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# From Virtualization to Private Clouds

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# Agenda

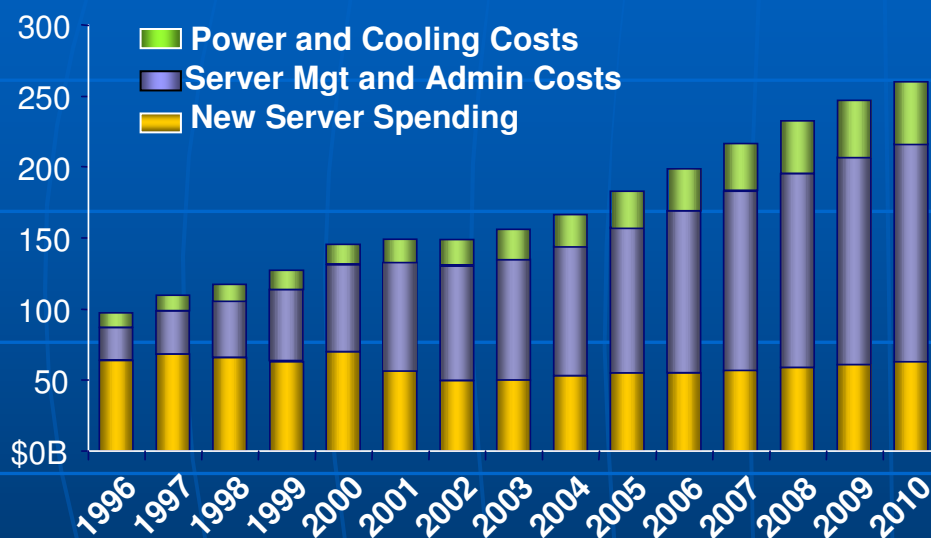
- Cloud Computing Benefits
- Public Cloud concerns
- From Virtualization to Private Clouds
- Virtual Private Cloud
- ITRI Cloud OS

# Cloud Computing Benefits

- Computing resources (雲端運算資源) on demand
  - server, storage, network, and software on demand
  - turn it on and off at will
  - clone it multiple times to meet a sudden workload
- Illusion of infinite computing resources (無限運算資源)
- No up-front commitment by Cloud developers (無需預先承諾)
- Pay as you go for use of computing resources (現收現付)
- Empowering developers to provision services without relying on IT (自我配置服務)

# Enterprise IT spending challenge

**Global Annual IT Spending**  
*Estimated US\$B 1996-2010*



**Uncontrolled system management costs**

**Steady CAPEX spend:  
Not the key problem to address**

➤ **Industry hypothesis is that clouds will be driven by scale. However to capitalize on this, providers must address the server management cost problem, not just CAPEX**

Source: IBM Corporate Strategy analysis of IDC data, Sept. 2007

# Public Cloud Concerns

- Security
  - Vulnerability due to sharing
  - Tampering or theft
- Data Protection
  - Archival
  - Disaster Recovery
- Quality of Service
  - Performance isolation
  - Availability
- Manageability
  - User interface
  - Data format
- Not ready for prime time - Mission critical applications



# Public vs. Private Cloud

## ■ Public Cloud

- A cloud computing environment that is open for use to the general public, whether individuals, corporations or other types of organizations

## ■ Private Cloud

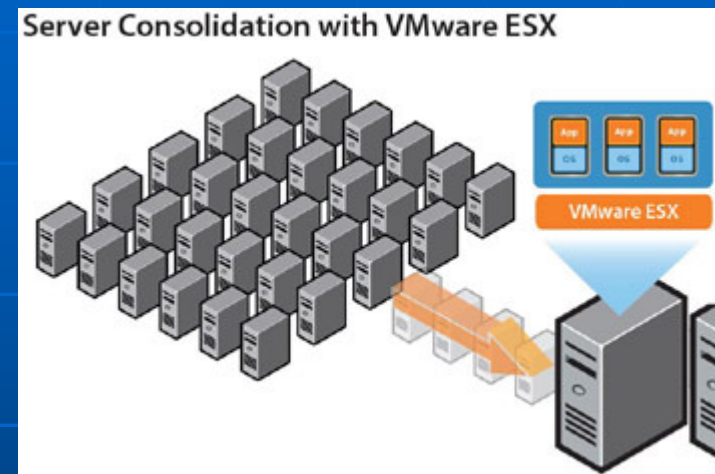
- A cloud computing-like environment within the boundaries of an organization and typically for the exclusive usage of its constituents

## ■ Community Cloud

- several organizations have similar requirements and seek to share infrastructure so as to realize some of the benefits of cloud computing

# From Virtualization to Private Cloud

- VMware 2000 – It's all about Cost Savings
  - Server consolidation
  - Higher system utilization
- Then CIO's realize...
  - Mobility of virtual machines
  - Speed of provisioning
  - Isolation
  - High availability / Failover
  - Disaster recovery
- Private Cloud
  - Deliver IT service at the lowest possible cost and at highest speed of adaptation
  - Yet IT maintains control
- Private Cloud is relatively at its infancy, but...
  - Over 30% of all servers deployed in large IT shops are virtualized
  - Virtualization brings on average 20-25% saving in IT cost





# Top 10 Cloud Computing Trends

- Cloud Tweaks, August 19, 2010

1. *Building Private Clouds*
2. Shift in IT skills of the Professionals
3. Down-sizing of IT Departments
4. Decrease of Concerns about Security Risks
5. Consultancy services along with the main Services
6. SMB's and Large Enterprise on Cloud
7. More Customizable Cloud Computing Resources
8. Large Enterprises as Part-time Cloud computing vendors
9. Cloud Computing will bring Innovation
10. Only Browser Needed

# Players

- VMware vCloud
- Citrix XenCloud for Enterprise
- Microsoft
  - M Cloud
    - Windows Server, Hyper-V, System Center and other server-based components
  - Windows Azure Platform Appliance
    - Appliance approach (pre-configured)
- IBM Blue Cloud
  - Xen, PowerVM, Hadoop, Tivoli
- Enomaly
- Cloud.com
- Platform Computing
- CA 3Tera



# So What's missing in this picture?

- Elasticity
  - Enterprise still needs to own all hardware
- License cost
  - Virtualization, Network shaping, Security, Storage management
- Management
  - Virtual resources vs. Physical resources
- Mostly, it's not an integrated solution

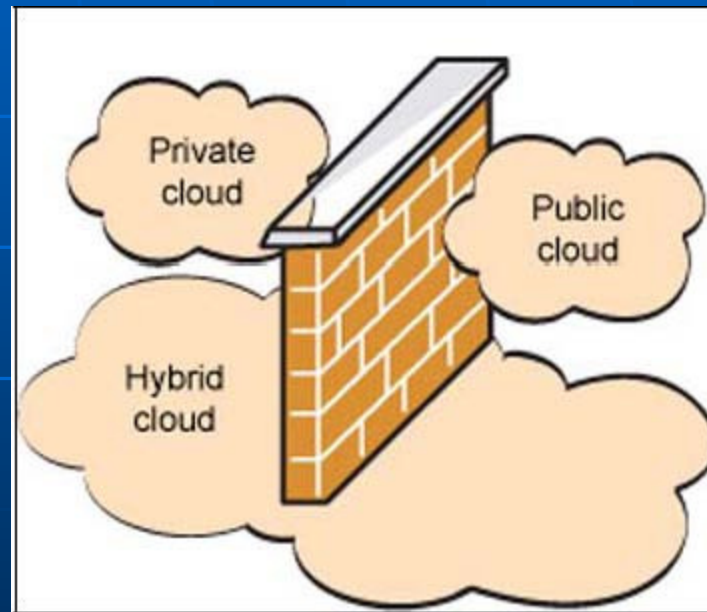
# Virtual Private Cloud (VPC)

## ■ Definition

- IT solution platform that integrates local and public cloud infrastructure under a single management & governance layer
- Aka Hybrid Cloud

## ■ Challenges

- IP address space
- Data format standardization (OVF?)
- Secure Network channel to bridge between private cloud and public cloud
- Management interface

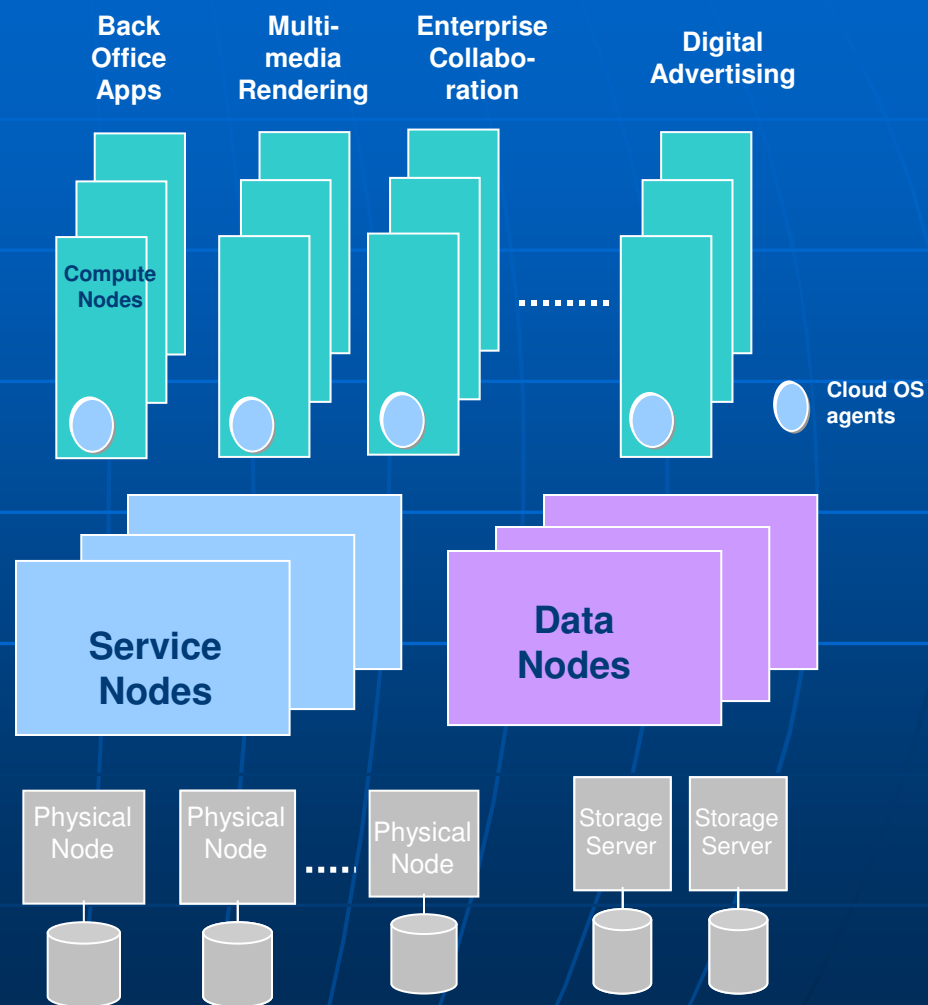


# CLOUDS

- Design objective: An **end-to-end, integrated** software stack for turning a physical data into a platform for providing IaaS service (e.g. AWS)
- Key features:
  - Fully integrated data center software stack
  - Hardware agnostic
  - Extensively deployed measurement sensors
  - End-to-end redundancy

# Scalable Data Center Services

- *Physical Resource Provisioning*
  - *Service Nodes*
  - *Data Nodes*
  - *Compute Nodes*
- *End User Self Provisioning*
  - *Virtual Data Centers & Clusters*
- *Highly Available Distributed Main Storage & Secondary Storage*
- All Layer 2 Networking
- Service Load Balancing
- Security
- Dynamic Virtual Machine Management
- Auto-Scaling
- Monitoring
- Hybrid Cloud



# Questions and Answers



Thank you!