Cloud Computing Strategy

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VP Infrastructure and Management
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Cloud Computing and Virtualization Are Top CIO Priorities

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<tbody>
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<td>Virtualization</td>
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<td>Cloud computing</td>
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<td>Web 2.0</td>
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<td>Networking, voice and data communications</td>
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<td>Business intelligence (BI)</td>
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<td>Mobile technologies</td>
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<tr>
<td>Data/document management and storage</td>
<td>7</td>
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<td>9</td>
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<td>Service-oriented applications and architecture</td>
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<td>10</td>
<td>7</td>
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<tr>
<td>Security technologies</td>
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<td>5</td>
<td>6</td>
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<tr>
<td>IT management</td>
<td>10</td>
<td>10</td>
<td>*</td>
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</tbody>
</table>

Source: Gartner. Leading in Times of Transition. The 2010 CIO Agenda
Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

This cloud model promotes availability and is composed of:

### 5 Essential Characteristics
- On-demand self-service
- Resource pooling
- Rapid elasticity
- Measured service
- Broad network access

### 3 Service Models
- SaaS
- PaaS
- IaaS

### 4 Deployment Models
- Public Cloud
- Private Cloud
- Community Cloud
- Hybrid Cloud

Source: NIST Definition of Cloud Computing v15
SaaS, PaaS and IaaS

- **Software as a Service**
  - Applications delivered as a service to end-users over the Internet

- **Platform as a Service**
  - App development & deployment platform delivered as a service

- **Infrastructure as a Service**
  - Server, storage and network hardware and associated software delivered as a service
Public Clouds and Private Clouds

- Used by multiple tenants on a shared basis
- Hosted and managed by cloud service provider

Public Clouds

- SaaS
- PaaS
- IaaS

Private Cloud

- Apps
- PaaS
- IaaS

Trade-offs

Lower upfront costs ↔ Lower total costs
Outsourced management ↔ Greater control over security, compliance, QoS
OpEx ↔ CapEx & OpEx

Enterprises will adopt a mix of public and private clouds
Why Are Enterprises Interested in Cloud? What Are the Challenges Enterprises Face?

**Benefits**

- **Speed**
  - Easy/fast to deploy: 63.9%
  - Pay only for what you use: 61.5%
  - Less in-house IT staff, costs: 67.0%
  - Low monthly payments: 53.3%
  - Offers the latest functionality: 50.0%
  - Encourages more standard IT: 46.3%
  - Sharing systems/information simpler: 43.4%
  - It's the way of the future: 29.1%

- **Cost**

**Challenges/Issues**

- **Security**
  - Performance: 74.6%
  - Availability: 63.1%

- **QoS**
  - Hard to integrate with in-house IT: 61.1%
  - Not enough ability to customize: 55.8%
  - Worried on-demand will cost more: 50.4%
  - Bringing back in-house may be difficult: 50.0%
  - Regulatory requirements prohibit cloud: 49.2%
  - Not enough major suppliers yet: 44.3%

**Do You Provide or Use Internal or Private Clouds?**

<table>
<thead>
<tr>
<th>Status</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, in production at scale</td>
<td>11.3%</td>
</tr>
<tr>
<td>Yes, in limited use</td>
<td>12.8%</td>
</tr>
<tr>
<td>Yes, in pilot stage</td>
<td>4.5%</td>
</tr>
<tr>
<td>Preliminary planning</td>
<td>4.9%</td>
</tr>
<tr>
<td>Under consideration</td>
<td>10.5%</td>
</tr>
<tr>
<td>No</td>
<td>47.4%</td>
</tr>
<tr>
<td>Don’t know/unsure</td>
<td>8.7%</td>
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</tbody>
</table>

28.6% of respondents have internal or private clouds today

Preliminary findings from the IOUG ResearchWire member study on Cloud Computing, conducted in August-September 2010.
<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Yes</td>
<td>13.8%</td>
</tr>
<tr>
<td>No</td>
<td>54.6%</td>
</tr>
<tr>
<td>Under consideration</td>
<td>11.2%</td>
</tr>
<tr>
<td>Don’t know/unsure</td>
<td>20.4%</td>
</tr>
</tbody>
</table>

13.8% of respondents use public clouds today

Preliminary findings from the IOUG ResearchWire member study on Cloud Computing, conducted in August-September 2010.
What Type of Private Platform and Infrastructure Cloud Services Is Your Company Providing?

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Application server platform as a service</td>
<td>24.7%</td>
</tr>
<tr>
<td>Database platform as a service</td>
<td>21.4%</td>
</tr>
<tr>
<td>Identity as a service</td>
<td>4.7%</td>
</tr>
<tr>
<td>Compute as a service</td>
<td>10.2%</td>
</tr>
<tr>
<td>Storage as a service</td>
<td>18.1%</td>
</tr>
<tr>
<td>Software development and test as a service</td>
<td>14.9%</td>
</tr>
<tr>
<td>Don’t know/unsure</td>
<td>20.5%</td>
</tr>
<tr>
<td>None</td>
<td>37.2%</td>
</tr>
</tbody>
</table>

Most popular:
App Server as a service  
Database as a service

Preliminary findings from the IOUG ResearchWire member study on Cloud Computing, conducted in August-September 2010.
Evolution of Private and Public Clouds

Public Cloud Evolution

Public Clouds

Hybrid

Private Cloud Evolution

Silo’d
- Physical
- Dedicated
- Static
- Heterogeneous

Grid
- Virtual
- Shared services
- Dynamic
- Standardized appliances

Private Cloud
- Self-service
- Policy-based resource mgmt
- Chargeback
- Capacity planning

Hybrid
- Federation with public clouds
- Interoperability
- Cloud bursting
Oracle Offers Customers Choice

Cloud Services

Public Clouds

- SaaS
- PaaS
- IaaS

Oracle Technology in public clouds

- Enterprise deployment option
- Power 3rd party public clouds

Private Cloud

- Apps
- PaaS
- IaaS

Oracle Private Cloud Platform

Run on private shared platform or public SaaS model
Oracle on Demand Cloud Services

Oracle On Demand is the premiere cloud service for Oracle software
Oracle Fusion Applications
Deployed on Shared Services Private PaaS

May also be deployed on public cloud
Full Oracle Software Stack Certified and Supported on Oracle VM on Amazon EC2

- Amazon EC2 now supports Oracle VM
- Fully certified and supported: Oracle Database, Oracle Fusion Middleware, Oracle Applications (EBS, PeopleSoft, Siebel), Oracle Enterprise Manager
- Oracle license portability
- Oracle Unbreakable Linux support and Amazon Premium Support
- Amazon Machine Images (AMIs) based on Oracle VM Templates
Oracle PaaS Hosted by Savvis

Savvis Management Portal
- SavvisStation

PaaS customer interface
- Oracle Virtual Assembly Builder

PaaS solution options
- Oracle Database Enterprise Edition & Standard Edition

IaaS solution options
- Oracle Linux
- Oracle VM
Oracle Private Cloud Platform

Platform as a Service

- Shared middleware and database services
- Elastically scalable, highly available
- Extreme performance
- Comprehensive functionality
- Robust development environment
- Rapid deployment

Cloud Management

- Complete cloud lifecycle management
- Complete apps to disk management
- Self-service
- Policy-based resource management
- Metering & chargeback

Infrastructure as a Service

- Shared compute and storage services
- Elastically scalable, highly available
- Physical and virtual
- x86 and SPARC
- Flash, disk and tape storage
Oracle Private Cloud Platform

Applications
- 3rd Party Apps
- Oracle Apps
- ISV Apps

Platform as a Service
- Integration: SOA Suite
- Process Mgmt: BPM Suite
- Security: Identity Mgmt
- User Interaction: WebCenter
- Application Grid: WebLogic Server, Coherence, Tuxedo, JRockit
- Database Grid: Oracle Database, RAC, ASM, Partitioning, IMDB Cache, Active Data Guard, Database Security

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

Extreme Performance, Engineered Systems

- Database and middleware machines
- Unmatched performance, simplified deployment, lower total cost
- Building blocks for public and private PaaS
Server Virtualization and Clustering Deliver Resource Pooling and Elastic Scalability

Both server virtualization and clustering are key technologies for cloud
Server Virtualization Options

Centralized VM Lifecycle Management

- Dynamic Domains
  - M-Series
  - T-Series
- Oracle VM for SPARC
- Containers
  - All SPARC & x86
- Oracle VM for x86
  - All x86
WebLogic Virtualization Option

- Runs natively on hypervisor
  - Higher density
  - Better performance
- Reduced operational cost
  - Simpler patching
  - Improved security
- Same administrative infrastructure
  - WebLogic console + scripting
  - Enterprise Manager JRockit Mission Control
- Custom Java appliances
  - Building blocks for larger assemblies
  - Simple deployment
Oracle Virtual Assembly Builder

- **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

Assembly = Appliances (VM Templates + configuration Metadata) + relationships & start order Metadata
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
- Deploy
Oracle Cloud Platform Key Differentiators

Comprehensive PaaS Solution
- Elasticity across the stack (clustering and server virtualization)
- Integrated hardware and software (Exadata, Exalogic)

Application-Aware Cloud
- Oracle packaged, 3rd party, custom applications
- Application-to-disk and Business Service Level Management

Deployment Efficiency
- Oracle Virtual Assembly Builder
- Oracle WebLogic Server – Virtualization Option

Broad Platform Support
- x86 and SPARC
- Physical and virtual

Complete Cloud Lifecycle Management
- Setup, use, monitor/manage, chargeback
Oracle Leadership in Cloud Computing

• Oracle provides the most complete cloud offering in the industry

• Private PaaS is the natural evolution for enterprise datacenters, and Oracle provides the best foundation for private PaaS

• Exalogic and Exadata provide the foundation blocks for a Cloud Computing infrastructure
Hardware and Software
Engineered to Work Together