

Cloud Systems BoF

Steven Newhouse

Microsoft

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

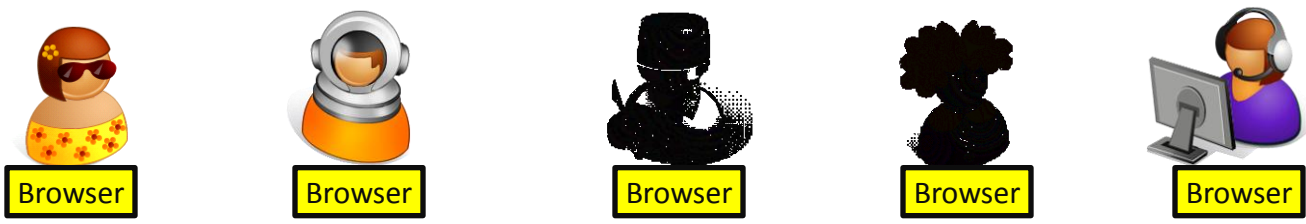
- Standalone Software (e.g. Traditional MS)
 - Your hardware & staff
 - Isolated Desktop installation
 - Networked workgroup licensing
- Hosted Software (e.g. MS Online)
 - Service Agreement
 - Not your hardware, software or staff
- Cloud Services (e.g. MS Live)
 - Software as a service
 - Potential pay per use model

Changing the way we work

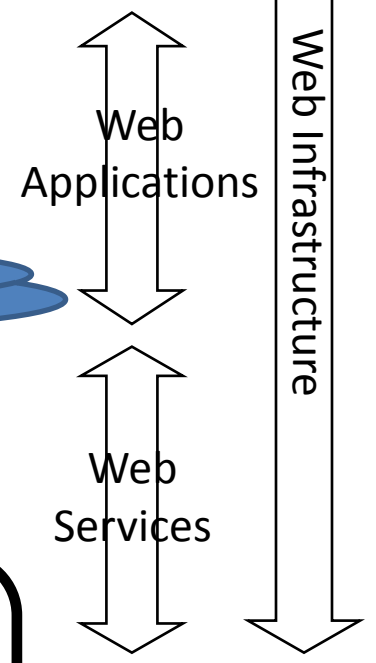
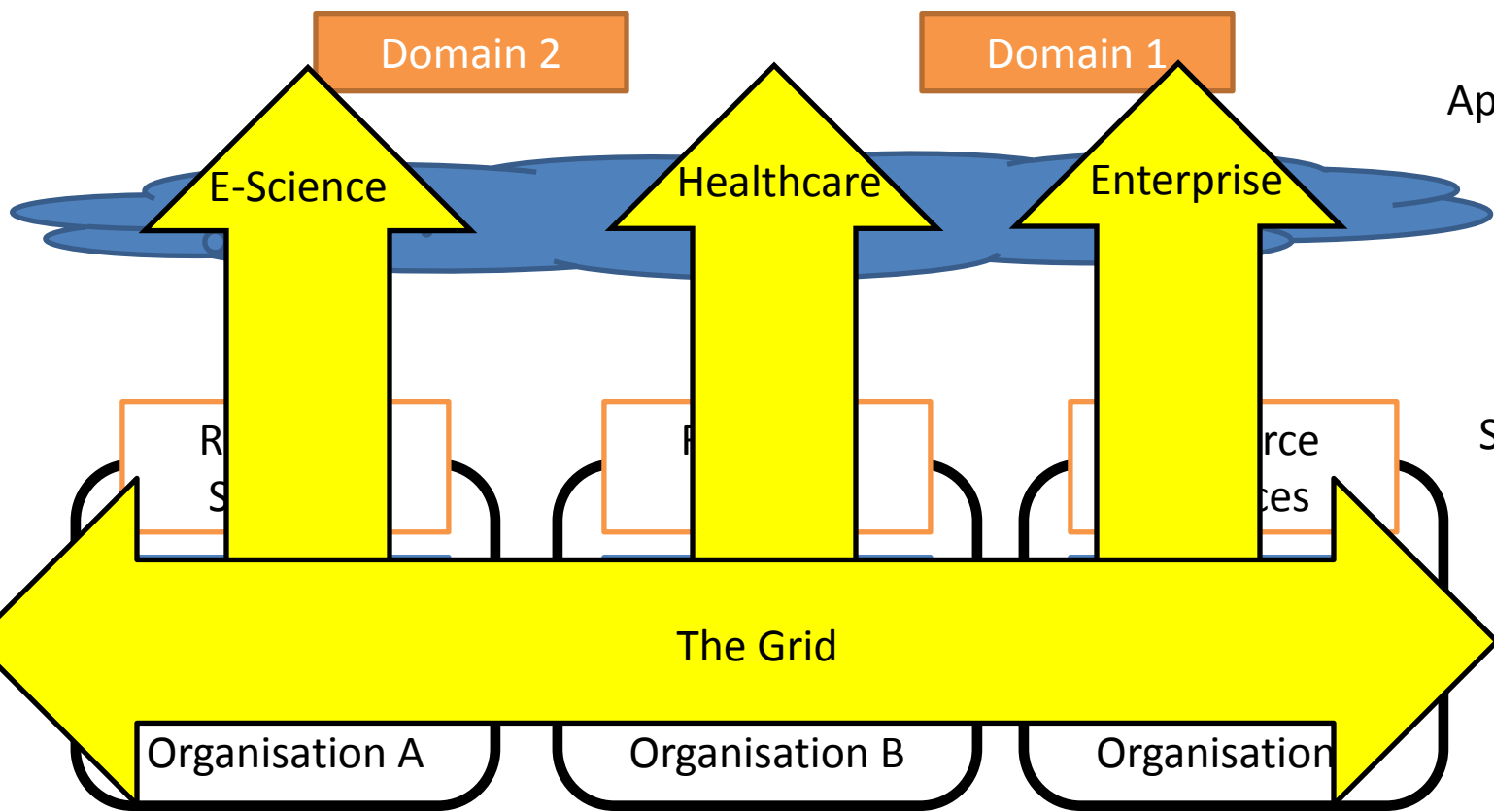
- Collaboration, collaboration, collaboration
 - IM
 - Email
 - Shared documents (e.g. Sharepoint, Wikis)
 -
- Information, information, information
 - Generating documents (of all forms)
 - Searching documents (of all forms)
 - Gaining knowledge to exploit information

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



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 'ensembles' 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!