Intel IT’s Open Cloud
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Agenda

Our Cloud Journey

ISTCC Relevance to my day job...

Summary

http://preview.tinyurl.com/IntelITOpenCloud
Intel IT Vital Statistics

6,400 IT employees
- 54 global sites

91,500 Intel employees†
- 164 sites, 62 countries

59 Data Centers
- ~75,000 servers

>138,000 Devices
- >109K PCs (80%+ mobile)
- >38,000 Handhelds (60% BYO)

Source: Information provided by Intel IT as of Jan 2012. † does not include wholly owned subsidiaries that Intel IT does not directly support
Open Perspective and Philosophy

- Linux + XEN/KVM
- OpenStack & Open Cirrus
- Open Farming Open Robots

- Many Public Cloud Services
- Federated Clouds
- Star Trek?

- New Innovations
- Innovations go Open
- More Open Source
- New Innovation
### Demand Drivers Comparison

<table>
<thead>
<tr>
<th>Traditional Drivers</th>
<th>Cloud Aware Drivers</th>
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<tbody>
<tr>
<td><strong>1. Incremental Velocity Increase</strong>&lt;br&gt;• &lt;3hrs “good enough”&lt;br&gt;• 70 day app release&lt;br&gt;• Bureaucracy normal</td>
<td><strong>1. Significant Velocity Increase</strong>&lt;br&gt;• Grow/shrink 20x in hours/minutes&lt;br&gt;• Need to release apps in days/weeks&lt;br&gt;• No patience for bureaucracy</td>
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<td><strong>2. More Lifecycle Automation</strong>&lt;br&gt;• Reduce Downtime costs&lt;br&gt;• Reduce Ops labor time</td>
<td><strong>2. All Components need Automation</strong>&lt;br&gt;• Expect APIs for all IT Services&lt;br&gt;• Manual is not an option</td>
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<td><strong>3. Incremental Reliability Increase</strong>&lt;br&gt;• 99.7%&lt;br&gt;• Downtimes are normal and expected</td>
<td><strong>3. Significant Reliability Increase</strong>&lt;br&gt;• 99.99%&lt;br&gt;• Consumers expect always on</td>
</tr>
<tr>
<td><strong>4. Growth is linear</strong>&lt;br&gt;• Linear employee growth&lt;br&gt;• Linear Data Growth</td>
<td><strong>4. Growth is potentially exponential</strong>&lt;br&gt;• Consumers can grow without warning&lt;br&gt;• Massive increase in connected devices</td>
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<tr>
<td><strong>5. Cost of Platform acceptable</strong></td>
<td><strong>5. Cost of Platform can impact Profit</strong></td>
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### Traditional IT incremental improvements<br>Cloud Aware requiring exponential improvements
Key Technical Concepts

Abstract users from underlying Cloud providers

Support multiple cloud providers, both private and public

Common identity and entitlement services across interfaces

Open Source first, minimize proprietary API lock-in

Minimize internal technical debt, utilize the community to scale

Stay pragmatic, as we scale – not always 100% greenfield
Key Business Focus Areas

Past (2009)
- Traditional Office & Enterprise
- Design Grid

Current (2012)
- Distinct Clouds
  - Office/Enterprise
  - Services
- Design

Future Goals
- Federated Clouds
- Public

80% Effective Asset Utilization
- Pervasive virtualization (75%)
- Larger pools in fewer data centers

Velocity for Service Provisioning
- On-demand self-service the norm
- Innovative idea to production <day
- External Cloud for burst demand
- Automated sourcing decisions

Zero Business Impact
- Application design for failure
- Increase availability
- Automated, end-to-end service-managed Cloud
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Summary
Specialized Platforms
Intel IT Cloud Future

Applications

App Services
- Location
- Context
- Recommendation
- Identity

App Platform Services
- Analytics
- Messaging
- Data
- Web

Infrastructure Services
- Storage
- Compute
- Network

Physical Infrastructure
- Intel® Atom™
- Intel® Xeon®
- Intel® Xeon® Phi™

Reusable Services empowering our end users
Specialized platforms powering the services
Challenges of Specialized Platforms

Capacity Utilization/Performance Analytics

- Significant multi-tenant sharing (flatten out peaks/valleys of usage)
- Most SW developers oblivious to HW below them

Manageability/Automation

- Homogenous resources are “easier” to manage at scale
- Most IT shops are trying to simplify

VM Movement

- VM solutions require lowest common denominator approach for workload movement (use the most basic platform)
Intel® IT Open Cloud IaaS Platform Solution Stack

**Consumers**
- Interfaces

**Contributors**
- **Manageability**
  - **Intel Contributions**
  - **Open-Source Foundation**
  - **Watcher** (e.g. Nagios*)
  - **Decider** (internal)
  - **Actor** (e.g. Puppet*)
  - **Collector** (tbd)

- **Cloud Operating Environment**
  - **Intel Contributions**
  - **Open-Source (OpenStack*)**
  - **Dashboard** (Horizon)
  - **Compute** (Nova)
  - **OS Images** (Glance)
  - **Block Storage** (Nova Volume)
  - **Object Storage** (Swift)
  - **Network** (Quantum)

**Producers**
- Physical Infrastructure

**Release Cadence**
- 3 Months
- 6 Months
- 12-18 Months

Notes:
- GUI (Graphical User Interface)
- API (Application Programming Interface)
- Open-Source Foundation
- Open-Source (OpenStack*)
- Intel Contributions
Automation
Automation Values for Intel IT

More complexity is the norm – HyperEvolution of Technology

Less people in infrastructure core:
  Go from 1 sysadmin per 100 servers to at least 5-10x

Less Errors in running environment:
  Remove human mistakes from deployment, manageability

Always on applications:
  Ensure constant uptime for application services

Better real time decisions with massive data:
  Increase utilization/performance /w predictive placement

But…. Cascading automation failures are really really bad
Self Remediation Framework – for 99.99%
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Summary
Wrap Up

Our Direction- Federated, Interoperable and Open Cloud

Transforming Data Center to Open APIs

• Exposing Specialized HW through Open APIs

True Autonomics possible – making the Decider brilliant

Enterprise IT will change massively in next 2-5 years

Have questions on Intel IT environment? das@intel.com and @dkamhout
Backup
Intel IT Hybrid Cloud

Focus Area | Key Aspects
--- | ---
Technical | Active/Active App Design – Software Design for Failure
Unified Monitoring/Manageability/Authentication
IT Service broker handling cloud on-boarding internal and external

Operational | IT handling basic IaaS container levels externally, covering all IaaS internally

Business | Single contract with Intel IT funding and showback to BUs
Liability/Indemnification at acceptable levels for associated risk

Fully Meshed VPN Tunnels
Benefits of Integrated Capacity Management

Hosting Automation, Measured Services, Life Cycle Management

- Development on Demand
- Non-Production
- Production
- EOL

Self-Service Portal

- I am developing / integrating
- I am testing new code or tool
- I am going live or I need more capacity
- My work is finished

Org A is using ...
Org B is using ...

IT BI Reporting (capacity + health)

Changes and Increases in quantity/capacity requested

Measure real consumption against requested capacity

Capacity Tracker
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