Cloud Lock-in and Interoperability

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Agenda

- Cloud Computing – A Recap
- Cloud Lock-in
- Portability & Interoperability
- Emerging Standard
- Best Practices
- Q & A
Cloud Computing – A Recap

NIST Summary

Essential Characteristics

- Measured Service
- Rapid Elasticity

Deployment Models

- Public
- Private
- Hybrid

Service Models

- On-Demand Self Service
- Broad Network Access
- Resource Pooling

- Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)

http://www.csrc.nist.gov/groups/SNS/cloud-computing/index.html
Examples of Cloud Providers

**SaaS**
- Google
- flickr
- LinkedIn
- Gmail
- Google Docs
- NetSuite
- Facebook
- Windows Live
- Salesforce

**PaaS**
- Google App Engine
- Intuit QuickBase
- Windows Azure
- Force.com
- AWS
- vmforce

**IaaS**
- Amazon Web Services
- Eucalyptus
- Rackspace
- Engine Yard
- GoGrid
What is vendor lock-in?

“You can checkout any time you like, But you can never leave”!

-Eagles, Hotel California

“One way ticket to the moon”

-Boney M
Lock-in: When there is significant cost to switch cloud vendors

Portability: Ability to move application, data, tools from one cloud to another

Interoperability: Ability for different cloud to talk to each other

Federation: Ability to bring together services from various cloud vendors to provide a solution
A Telecom Example

Portability

Interoperability
What was in it for customers?

Portability + Interoperability + Federation

= More choices => Lower costs & Innovative solutions
And for vendors/operators?

The carriers saw a jump of 250% to 900% in SMS volumes!

Interoperability = The Network Effect

What does that mean?

Cloud vendors are not against interoperability or federation. They just need to agree on standards.

Some cloud vendors are implicitly against portability. Because that means they have to be cost effective and innovative.
What Lock-in Means For the Cloud Ecosystem

For Customer
- High Cost for Poor Service
- Incompatible Technology
- Non Compliance to Standards

For Vendor
- Strategy to avoid customer churn
- Promoting particular technology
- Pricing Power

For Overall Market
- Oligopolistic Market
- Entry Barriers for New entrants
- Detrimental to cloud computing penetration
Lock-in Concerns

What concerns you about moving to the cloud?

- Lock-in to Cloud Vendor: 21%
- Having My Data Locked-in: 71%
- Being Locked-in to a Development Environment: 57%
- Being Locked-in to a Development Language: 29%
- Having my Log Files Locked-in: 21%

Source: RightScale blog
Why do customers need choice?

- Issues with service levels provided
- Escalating cost, relative to alternatives
- New and change in strategy by customer
- Long term viability of provider
- Acquisition of or by provider and resulting change in strategy
- Compliance and Legal Issues
Customer Concerns

How do I manage data seamlessly?

How will my DR and BC look like?

How will be SLA look like in this environment?

How will I manage Audits?

Can I move my application, data?
Some Use Cases

On Premise Data Center

Public Cloud

Public Cloud 1

Public Cloud 2

Federated Solution

Data

APIs/Services

On Premise Data Center
Portability means taking what you own
What is portable?
Salesforce.com

You own only data, you can take only data!
What is portable?

force.com

Only Data!
**What is portable?**

**Microsoft Azure**

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<td>Synchronize databases between cloud and on-premises sources. <strong>More</strong></td>
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<td>Develop and deploy operational reports to the cloud using familiar tools. <strong>More</strong></td>
<td>Standards-based service for identity and access control. <strong>More</strong></td>
<td>Buy and sell finished applications, data sets, components and more. <strong>More</strong></td>
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Primarily Data!
What is portable?

Amazon Web Services

Primarily Data!
Lock-in Summary

• Customer owns data but Salesforce owns database, middleware and applications
• Visualforce (UI), Apex scripting language and database model (objects) is proprietary to Salesforce

• Windows Azure middleware centered around IIS and .NET framework
• SQL Azure relational database is primarily MS SQL Server
• Platform is proprietary (caching, service bus, access control, etc)

• Has proprietary VM image technology (Amazon Machine Image)
• Proprietary infrastructure platform: SQS, SNS, SES, Management
Bright spots on portability

- Rightscale
- VMForce
- CloudFoundry
- OpenStack
- Open Source: Eucalyptus, Cloud.com
Cloud Standards
Distributed Management Task Force

DMTF – Development, validation and promotion of systems management standards.

Cloud Management Working Group

- Develop a set of prescriptive specifications that deliver architectural semantics and implementation details to achieve interoperable management of clouds between service requester/developers and providers.

- Primary focus on cloud resource management aspects of IaaS including SLA, QoS, utilization, provisioning, monitoring, reporting and auditing.

- Working on deliverables from

  - **Common Information Model (CIM)**: provides a common definition of management information for systems, networks, applications and services, and allows for vendor extensions

  - **Open Virtualization Format (OVF)**: OVF is a hypervisor-neutral, efficient, extensible, and open specification for the packaging and distribution of virtual appliances composed of one or more virtual computer systems
Cloud Auditing Data Federation Working Group

Open standards for cloud auditing that support submission and retrieval of audit event data from cloud provider in form of customizable reports and logs.

- Scope will include
  - Data model and specification
  - Interface model, API specification
  - Interaction model
Members
Storage Networking Industry Association

Developing and promoting standards, technologies, and educational services and promoting activities that expand the breadth and quality of the storage and information management market.

**Cloud Data Management Interface (CDMI)**

- Applications will use to create, retrieve, update and delete data elements from the Cloud
- Discover the capabilities of the cloud storage offering and manage containers and its data
- Manage data system metadata on containers and contained data elements
Members

- Cisco
- Oracle
- HP
- NetApp
- LSI
- Symantec
- EMC²
- IBM
- Microsoft
Cloud Security Alliance

- **CSA Governance, Risk & Compliance Stack**
  Help enterprises, cloud providers, security solution providers, and IT auditors instrument and assess both private and public clouds against industry established best practices, standards and critical compliance requirements.

- **CloudAudit Standard**
  Automated Audit, Assertion, Assessment, and Assurance API (A6) of IaaS, PaaS and SaaS environments

- **Cloud Controls Matrix (CCM)**
  Provide fundamental security principles to guide cloud vendors and customers in assessing the overall security risk of a cloud provider.
Members

- eBay
- AT&T
- Coca-Cola
- Cisco
- Dell
- Google
- McAfee
Other Standards Bodies

- European Telecom Standards Institute
  - TC Cloud – Convergence of IT and telecommunication
- National Institute of Standards and Technology
  - Definition, Standards and Use Cases
- Open Grid Forum
  - Open Cloud Computing Interface (OCCI) – Specs for cloud based interactions
- Open Cloud Consortium
  - Standards, benchmarks and reference implementations
- Organization for the Advancement of Structured Information Standards (OASIS)
  - Identity in the cloud (IDCloud)
Portability/Interoperability
Best Practices - General

- Have ongoing assessment of potential replacement options for the current cloud provider.
- Conduct due diligence in the SLA about who owns platforms, processes and data.
- Plan for migration upfront as part of your business continuity and governance process.
- Understand the size of the data and plan for transition.
- Avoid using services that do not have a corollary in other providers.
- Dependency on Cloud provider “too big to fail”.
Portability/Interoperability
Best Practices - IaaS

- Understand the VM format for portability
- Get a good handle on VM conversion: VMware to Hyper-V to Zen
- Understand the de-provisioning process of the provider
- Understand HW and SW platform dependencies
- Limit the use of vendor specific infrastructure pieces
Portability/Interoperability
Best Practices - PaaS

Before finalizing a platform, make sure they are not so unique/proprietary that switching will be hard.

Use standard API, syntax and standards where possible. Document exceptions.

Understand the tools, modules specifics to PaaS provider and document them.

Understand how platform services like logging, monitoring and auditing would transfer to a new provider.
Portability/Interoperability
Best Practices - SaaS

- Export data regularly into a format that can be used without the SaaS provider.
- Make sure you can export meta-data from the cloud provider.
- Confirm migration of backups as well as historical logs, audit data and monitoring data.
- Make sure any data required for legal, regulatory and compliance reasons are migrated.
Portability
A Contrarian View

• Comparison to buying a car
• Comparison to renting a fully furnished house
• The value of I/P/SaaS provider is in its proprietary system
• Proprietary also means innovative
Key Takeaways

- Lock-in and interoperability
- Today cloud vendors provide limited portability
- Near future of interoperability is bright; portability will take some time.
- Follow standard best practices on all platforms to minimize lock-in
- Lock-in is not evil as long as it is informed decision
Questions?
Thank You!

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