Developing a Cloud Strategy

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Public Sector Manager
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Today’s Key IT Challenges

Security

70% of respondents saying security is top concern in moving to public cloud¹

IDC

Efficiency

Today’s technology would require building 45 new coal power plants to support 2015 IT infrastructure²

Manageability

IT will spend ~$2T on deployment and operations thru 2015 unless smarter infrastructure radically simplifies management of virtualized environments

Lock-in

“We have seen lock-in return as a top concern... routinely seeking alternatives to proprietary virtualization and cloud computing technology”

Bain & Company

1. IDC Market Analysis, January 2010
2. Source information in speaker notes
3. Source information in speaker notes
Evolution of the Datacenter

Cloud Datacenter

Virtualized Datacenter

Efficient and Secure
Open Architecture
Simplified Network

Discrete Datacenter

Consolidation
Discrete networks

Flexible Management
10G Unified Network

Source: Cut $25B in annual “excess” IT spend by 2015 by making deployment of clouds simpler. Projects out $142B in annual Bain spending estimates on infrastructure and assumes we can reduce by 15% by 2015. Extrapolating on 2013 yearly estimate of $142B, assumes 15% reduction. 2013: $142B spend in infrastructure / support that doesn’t add value but is “overhead” of deployment (source: Bain)
Business Value of Cloud Computing

Cloud Computing
• An evolution in IT consumption and delivery made available self-service via the Internet with a flexible, pay as you go business model
• Requires a highly scalable and efficient Cloud Architecture

Cloud Architecture
• Data resides in shared, dynamically scalable resource pools
• Based on virtualization and/or scale-out application environments

Multiple stakeholders have varied expectations of cloud....
• CEO wants IT to support business growth
• CIO wants IT to impact business value
• CFO wants effective IT asset utilization
• Shareholders want IT to support business flexibility

Cloud Computing provides a services delivery framework

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Intel’s Cloud 2015 Vision

**FEDERATED**
Share data securely across public and private clouds

**AUTOMATED**
IT can focus more on innovation and less on management

**CLIENT AWARE**
Optimizing services based on device capability

- Desktops
- Laptops
- Netbooks
- Tablets
- Smartphones
- Smart TVs
- Embedded

Intel Confidential NDA required
What is Holding Back the Cloud Today?

Technology Maturation
- Security
- Lack of automation
- More power efficiency
- Standards

Acceptance of Risk
- IP protection
- Interoperability and lock in
- Compliance and audit
- Guaranteed quality of service

A Cultural Shift And Technology Advancement Is Needed
### Cloud Computing Concerns

#### Security Concerns Continue To Cloud The Use Of Public IaaS Offerings

**“What are your firm’s concerns, if any, with pay-per-use hosting of virtual servers (also known as cloud computing infrastructure-as-a-service or IaaS)?”**

<table>
<thead>
<tr>
<th>Concern</th>
<th>Percentage</th>
<th>Base: 1,252 North American and European IT executives and technology decision-makers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security concerns about security/privacy in virtualization or cloud environments</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>Too immature</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Specific compliance requirements that the service providers can’t meet</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>We believe our total costs are cheaper</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>Our application vendor or custom apps aren’t compatible or won’t support it</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>The offering capabilities don’t match our needs</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>The performance isn’t good enough</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Other reason (please specify)</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>None — we don’t have any concerns</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Too difficult to understand</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Forrester’s Forrsights Hardware Survey, Q3 2010

Forrester Research Inc, November 2010 “Companies Building Private Clouds Focus On Infrastructure But Not Operations”
Considering Cloud Deployment

**Private Clouds**
- Behind the Firewall
- Security
- Compliance and Governance
- Interoperability

**Public Clouds**
- Multi-tenant
- Rapid Deployment
- Reduced Capital Expenditure
- External vendor expertise

Virtual Private and Hybrid clouds

Cloud Brokers

Potential IT strategy: Develop private clouds while adopting best of breed public cloud services
Value and Evolution to Private Cloud

Private Cloud Drivers

Message: Most customers “get” the idea that private cloud is for agility and speed, not saving money (in other words, an investment).

- Agility/Speed: 55%
- Don’t Know: 5%
- Defend IT: 2%
- Cost: 21%
- Business Alignment: 9%
- Enable Hybrid: 6%
- Quality: 2%

Gartner Data Center Conference Poll, December 2010: What is your main driver in moving to private clouds? N = 170

Virtualization and Private Cloud Roadmap Plans

By 2015, how would you describe your virtualization progress (choose the one most applicable)? (n=55)

- Heavily virtualized: 24%
- Partially virtualized: 0%
- Private cloud: 41%
- Stage 4
- Stage 3
- Stage 2
- Hybrid cloud: 35%

Gartner

Source: Gartner, December 2010
1 The Drivers and Challenges of Private Cloud Computing (G00210705)
2 The Road Map From Virtualization to Cloud Computing (G00210845)
Summary of Cloud Services

- **Infrastructure as a Service (IaaS)**: Compute, Storage, Networking
- **Platform as a Service (PaaS)**
- **Software as a Service (SaaS)**

Enterprises, Service Providers, Consumers, Developers

Internet

**Infrastructure as a Service** is the foundation of cloud services
Cloud Services Examples

Primary Market
IDC IT Product Taxonomy

Applications
  - Application as a Service
    (NIST calls this “SaaS”)
  - Platform as a Service
  - Infrastructure as a Service

Application Development & Deployment

System Infrastructure Software
  - Servers
  - Storage

Secondary Market
IDC IT Product Taxonomy

- Collaborative Applications
- Content Applications
- Enterprise Resource Management Applications
- Supply Chain Management Applications
- Operations and Manufacturing Applications
- Engineering Applications
- Customer Relationship Management Applications
- Application Development Software
- Application Server Middleware
- Data Access, Analysis, and Delivery
- Information & Data Management
- Integration & Process Automation Middleware
- Other Application Dev and Deployment
- Quality & Life-Cycle Tools
- Enterprise Portals
- System and Network Management
- Security Applications
- Systems Software
- Servers
- Storage
- Networks
- Clients

Source: IDC March 2011
Key Public Cloud Application Segments

2010 US Market Composition & Penetration

- Content (Ent & Web Mgmt, Auth, Publish) 4%
- CRM (Cust Svc, Sales, Cntc Ctr, Marketing) 15%
- ERM: Financial Accounting and Payroll 9%
- ERM: HR and HCM (Talent) 5%
- ERM: Supply Chain Management 3%
- ERM: Other 4%
- Collaboration 14%
- BI and Analytics 7%
- Database/Data Access, Analysis, Delivery 3%
- Application Development 5%
- System Management 3%
- Engineering 3%
- Security 2%
- Other 8%

Source: IDC, March 2011

WW Total: $16.98 billion
US Total: $10.64 billion

CRM, collaboration, financial accounting/payroll, SCM highest deployed
2010 Intel IT Vital Statistics

6,300 IT employees
Supporting 78,900 Intel employees in 150 sites

95 Data Centers
410,000 square feet
55 MW Total Power Load
4,976 Cabinets

~100,000 Servers & >90,000 PCs (80%+ mobile)

177M e-mail messages (per month)

>20k hours of video collaboration
Cloud Computing Business Drivers

Intel IT Enterprise Private Cloud Architecture

### Business Benefits

**Efficiency**
- Accelerate virtualization to create a **multiple tenant O/E environment**
- Deploy new, retire old servers to **improve energy efficiency**
- Drive **higher utilization** via **resource pools** and consolidation
- **Measure services** for VM utilization, health and IT capacity management

**Agility**
- Improve **provisioning time** from days to hours with on-demand self service
- **Automate workflows** to enable consistency, agility and elasticity
- **Streamline business processes** with on-demand self-service portal
- **Opportunistic use** of federated public cloud services, when applicable

**Security**
- **Utilize** and build on **existing security infrastructure** and **safeguards**
- **Protect Intel IP, data** and **differentiated business processes**
- **Provide secure access** to **authenticated devices** and **users**

**Availability**
- Deliver **high availability** and drive **increased resiliency** for all IT services
- Use a consistent **disaster recovery** architecture for critical applications
- Adopt advanced technologies for **highest availability** on **mission-critical apps**
Intel IT’s Cloud Strategy & Roadmap

Current

Internal: Intel Network
Hosting Platforms
- Office/Ent
- Design Grid

Legacy Environments
- Internal Clients

External: Internet
- IaaS • Caching
- SaaS • Job Search • Benefits/Stocks

Interim

Internal: Intel Network
Build/Grow Enterprise Private Cloud
- Office/Ent
- Design Grid

Legacy Environments
- Internal Clients

External: Internet
- IaaS • Caching
- SaaS • Job Search • Benefits/Stocks • Sales

Future

Internal: Intel Network
Evaluate Hybrid Clouds. Federated IaaS
- Office/Ent
- Design Grid

Legacy Environments
- Internal Clients

External: Internet
- IaaS • Caching
- SaaS • CRM • Benefits/Stocks • Back & Restore • Client Image/VM • Storage • Manageability • Productivity • Collaboration

Grow Cloud from the Inside Out

SaaS - software as a service, IaaS - infrastructure as a service, CRM - customer relationship management, VM - virtual machine
Service Hosting Decision Tree

1. Public SaaS service requirements
   • Commodity services available
   • Public cloud security is acceptable
   • Public cloud availability is acceptable

   YES

   Public SaaS
   SW as a service. Applications Hosted as a service.
   • Examples: CRM, expense report mgmt
   • Salesforce.com, netsuites, webex, workday, others

   NO

2. Public IaaS/PaaS service requirements
   • Inhouse application or available COTS
   • Public cloud security is acceptable
   • Public cloud availability is acceptable

   YES

   Public IaaS/PaaS
   Infrastructure as a Service and Platform as a Service
   • Examples: VM hosting, app hosting
   • AWS, Azure, Rightscale, Joyent, others

   NO

Potential Strategy:
✓ Host Vast Majority of Applications in Enterprise Private/Hybrid Cloud
✓ Selectively use Public Cloud for non-differentiated IT services

IaaS/PaaS
Internal or External
• Examples: VMware vCloud, Red Hat Foundations
Cloud Service Provider Checklist

- **Data handling, clarifying where the data is located and how it is managed.** This should include an inspection of the processes involved if the cloud service provider loses customer data.

- **Policies on data and data corruption,** asking if data is backed up and whether it can easily be reconstituted from the backups.

- **Clarify policies on identity management and access control.** This should cover issues that boil down to who is authorized to do what and under what circumstances.

- **Robust audit-checking procedures for data co-location** to ensure that a competitor of the customer cannot access the customer's information, even though both the customer and its competitor may be hosted on the same hardware.

- **Compliance with regulatory requirements** such as accounting and auditing standards, banking regulation, corporate governance, information provision requirements (such as Sarbanes-Oxley), data regulation, etc. The policies of the cloud service provider (such as the data protection policy) should also be carefully scrutinized. There are already data checks on export of data to certain jurisdictions.

- **How easy it is to terminate and move to another cloud service provider** -- not contractually but practically!

Source: Mark Weston, Principal at UK law firm Matthew Arnold & Baldwin LLP, article can be found at http://searchvirtualdatacentre.techtarget.co.uk/tip/0,289483,sid203_gci1375420,00.html
Cloud Strategy and Execution: Assess the present, Plan the future

**Strategy**
- People, Process, Technology
  - Vision
  - Mission
  - Goal
  - Positioning
  - Proposition
  - Principal Architecture
  - Service Offering

**Execution**
- Technology, Process, People
  - Service Offerings
  - Culture
  - People
  - Policies
  - Processes
  - Tools
  - Infrastructure

A tops-down & bottoms up approach

Reducing CapEx and ensuring consistency

Reducing OpeEx and increasing customer satisfaction
Summary & Next Steps

• Cloud represents an IT & business transformation
• Cloud Computing can offer compelling benefits
• Tradeoffs to consider in private vs public cloud deployments and services
• Learn more about Intel’s Cloud 2015 Vision & Strategy to support your cloud evolution
Thank You