Data Protection in Transition to the Cloud

David A. Chapa, CTE
Seagate Technology

Author:
SNIA - Data Protection & Capacity Optimization (DPCO) Committee
SNIA Legal Notice

- The material contained in this tutorial is copyrighted by the SNIA unless otherwise noted.
- Member companies and individual members may use this material in presentations and literature under the following conditions:
  - Any slide or slides used must be reproduced in their entirety without modification
  - The SNIA must be acknowledged as the source of any material used in the body of any document containing material from these presentations.
- This presentation is a project of the SNIA Education Committee.
- Neither the author nor the presenter is an attorney and nothing in this presentation is intended to be, or should be construed as legal advice or an opinion of counsel. If you need legal advice or a legal opinion please contact your attorney.
- The information presented herein represents the author's personal opinion and current understanding of the relevant issues involved. The author, the presenter, and the SNIA do not assume any responsibility or liability for damages arising out of any reliance on or use of this information.

NO WARRANTIES, EXPRESS OR IMPLIED. USE AT YOUR OWN RISK.
About the SNIA DPCO Committee

- This tutorial has been developed, reviewed and approved by members of the Data Protection and Capacity Optimization (DPCO) Committee which any SNIA member can join for free.

- The mission of the DPCO is to foster the growth and success of the market for data protection and capacity optimization technologies.
  - Online DPCO Knowledge Base: www.snia.org/dpco/knowledge
  - Online Product Selection Guide: http://sniadataprotectionguide.org

- 2015 goals include educating the vendor and user communities, market outreach, and advocacy and support of any technical work associated with data protection and capacity optimization.

Check out these SNIA-DPCO Tutorials at www.snia.org/education/tutorials

- Intro to Data Protection: Backup to Tape, Disk and Beyond
- Trends in Data Protection
- Advanced Data Reduction Concepts
Abstract

Organizations of all types and sizes are moving many, but usually not all, applications and data to public and private clouds, and the hybrid environments thus created are an increasing challenge for those responsible for data protection. There are many new services available in the cloud for backup and disaster recovery that can help, but IT managers want to avoid setting up separate data protection procedures for each of the parts of their hybrid environments.

Topics will include:
- Trends in cloud usage and the impact on data protection
- New services available for backup and disaster recovery
- Benefits of managing data protection in today's cloud environment
Overview

- Cloud: Defined
- Research & Trends
- Deployment Models & Challenges
- Summary
- Questions to Ask you CSP for Data Protection
Cloud: Defined

SNIA Dictionary
- [Cloud] A set of data processing components that can be automatically provisioned by consumers, over a network and that provide secure multi-tenancy

Wikipedia
- Cloud computing, or something being in the cloud, is an expression used to describe a variety of different types of computing concepts that involve a large number of computers connected through a real-time communication network such as the Internet

Cloud Computing for Dummies
- The “cloud” in cloud computing can be defined as the set of hardware, networks, storage, services, and interfaces that combine to deliver aspects of computing as a service
Research & Trends
## Top of Mind: Key IT Priorities

<table>
<thead>
<tr>
<th>Initiative</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Security Initiatives</td>
<td>32%</td>
<td>34%</td>
</tr>
<tr>
<td>Improving Backup and Recovery</td>
<td>29%</td>
<td>26%</td>
</tr>
<tr>
<td>Managing Data Growth</td>
<td>25%</td>
<td>26%</td>
</tr>
<tr>
<td>Increase Use of Server Virtualization</td>
<td>32%</td>
<td>25%</td>
</tr>
<tr>
<td>Desktop Virtualization</td>
<td>24%</td>
<td>25%</td>
</tr>
<tr>
<td>Use of Cloud Infrastructure Services</td>
<td>23%</td>
<td>25%</td>
</tr>
<tr>
<td>Regulatory/Compliance</td>
<td>23%</td>
<td>24%</td>
</tr>
<tr>
<td>Business Continuity/DR Programs*</td>
<td>21%</td>
<td>23%</td>
</tr>
<tr>
<td>Build Private Cloud Infrastructure</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Improve Collaboration Activities*</td>
<td>19%</td>
<td>22%</td>
</tr>
</tbody>
</table>

*Source: Enterprise Strategy Group, 2014, 2015 IT Spending Intentions Survey*

*Not in 2014 Top 10*
Cloud Trends

- **2008 - 2011**: Top three barriers to entry
  - Security, Access and Control
- Cloud solutions have matured
- Many concerns relieved
- Driving nearly 90%* who plan, or are using cloud today

*Source: Enterprise Strategy Group, 2014 IT Spending Intentions Survey*
Deployment Models & Challenges
Main Aspects of Cloud Technology

**Features**
- Elastic
- Reliable
- Virtual
- Availability
- Security

**Types**
- IaaS
- PaaS
- SaaS

**Modes**
- Private
- Public
- Hybrid

**Technology**
- Virtualization
- Deduplication
- Monitoring
- Replication
- Storage Tiering

**Service Options**
- Backup as a Service
- DR as a Service
- Archive as a Service
- Deep Storage Archive

**Expanded Services**
- Monetizing data
- New XaaS Offerings
- Secured Data Anywhere

Source: EU CORDIS
*aaS Types: Defined

- **Software as a Service (SaaS)**
  - Delivery over a network, on demand, of the use of an application

- **Infrastructure as a Service (IaaS)**
  - Delivery over a network of an appropriately configured virtual computing environment, based on a request for a given service level

- **Platform as a Service (PaaS)**
  - Delivery over a network of a virtualized programming environment, consisting of an application deployment stack based on virtual computing environment; typically PaaS is based on IaaS, and is either self-provisioned or provisionless, and is billed based on consumption
*aaS Types: Simple Overview

- **Software as a Service (SaaS)**
  - HR Solutions
  - CRM
  - Cloud backup solutions

- **Infrastructure as a Service (IaaS)**
  - Foundation to run your system or solution
  - Hardware, network, firewalls, etc.
  - Disaster Recovery as a Service

- **Platform as a Service (PaaS)**
  - An architecture on which to build your applications/services
Deployment Models for Backup

Public Cloud SaaS: Secure & Multi-tenant

Hybrid Cloud: Secure & Multi-tenant

Private Cloud: Secure & Single Tenant
Deployment Models

❖ Public Cloud
  ❖ 100% connected cloud solution, e.g., SaaS
  ❖ Typically equipment is not on premise
  ❖ Secure and Multi-tenant

❖ Hybrid Cloud
  ❖ On and off premise assets
  ❖ In-house servers and storage + cloud resources
  ❖ Both public cloud and private cloud

❖ Private Cloud
  ❖ Either owned or rented
  ❖ Only 1 tenant
Considerations

▷ Key considerations for choosing a deployment model

▷ What are the benefits?

▷ Questions to ask a CSP for data protection
Choosing a Deployment Model

Key considerations

- Total amount of data to protect
- RTO / RPO
- Is your data already in the cloud?
- Frequency of restores/recoveries
- Limited or no IT staff/budget
Cloud Based Data Protection: Benefits

- **Replication based data protection**
  - Efficiently use resources
  - Transfer data incrementally

- **Eliminate costs and complexities**
  - Reduce or eliminate tape

- **Security**
  - Data encryption at rest and in flight
  - Securely store data offsite
  - Ubiquitous data access
Cloud Based Data Protection: Benefits (Cont.)

- **Limit Exposure and Reduce Risk**
  - Hybrid Cloud for faster recovery
  - Meet offsite compliance faster over legacy solutions

- **CSP: Extends your IT environment**
  - Interview CSP as though a badged employee
  - Documented Process and Procedures
    - Access
    - Upgrades
    - Security breaches
    - Communication…
Cloud Based Data Protection: Benefits (Cont.)

Cost of ownership
- Compare existing solution vs. Proposed Cloud Solution
- Amortize acquisition costs over three years

Recovery
- File recovery
  - Caching device (local), provides benefit of fast recoveries
- System recovery
  - Recovery at the volume or system level
- Operational recovery
  - Recovery from a disaster: business continuity plan
- RTO defines best of breed options
## Cost Comparison (Example)

### Cloud Data Protection Solution (Data to Protect=10TB, 10% Annual Growth)

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Cost/Month/3 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Backup Service</td>
<td>48,000</td>
<td>48,000</td>
<td>48,000</td>
<td>$4,000/mo</td>
</tr>
<tr>
<td>Hybrid Appliance w/SW</td>
<td>150,000</td>
<td>0</td>
<td>0</td>
<td>4,200/mo</td>
</tr>
<tr>
<td>HW Maintenance</td>
<td>15,000</td>
<td>15,000</td>
<td>15,000</td>
<td>$1,250/mo</td>
</tr>
<tr>
<td>SW Maintenance</td>
<td>18,000</td>
<td>18,000</td>
<td>18,000</td>
<td>$1,500/mo</td>
</tr>
<tr>
<td><strong>Total Monthly Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$10,950/mo</strong></td>
</tr>
<tr>
<td><strong>Total Solution Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$394,200</strong></td>
</tr>
</tbody>
</table>

### Traditional HW/SW Backup Solutions (Data to Protect=10TB, 10% Annual Growth)

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Cost/Month/3 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW Acquisition Costs</td>
<td>145,000</td>
<td>0</td>
<td>0</td>
<td>$4,025/mo</td>
</tr>
<tr>
<td>Software Maintenance</td>
<td>30,450</td>
<td>30,450</td>
<td>30,450</td>
<td>$2,540/mo</td>
</tr>
<tr>
<td>Tape/D2D HW costs</td>
<td>230,000</td>
<td>12,000</td>
<td>12,000</td>
<td>$7,055/mo</td>
</tr>
<tr>
<td>Maintenance</td>
<td>23,000</td>
<td>23,000</td>
<td>23,000</td>
<td>$1,900/mo</td>
</tr>
<tr>
<td><strong>Total Monthly Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$15,520/mo</strong></td>
</tr>
<tr>
<td><strong>Total Solution Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$558,720</strong></td>
</tr>
</tbody>
</table>
Summary: Cloud Data Protection

❖ **Cloud enables IT agility**
  - Do more with what you have today
  - Cloud + Data Protection = Perfect Storm
  - From data protection to disaster recovery
  - Ubiquitous cloud storage access

❖ **Optimize IT staff resources**
  - Set it and forget it protection
  - Increase IT bandwidth focus on more projects
Summary (Cont.)

❖ Offset CAPEX with OPEX
  ❖ Reduce onsite footprint (CAPEX)
  ❖ Move some operations to cloud (OPEX)
  ❖ Lower total cost of ownership

❖ Maintain better control
  ❖ Minimize local copies for fast recovery
  ❖ Actively Archive Data from primary to cloud
  ❖ Reduce physical onsite storage requirement
Questions to ask your CSP for Data Protection

❖ Cloud Provider 1 versus Cloud Provider 2

❖ Security
  › Do you support Encryption?
    – “In-flight” and “at-rest”
  › How is Key Management (Encryption) handled?
  › Is there a back-door to access the data?

❖ Physical Access

❖ Data Communication
  › What are the options for data being transferred?

❖ Data Privacy
  › How do you ensure my data remains private?

❖ Request a Proof of Concept (POC)

❖ What is the liability that the CSP accepts?
Source Citations

Cloud, Defined

- SNIA
  - http://snia.org/education/dictionary/c
- Wikipedia
- Cloud Computing for Dummies
  - http://www.dummies.com/how-to/content/what-is-cloud-computing.html

Research and Trends

- Source: Enterprise Strategy Group
- 2015 Spending Intentions Report
Main Aspects to Cloud

- Source: EU Commissioned Research Report
- “The future of cloud computing”
The SNIA Education Committee thanks the following individuals for their contributions to this Tutorial:

Authorship History
Name/Date of Original Author here:
DPCO Committee – 01/2014

Updates:
DPCO Committee – 03/2014
DPCO Committee – 03/2015

Additional Contributors
Ashar Baig
David A. Chapa
Kevin Dudak
David Hill
Gene Nagle
Ron Pagani
Thomas Rivera
Tom Sas
Gideon Senderov
Paul Talbut

Please send any questions or comments regarding this SNIA Tutorial to tracktutorials@snia.org