Delivering a Cloud Architecture

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Abstract

The emphasis in the design and implementation of cloud architectures is often on the virtualization and network aspects, and storage is often not considered in the overall design until late (often too late) in the implementation. This session will be an overview on developing & delivering a cloud architecture with a focus on getting the storage aspects correctly specified and defined. A commercial implementation of such a system will be presented as a case study on the benefits of treating storage as an important part of the process of delivering a practical cloud architecture.

Learning Objectives

- Understand the place of storage in cloud architectures
- Learn about specific storage requirements for cloud
- Identify the issues in using storage in a cloud architecture
The Theoretical ITU Model

diagram provided by ITU-T (N326)
Service Delivery Business Challenges

- The need for speed and innovation by business users creates a demand that is difficult to meet with the current IT model
  - Operating model can be constrained by IT’s need for consistency and standards
  - One-size-fits-all model which typically doesn’t “fit all sizes”
  - Prioritized against enterprise IT projects

- Technology has become more available
  - Commercial public cloud is available with the swipe of a credit card and equally easy to use

- End-users are finding other ways to procure resources and cloud becomes an enabler.

- These solutions have the potential to increase risk and cost to the business
  - Spawns applications with no integration to IT support or security, and typically with no business continuity
  - HW, SW, and resources are invested by the business in order to manage their needs; no economy of scale
Specific Business Scenarios

1 week

Application #1
- Web-Community with Support for:
  - Open-Source Tech
  - Account Handling
  - Dynamic Content
  - Public-Facing

IT?
- No Open-Source Support
  - High-Cost

Jive?
- Missing Core Functionalities

Prod Ops?
- Limited Scaling
  - Not External

TBD?

7-16 weeks

Application #2
- Data Warehouse with Support for:
  - Dynamic Scaling
  - AD Integration
  - Scripted Queries
  - Custom Reporting

IT?
- High Cost
  - Long Delivery Time

eBI?
- Feature Gaps

TESO
- Limited Hosting Capability

TBD: Launch as project in PPMO?
- Doesn't Scale
  - No Support
  - High Capital Cost
Approach

- Started fast with Cloud Service Provider which provided VPC (virtual private cloud)
  - Provided needed velocity to capability at lowest cost
  - Iterative approach to defining capabilities and mapping to business needs of the end-user
  - Demonstrate the simplicity and agility of a resource on-demand model
  - Prove application / workload compatibility
  - Illustrate how cloud fits as a component in the IT service management framework
- Iterate to refine service offering
- Continue business apps migration
- Drive toward private / hybrid cloud
Approach (cont.)

<table>
<thead>
<tr>
<th>Application-Based Silos</th>
<th>Zones of Virtualization</th>
<th>Public Cloud</th>
<th>Private Cloud</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Servers</td>
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<td></td>
</tr>
<tr>
<td>Network</td>
<td></td>
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<tr>
<td>Storage</td>
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</tbody>
</table>

Current State

Future State

- Reduced Time to Capability
- Capacity Management
- Standard Image Library
- Increased Security Posture
- Business Scalability
- Data Protection and Management
- Resource Monitoring and Reporting
- Lowered Capital Requirements
The Planning Process & Challenges

- Legal Considerations
- Culture
- Operations
- Governance
- Processes
- Security & Data Privacy
- Contracts & SLAs
- Best Practices
Legal Considerations

Why and when you need a lawyer

Transborder Data Flow
- May generate legal obligations (sometimes conflicting) in multiple jurisdictions
- “The Right To Be Forgotten”; many jurisdictions have such laws
- Exporting data may be illegal
  - EU Data Protection Directive; does NOT permit transferring personal information to countries that do not provide EU protection levels; the USA is one such country

Expectation of "Reasonable Security"
- Security breaches leading to potential liability
- Only as strong as weakest link
Legal Considerations (cont.)

- Electronic evidence & e-discovery
  - What constitutes evidence?
  - Multiple copies, digital signing, data fragmentation
  - Retrieval of data often complicated

- Existing non-Cloud contracts insufficient
  - License agreement vs service agreement
  - Ownership vs use of content

- Mobile Devices
  - The law applies where you are, and where your data is stored

- Get Legal Involved
  - Early and often; laws change
Key Challenges in Selecting/Using Cloud

Culture
- Some groups are wary of clouds & those services that they cannot physically interact with
- Utility model (pay-as-you-go) takes time to be fully accepted by business users
- Shifting the mindset of the user: chargeback doesn’t always mitigate over-provisioning

Operations
- Managing the service-provider!
- How to integrate off-premise services (and do so where the current model is in silos)
- Cloud education is essential – to understand the value of cloud to business users, and how it can help make more efficient
Key Challenges in Selecting/Using Cloud

**Governance**
- Governance is key in shaping the speed of adoption and success
- Companies must understand what they should put in the cloud and why
- Risk management is crucial - from vendor sourcing, to legal policy, to developing strong application patterns around cloud usage

**Processes**
- Clarity of processes for Cloud operations, governance and SLA
- Driving cloud brokerage into the service management framework
- Normalizing and federating data
Key Challenges in Selecting/Using Cloud

_security & Data Privacy_
- Enterprise CSP - offers a more secure environment than most IT datacenters
- Data privacy- threat of data holds & other legal matters can be potential risks
- Self-service can open the door without proper controls

Contract & SLAs
- A strong contract helps mitigate risks and the key in cloud provider selection
- A well-structured SLA is essential to manage expectations and deliverables
- Exit strategy; how to cleanly terminate or move
Key Challenges in Selecting/Using Cloud

籥 Best Practices
  - CSP selection process & risk management
  - Modernization of applications - as they are the true consumer
  - Pay-as-you-go, chargeback consumption model
Capabilities

- xCloud provides a method for end-users to provision and manage IT systems
- Service catalog of more than just simple infrastructure instances
- Many common web and database platforms are fully supported; from deployment through steady-state
- Core Services (SSO, LDAP, AD, DNS, etc) are available via blueprint catalog
What does xCloud do?

- Load Balancing
- Monitoring
- Reporting
- Scheduling
- Instance Management
- Billing
- Continuity
- Blueprints
- Core Service Support
- API
Value of xCloud

**Business Agility**
- Removes IT as a bottleneck
- Increased platform and application confidence

**Improved Security**
- Lowered risk of app compromise or data loss
- Reduced application downtime

**Measurable Benefits:**

<table>
<thead>
<tr>
<th>Value Opportunity</th>
<th>Quantitative Benefits</th>
<th>Qualitative Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Time to Capability</td>
<td>Up to 3000% decrease in time to deliver over traditional IT</td>
<td><em>(acceleration of feature/function, ability to repurpose resources)</em></td>
</tr>
<tr>
<td>Enhanced Reliability</td>
<td>99.9+% availability</td>
<td><em>(less application downtime, fewer P1/2's, improved application performance)</em></td>
</tr>
<tr>
<td>Capacity Management</td>
<td>30% better capacity utilization</td>
<td><em>(more efficient use of resources, fewer performance issues)</em></td>
</tr>
<tr>
<td>Expense Avoidance</td>
<td>$3.5M estimated annual savings in HW, SW, and support</td>
<td><em>(reduced up-front costs, no long-term commit, visibility into actual consumption)</em></td>
</tr>
</tbody>
</table>
What can xCloud be used for?

![Diagram showing the use of xCloud for various systems](image)

**Good Fit**
- Field-Facing Applications
- Source Code Repositories
- Marketing Campaign Systems
- Internal Web Tools
- Productivity Tools
- Sandbox / POC Environments
- Archival Systems
- Team / Org Intranet Sites
- Offerings-to-Order Systems
- Integration Systems
- CRM Systems
- ITSM Systems
- DR / BC Systems
- Collaboration Environments
- Access Management Systems
- Customer Support Systems
- Business Analytics Systems
- Identity Management Systems
- Content Management Systems
- Content Delivery Systems
- Directory Management Systems

**Possible Fit**
- Core Competitive Process Systems
- Procurement Systems
- HR / Payroll Systems
- MDM / Data Warehouses
- High Transaction Systems
- ITSM Systems
- Customer Support Systems
- Content Delivery Systems
- Directory Management Systems

**Not a Fit**
- Financial Management Systems
- ERP Systems
- Marketing Campaign Systems
- Field-Facing Applications
- Source Code Repositories
- Marketing Campaign Systems
- Internal Web Tools
- Productivity Tools
- Sandbox / POC Environments
- Archival Systems
- Team / Org Intranet Sites
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Decision Framework for Business and IT to know which lever to pull to solve the right business problems and drive cost optimization

Platform Options
- Customer One
- Lifespan
- Cost
- Tech

Risk
- Data Privacy
- Comp
- Security
- Critical

App Requirements
- Perf
- Int
- Cost

Service Level
- SaaS
- PaaS
- xCloud

Sourcing

Off-Premise
- On-Premise
- HDC
## Service Delivery Current State

### Public SaaS

<table>
<thead>
<tr>
<th>Service</th>
<th>SFDC</th>
<th>eloqua</th>
<th>ServiceNow</th>
<th>Aprimo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chatter</td>
<td>Brassring</td>
<td>WebEx</td>
<td>EchoSign</td>
<td></td>
</tr>
<tr>
<td>DrawLoop</td>
<td>RedAlert</td>
<td>Jive</td>
<td>iPerception</td>
<td></td>
</tr>
<tr>
<td>Apptus</td>
<td>Boldchat</td>
<td>ShareFile</td>
<td>Vartopia</td>
<td></td>
</tr>
<tr>
<td>Radian6</td>
<td>e2Open</td>
<td>Cloud9</td>
<td>etc…</td>
<td></td>
</tr>
</tbody>
</table>

### xCloud

<table>
<thead>
<tr>
<th>Service</th>
<th>Qubes</th>
<th>IT Front Door</th>
<th>Solution Builder</th>
<th>Linux Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice</td>
<td>SPM</td>
<td>Traceability</td>
<td>DMM</td>
<td>etc…</td>
</tr>
<tr>
<td>HR Web</td>
<td>Benefits</td>
<td>WPR Vault</td>
<td></td>
<td>etc…</td>
</tr>
</tbody>
</table>

### Datacenter

<table>
<thead>
<tr>
<th>Service</th>
<th>SAP</th>
<th>BI</th>
<th>OIM / OAM</th>
<th>MDMi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exchange</td>
<td>ERP</td>
<td>Directory Svcs</td>
<td>DMM</td>
<td></td>
</tr>
<tr>
<td>BIZ APPI</td>
<td>Support</td>
<td>PLM Agile</td>
<td>etc…</td>
<td></td>
</tr>
</tbody>
</table>

**Strong adoption of SaaS**
- Mature enterprise operations

**xCLOUD : Virtual Private Cloud**
- IT acts as Provider and Broker
- Operate in silos
- Immature cloud technology
- Lack of holistic governance
- Basic concept of chargeback

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### xCloud: Reference Model RAG

#### xCloud Reference Model

<table>
<thead>
<tr>
<th>Capabilities</th>
<th>Service Management</th>
<th>Governance</th>
<th>Deployment</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Service</td>
<td>Service Strategy</td>
<td>Security</td>
<td>Public</td>
<td>General User</td>
</tr>
<tr>
<td>Elastic</td>
<td>Service Catalog</td>
<td>Policy Definition</td>
<td>Private</td>
<td>Power User</td>
</tr>
<tr>
<td>Image Mgmt</td>
<td>Service Levels</td>
<td>Scope</td>
<td>Hybrid</td>
<td>Org Manager</td>
</tr>
<tr>
<td>Orchestration</td>
<td>Service Delivery</td>
<td>Roles</td>
<td>Community</td>
<td>Cloud Admin</td>
</tr>
<tr>
<td>Platform Svcs</td>
<td>Operations Mgmt</td>
<td>Access Control</td>
<td></td>
<td>Cloud Manager</td>
</tr>
<tr>
<td>Backup</td>
<td>Support Mgmt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>Billing / Chargeback</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reporting</td>
<td>Problem Mgmt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-Tenant</td>
<td>Vendor Mgmt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Pooling</td>
<td>Config Mgmt</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Service Management
- Service Strategy
- Service Catalog
- Service Levels
- Service Delivery
- Operations Mgmt
- Support Mgmt
- Billing / Chargeback
- Problem Mgmt
- Vendor Mgmt
- Config Mgmt

#### Governance
- Security
- Policy Definition
- Scope
- Roles
- Access Control

#### Deployment
- Public
- Private
- Hybrid
- Community

#### Roles
- General User
- Power User
- Org Manager
- Cloud Admin
- Cloud Manager
Technology

- Secure private network
- Monthly security auditing
- DDOS protection
- Intrusion protection

- Switches, blades & VMs

- Three copies of data across two data centers kept at all times
- Clustering and HA
- 5/14 day backups
Topology

Cloud

- Compute Policy 1
- Compute Policy 2
- Storage Policy 1
- Storage Policy 2
- Network Policy 1
- Cost Model 1
- Cost Model 2
- vDC 1
- vDC 2

Other Cloupia Clouds

Referenced Image/Template
Layered Services/Apps
Guest Customization
Additional Cost Qualifiers
Access to Storage Catalog

DFM Inputs
vFilter Templates
Resource Pool Management
Protection Manager Policies
Provisioning Manager Policies
xCloud Reference Architecture
Compare With the Theoretical ITU Model

diagram provided by ITU-T (N326)
Before & After

Application #1
- Web-Community with Support for:
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IT?
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- Jive?
- Missing Core Functionalities
- Prod Ops?
- Limited Scaling Not External
- TBD?

1 week

Application #2
- Data Warehouse with Support for:
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IT?
- High Cost Long Delivery Time
- eBI?
- Feature Gaps
- TESO
- Limited Hosting Capability
- TBD: Launch as project in PPMO?

7-16 weeks

1 day
Final thoughts

- There are significant differences in how cloud services are delivered to the various categories of users. The integration of these services with traditional IT operations will remain an important success factor but also a challenge for IT managers.

- The Cloud industry is still in its infancy. We can expect many more developments for IaaS, PaaS and SaaS solutions across business segments and verticals. It will become increasingly important to understand how such services can be combined in a secure and cost-efficient fashion.

- Mobile & virtualised use of data well suited to cloud. Embracing it now will prevent data proliferation on unsuitable services.
For More information

❖ One Web Site to Remember: http://snia.org/cloud
❖ Large Cloud Storage Community
  ✔ http://groups.google.com/group/snia-cloud
  ✔ http://twitter.com/SNIAcloud (@SNIAcloud)

❖ SNIA Cloud Blog Site:
  ✔ http://sniacloud.com
The SNIA Education Committee thanks the following individuals for their contributions to this Tutorial.

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