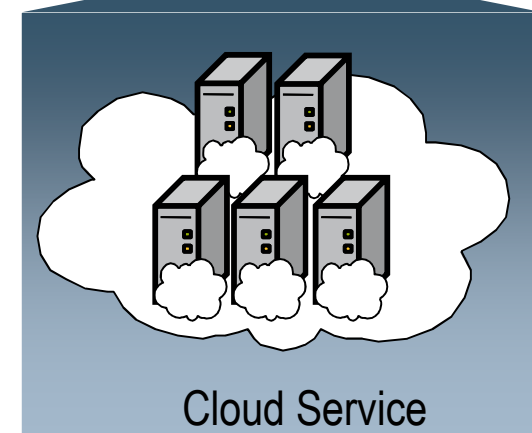
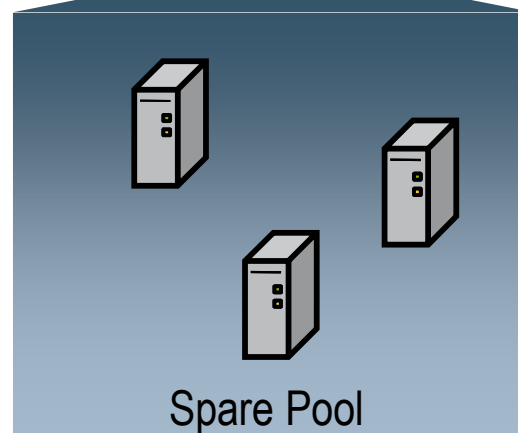
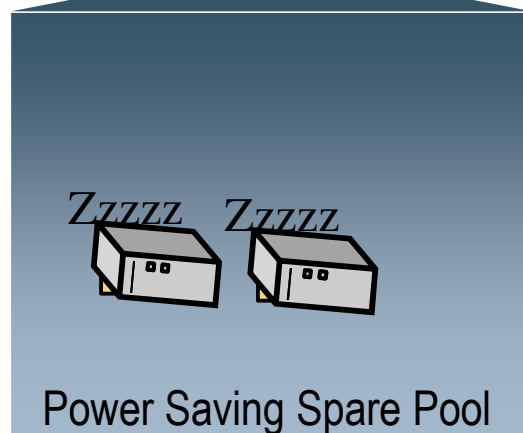
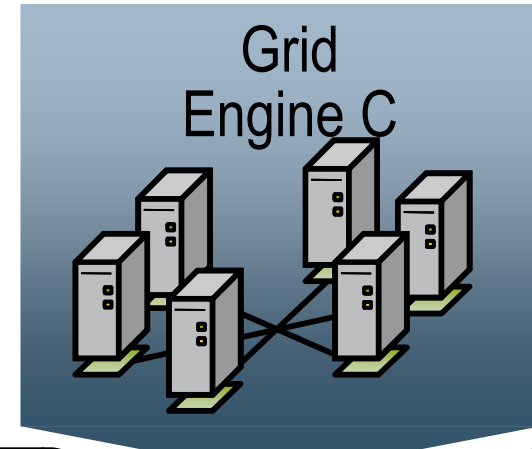
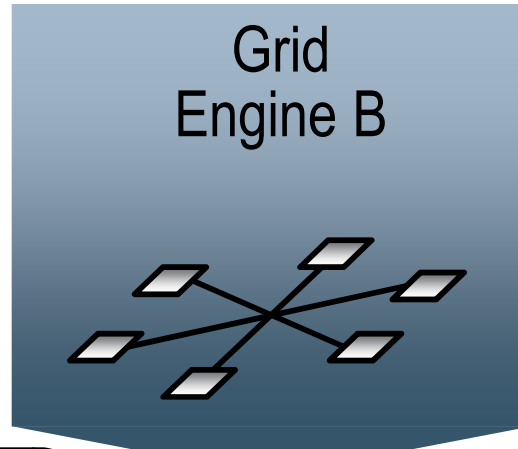
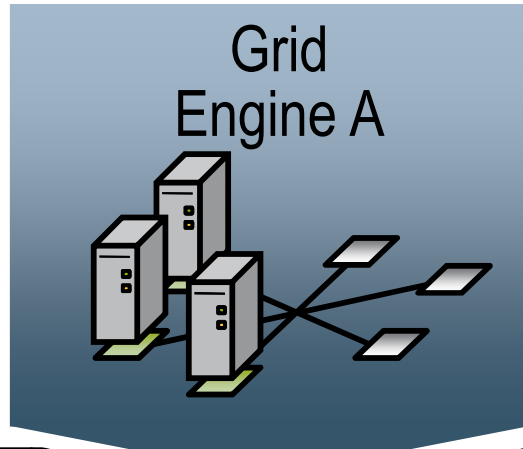


You own the server, network and disk, and decide who gets to run on it

Sample Use Case: „Cloud Bursting“

- Sun Grid Engine: Maximize resource utilization and horizontal scalability for a wide range of workloads
 - Batch, parallel, parametric, interactive and distributed services
- Bundled components:
 - SGE “Core” – workload and resource management
 - SGE Inspect – Monitoring & management console
 - ARCo – Accounting and Reporting console
 - SDM – Service Domain Manager
 - Power Saving
 - Multi-Clustering and more
 - Cloud connectivity

Sample Use Case: „Cloud Bursting“



All Clouds Share Key Traits

One Service Fits All

Virtualized Physical Resources

Self Provisioning

Elasticity

Pay Per Use

Programmatic Control

Sun's View



Building an Enterprise Cloud

Consolidation

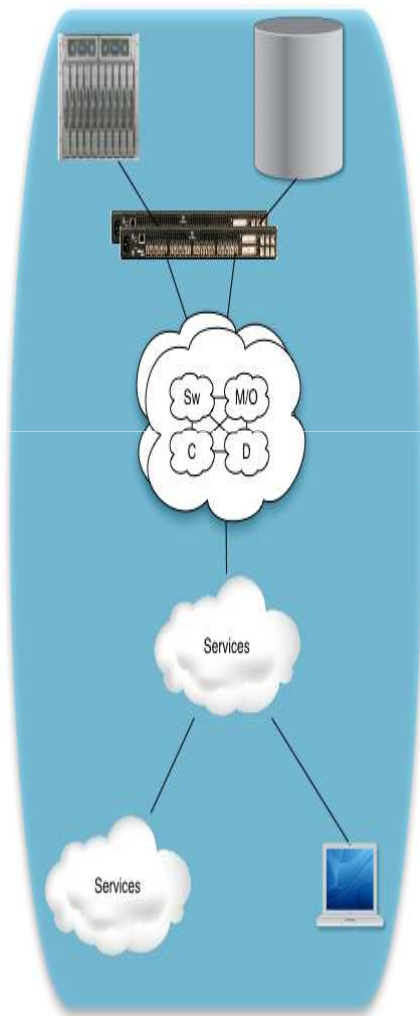
Abstraction

Automation

Utility

Interoperability

Cloud Building Blocks



Platforms and Services

Management & Orchestration

Virtualization

Infrastructure (Networks, Servers, Storage, Appliances)

Summary

- Many clouds: usage will drive redundancy models
- Rich ecosystem evolving
- Architectures are changing
- Developers are impacted
- Forget 9s, think parallel distribution

More Bits

- sun.com/cloud
- Sun Grid Engine

<http://www.sun.com/software/sge/>

- Security projects:

- Cloud Safety Box

<http://kenai.com/projects/s3-crypto/pages/Home>

- Hardened VMIs

http://blogs.sun.com/ec2/entry/hardened_opensolaris_2008_11_on

Questions/Comments?

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