Provisioning Your Own Private Cloud Storage

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Market Drivers

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The world is getting smarter – more instrumented, interconnected, intelligent.

Smart traffic systems

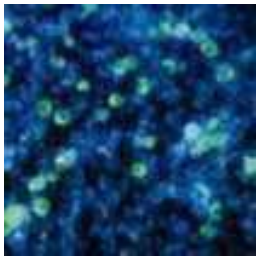
Intelligent oil field technologies

Smart food systems

Smart healthcare

Smart energy grids

Smart retail



Smart water mgmt

Smart supply chains

Smart countries

Smart weather

Smart regions

Smart cities

As the planet gets smarter the information explosion and rapid change create new challenges

10x

Digital data is projected to grow tenfold from 2007 to 2011

55K PB/Mo

Global Internet traffic volume expected by 2013

1 trillion

Number of devices will be connected to the Internet by 2011

83%

Percentage of CIOs who expect to face substantial change over the next three years

Yet today's IT infrastructure is under tremendous pressure and is finding it difficult to keep up…

It will reach a breaking point

85% idle

In distributed computing environments, up to 85 percent of computing capacity sits idle

82%

Percentage of executives who report a security breach and aren't confident they can prevent future breaches

66%

66 percent is spent on maintaining current IT infrastructures versus adding new capabilities

78%

Percentage of CIOs who want to improve the way they use and manage their data

There is a greater need for IT to help address business challenges

Doing more with less

Reduce capital expenditures and operational expenses

Reducing risk

Ensure the right levels of security and resiliency across all business data and processes

Higher quality services

Improve quality of services and deliver new services that help the business grow and reduce costs

Breakthrough agility

Increase ability to quickly deliver new services to capitalize on opportunities while containing costs and managing risk

There are three ways to acquire IT capabilities

Software, hardware and services

Pre-integrated systems and appliances

Provided as services

Cloud computing is a new delivery and consumption model or methodology spanning all 3 ways.

Cloud Computing

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Defining the cloud

Computing infrastructure and some business functions can live virtually, “in the cloud.”

- **Technical** people see a more efficient way to organize IT assets.
- **Executives** see a better way to run the business.
- **Consumers** benefit!

Computing resources such as:

- Processing power
- Storage
- Databases and messaging

An emerging paradigm:

- Four walls and a floor no more
- Tap into the virtual resources when needed
- Everything is provisioned by the cloud

Standardized services enable automated provisioning and delivery

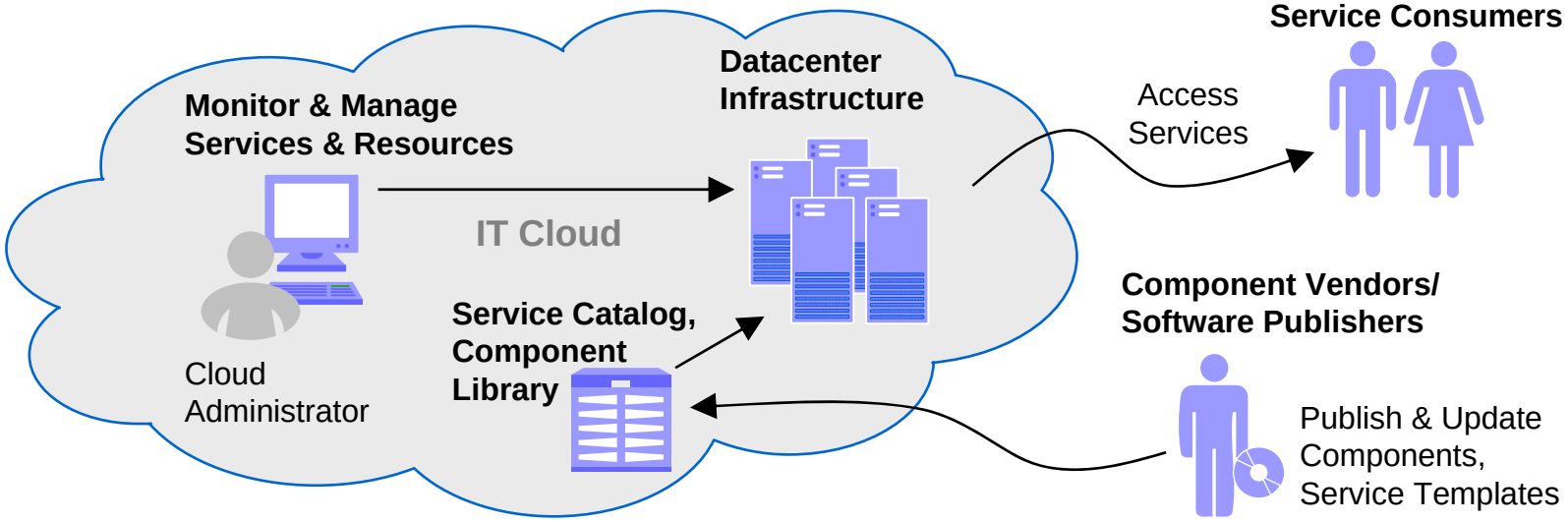
What is Cloud Computing?

A user experience and a business model

- Cloud computing is an emerging style of IT delivery in which applications, data, and IT resources are **rapidly provisioned** and provided as **standardized offerings** to users over the web in a **flexible pricing model.**

An infrastructure management and services delivery methodology

- Cloud computing is a way of managing large numbers of highly **virtualized resources** such that, from a management perspective, they resemble a single large resource. This can then be used to deliver services with **elastic scaling**.



Cloud computing is…

A user experience *and* a business model

- **Applications**
- **Data**
- **IT resources**

… provided as services over the network

An infrastructure

- **Provision**
- **Deploy**
- **Operate**

… virtualized computing resources over an intranet or the Internet

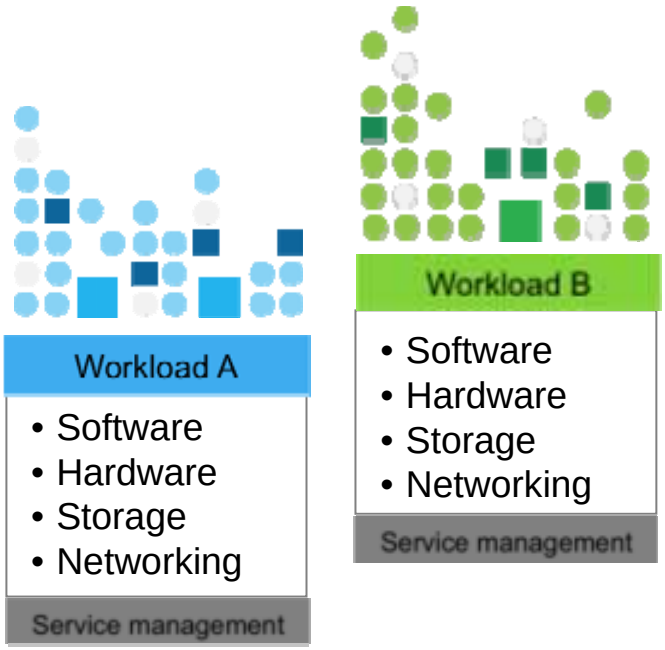
An acquisition and delivery model

- **Acquire computing services through the network**
- **Improve business performance**
- **Control costs**

A way to reduce IT complexity and accelerate business value

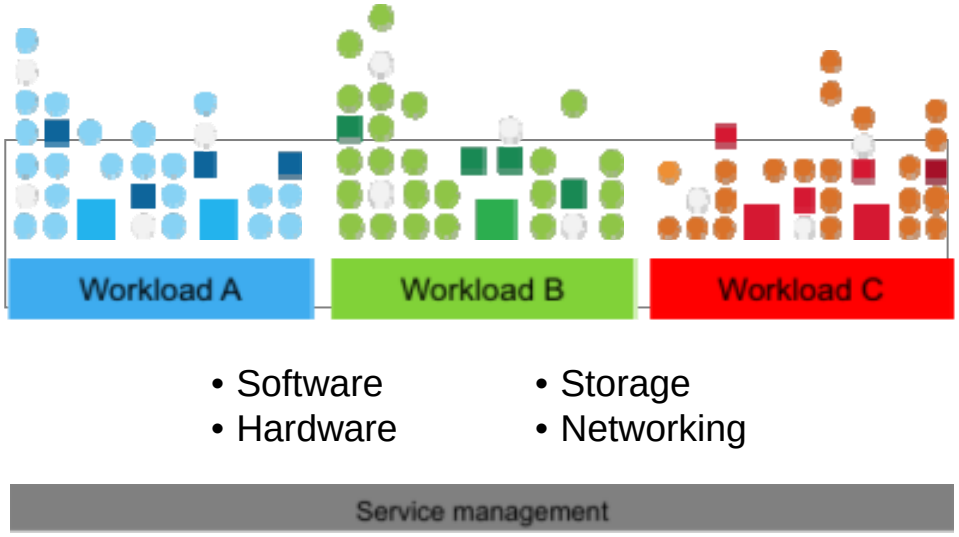
What is different about cloud computing?

Without cloud computing



With cloud computing

- Virtualized resources
- Automated service management
- Standardized services
- Location independent
- Rapid scalability
- Self-service



Cloud computing delivers IT and business benefits

Virtualized

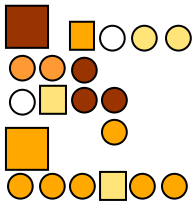
Higher utilization
Economy of scale benefits
Lower capital expense

Standardized

Easier access
Flexible pricing
Reuse and share
Easier to integrate

Automated

Faster cycle times
Lower operating expenses
Optimized utilization
Improved compliance
Optimized security
End user experience



Doing more with less

Higher quality services

Breakthrough agility and reducing risk

Business Benefits of Cloud Computing

1. **Accelerates innovation**
2. **Lowers costs/Reduced TCO/ High ROI**
3. **Provides competitive differentiation**
   - Creates sustainable advantage
4. **Lowers barriers to new business creation**
5. **Reduces and manages risk**
   - Ensures compliance
   - Contains costs
   - Improves business flexibility
6. **Reduces IT operational expenses, including:**
   - Development costs
   - Management costs
   - Integration costs
   - Energy consumption

Cloud implementation types

Private Cloud

- Owned and managed by the enterprise
- Limits access to enterprise and partner network
- Drives efficiency, standardization and best practices
- Retains high degree of control, privacy and security
- Enables business to more easily customize services
- Reduces deployment time for new services
- Accessed from "inside" the firewall

Considerations

- Is best for help desk, desktop, e-mail and application servers
- Uses outside help for implementation, assessment and education
- Supplements traditional outsourcing

Public Cloud

- Owned and managed by service provider
- Limits access to subscribers
- Delivers select set business process, application or infrastructure services on a “pay per use” basis
- Highly standardized
- Limited customization options
- Accessed from "outside" the firewall

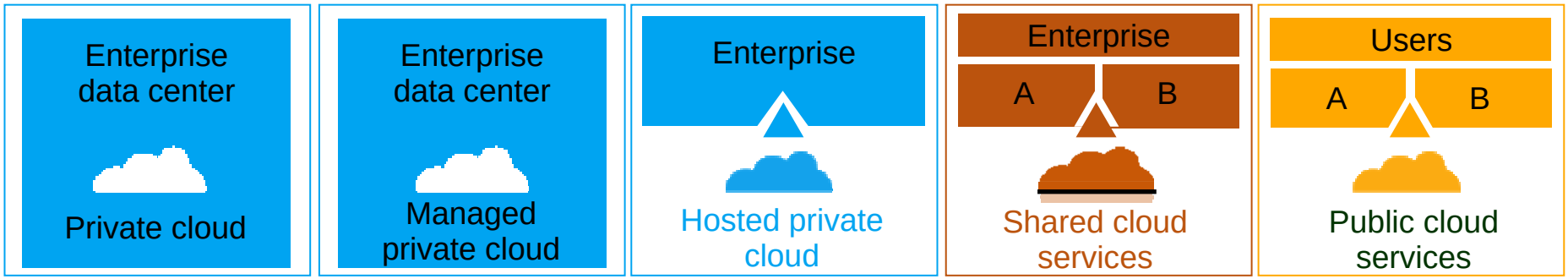
Considerations

- Is best for conferencing, continuity/data recovery and customer relationship management (CRM)/ salesforce automation
- Offers improvements in system reliability/ availability
- Enables consumption-based pricing
- Is ideal when data security/ privacy is perceived as an issue

There is a spectrum of deployment options for cloud computing

Private
IT capabilities are provided "as a service," over an intranet, within the enterprise and behind the firewall

Public
IT activities / functions are provided "as a service," over the Internet



Hybrid Internal and external service delivery methods are integrated

Cloud is not appropriate for all solutions

Some traditional IT services come with significant migration costs and risks. Cloud computing cannot provide the necessary scalability without disrupting service. Existing resources may be insufficient to meet requirements. Cloud computing can help augment existing service levels.

Examples include:

- **Database applications**
- **Transaction-processing systems**
- **ERP workloads**
- **Highly regulated services**

Storage Cloud

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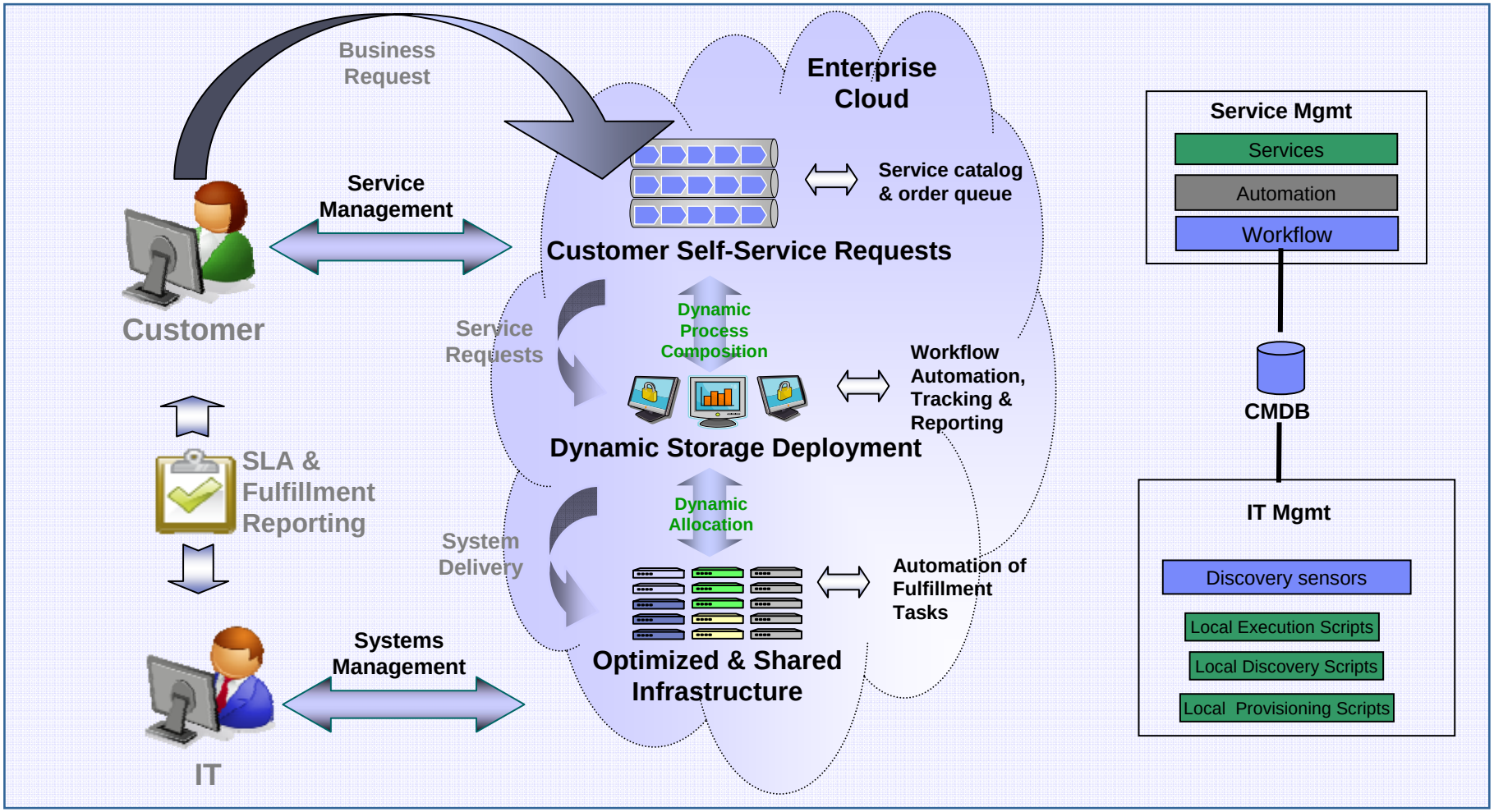
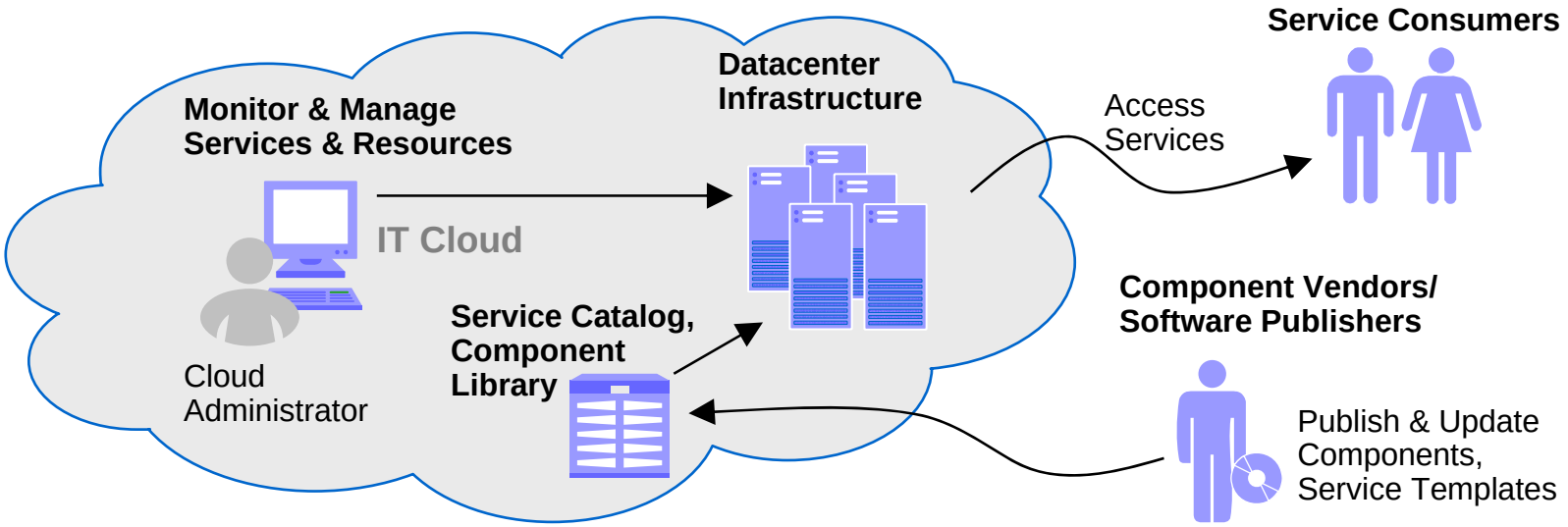
Architecture Overview of Storage Cloud Services



What are clients looking for in a Storage Cloud?

- First and foremost, clients want a lower cost option.
- They also want to only pay for what they use.
- And they want to get it fast, when they need it.
- Finally, they want it to be really easy to manage.



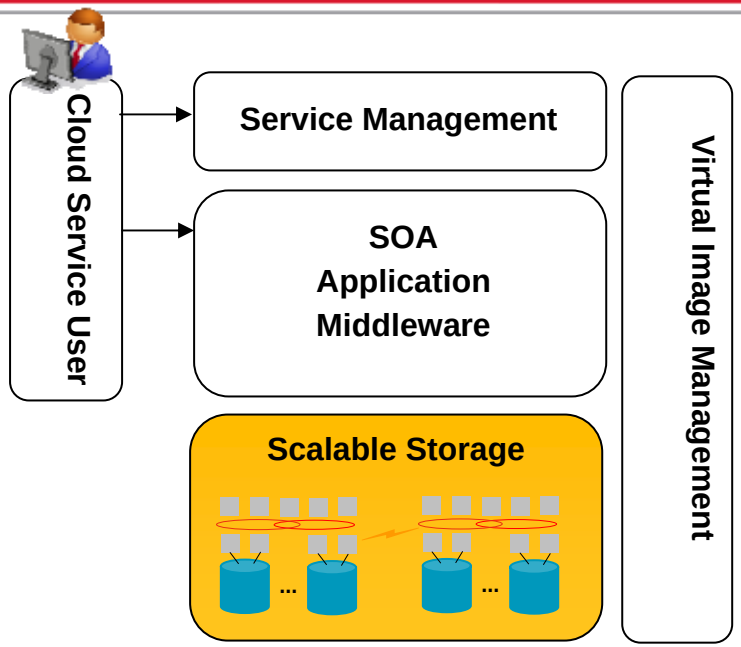
Building Storage Clouds

Requirements for Storage in Clouds

- Highly virtualized storage layer
- Clustered storage, built on standard parts
- Non-Disruptive, Self-managing for:
  - Recovery on failure of HDDs, paths, etc.
  - Capacity upgrades
  - Load balancing
- Integrated with Service Management, Virtual Server image management
- Scalable capacity and performance
- Reliability
- Ease of install, configuration, management
- Replication, Data migration, Snapshots
- Thin Provisioning

Value proposition:

- Large scale/low cost storage
- Automated operations
- Rapid response to new workload demands



Required Complimentary 'Cloud' Investment

- Application Middleware layer

  Integration with common middleware (e.g. Oracle, SAP, Netbackup..), and Virtual Image and Service management
- Service Management Layer

  Need policy mechanisms for Service User to control storage functions
- Virtual Image Management Layer

  Translate service policy to application, storage, server, and data management controls
- Cloud Service User

  Client functions to discover and invoke service, assert policy for application and data management

Tivoli Storage helping with Clouds

SAN Volume Controller

- Virtualisation
- Thin Provisioning
- High availability and reliability
- Non-disruptive migrations
- Scalability and performance
- Replication, Snapshots
- Ease of management and configuration

Tivoli Productivity Center

- Storage Resource Management
- Monitoring of capacity
- Monitoring of performance
- ILM
- Alerting
- Automated Provisioning
- Scalable with heterogeneous environment
- Integration with TIP and BIRT

Clouds Data Protection

- Tivoli Storage Manager (TSM) can provide LAN-Free Backup capabilities to the various storage pool owned by a cloud solution. This can free up Ethernet links for better end user response time.

- An extension to TSM - Space Management can provide significant cost savings in reducing data on primary storage pools, moving less used data to less costly storage devices/pools (Hierarchical Storage Management).

- If there is a remote storage pool for a cloud solution that has no storage administration personnel, Tivoli FastBack should be considered as an automated disk to disk backup solution - with an option to then forward backup data to the central storage site.

Other IBM Solutions

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IBM CloudBurst

Integrated service management offering with network, servers, storage, quickstart services, and financing as an integrated offering for client test platforms.

Customer Benefits

- ✓ **Improved time to value-** Quickly deliver a private cloud using a preloaded and integrated system
- ✓ **Improved innovation-** Dramatically improve business value and IT's effect on time-to-market by delivering services faster
- ✓ **Decrease capital expenses** – Maximize capital usage and reduce added capital expense.
- ✓ **Reduce complexity and risk-** With automation and standardization the human error factor is minimized.

Now includes Tivoli Service Automation Manager 7.2

- Self serve portal
- Service catalog
- Provisioning
- Integration

Designed from IBM client engagements

IBM CloudBurst at a Glance

- A **service delivery platform** that is pre-integrated at the factory
- **Built-for-purpose** based on the architectural requirement of specific workloads
- Delivered and supported as a **single product**
- **Prepackaged, pre-configured** servers, storage, networking, software and installation services needed to stand up a **private cloud**

GTS Quickstart Services:

Installation and configuration

Deploy and integrate BladeCenter hardware in customer data center and network

Configure local storage area network

Configure users and security profiles

Configuration and discovery of virtualized compute, network and storage resources

Configure self- service portal

On-Site introductory Training

Overview and hands-on platform training including topics like:

BladeCenter, local SAN and network switch management

Administrator and user level training

Cloud Software Configuration:

- Systems Director 6.1.1 with BOFM, AEM; ToolsCenter 1.0; DS Storage Manager for DS4000 v10.36; VMware VirtualCenter 2.5 U4; LSI SMI-S provider for DS3400
- VMware ESXi 3.5 U4 hypervisor on all blades
- Tivoli Provisioning Manager v7.1
  - DB2 ESE 9.1; WAS ND 6.1.0.13; TDS 6.1.0.1
  - Special purpose customized portal and appliance wizard that enables client portal interaction
- Tivoli Monitoring v6.2.1
  - OS pack

Base Hardware Configuration:

- 1 42U rack
- 1 3650M2 Systems Management Server
- 1 HS22 cloud management blade
- 1 BladeCenter H chassis with redundant Ethernet and Fibre Channel switch modules
- 3 managed HS22 blades
- DS3400 FC attached storage

SoNAS Overview

- **Unified management of petabytes of storage**
  - Automated tiered storage, centrally managed and deployed
- **Global access to data, from anywhere**
  - Single global namespace, across petabytes of data
- **Based on standard, open architectures**
  - Not proprietary
  - Avoids lock-ins
  - Leverage worldwide Open Source innovative technology
- **Provides and exceeds today's needed requirements for:**
  - Scale-out capacity, performance, global virtual file server
  - Extreme scalability with modular expansion
- **High ROI**
  - Significant cost savings due to auto-tune, auto-balance, automatic tiered storage
- **Position to exploit the next generation of storage technology**
  - Superb foundation for cloud storage

Thank You !!!

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