Understanding Virtualization and Cloud in the Enterprise

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Virtualization is evolving toward cloud but won’t be subsumed by it
What’s different about the cloud?

**Typical web site**

Your app: virtualized
- 3-tier deployment in your compute pool
- Significant capacity against forecasts traffic pattern
- Clustered database
- Fixed IP addresses
- Oracle or IBM app servers
- 99.999% SLA
- 30 ms latency QoS SLA
- Our security

Your app: in the cloud
- All VMs somewhere on the West coast
- Elastic scaling. Low start cost but big traffic = big bill
- Single database (no clustering)
- Elastic IP addresses (that expire)
- Open source app servers
- 99.95% SLA
- No QoS SLA
- Semi-secure, multitenant environment
<table>
<thead>
<tr>
<th>HPC</th>
<th>Your app: Virtualized</th>
<th></th>
<th>Your app: in the cloud</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grid-based app</td>
<td>Grid-based, but difficult to set up</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dedicated environment (servers and storage)</td>
<td>Shared environment (commodity servers and storage)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dedicated network (low latency between servers and developers)</td>
<td>Shared network (with frequently busy neighbors)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Large dedicated, physical nodes</td>
<td>Small nodes that can disappear… at any time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High speed storage connectivity</td>
<td>No storage latency SLA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tiered, high capacity, contiguous storage environment</td>
<td>Block storage (local hard drive), Object storage (on slow network)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>99.999% SLA</td>
<td>“Where’d my nodes go?”</td>
<td></td>
</tr>
</tbody>
</table>
Four myths about the cloud that you shouldn’t fall for

1. Cloud = server virtualization
2. Cloud = hosting, or outsourcing or the future of both
3. All cloud computing platforms are created equal
4. Clouds cost less
Definition: cloud computing

- A standardized IT capability (services, software, or infrastructure) consumed in a pay-per-use, self-service way
Not everything is or should be cloud

Traditional computing
- Fixed costs/terms
- Varied deployments
- Single tenant
- More manual
- High control
- High customization

Cloud computing
- Variable costs/terms
- Standardized deployments
- Multitenant
- Highly automated
- Low control
- Limited customization

August 2010 “Justifying Your Cloud Investment: Test And Development”
The realities of cloud economics

Optics matter

Clouds cost more, the more you use them

Clouds allow you to bring the bill down to zero
Public cloud is about two things

**Agility**
- Simplicity
- Speed of deploy
- Flexibility

**Outsourcing**
- CapEx to OpEx
- Freeing up people
- Focus on business innovation

**What unites these aims:**
- Standardization of the function or need
- Growing complexity and cost of on-premise operation
- Financial pressures

**Cloud’s Achilles heel:**
- Limited customization
- You adapt to the cloud; it doesn’t adapt to you
- Local privacy and protectionist bounds
Secure cloud computing is an uneven handshake

- Physical support infrastructure (facilities, rack space, power, cooling, cabling, etc)
- Abstracted services (SaaS application, hosted framework, hypervisor, virtual firewall, etc)
- Physical and virtual infrastructure security and availability (servers, storage, network bandwidth, etc)
- Basic monitoring
- Element management
- Your application
- Architectural views (e.g., scalability, availability, recovery, data quality, and security)
- Governance (who has authority / responsibility to make changes and how)
- Lifecycle management (birth, growth, failure, and recovery)
- Enterprise integration (Identity management, access control, etc.)
- Testing, monitoring, diagnosis, and verification
- Network of metadata (categories, capabilities, configurations, and dependencies)
Most enterprises don’t trust public clouds

“Why isn’t your firm interested in pay-per-use hosting of virtual servers (also known as cloud computing)?”

<table>
<thead>
<tr>
<th>Security concerns about security/privacy issues in virtualization or cloud environments</th>
<th>SMB</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>51%</td>
<td>49%</td>
</tr>
<tr>
<td>Too immature</td>
<td>40%</td>
<td>46%</td>
</tr>
<tr>
<td>We believe our total costs are cheaper</td>
<td>37%</td>
<td>39%</td>
</tr>
</tbody>
</table>

Thus:
They want private cloud

Source: Enterprise and SMB North America and European Hardware Survey, Q4 2009
Private clouds are a top priority for 25% of large enterprises

Which of the following initiatives are likely to be your firm's/organization's top hardware/IT infrastructure priorities over the next 12 months?

Build an internal or private cloud operated by IT (not a service provider)

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Don't know/ does not apply</th>
<th>Not on our agenda</th>
<th>Low priority</th>
<th>High priority</th>
<th>Critical priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise (N= 1020) (1000+ employees)</td>
<td>5%</td>
<td>45%</td>
<td>28%</td>
<td>19%</td>
<td>4%</td>
</tr>
<tr>
<td>Midmarket (N= 728) (100 to 999 employees)</td>
<td>1%</td>
<td>56%</td>
<td>27%</td>
<td>13%</td>
<td>4%</td>
</tr>
<tr>
<td>VSB (N=179) (20 to 99 employees)</td>
<td>4%</td>
<td>64%</td>
<td>20%</td>
<td>9%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Base: North American and European hardware decision-makers

Source: Enterprise And SMB Hardware Survey, North America And Europe, Q3 2009
Internal cloud reality check: Barely any enterprises are ready for it

- Cloud infrastructure requires:
  - Standardized operating procedures.
  - Fully automated deployment and management.
  - Self-service access for deployers.
  - Business units sharing the same infrastructure.

Only 5% of enterprises are here today
Virtualization maturity is a journey

- Acclimation
- Strategic consolidation
- Optimization
- “Cloud”
Virtualization maturity stages

**Stage 1: Acclimation**
- Get comfortable with it as a concept and tool
- Deploy for test/dev
- Deploy for non-business critical DR
- Some production deployments — but tactical
- No change to operations processes
- Limited virtualization tool deployments

**Stage 2: Strategic consolidation**
- Comfortable with concept, use, maturity, stability
- Shift mindset from server to virtual server
- Spread production deployments widely
- Begin deployment for some business critical DR
- Painfully transition from server sprawl to virtual server lifecycle management
- Experimenting with live migration and automation.
Virtualization maturity stages

- **Stage 3: VM movement**
  - Using live migration, starting to trust policy-based automation
  - Can utilization rates be increased?
  - Deploy for business critical DR
  - Begin bifurcating applications between priority and non-priority
  - Developing new operational efficiencies
  - Process improvement spreading/butting up against: network, storage, security, development

- **Stage 4: Internal Cloud**
  - Highly automated
  - Multitenant
  - Chargeback/utility tracking
  - SLA and QoS focus
  - Self-service provisioning
    - Test & Dev
    - Then production
  - Some mission critical DR deploys
Virtualization maturity takes time

- **Acclimation**: 12 to 24 months
- **Strategic consolidation**: 18 to 36 months
- **Optimization**: 3 to 5 years
- **“Cloud”**: 12 to 24 months
The struggle: how to get there from here…faster

<table>
<thead>
<tr>
<th></th>
<th>Current state</th>
<th>Desired state</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>IT-centric</td>
<td>Business centric</td>
</tr>
<tr>
<td><strong>Time to deploy</strong></td>
<td>Wks-months</td>
<td>Hours</td>
</tr>
<tr>
<td><strong>Standardization</strong></td>
<td>None-minimal</td>
<td>Strict</td>
</tr>
<tr>
<td><strong>Utilization</strong></td>
<td>5-30%</td>
<td>70-99% with on-demand capacity</td>
</tr>
<tr>
<td><strong>Operations</strong></td>
<td>Mostly manual</td>
<td>Fully automated</td>
</tr>
<tr>
<td><strong>Application model</strong></td>
<td>Various (all)</td>
<td>Composable templates, SOA</td>
</tr>
<tr>
<td><strong>Business services</strong></td>
<td>Undefined</td>
<td>Consistently composed models</td>
</tr>
</tbody>
</table>
## Two approaches

<table>
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<tr>
<th>Current state</th>
<th>Desired state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Must drive process change</td>
<td>Create new processes from business desire</td>
</tr>
<tr>
<td>Retrain and re-skill</td>
<td>Start new, hire new</td>
</tr>
<tr>
<td>Rebuild</td>
<td>New infrastructure</td>
</tr>
<tr>
<td>Retrofit/overlay</td>
<td>All new tools and dashboards</td>
</tr>
<tr>
<td>Rationalize</td>
<td>Leaves legacy behind</td>
</tr>
<tr>
<td>Phase transitions</td>
<td>Start now</td>
</tr>
<tr>
<td>Result: Slow, expensive</td>
<td>Result: Speed, no continuity</td>
</tr>
</tbody>
</table>
## Internal and public aren’t the only options

<table>
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<tr>
<th></th>
<th>Public cloud</th>
<th>Hosted cloud</th>
<th>Internal cloud</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where it resides</td>
<td>Internet-connected data centers</td>
<td>Internet-connected data centers</td>
<td>Corporate data center</td>
</tr>
<tr>
<td>Tenancy model</td>
<td>Multiple clients</td>
<td>Multiple clients</td>
<td>Single company</td>
</tr>
<tr>
<td>VMs reside on</td>
<td>Shared infrastructure</td>
<td>Dedicated but hosted infrastructure*</td>
<td>Dedicated infrastructure</td>
</tr>
<tr>
<td>Security model is</td>
<td>Common across all customers, with limited configurability</td>
<td>Common across all customers, with greater configurability</td>
<td>Unique to the customer</td>
</tr>
<tr>
<td>Cloud managed by</td>
<td>Provider</td>
<td>Provider or IT ops</td>
<td>IT ops</td>
</tr>
<tr>
<td>Infrastructure managed by</td>
<td>Provider</td>
<td>Provider</td>
<td>IT ops</td>
</tr>
<tr>
<td>Billed by</td>
<td>Consumption</td>
<td>Monthly for dedicated infrastructure, excess billed by consumption</td>
<td>Consumption-based metering for BU chargeback or allocation</td>
</tr>
</tbody>
</table>

*Infrastructure may be fully dedicated or partially shared.

Not all clouds are created equal

- **Areas of Choice**
  - Hypervisor
  - Infrastructure type
  - Network
  - Security capabilities
  - Data center type & location
  - Management tools provided

- **Areas of Differentiation**
  - SLA
  - QoS guarantees
  - Recovery services
  - Enterprise connectivity
  - Managed services provided
  - Additional cloud services provided
  - Hybrid options
  - Pricing & billing options
Where to start:  
**Turn test & dev into a self-service center**

- Use RBAC deployment tools
  - Surgent, VMware Lab Manager, Life Cycle Manager, HP Insight Orchestration, Tivoli Provisioning Manager

- Maintain library of VM templates

- Leverage resource scheduling tools

- Build to practices that automate promotion to QA, then production
So, what should you do?

Build a cloud leverage team
- Invite your most innovative thinkers
- Use hybrid architectures to optimize deployments
- Build a cloud management model

Start in pockets
- Test and development
- New web-based projects (green field)
- HPC (loosely coupled, grid-based)
- Highly volatile web sites

Create a cloud migration road map
- Optimize IT by taking a portfolio approach
Take a portfolio approach

Decision tree
Workload management
GRC

Internal cloud  Virtual  Physical  Trad out  Virtual hosting  Public cloud

CapEx  OpEx

Common  Custom  Fixe  Custom  Fixed  Common

Transient  Metered  Fixed  Metered

Owned  Owned  Owned  Metered
Thank you

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