Cloud Systems BoF

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Evolving State of (my) Networking

• 1970s: Walked across campus to submit jobs
  – Carrying a stack of punch cards!

• 1980s: Cross-campus networking
  – Distributed Computing. International networks

• 1990s: Limited home connectivity
  – 56K modems to ADSL

• 2000s: Internet everywhere
  – Massive bandwidth to the home & to the mobile
Evolving State of Computing

• 1970s: Time sharing mainframes
  – A few machines per campus

• 1980s: Affordable Distributed Computing
  – Home & Office desktops. Research workstations

• 1990s: High Performance Computing
  – Vector processors, high-speed interconnects, COTS

• 2000s: The Grid
  – Enough connected computing to do interesting ‘stuff’
Universal ubiquitous network connectivity...

How does this change the way we work?
Changing Software Use

• Standalone Software (e.g. Traditional MS)
  – Your hardware & staff
  – Isolated Desktop installation
  – Networked workgroup licensing

• Hosted Software (e.g. MS Online)
  – Service Agreement
  – Not your hardware, software or staff

• Cloud Services (e.g. MS Live)
  – Software as a service
  – Potential pay per use model
Changing the way we work

• Collaboration, collaboration, collaboration
  – IM
  – Email
  – Shared documents (e.g. Sharepoint, Wikis)
  – ....

• Information, information, information
  – Generating documents (of all forms)
  – Searching documents (of all forms)
  – Gaining knowledge to exploit information
In Moving to the Cloud...

• It’s nothing new!
  – Software running remotely on a computer
  – Various access methods
    • Thin client web browser (e.g. traditional server side)
    • Active thin client (e.g. smarter client – Silverlight, AJAX,...)
    • Fat clients (e.g. MS Office & Sharepoint)

• It’s a whole new paradigm!
  – Everything is done & stored on remote resources
  – Your (business) success depends 100% on someone else
  – Breaks the enterprise silo to enable collaboration
Web 2.0 / Portals / APIs

Domain 1

Domain 2

The Grid

E-Science

Healthcare

Enterprise

Organisation A

Organisation B

Organisation C

Web Applications

Web Services

Web Infrastructure

Browser

Browser

Browser

Browser

Browser

Browser
So, What is the Cloud?

• A User oriented access layer to the distributed resources
  – A layer above the resource services
  – Focused on what users want to do
    • Not on how they are provisioned

• Different clients for different communities:
  – From the Browser
    • ‘Traditional’ Portals
    • New Portals (Web 2.0)
  – From the Operating System
    • Transparently access the grid from desktop Windows & Linux
      – E.g. from with shell environments

• Both need APIs (from Browser or OS)
  – e.g. C#, Java, JSON, Perl, PowerShell
Hierarchical Decomposition

• Users will want to go to multiple clouds
  – User → Cloud: Bespoke solution
  – User → Clouds:
    • Interoperability through the UI (Hotmail vs. Gmail)
    • Interoperability through standards (IMAP, SMTP, ...)

• Cloud providers will want multiple resources
  – Swap providers of resource services (no lock in)
  – Both internal and external resource providers
Do Clouds Need Standards?

• Standards at two levels:
  – Infrastructure Services
  – Interface Services

• Infrastructure
  – Low-level compute & data services
  – Management & Monitoring services

• Interface
  – Authentication & Authorization management
  – Functional Application or domain services
Standard APIs?

• APIs to the clouds
  – Help build a client ecosystem
  – Avoid provider lockin
    • Not a concern now... but later?

• APIs to the resources
  – Helps build portable cloud services
  – Portability between resource provider
    • And across ‘ensambles’ from a resource provider
What can OGF do?

• What is it **you** want to do within OGF?
• OGF has a set of resource specifications
  – Computing, data, ...
• Looking at how to apply OGF specifications
  – Specification adoption – Andrew Grimshaw
  – Vendors have technology that can be exposed
    • MS HPCS 2008, LSF, PBS
• Looking at practical gaps in current OGF activity
  – Be consumer (community) driven through use cases
Summary

• The Cloud is a new perspective on the Grid
• Focused on its use rather than its provision
• The need for Grid standards continues
  – Strong base: HPCBP, BES, JSDL, RNS, Naming, ...
• Need for standards in the access layer
  – Simple API for Grid Applications
  – Accounting... someone will HAVE to pay!