



Tomorrow's Cloud Starts Today

Driving the Data Center Infrastructure for the Next Decade

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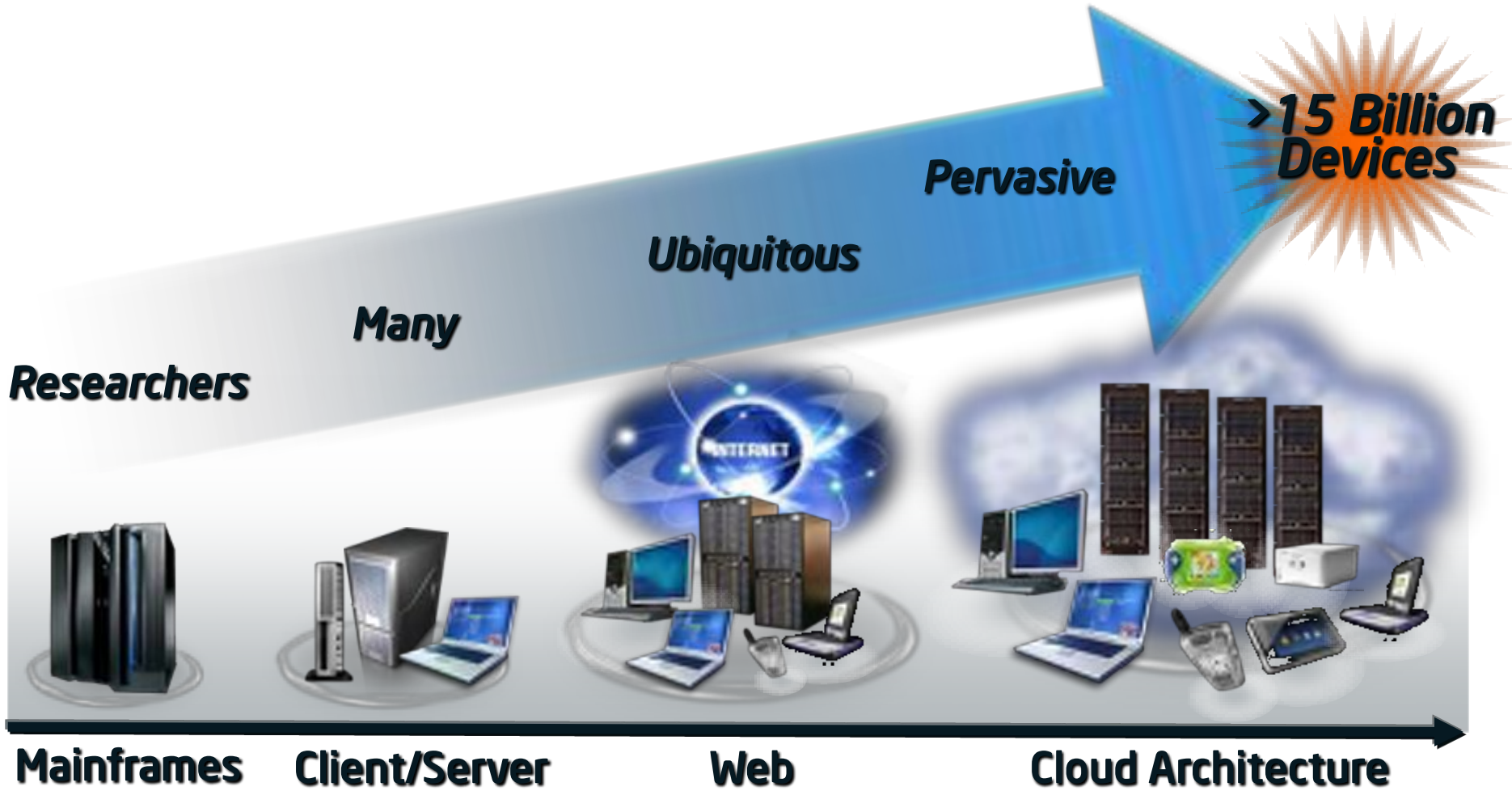
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Vision of Explosive Connected Growth



Significant Infrastructure Required



CERN Supercollider
15 Million GB / year

CCTV Camera
300 GB / day

Online Video
10-100 MB

Mobile Phone
250 kb / sec

RFID
128 b / read

1

Millions

10s of
Millions

Billions

10s of
Billions

Are We Ready for the Challenge?

Innovation and Scale!

Catalyst For Change



Open & Interoperable Solutions Essential

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

Personal
Devices

Smartphones

Smart TVs Embedded

Intel: Addressing IT Requirements

IT & Service Providers

Products & Technologies

Intel® Cloud Builders



*Define and Prioritize
IT Requirements*



*Enable New
Capabilities In Intel
Platforms*



*Collaborate and Publish
Proven Reference
Solutions*

<http://www.intel.com/itcenter/cloud/>

Evolving Cloud Security

Isolate

Intel® VT & Intel® TXT

protects VM isolation and provides a more secure platform launch



VMM



Intel® TXT ensures platform launch with known configuration

Encrypt

Intel® AES-NI

delivers built-in encryption acceleration for better data protection



Enforce

Intel® TXT

establishes "trusted" status to enable migration based on security policy



Establishing the Foundation for More Secure Clouds

Today's Key IT Challenges

Security

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



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



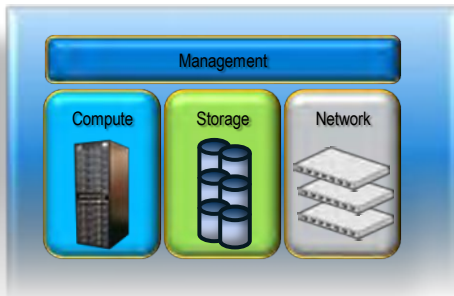
Lock-in

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

Infrastructure Must Evolve to Address Key Challenges

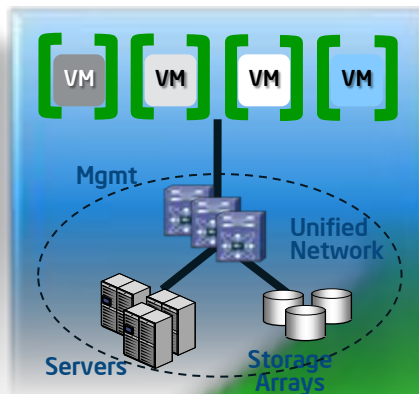
Evolution of the Datacenter

Discrete Datacenter



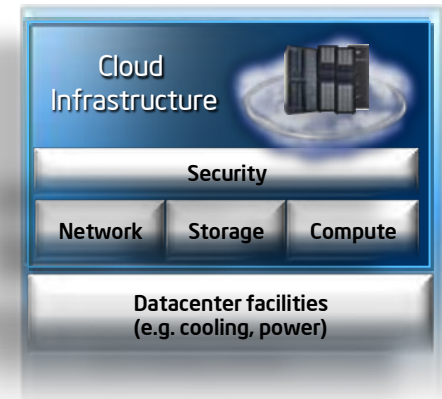
Consolidation
Discrete networks

Virtualized Datacenter



Flexible Management
10G Unified Network

Cloud Datacenter



Efficient and Secure
Open Architecture
Simplified Network

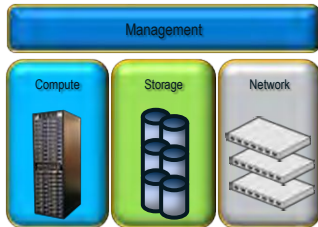
Cloud: Opportunity to save \$25B in annual "excess" IT spend by 2015¹

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

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

Considering Cloud Deployment

Private Clouds



Behind the Firewall

- ✓ Security
- ✓ Compliance and Governance
- ✓ Interoperability

*Virtual Private
and Hybrid
clouds*



Cloud Brokers

Public Clouds

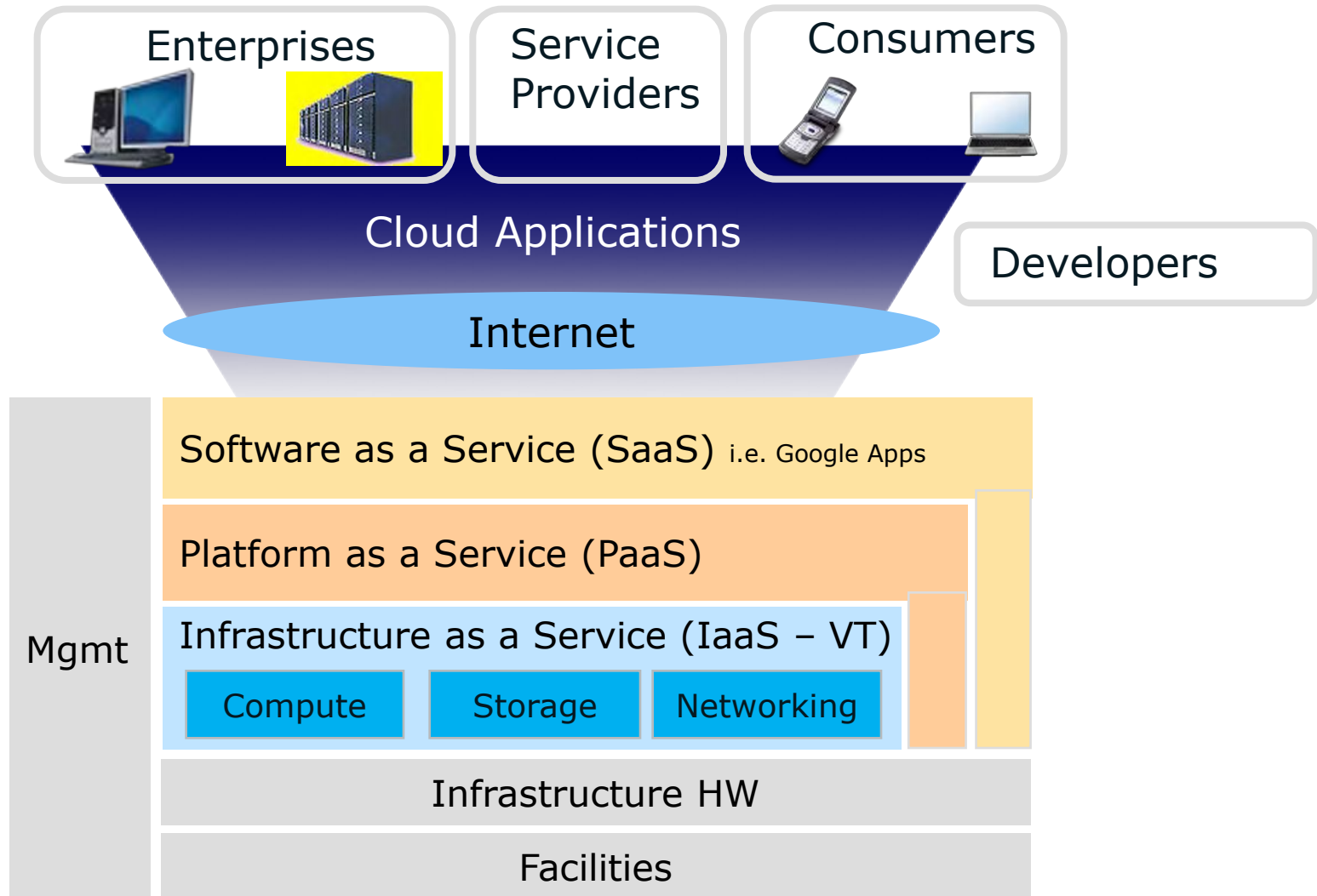


Multi-tenant

- ✓ Rapid Deployment
- ✓ Reduced Capital Expenditure
- ✓ External vendor expertise

Potential IT strategy: Develop private clouds while adopting best of breed public cloud services

Summary of Cloud Services



Infrastructure as a Service is the foundation of cloud services

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

High-Level IT Strategies and Goals

- 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

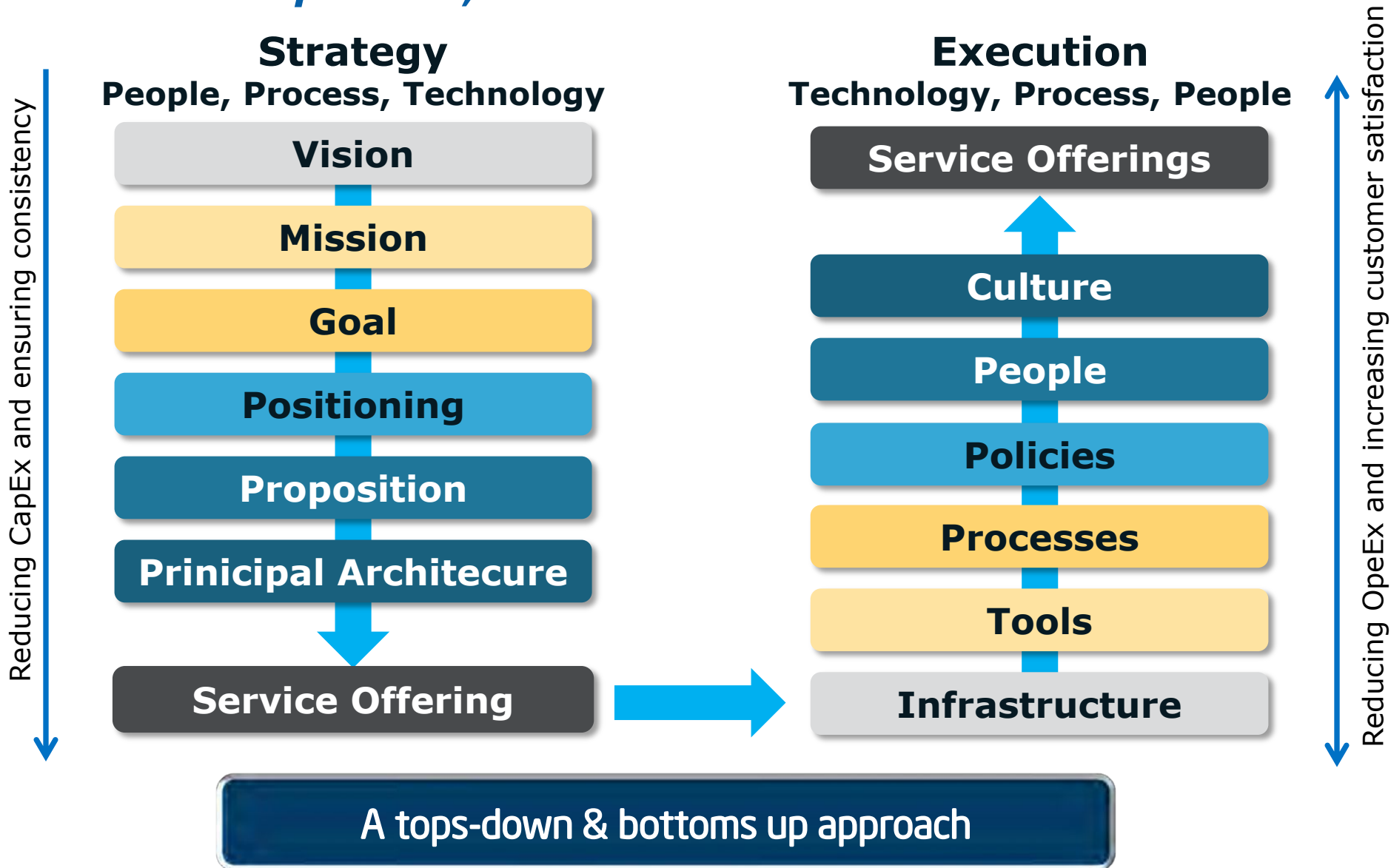
- **Utilize** and build on **existing security infrastructure** and **safeguards**
- **Protect Intel IP, data** and **differentiated business processes**
- Provide **secure access** to **authenticated devices** and **users**

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**

Cloud Strategy and Execution:

Assess the present, Plan the future



Hybrid Cloud: Potential Cloud Application Sourcing Strategy

Selectively use Public Cloud for non differentiated IT services

External Cloud Software as a Service (SaaS) Applications



- Staffing
- Benefits
- Expense
- Social Media/ Web 2.0
- Travel
- Stock
- Other SaaS Applications
- Hosted Web Applications

Host Vast Majority of Applications in a Private Cloud

Internal Cloud Infrastructure and Platform as a Service (IaaS / PaaS) Applications



- Messaging and Collaboration Infrastructure
- Enterprise Applications
- User Profile Management
- Hosted Web Applications
- Primary Data Storage
- Productivity Applications
- Security and Virtual Machine (VM) Policy Control
- Applications Delivery and Management
- Workspace/Container Provisioning and Management

By building a **private cloud**, IT can deliver on the **benefits of public clouds**, such as increased **agility & efficiency**, **without the risks** associated with **exposing sensitive apps and data** outside the firewall

Need to find the balance between TCO, performance and security

Cloud Service Provider Checklist

- A customer should check its own (and the cloud provider's) processes on **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.
- A customer should check the service provider's **policies on data and data corruption**, asking if data is backed up and whether it can easily be reconstituted from the backups.
- A customer should **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. Examples:
 - There should also be **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.
- A customer should check **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.
- A customer should check **how easy it is to terminate and move to another cloud service provider** -- not contractually but practically!

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

<http://www.intel.com/itcenter/cloud>



Thank You

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