Building the Business Case for the Cloud

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Abstract

❯ **Building the Business Case for Clouds – Moving Beyond Vanilla Use Cases**

- The fast emerging cloud services business arena is creating numerous new opportunities for both IT users and IT players beyond the traditional Enterprise IT ecosystem.

- This presentation will cover popular use cases for cloud including storage clouds and enterprise or application specific clouds including multi-tenancy, private, and hybrid clouds while exploring why IT professionals are interested in each use case.

- SNIA's Cloud Storage Initiative (CSI) has created the Cloud Data Management Interface (CDMI) that can assist in cloud implementations and incorporation into your business case to prevent lock-in or solution obsolescence.

Cloud Storage

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Advancing storage & information technology

- ❖ **451 Group on cloud:**
  - ◆ "Cloud is a way of using technology, not a technology in itself – it's a self-service, on-demand pay-per-use model. Consolidation, virtualization and automation strategies will be the catalysts behind cloud adoption."

- ❖ **Forrester Research on cloud:**
  - ◆ "A pool of abstracted, highly scalable, and managed compute infrastructure capable of hosting end-customer applications and billed by consumption"
 - ◆ Cloud Storage use cases: Storage for SaaS, B/R, File Storage

- ❖ **SNIA: Data Storage as a Service (DaaS)**
  - ◆ [Services] Delivery over a network of appropriately configured virtual storage and related data services, based on a request for a given service level.
  - ◆ Typically, DaaS hides limits to scalability, is either self-provisioned or provision-less and is billed based on consumption.

- ❖ **Why Cloud Services:**
  - ◆ Agile IT environments across coordinated layers
  - ◆ Reduce capital costs, optimize operational costs
  - ◆ Leverage expertise from all service dimensions
  - ◆ Pay for the IT you use, not just what is needed for peak times
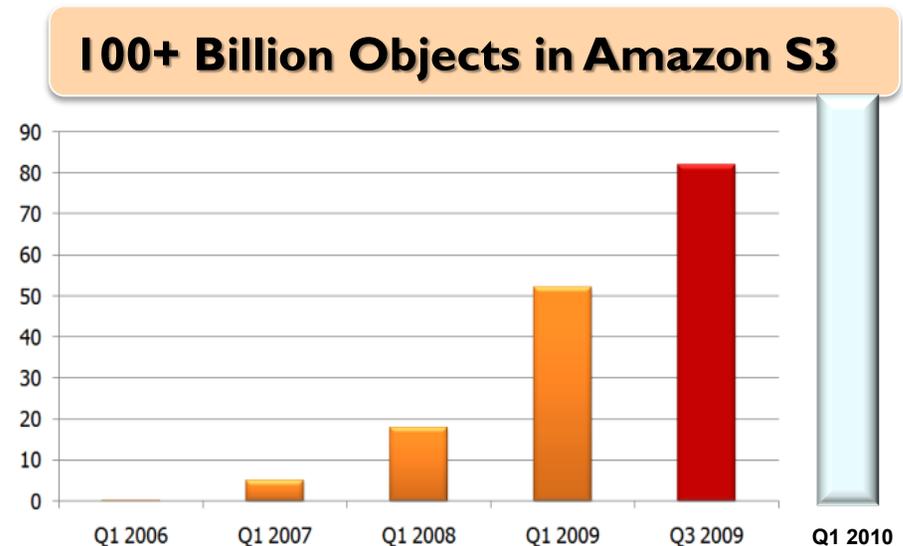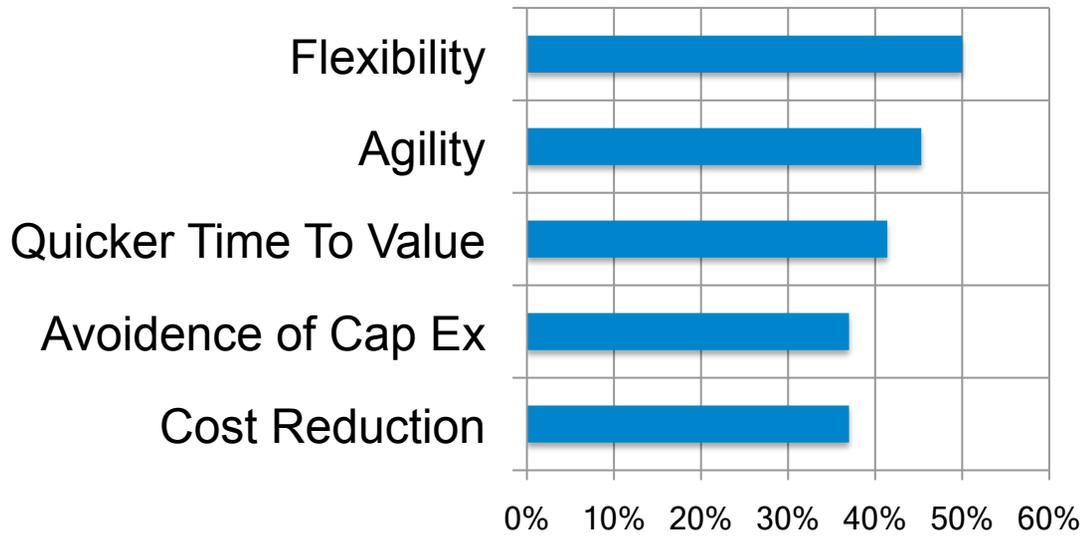
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Taxonomy for Cloud
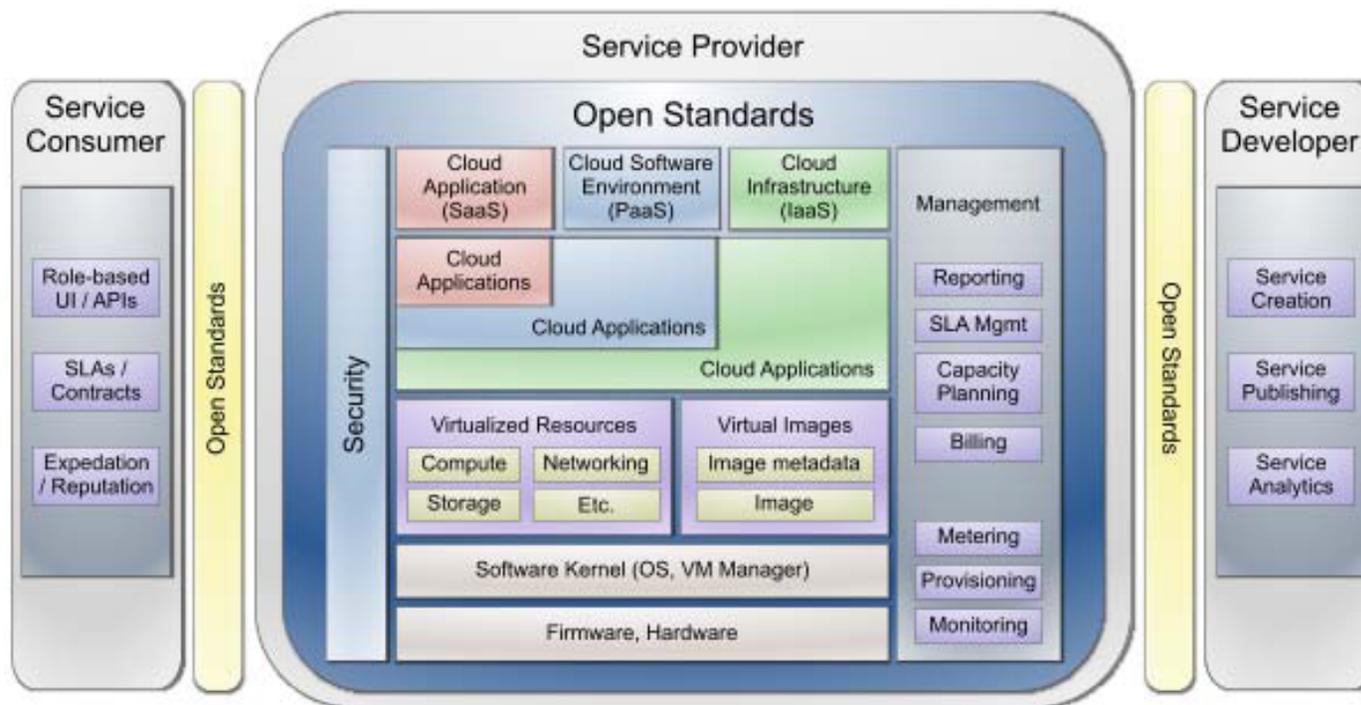
Source: http://cloud-computing-use-cases.googlegroups.com/web/Cloud_Computing_Use_Cases_Whitepaper-3_0.pdf

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What is Cloud Storage Used For so far?

❖ **Elastic demand for web media** with many variations of media types and locations

❖ **Data tiering**
  ◆ Replication / Sync of files/objects to the Cloud
  ◆ Cloud-based secondary/tertiary storage

❖ **Backup to the Cloud**
❖ **Archive to the Cloud**
  ◆ including Compliance, Retention and e-Discovery

❖ **Storage for Cloud Computing**
❖ **Storage for Cloud Application / SaaS**

100+ Billion Objects in Amazon S3

Cloud Drivers / Inhibitors

Flexibility

Agility

Quicker Time To Value

Avoidance of Cap Ex

Cost Reduction

0% 10% 20% 30% 40% 50% 60%
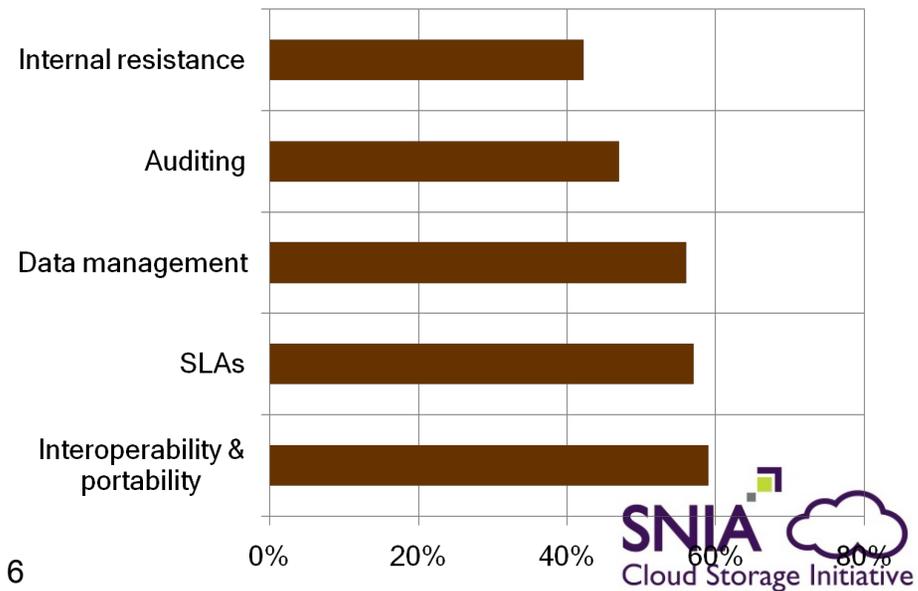
IT Users motivated by improving IT resource management with cloud services…

… but hesitant about existing tools and service guarantees!

Internal resistance

Auditing

Data management

SLAs

Interoperability & portability

0%   20%   40%   60%   80%

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NIST* Cloud Computing Attributes

On-demand self-service

- *A consumer can unilaterally provision computing capabilities as needed automatically without requiring human interaction with each service's provider*

Broad network access

- *Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms*

Resource Pooling

- *The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand*
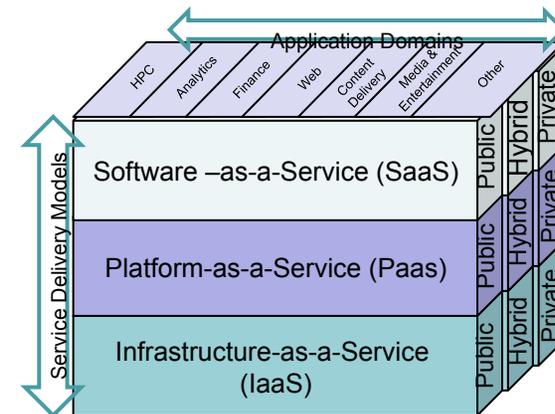
Rapid Elasticity

- *Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in*

Measured Service

- *Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service*

Storage Cloud Flavors

◆ **A Storage Cloud can be created as public, private or hybrid**

- Public – secure multi-tenant externally hosted

- Private – secure single or multi-tenant usually hosted in-side the firewall or by a 3rd party

- Hybrid – combination of (public and private) cloud infrastructures and services

◆ **Storage Cloud may be mixed with other Cloud services**

Application Domains

HPC, Analytics, Finance, Web, Content Delivery, Media & Entertainment, Other

Service Delivery Models

Software –as-a-Service (SaaS)

Platform-as-a-Service (Paas)

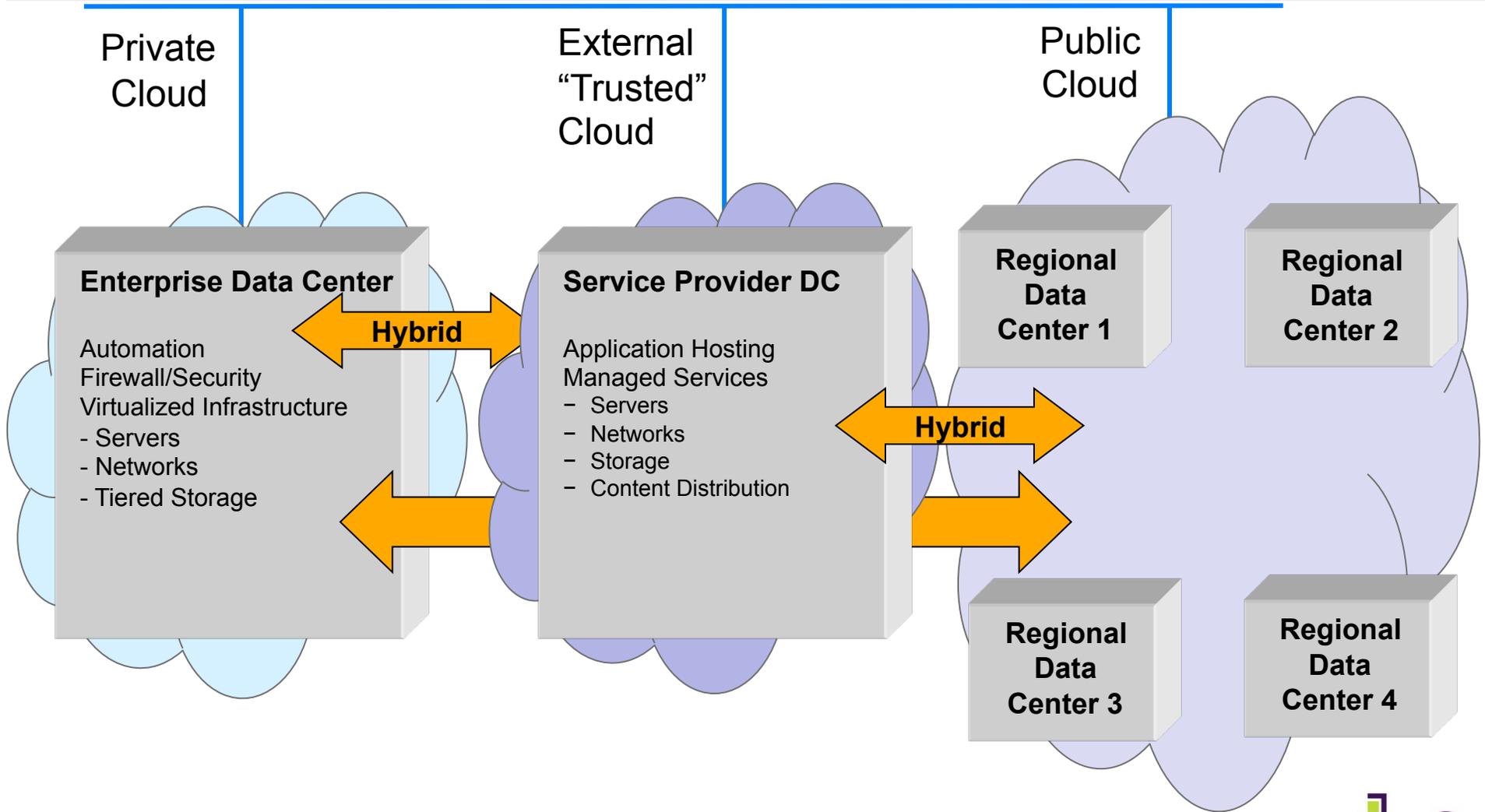Infrastructure-as-a-Service (IaaS)

Public, Hybrid, Private

SOURCE:
Cloud Security and Privacy,
Mather,
Kumaraswamy,
Latif,
2009, O'Reilly,
ISBN:
978-0-596-80276-9.

* Service Provider Interface

Check out SNIA Tutorial:
Cloud Storage – Securing CDMI

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Private, Hybrid & Public Clouds

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Private Cloud

External "Trusted" Cloud

Public Cloud

Enterprise Data Center

Automation
Firewall/Security
Virtualized Infrastructure
- Servers
- Networks
- Tiered Storage

Hybrid

Service Provider DC

Application Hosting
Managed Services
  − Servers
  − Networks
  − Storage
  − Content Distribution

Hybrid

Regional Data Center 1

Regional Data Center 2

Regional Data Center 3

Regional Data Center 4

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Multi-Tenancy in Storage Cloud

◆ **What is multi-tenancy:**

- ◆ "the terms multi-tenant and multi-tenancy are not new; both have been used to describe application architectures designed to support multiple users, resource owners or "tenants" for many years. With the advent of cloud computing, this terminology has simply been extended to include any cloud architecture"

◆ **Secure multi-tenancy:**

- ◆ Application layer
- ◆ Server layer
- ◆ Network Layer
- ◆ Storage Layer

- Source: "Storage Multi-Tenancy for Cloud Computing" Whitepaper, Paul Feresten, SNIA CSI Member

Private Storage Cloud

- ◆ **Multiple Tenancy Models**
  - Multi-Tenants
    - › Each Enterprise business unit (e.g. Division, Dept.) has its own dedicated cloud services space
    - › Monitoring, Billing is handled separately for each BU
  - Single-Tenant
    - › All Enterprise BUs are regrouped under the same cloud services space
    - › Service monitoring and billing is jointly organized and internally processed

- ◆ **Private Cloud Infrastructures are usually deployed behind the firewall**
  - In line with the Enterprise security guidelines
  - Geographical dispersion possible

- ◆ **Private Cloud may be hosted by a trusted 3rd party (xSP).**
  - IT resources are dedicated to a single customer with metering and billing matching requested model.
  - Its integration behind the firewall will depend on cloud service uses
  - Segregation of IT resource will be determined by SLA

Hybrid Storage Cloud

◆ **Combination of public and private storage clouds**

 ◆ Different clouds maybe access to different type of services

 › E.g. Storage Tiering – both internal and external services

 › E.g. B/R to the cloud – internal services

 › E.g. Archiving to the cloud - external services

 › E.g. cloud storage for computing – will depend on compute resource location

◆ **Services may be tied to applications layers & services**

 ◆ SaaS/PaaS with storage resource dependencies

 › E.g. B/R, DR services

◆ **Usual misconception about hybrid cloud**

 ◆ Accessing external cloud services from a traditional data center does not make it a hybrid cloud

Options for Cloud Storage

◆ Understand your options for cloud and how to create a cloud business case

◆ Gain an understanding of:

- Use cases
- Requirements
- Advantages

◆ For:

- › Backup/Restore
- › Archive
- › Application Data
- › RFP/RFI

Popular Options for the Cloud

◆ **Backup/Restore**

◆ Archive

◆ Application Data

◆ RFP/RFI

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Backup / Restore

❖ **Business Problem:**

- Business critical data needs to be point-in-time restorable within defined operational constraints

❖ **Traditional Approach**

- Backup software/agents on file servers or desktops backing up to dedicated data systems (disk or tape), usually on premises

❖ **Cloud Approach**

- Backup software/agents backing up to a dedicated dynamic service platform with high capacity and moderate latency backup storage to meet backup window and recovery time objectives

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Cloud B/R Requirements

- ### Cost
    - Lower cost B/R solution than traditional tape or disk based solutions
- ### Capacity
    - Adequate capacity to handle your daily, weekly, monthly backup capacity plus growth
- ### Latency
    - Latency needs to be low enough to meet backup AND recovery objectives but not too expensive to make cost prohibitive
    - Complementary shuttle services may be need especially for ingesting/ restoring large data sets
- ### Manageability
    - Management tools of the B/R service platform need to allow to meet SLA/ SLO as well as to fit within Enterprise guidelines
        - E.g. Asset management, security…

Cloud B/R Advantages

◆ **Lower costs**

- Benefit from the economies of scale from the service provider
- Cost of recovery ought to be included

◆ **Charge-back to business units**

- Focus on more granular/specific requirements vs. bulk-park numbers

◆ **Option to shift burden of meeting SLAs to a service provider**

- An important transition when going cloud

◆ **Traditional backup environments require your capital investment – scale and efficiencies are experienced by the largest customers**

- Do you over buy capacity or risk running out of capacity and risk paying a higher price?
- Are you prepared to cover the cost of technology refreshes

◆ **Cloud B/R service platform can include capacity optimization**

- Deduplication, compression…

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Deployment Style

❖ **Public Backup Cloud:**

- Turn Capital Expenses into Operating Expenses
- Simplify B/R solution deployment

❖ **Private Backup Cloud:**

- Re-organize B/R as an internal service
- Potential to leverage dedicated backup cloud in an offsite location(s).

❖ **Hybrid Backup Cloud:**

- 3rd party service optimization per application, data type…
- Manage backups to public or private clouds with varying costs, availability, latency, or security

B/R Cloud Radar

Price Range (e.g. $/GB/mth)

Shuttle Service Efficiency

Management SLA/ SLO Objectives

Capacity Optimization Capabilities

B/R Strategy Optimization

Consumer
SMB
SME
Enterprise

Options for the Cloud

◆ Backup

◆ Archive

◆ Application Data

◆ RFP/RFI

Archive

◆ Business Problem

- Business criticality or regulatory compliance require data to be retained for very long periods of time (up to 100 years).

◆ Traditional Approach

- Data is archived to external storage media and stored offsite in a managed archives location (internal or external to the Enterprise)

◆ Cloud Approach

- Data is sent to an archiving service platform providing (very) low cost and high capacity archive storage

Cloud Archive Requirements

❖ **Cost**
- Lower cost archive solution than traditional archive to vault or offsite location
    - Important requirement as the long-term archive market has many mature vendors

❖ **Capacity**
- High capacity to meet growing business requirements
- In line with Enterprise data lifecycle policies

❖ **Latency**
- Latency is less important than cost per se, however some active archive cases require fast access to archived data.
- Complementary shuttle services

❖ **Manageability**
- Ease of integration with Enterprise management policies
- SLA/SLO managed in line with targeted data preservation objectives
- Transparent technology refresh

Cloud Archive Advantages

◆ **Lower costs**
  - Leverage economies of scale from service provider
  - Multi-provider strategy possible

◆ **Shift meeting SLAs to a cloud provider**
  - Focus on key objectives of the archiving function

◆ **Services can be adapted to**
  - Data types (transformation, preservation…)
  - Vertical requirements
  - Specific applications

◆ **Data archiving service providers can complement your team expertise.**
  - Traditional environment requires your staff to have long-term archive expertise, comply with regulatory, compliance, and legal requirements

Deployment Style

❖ **Public Archive Cloud:**

- Turn Capital Expenses into Operating Expenses
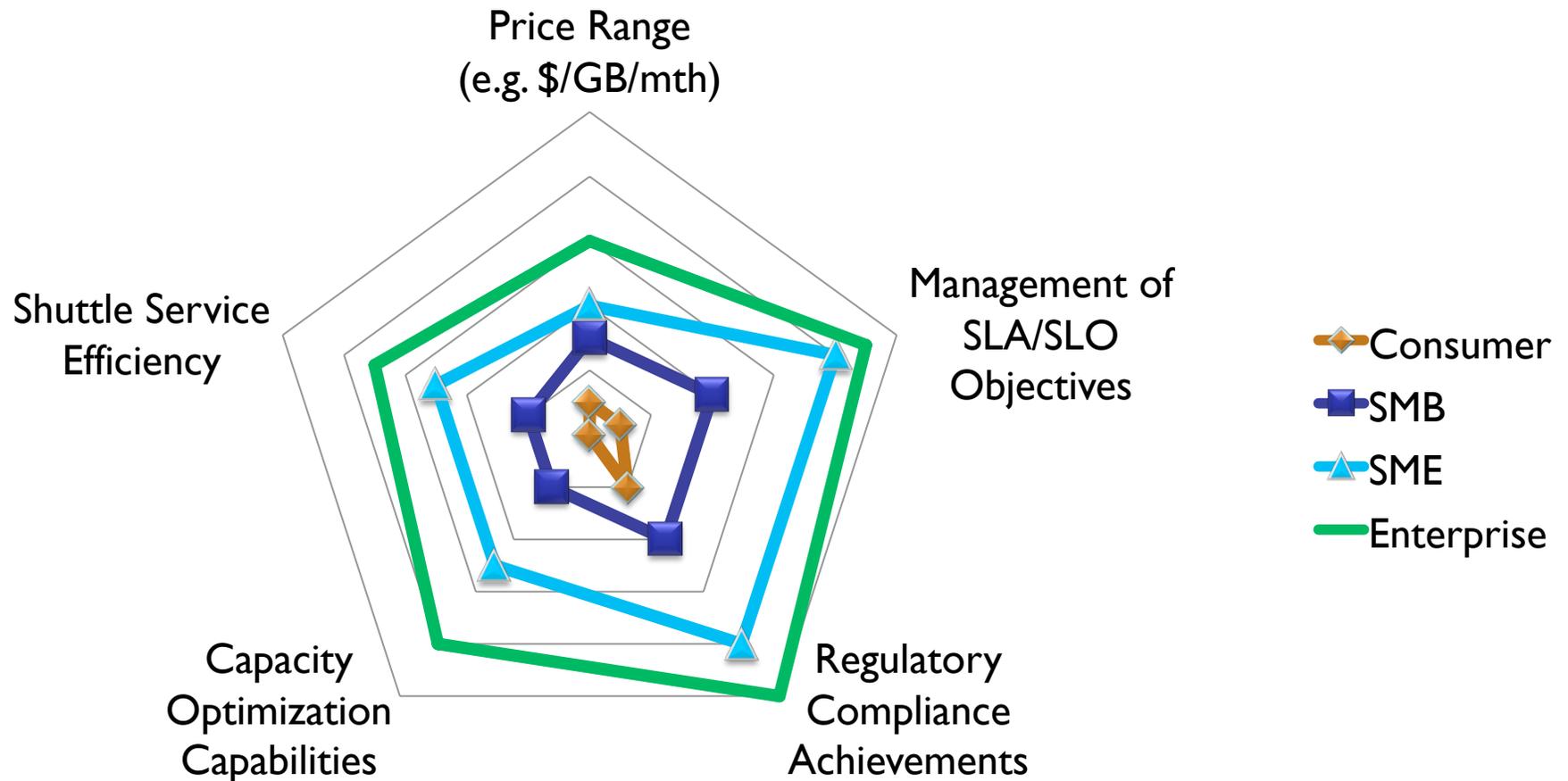- Simplify the installation of archiving functionalities

❖ **Private Archive Cloud:**

- Re-organize Data Archiving as a service
- Potential to leverage dedicated archive cloud in an offsite location(s).

❖ **Hybrid Archive Cloud:**

- 3rd party service optimization per application, data type…
- Combination of public and private archive clouds
  - Possibly different models for different regions of the world or business units to comply with regulatory, compliance, or legal requirements

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Cloud Archive Radar

Price Range
(e.g. $/GB/mth)

Management of
SLA/SLO
Objectives

Regulatory
Compliance
Achievements

Capacity
Optimization
Capabilities

Shuttle Service
Efficiency

- Consumer
- SMB
- SME
- Enterprise

Options for the Cloud

◆ Backup

◆ Archive

◆ Application Data

◆ RFP/RFI

Application Data

- **Business Problem:**
  - Business critical applications and supporting applications require temporary and permanent data with various statuses and lifecycles

- **Traditional Approach**
  - Local disk, DAS, NAS, or SAN(FC/IP)
  - Network: SAN/LAN/MAN/WAN

- **Cloud Approach**
  - Storage cloud providing adequate data services capabilities
    - Size, protection, location, access, distribution

IaaS Requirements

- ### Cost
  - Lower cost storage solution than traditional local disk, DAS, NAS, or SAN, including management cost

- ### Capacity
  - Dynamic Grow/Shrink capabilities for various tiers of storage resources
  - Temporary and longer-term application data storage options that can expand/contract with business needs

- ### Latency
  - Adapted latency to support the various criticality levels of business and support applications
  - Edge acceleration might be required
  - Geographical distribution if needed
  - Specialized delivery when required

- ### Manageability
  - Ease of deployment with existing Enterprise management framework
  - SLA/SLO in line with Enterprise policies
  - Automated/Policy-based data movements to/from Cloud
  - Migration assistance
  - Data Sharing

◆ **Lower costs**

- Leverage economies of scale from provider
- Services adapted to various tiers of storage

◆ **Shift burden of meeting SLAs to service provider**

- Complementary approach to complete necessary IT coverage in various business/technology domains
- Help addressing special requirements (e.g. Application)

◆ **Increasing IT complexity becomes a roadblock to optimize IT only through in-house efforts**

- Traditional storage approach limits your organizations expertise to what you can hire or engage with professional services

IaaS Challenges

- **To multi-tenant or not multi-tenant?**
  - Cloud storage solutions need to allow multiple tenancy models
- **Cloud lock-in**
  - Risks exist from vendors and/or xSP
  - Standards will help to avoid Cloud solutions to be silo'd
  - Importance of API strategy
- **As efficient at large scale as doing it yourself?**
  - How much of my Data Center can really go Cloud?
  - Can IaaS be separated from SaaS, PaaS and other Data Center considerations?
- **Meeting SLAs requirements**
  - Several dimensions: price, performance, availability, protection, security?
  - Monitoring Cloud is key; Adapted billing is required from xSP
- **Security**
  - Can you meet your security requirements with Cloud-based solutions?
  - Can you control your data location?
  - Who can audit the cloud's security
  - Who is liable if compliance/regulatory requirements are not met?
- **Staffing efficiencies**
  - Can Cloud xSP truly replace in-house expertise on all IaaS fronts?

Deployment Style

◆ **Public IaaS Cloud:**

- Turn Capital Expenses into Operating Expenses
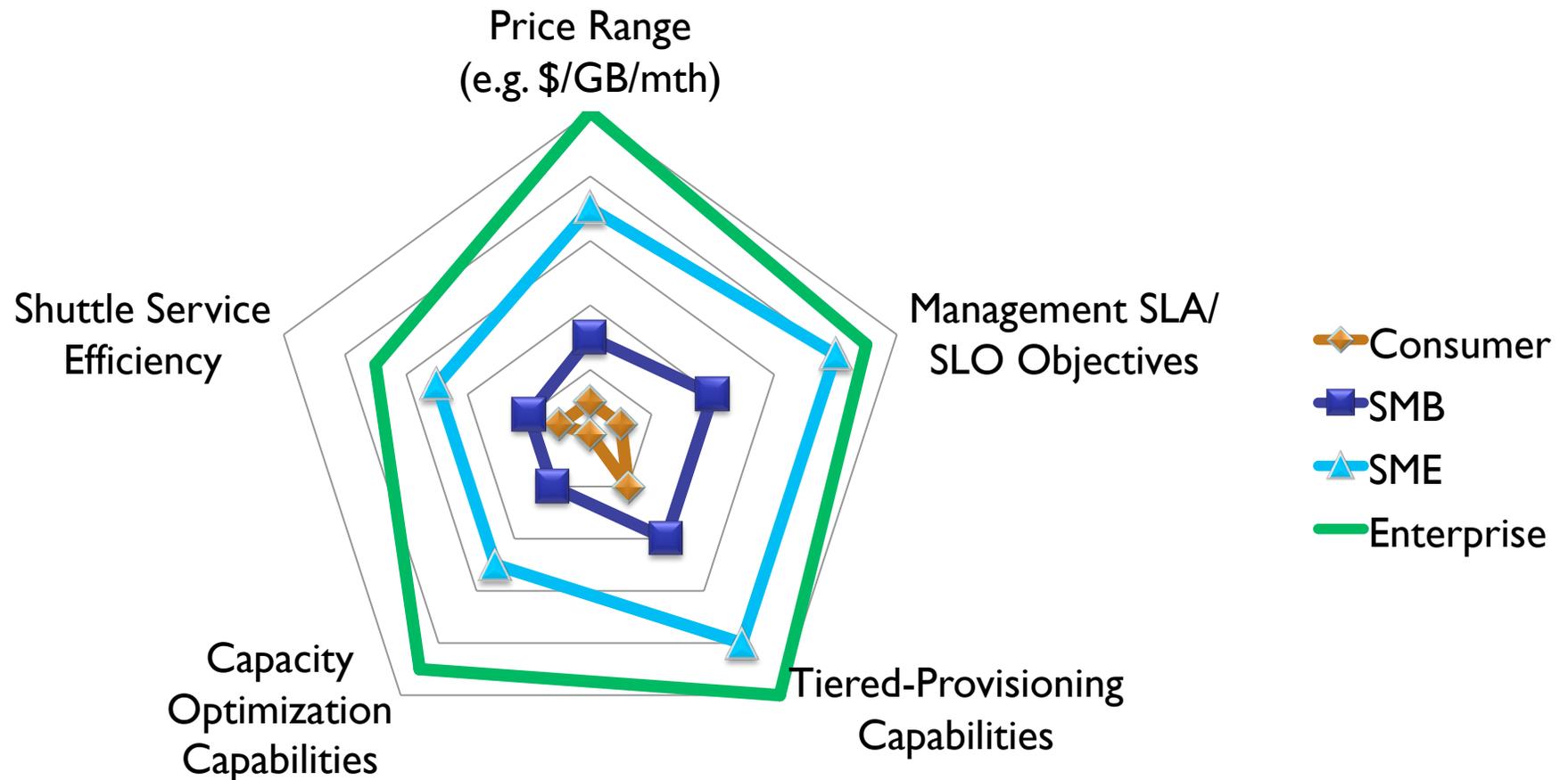- Leverage economies of scale from provider

◆ **Private IaaS Cloud:**

- Re-organize Storage as a Service inside the Enterprise
- Can be combined/aligned with other IaaS services (e.g. Compute)
- Can leverage dedicated 3rd party facility for additional/extended services
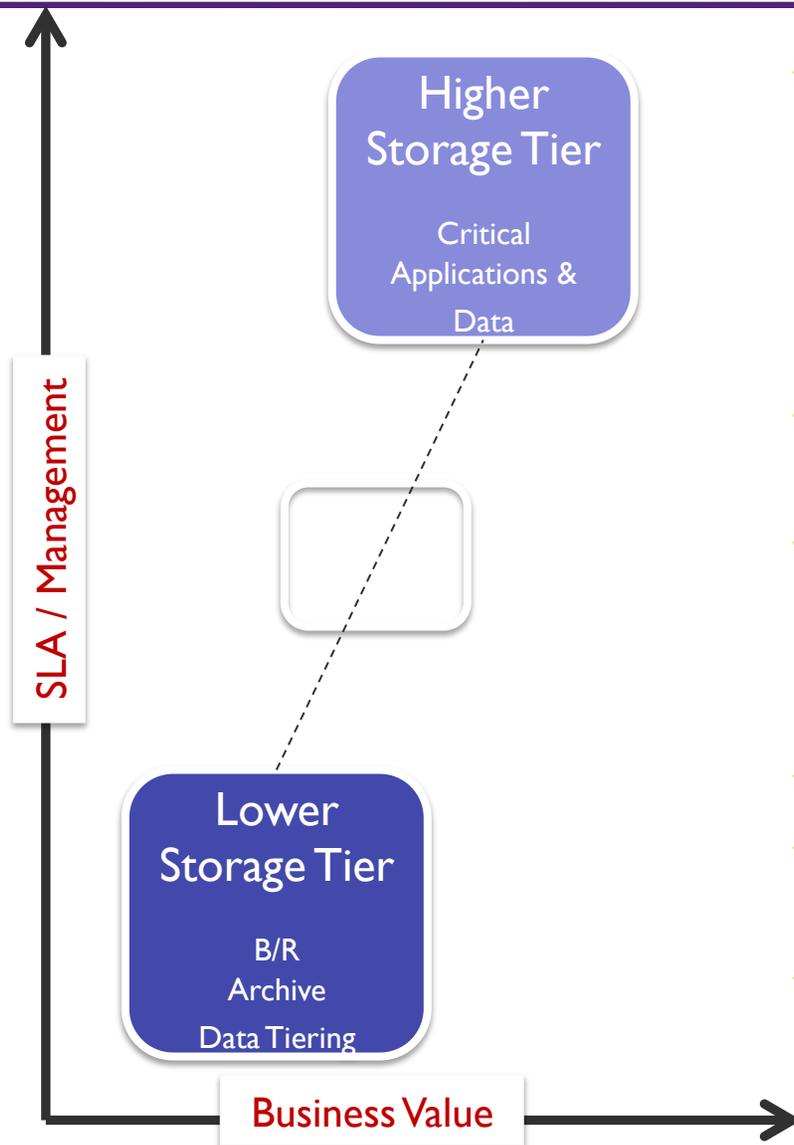
◆ **Hybrid IaaS Cloud:**

- 3rd party service optimization per application, data type…
- Combination of public and private cloud storage services

Storage Services Radar

- Price Range (e.g. $/GB/mth)
- Management SLA/ SLO Objectives
- Tiered-Provisioning Capabilities
- Capacity Optimization Capabilities
- Shuttle Service Efficiency

Legend:
- Consumer
- SMB
- SME
- Enterprise

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Options for the Cloud

- Backup
- Archive
- Application Data
- **RFP/RFI**

RFP/RFI

Higher Storage Tier

Critical Applications & Data

Lower Storage Tier

B/R
Archive
Data Tiering

SLA / Management

Business Value

- ❯ **Understand your Cloud strategy for SaaS, PaaS, IaaS**
  - ◆ Define your key objectives and success criteria
  - ◆ E.g. Management, deployment, billing, uptime, security…
- ❯ **Understand your options: public, private, or hybrid storage cloud**
- ❯ **Identify what portion of your Enterprise data will go Cloud**
  - ◆ Applications, data types, expected growth…
- ❯ **Identify impacted IT locations**
- ❯ **Defense against Cloud solution lock-in**
  - ◆ Best practices, standards (e.g. CDMI)
- ❯ **Understand/establish your Cloud (Storage) API strategy**

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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.

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THANK YOU!