The progression of Cloud Storage: Hybrids, QoS, and Beyond

Henry Baltazar
The 451 Group
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Commercial progress continues, revenue still small

Reliability and security still a major concerns

Is Hybrid Cloud Storage the key?

The role of QoS in the cloud

What’s missing?
Where are we in cloud evolution? Cloud Phase 2

Phase 1: On-Demand Infrastructure
- 2008
- 2009
- 2010

Phase 2: Management of Cloud Environments
- 2011
- 2013

**PHASE TRANSITION**
- Investments, product intros & new deals point to:
  - Increase in private activity
  - Higher end data
  - Shift to management

**Focus Shifting to Private/Hybrid Clouds**
- Products
  - Automation
  - Management
  - Services
- Customers
  - Enterprise Adoption
  - Elevates Market
- Workloads
  - Production & Mission Critical

**Products**
- IaaS, PaaS, On Ramps

**Customers**
- Developers, Consumers, SMBs

**Workloads**
- Test & Development
  - Project Based

“Public Clouds Dominate”

$4.0BN

$0.5BN

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Cloud Storage Taxonomy

Source: The 451 Group’s Market Monitor: Cloud As a Service

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Who’s using clouds?

Corporate Market: Current Public Cloud Computing Usage

Percentage of Respondents Whose Companies Currently Use Applications that Run on Public Cloud Computing Services

<table>
<thead>
<tr>
<th>Month</th>
<th>Usage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul 2010</td>
<td>11%</td>
</tr>
<tr>
<td>Oct 2010</td>
<td>14%</td>
</tr>
<tr>
<td>Jan 2011</td>
<td>17%</td>
</tr>
<tr>
<td>Apr 2011</td>
<td>17%</td>
</tr>
<tr>
<td>Jul 2011</td>
<td>19%</td>
</tr>
</tbody>
</table>

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Cloud use cases

And in which of the following areas does your company currently support applications that run on public cloud computing services? (Check All That Apply)

<table>
<thead>
<tr>
<th>Area</th>
<th>Current Survey Jul '11</th>
<th>Previous Survey Apr '11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Systems</td>
<td>39%</td>
<td>35%</td>
</tr>
<tr>
<td>Customer Relationship Management (CRM)</td>
<td>35%</td>
<td>29%</td>
</tr>
<tr>
<td>Document and Enterprise Content Management (ECM)</td>
<td>22%</td>
<td>17%</td>
</tr>
<tr>
<td>Collaboration Tools</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Business Intelligence/Reporting and Analytics (BI)</td>
<td>21%</td>
<td>14%</td>
</tr>
<tr>
<td>Disaster Recovery/Failover</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>B2B e-Commerce (Business to Business)</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Enterprise Resource Planning (ERP)</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>Test and Development</td>
<td>11%</td>
<td>9%</td>
</tr>
<tr>
<td>Supply Chain Management (SCM)</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>Don't Know</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Other</td>
<td>10%</td>
<td>7%</td>
</tr>
</tbody>
</table>
Role of cloud storage

Offsite tape replacement for backup

Cloud Storage for Cloud Compute

Unstructured data archiving
Emerging use cases

Private alternatives to public clouds

Smart Phone and Tablet access

Follow the sun/moon processing
What’s holding back cloud adoption?
Top Inhibitors of Cloud Projects

List the top three inhibitors/roadblocks you had to overcome for your cloud project.

- Change/Learning
- Complexity
- Cost
- Security
- Buy-In

Change and Complexity are key ingredients for Professional Services demand.

Final Cloud W2: Full Sample. n=97. Note that due to multiple responses per interview, total exceeds 100%.
Feeling insecure?

### Corporate Perceptions on Security of Cloud Computing

On the issue of security, how **secure** do you think data is when using the cloud computing services available today - where 1 is Very Unsecure and 10 is Very Secure?

**July 2011**

<table>
<thead>
<tr>
<th>Mean (SD)</th>
<th>Very Unsecure 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Very Secure 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6 (2.2)</td>
<td>6%</td>
<td>6%</td>
<td>12%</td>
<td>9%</td>
<td>14%</td>
<td>13%</td>
<td>16%</td>
<td>13%</td>
<td>6%</td>
<td>4%</td>
</tr>
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Reliability still a concern

Corporate Perceptions on Reliability of Cloud Computing
Thinking about cloud computing overall, how would you rate the reliability of the cloud computing services available today - where 1 is Very Unreliable and 10 is Very Reliable?
July 2011

<table>
<thead>
<tr>
<th>Mean (SD)</th>
<th>Very Unreliable 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Very Reliable 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4 (2.1)</td>
<td>3%</td>
<td>2%</td>
<td>6%</td>
<td>7%</td>
<td>15%</td>
<td>13%</td>
<td>21%</td>
<td>19%</td>
<td>9%</td>
<td>6%</td>
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Amazon outage impact

Effect of AWS Outage on Future Likelihood of Using Cloud

Does the fact that Amazon Web Services (AWS) experienced this outage make your company less likely to use cloud computing in the future, more likely, or has it had no effect?

July 2011

- Significantly Less Likely: 7%
- Somewhat Less Likely: 20%
- No Effect: 50%
- Somewhat More Likely: 1%
- Significantly More Likely: 0%
- Don't Know: 22%

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Cloud storage challenges

- Latency
- Security: encryption and key management
- Legacy applications do not support object storage APIs
- Emerging standards need broader adoption
  - SNIA CDMI
Hybrid cloud storage

On-premises cloud gateway appliance which simplifies the transfer of data from a customer site up to a storage cloud.

The offering can be sold in the form of an appliance or as a VSA (Virtual Storage Appliance), and typically look like a NAS appliance.

Added benefits typically include deduplication, caching, and the ability to speak with multiple clouds.
Examples of hybrid cloud storage

**Bottomless NAS Gateway**
- Earliest iteration of hybrid storage
- Looks and functions like a file server
- Pushes older content to cloud, keeps warm data local
- Replacement for NAS and backup

**Disaster Recovery Appliances**
- Replicate data out to remote storage cloud for offsite protection
- Provide backup and bare metal restore functionality
- Have the ability to fill in for servers after an outage

**Primary Storage Replacement**
- Function as a iSCSI storage target
- Identify active content and push old data out to cloud
- Replaces storage arrays
Case Studies: Backup replacement

MedPlast Group
600 employee company specializing in thermoplastic and elastomer molding
Backup infrastructure
  - Veeam + Data Domain (Operational)
  - CommVault (Offsite tape)
Moving to StorSimple writing to Amazon S3 cloud

Large energy company
6PB of seismic data with 6TB daily change rate
Offsite tape backups
  - Cost $2 per GB,
  - Recovery could take weeks
Moved to Panzura hybrid controllers and private cloud storage
  - Cost $0.50 per GB
  - Recovery in hours
Case Studies: NAS replacement

NYU Langone Medical Center

- 4 Tier Storage architecture
  - EMC VMAX, IBM XIV, Windows NAS, Offsite Storage
- Private cloud option: IBM Outsourced
  - $0.87 per GB per Month
- Public cloud with Nirvanix
  - $0.15 per GB per Month, no bandwidth fees
- Hybrid cloud with Panzura Alto Controllers
  - Global Namespace, SSD Cache, Dedup/Compression
- Initially for research data, expanding to email archive and PACS (up to 100TB)
Dialing in performance: QoS

Evolution beyond “cheap and deep” to application storage

Consistent performance in multitenant environments

Enforce performance limits: no gold performance for bronze service levels
QoS and SLA policies

Performance oriented thresholds
maximum and minimum IOPS
maximum and minimum throughput
“burst” mode

Availability
Are credits enough?
Innovation required

Disaster Recovery/ Workload orchestration

Service definitions for backup, archive, and other storage classes

Cross cloud mobility
Thank You

Questions?
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What is a Cloud? A 451 Definition

FIGURE 1: CLOUD INFRASTRUCTURE CRITERIA

Dynamic Pricing Models
Publicly Accessible

Rapid Provisioning & Self-Service
Programmatic Mgmt. Interface

Public Cloud

Internal Private Cloud

Hybrid Cloud

Virtual/Private Cloud

Multi-Tenancy Automation
Virtualization
Scalability & Elasticity

Technology Enablers

Network
Compute
Storage
Enterprise Apps
Security Mgmt. Apps