

Community Clouds  
And why you should care about them

Matt Johnson, Ed Zedlewski, Eduserv

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Introduction

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What is Cloud Computing?

National Institute of Standards & Technology (NIST)  
"a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction."

**NIST**  
National Institute of Standards and Technology  
U.S. Department of Commerce

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What is Cloud Computing?

"Non-techie" version:  
"On-demand, elastic & metered IT resources"

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Cloud Service Models

The diagram illustrates the layers of cloud service models. On the left, a vertical stack of layers is shown: Services, Software, Platform, Infrastructure, and Datacentre. On the right, five colored boxes represent different service models, each with associated examples:

- MSP (purple):** Eduserv, Savis, Steria
- SaaS (green):** Salesforce, Basecamp, Huddle
- PaaS (blue):** Force.com, Azure, AppEngine
- IaaS (orange):** Amazon AWS, GoGrid, Rackspace
- CoLo (red):** Eduserv, Rackspace, Lots more!

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Cloud Deployment Models

**Public Cloud**

- Available to the public
- Owned & operated by a 3<sup>rd</sup> party provider
- Examples include Amazon AWS, Microsoft Azure

**Private Cloud**

- Service dedicated to a single organisation
- Owned & operated by the organisation or a 3<sup>rd</sup> party provider
- Examples include Amazon Virtual Private Cloud

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## Cloud Deployment Models

**Community Cloud**

- Infrastructure shared between a "community of organisations"
- Owned & operated by the community or a 3<sup>rd</sup> party provider
- Examples include CERN's Research Grid, the NGS

**Hybrid Cloud**

- Composition of 2 or more Clouds
- Bound together by (standardised) technology
- Examples potentially includes the Government G-Cloud

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## Which Cloud model is best suited for HE?

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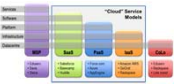
## Which Service Models for HE?

**1. Infrastructure as a Service**

- Server provisioning
- Scalable storage
- Lower costs

**2. Platform as a Service**

- Bespoke development
- Research




**3. Software as a Service**

- Standard "utility" services
- Significant cost savings

**4. Managed Services**

- 24x7 Support
- Outsourced services

**All of the above!**

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### Which Deployment Model(s) for HE?

Consideration	Public	Private	Community	Hybrid
Time to build	Instant	Weeks+	Months+	Months+
Cost to build & support	None	High	Varies	Varies
Economies of Scale	Yes	No	Yes	Yes
Flexible Business Models	No	Yes	Yes	Varies
Flexible Service Levels	No	Yes	Yes	Varies
Autonomy of Service	No	Yes	Varies	Varies
Data "Locate-ability"	Limited	Yes	Yes	Limited

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### Summary of deployment models

- Public Clouds
  - Great for quick, non-sensitive, non-critical requirements
- Private Clouds
  - Ideal for secure, internal-facing services with known demands
- Community Clouds
  - Merge sector-specific requirements with economies of scale
- Hybrid Clouds
  - All of the above – but with added complexity!

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### Pay-as-you-Go Clouds:

- Great for commercial services...
  - Ad-supported websites, SaaS applications, etc;
  - On-demand Cloud pricing matched by increased revenues;
- ...Less so for "non-profit" services
  - Sites likely to be information-based & non-revenue generating;
  - Often funded by fixed-term budgets with little flexibility;
  - Cloud pricing becomes an unacceptable risk

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### Our vote: a Community Cloud for education

- Security
  - Infrastructure is used only by like-minded organisations
  - Server / storage infrastructure remains in UK borders
  - Can integrate with the UK Access Management Federation
- Flexibility
  - Pricing/service models tailored to academic requirements
  - Shared investment in infrastructure and support
  - Setup costs can be mitigated via trusted external providers

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### Example: Government hosting services

- Technical challenges
  - Varying infrastructure / architecture
  - Differing service levels
- Business challenges
  - Different stages of the contract lifecycle
  - Significant cost pressures
- Major contract renewal



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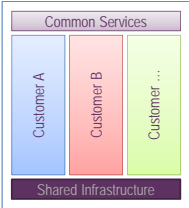
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### Our solution: the Government Ready Platform (GRP)

- Developed in 2008
  - One initial customer
  - Multi-site high-availability architecture
- Segmented architecture
  - Private services
  - Common services
  - Support for 1000+ VMs
- Example of a Community Cloud



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Deploying a Community Cloud



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Before anything else...

- Get some quick wins using cloud services
  - Google Apps / Microsoft Live@EDU for student / staff email
  - Google Analytics for web analytics
  - Facebook / Twitter / Wordpress.com for public messaging
  - Skype / Gtalk for communications
- Use success to sell the cloud to decision makers
  - Highlight the benefits
  - Don't hide the risks



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Outsource or Insource? Create or Join?

- Decide on the structure you're most comfortable with:
  - Community-managed – more control, more effort
  - Supplier managed – less hassle, more restrictive
- Then either start your own Community...
  - Good luck...
  - ...history shows this is harder than it looks!
- ...or join an existing Community
  - Faster and (usually) more straightforward



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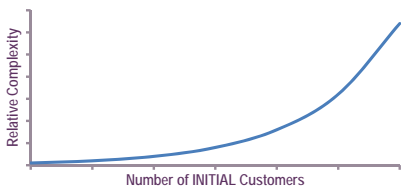
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Communities should start small...

...The optimal size of any initial community is ONE



Relative Complexity

Number of INITIAL Customers

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Then exploit existing relationships

- Partnering can bring benefits...
  - Shared risk
  - More capability
  - Larger initial investments
- ..but don't aim too high:
  - Complexity = (no. of partners)<sup>3</sup>
  - Easier to join an existing community?
- Establish a robust business case



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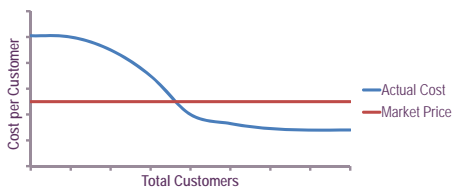
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Always think big...

...The optimal size of an established community is LOTS



Cost per Customer

Total Customers

Actual Cost

Market Price

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### Consider your commodity services

- Making use of your cloud
  - What doesn't **need** to be an internally operated service?
- Consider outsourcing when cloud services offer:
  - Better economies of scale
  - Better support levels
  - Environmental benefits
  - Increased functionality
  - Lower costs
- Be honest – include true TCO for internal services!

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### Keep it simple...

... start with the basics, and expand from there

Phase 3	Bespoke Services	Software as a Service	Managed Services
Phase 2	Tailored Services	Platform as a Service	
Phase 1	Common Services: DNS, email etc	Infrastructure as a Service	

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### Financial models for public sector Clouds

- Capped services – fixed monthly price provides:
  - Specific amounts of storage/compute/network resource
  - Equivalent of a physical infrastructure with hard limits
  - Rationed by throughput rather than quantity
- Unlimited services – fixed monthly price provides:
  - Unlimited use of specific resources
- Ring-fenced services – dedicated infrastructure
  - Purchased as CapEx, for a set period of time

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### Example: The FleSSR Project

- Flexible Services for the Support of Research
  - Hybrid Private-Community Cloud pilot service
  - Rapid innovation and prototyping
  - Multiple use cases
  - Technical and business outputs
- Commenced September 2010, reports July 2011



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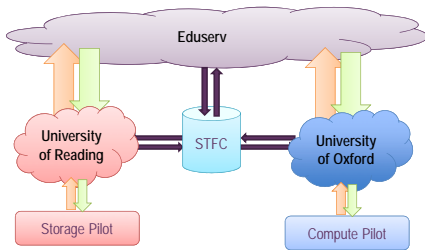
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### FleSSR: Technical Architecture



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### FleSSR: Next Steps

- Commence live service
  - Scheduled for end November 2010
- Key areas of work
  - Prove the technical capability
  - Engage with HE to understand cloud business models
  - Evaluate additional pilot services
- Develop a post-project roadmap



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To summarise...

- Cloud services are:
  - Mainstream – Google Apps has > 30m users
  - Still evolving
- Cloud services are not:
  - A panacea to all technology considerations
  - Supported through mature business models
  - Something that has to be tackled alone

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Thank you!

<b>Matt Johnson</b> Head of Research email: <a href="mailto:Matt.Johnson@eduserv.org.uk">Matt.Johnson@eduserv.org.uk</a> twitter: @mhj_work web: <a href="http://labs.eduserv.org.uk/">http://labs.eduserv.org.uk/</a>	<b>Ed Zedlewski</b> CTO email: <a href="mailto:Ed.Zedlewski@eduserv.org.uk">Ed.Zedlewski@eduserv.org.uk</a> web: <a href="http://www.eduserv.org.uk/">http://www.eduserv.org.uk/</a>
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