



Planning for the Future of IT -

Issues to Consider as You Move to Cloud and Virtual Environments

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Strategic Technologies

“at today’s rate of change, we will achieve an amount of progress equivalent to that of the whole 20th century in 14 years”

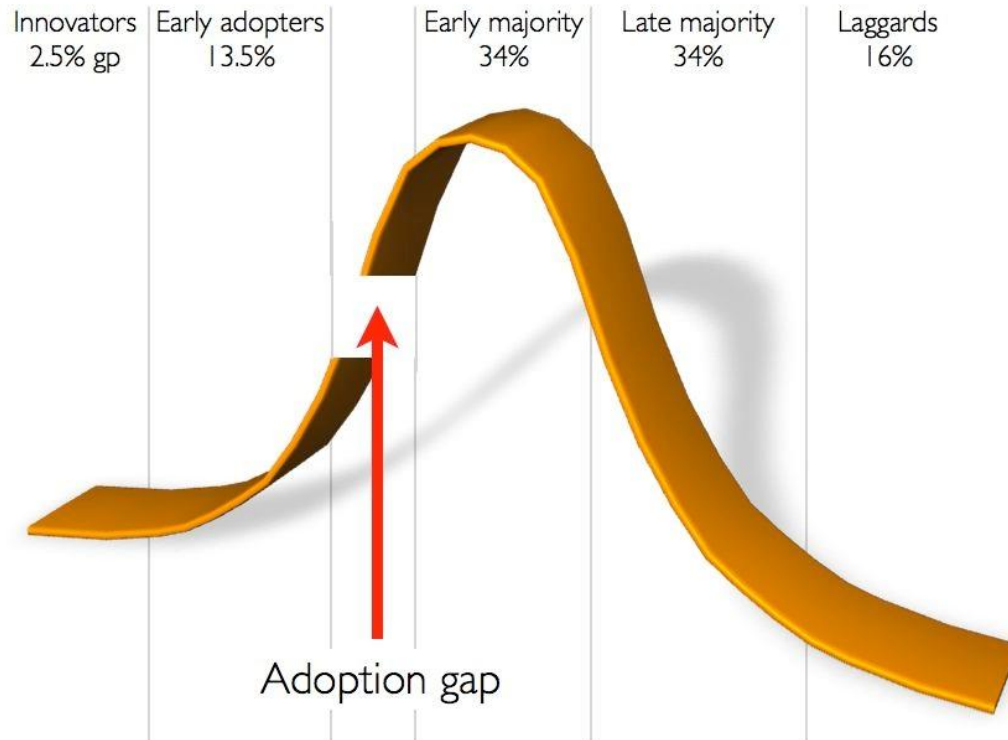
- Ray Kurzweil

Strategic Technologies

- Biggest long term impact on IT infrastructures of the future:
 - Virtualization
 - Cloud Computing

Technology Adoption

Technology Adoption Curve



Cloud Computing

- Simple Definition:
Shared computing services accessible over the Internet that can expand or contract on demand.

Cloud Computing

Service Models

- Software-as-a-Service (SaaS)
 - Hosted Email, Service Bureau Applications
- Infrastructure-as-a-Service (IaaS)
 - Amazon EC2, Rackspace
- Platform-as-a-Service (PaaS)
 - Salesforce, Windows Azure

Is the Cloud Right for You?

- Cloud Computing
 - Not a one-size-fits-all solution
 - Can impact other areas of IT, Compliance
 - Heavily dependent on your strategic objectives
- 5 Key Questions

Is the Cloud Right for You?

- Where is your institution going to be in 3-5 years?

Cloud Computing	Internal Infrastructure
Market Turbulence	Predictable Market
Restricted IT Budgets	Flexible IT Budgets
Aggressive Growth	Existing IT Investments
Limited Access to Expertise	Dedicated Internal Staff

Is the Cloud Right for You?

- Is IT a strategic differentiator for your institution?

Cloud Computing	Internal Infrastructure
IT as a Cost Center	IT as a Strategic Differentiator
Access to Best of Breed	Innovative Solutions
Limited Internal Staff	Access to Available Resources & Expertise
Predictable Cost Model	Ability to Incur Expense Swings

Is the Cloud Right for You?

- Does your current IT budget support your risk and tolerance for downtime?

Cloud Computing	Internal Infrastructure
Low-Moderate Margin for Downtime	High OR Extremely Low Margin for Downtime
Budget Constraints for DR	Adequate Budget for DR
Limited Internal Staff	Dedicated Internal Staff or Access to Available Resources/Expertise

Is the Cloud Right for You?

- Is your IT infrastructure outdated?

Cloud Computing	Internal Infrastructure
Outdated Infrastructure	Outdated Infrastructure
Limited Ability to Invest in IT Infrastructure	Willingness to Invest in IT Infrastructure
Predictable cost model	Ability to Incur Expense Swings

Is the Cloud Right for You?

- Are you willing to invest the required resources to develop or access IT expertise?

Cloud Computing	Internal Infrastructure
Streamlined Business Focus	IT is a Core Competency
Less Internal Expertise Required	Internal Staff Expertise
Limited Continued Training	Continuous Education

Is the Cloud Right for You?

- Align solutions with your IT strategy
- Most environments will blend virtualization and cloud
- Plan infrastructure according to your goals
- Consider issues that could affect your strategy

Planning Considerations

- Bandwidth/Connectivity
 - Internet Redundancy
 - WAN Topology
 - Bandwidth Speed
 - Upstream & Downstream

Planning Considerations

- Storage
 - Shared Storage = Complexity
 - SAN, NAS, Fiber Channel, iSCSI, FCoE, LUNs, Thin Provisioning, Storage Virtualization, Auto Tiering
 - Hardware Redundancy
 - Data Protection/Retention
 - Usable vs. Raw Storage
 - Replication penalties, SAN Snapshots, RAID Levels

Planning Considerations

- Management
 - Cloud Management Tools Still Developing
 - Complexity
 - Visibility
 - Prolonged Downtime

Planning Considerations

- Disaster Recovery
 - Key Factor for Virtualization and Cloud
 - Shift DR Burden to Cloud Provider
 - VM Image Snapshots/Backups
 - Replication
 - Increased Data Footprint
 - Local Failures vs. Site Failures

Summary

“I’m an inventor. I became interested in long term trends because an invention needs to make sense in the world in which it is finished, not the world in which it was started.”

- Ray Kurzweil