Cloud Storage in a PaaS World

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Cloud Storage runs “Apps”

- Just like a Platform runs Applications, there are many Applications that need to run in Cloud Storage
  - Backup/Restore, Archive, Retention, De-Dup, Compression, Encryption
  - BUT: these are applications (aka data services) launched and managed by the cloud provider
- Cloud Providers need to be able to create a bill that reflects which data services were run against each customer’s data
Ordering Cloud Data Services

- Instead of launching cloud-storage-based data services directly, the cloud user sets the “data requirements” for each set of data
  - Expressed through metadata
  - Provider bills for the data services that are therefore run against the data so marked
- Different “classifications” of data can thus receive different “treatments”
  - Provider’s bill reflects this, drives the cloud user to better Data Classification (to optimize bill)
Management Software and Automation will thus play an increasing role in the new Cloud based world.

- Marshaling and Orchestrating storage and networking devices plus data services software to meet the data requirements.
- Simplifying the setup and administration of those resources into pools that are drawn on by the cloud user.

Look for vendors that understand this and are moving their product lines in this direction.
Cloud Services

Public Clouds

- SaaS
- PaaS
- IaaS

Technology in public clouds
- Enterprise deployment option
- Power 3rd party public clouds

Private Cloud Platform

Private Cloud

- Apps
- PaaS
- IaaS

Run on private shared platform or public SaaS model
Private Clouds Are Gaining Momentum

2010 Survey* of Independent Oracle User Group Members

Benefits of Private Cloud Computing

- Cost Savings: 43%
- Better Workload Mgmt: 25%
- Agility: 25%
- Greater Info Sharing: 7%

Concerns Over Public Cloud

- Security: 43%
- Cost: 25%
- Qos: 25%
- Other: 7%

* Preliminary findings from the IOUG ResearchWire member study on Cloud Computing, conducted in August-September 2010.
Cloud Management Capabilities

Cloud Management Capabilities

- Self-Service Provisioning
- Metering and Chargeback
- Policy-Driven Resource Mgmt
- Capacity Planning
- Assembly Packaging

Foundation Capabilities for Managing Datacenters

- Configuration and Compliance
- Application Performance Management
- Lifecycle Management
- Full Apps to Disk Management
- Application Quality Management

Applications
Middleware
Database
Operating System
Virtual Machine
Servers
Storage
Cloud Management: Key Differentiators

- **Comprehensive Cloud Lifecycle Management**
  - Setup, Deploy, Monitor, Patch, Policy-Driven Scale In/Out, Retire

- **Broad and Complete Enterprise Services**
  - Choice of IaaS, DaaS, PaaS from single Self-Service interface
  - Choice of physical and virtual environments (x86, Sparc)

- **Business-Driven, Application-Aware**
  - Business-Driven Application Management
  - Integrated Application-to-Disk Management
Complete Enterprise Services

Infrastructure-as-a-Service (IaaS)

Data(base)-as-a-Service (DBaaS)

Platform-as-a-Service (PaaS)

Increasing Enterprise Value
CernerWorks is a remote hosting division of Cerner, providing turnkey healthcare IT solutions to hundreds of US-based hospitals.

CernerWork’s Skybox Services is centrally managed by Oracle Enterprise Manager (EM).

All of the DB targets are centrally managed in EM; EM exposes only the db instances to the DBAs employed at their respective hospital.

Challenges
Cerner had to meet rigorous security and compliance standards set for their healthcare industry.

Business Value
Reduction of Capex by $9.5M, improve IT performance and Increase DBA efficiency to support 12% client growth, no new staff.
Complete Cloud Lifecycle Management

Oracle Enterprise Manager

Setup Cloud Infrastructure

Build App & Package as Appliance

Setup Cloud Policies

Deploy

Decommission

Scale Up/Down

Monitor

Patch
Cloud Setup: Infrastructure as a Service

**EM driven Tasks**

### Cloud Administrator
1. Provision Bare metal Hypervisor
2. Configure Storage Arrays and network (VLAN)
3. Create Server Pools
4. Define Zones based on functional and operational boundaries
5. Configure Software Library

### Self Service Administrator
1. Define allowable VM sizes
2. Assign quotas to Users and Roles
3. Define access boundaries (map roles to zones)
4. Setup Chargeback Plans
5. Make software available for deployment by Self-Service users
Cloud Setup: Database as a Service

**EM driven Tasks**

1. **Cloud Administrator**
   - Provision Servers and Storage
   - Provision Database Software on single instance servers or RAC
   - Create database server pools
   - Define Zones based on functional and operational boundaries
   - Configure Software Library

2. **Self Service Administrator**
   - Define Deployment Procedures for Database Provisioning
   - Assign quotas to Users and Roles
   - Define access boundaries (map roles to zones)
   - Setup Chargeback Plans and maintenance levels
   - Define a service in Service Catalog for deployment by Self-Service users
Oracle Virtual Assembly Builder

Package Complex, Multi-Tier Applications

- Package up complex structure from dev/test and reconstitute in production
- Minimize setup time and risk of hard-to-debug configuration errors
- Easily replicate in production with minor variations
- Each production instance has well-contained configuration parameters for flexibility
Oracle VM 3.0 Architecture

Storage
- FC / iSCSI / NFS Storage Repositories
- Raw block device mapping to VM

Server Pool
Management UI
Oracle VM Manager
Storage Connect
Oracle VM 3.0 Storage

- Support for iSCSI, FC and NFS
- Flexible configuration options:
  - VMs and pools can use storage from multiple sources simultaneously.
  - Repositories can be shared between multiple clusters
  - VMs can use raw devices directly
- All options are configurable from the UI
Oracle Storage Connect (OSC)

- Built as a generic Linux framework
- Allows the user to manage storage arrays from Oracle VM Manager
- Uses advanced features available from the storage arrays
- Allows the user more control over the storage provisioning process
- Designed as a plug-able architecture:

Oracle VM Manager

Oracle VM Server

Storage Connect Framework

Generic Plug-in

Vendor Plug-in

OCFS2 / NFS

Managed Storage Systems
Storage Connect Partners:

- NetApp™
- Hitachi Data Systems
- Sun
- Oracle
- EMC²
- Fujitsu
- Pillar Data Systems
Self-service Provisioning

- Out-of-box console; no additional set up required
- Rich service catalog:
  - Oracle VM Templates
  - Complete Assemblies
  - Database service
  - Java applications
  - ............
- Additional capabilities include
  - Basic resource monitoring
  - Chargeback information
  - Quota monitoring
- Cloud APIs – submitted to DMTF
  - RESTful APIs ideal for Cloud integrators
Policy based Resource Management

- Dynamically allocate resources based on pre-defined policies
  - Scale out and scale back actions to support Capacity On Demand
- There are two policy categories:
  - Schedule based
    - Invoke actions based on schedules. Example: Quiesce VMs on weekends
  - Performance based
    - Invoke actions based on performance (metrics) of targets
      - Example: Add a RAC node if the load node exceeds 90%
Complete Test Lifecycle Automation

Self Service Lab Management
Define and Run Test Suits

Automatic Provisioning of Test Hardware, Software and Data

Faster Testing
Reduced Manual Effort
Quick Defect Discovery and Resolution

Integrate Performance Diagnostic
Test Metering and Chargeback

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Self-Service: IT: Dev/Test

- 2600 physical servers,
- 6000 VMs, 4 IT Admins
- 3500 developers
- 80% utilization 7x24

DevOps - User: susan.wu

Current Backorders
Place In Backorder Queue Image Date Requested Actions
28 Oracle Linux v4.0 (32-bit) 2011-06-15 10:33:40,7112679 Cancel
1 backend.

Reservations
Request new reservation:
You have a MSDN license — Windows image options enabled
Reservation Type: Long-Term Entitlement (365 Days)
You are at your limit and unable to request more until you release some of you
Insight Into Oracle Use Cases
Various Type of Requirements

Inter Connected Data Centers
- Global Data Centers
  - Austin, TX
  - Colorado Springs, CO
  - Sandy, UT
- Geo-Located Data Centers
- Micro On Premise Unit

Still Globally Operated
- USA, Czech Republic, Romania, Egypt, India, Singapore
Chargeback & Metering
Enterprise Manager + Billing and Revenue Management

Cloud Services
- Applications
- Middleware
- Database
- OS
- Virtualization

Cloud Management
- Oracle Enterprise Manager
  - Configuration Mgmt
  - Lifecycle Management
  - Application Performance Management
  - Application Quality Management
- Ops Center
  - Physical & Virtual Systems Management

Cloud Monetization
- Oracle Billing and Revenue Management
  - Pricing/Charging Flexibility
  - Customer Management
  - Complete Billing Operations
  - Value Chain Management
  - Business Intelligence

Provisioning
Usage data collection
Balance Control
Metered Usage
Bill/Invoice generation and delivery
## Chargeback Metrics

- Flexibility to create Charge Plans based on Fixed, Configuration and Usage
- Service based metric tracking for schema based multi-tenancy

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<th>Target</th>
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<th>Configuration or Metrics</th>
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<tr>
<td>Database</td>
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<td>Host or VM</td>
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<tr>
<td></td>
<td></td>
<td>CPU, allocated memory, disk size</td>
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<tr>
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<td>CPU utilization, memory usage, disk utilization,</td>
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