Cloud computing delivering innovation and efficiency

How will Cloud effect the network?

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Cloud Computing is a game changer

“Cloud is the big leap that successful CIOs must make in the coming year because if by mid-year you have not developed and begun to execute upon an ambitious and enterprise wide cloud strategy, then by year-end the odds are good you’ll no longer be a CIO.”

-- Information Week: The Top 10 CIO Issues for 2010

... in a recent IBM developerWorks survey of 2,000 IT professionals from 87 countries, 91 percent of respondents said they anticipate cloud computing to overtake on-premise computing as the primary way organizations acquire IT by 2015.

-- eWeek – UK
IBM Technical Adoption Program (TAP)—ROI Analysis

**Without Cloud**

- New Development
- Software Costs
- Power Costs
- Labor Costs (Operations and Maintenance)
- Hardware Costs (annualized)

**With Cloud**

- Librered funding for new development, transformation investment or direct saving
- Software Costs
- Power Costs (- 89%)
- Labor Costs (- 81%)
- Hardware Costs (- 89%)
- Deployment (1-time)

**Strategy Change Capacity**

- Reduced Capital Expenditure
- Reduced Operations Expenditure

**Additional Benefits**

- Reduced risk, less idle time, more efficient use of energy, acceleration of innovation projects, enhanced customer service

**Business Case Results:**

- Annual savings: $3.3M (84%) from $3.9M to $0.6M
- Payback Period: 73 days
- Net Present Value (NPV): $7.5M
- Internal Rate of Return (IRR): 496%
- Return On Investment (ROI): 1039%
What is different about cloud computing?

Without cloud computing

With cloud computing

- Virtualized resources
- Automated service management
- Standardized services
- Location independent
- Rapid scalability
- Self-service

- Workload A
  - Software
  - Hardware
  - Storage
  - Networking

- Workload B
  - Software
  - Hardware
  - Storage
  - Networking

- Workload C
  - Storage
  - Networking
The emerging agenda: the impact of cloud computing is extending into driving business transformation

**An enabler of business transformation**
- Creating new business models
- Enabling speed and innovation
- Reengineering business process
- Supporting new levels of collaboration

**An evolution of information technology**
- Changing the economics of IT
- Automating service delivery
- Radically exploiting standardization
- Rapidly deploying new capabilities
What our clients are telling us: Universal interest across all industries and geographies

**Cost takeout** and **Faster Time to Value**

- Cited by 77% and 72% respectively as top reasons for interest in cloud.

**Security and Control** are top concerns

- 69% say security is the top inhibitor to their use of public clouds

**Workloads and patterns** are emerging

- Almost all workloads require connection to other IT services
- Collaboration and analytics meta-patterns are occurring

**Industries with the greatest cost pressures lead adoption**

- Over 50% of clients in Retail, Manufacturing, Utilities, Government have cloud projects budgeted or in process

Source: IBM Market Intelligence

What our clients are telling us:

Universal interest across all industries and geographies
A cloud deployment option can be used that best aligns with the needs of the organization.

Private
IT capabilities are provided “as a service,” over an intranet, within the enterprise and behind the firewall.

Public
IT activities / functions are provided “as a service,” over the Internet.

Hybrid
Internal and external service delivery methods are integrated.

Enterprise data center
Private cloud
Third-party operated

Enterprise data center
Managed private cloud
Third-party hosted and operated

Enterprise
Hosted private cloud

Enterprise
Shared cloud services

Users
Public cloud services
Concerns about data security and privacy are the primary – but not the only - barriers to public cloud adoption

What, if anything, do you perceive as actual or potential barriers to acquiring public cloud services?

- Security/privacy of company data: 69%
- Service quality: 54%
- Doubts about true cost savings: 53%
- Performance / Insufficient responsiveness over network: 52%
- Difficulty integrating with in-house IT: 47%

Source: IBM Market Insights, Cloud Computing Research, July 2009. n=1,090
Clients are adopting cloud deployment based on workload affinity
…leveraging a common cloud management platform
IBM’s portfolio helps clients optimize use of clouds

Consulting Services in support of Cloud

Smart Business Offerings:
Comprehensive cloud solutions for infrastructure workloads

Delivery options to fit your requirements:
On the IBM Cloud............Private Cloud...........Pre-integrated Systems

Infrastructure services & technologies enabling cloud

Security – Resilience - Maintenance
The role of networking in cloud computing
Private cloud options require a new set of network design attributes

**Traditional Network Design**
- Optimized for availability
- Slow to adapt
- Costly
- Rigid, inflexible
- Infrastructure silos
- Dedicated
- Device sprawl
- Location dependence

**Cloud Network Design**
- Optimized for flexibility
- New approach to availability
- Cost more important
- Variable, metered
- Integrated infrastructure
- Shared
- Consolidation/Virtualization
- Location independence
Whether you buy from a cloud provider or build your own private cloud, the network must be designed to take advantage of current and future cloud delivery models to best meet your needs.

**Public Cloud Delivery Model**
- Requires a network design that can leverage the public Internet and Internet associated value-added services to connect to public cloud delivered services.
- Takes advantage of the cost efficient Internet for cloud computing delivery.
- Connects through various access methods.
- Requires security measures for individual end users.

**Private Cloud Delivery Model**
- Supports dynamic provisioning, security, performance, and reliability requirements.
- Requires an understanding of financial impacts.
- Demands end-to-end network management capabilities.
- Needs a flexible network design to support cloud computing data centers.
For success in cloud computing, network design decisions must made in concert with the server and storage disciplines.

<table>
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<tr>
<th>Network Design</th>
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<td>Develop central design principles based on cross-discipline requirements to support a balanced mix of resources to meet performance, availability and cost requirements</td>
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<td>Ensure the network, server and storage teams are fully aware of each other’s requirements and the operational implications of design choices</td>
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<th>Technology</th>
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<td>Choose from current and emerging networking technology options to support the central design principals</td>
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<td>Integrate the management of the network with server and storage resources management</td>
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<td>Provide the optimal relationship between business demands and risk tolerance</td>
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Increasing the distance between the user and the application can adversely impact user application response time

- Data traveling across copper or fiber optic links is limited to the speed of light.

- As the distance between the client and the user is increased the latency increases due to physical distance, serialization delay, WAN link congestion and hardware resource availability.

- Applications that transmit a large number of small packets or that have a high number of application turns per transaction (“chatty”) are particularly susceptible to latency.

- WAN optimization solutions can aid in relieving some of the effects of but latency and WAN link bandwidth as well as traffic prioritization still need to be evaluated.
Virtela’s Overlay Network Architecture

Intelligent Multi-Carrier Overlay Architecture
MPLS, Private VPN, IP VPN

Proprietary Policy Infrastructure Overlay

- Multi-Carrier Backbone and Auto-Failover
- Any Access – Anywhere Last Mile
- Deliver On Demand Services from the Network
- Pay-as-You-Grow vs. Build-It-and-They-Will-Come
Integrated Service Management for Cloud

A comprehensive offering to create, deliver and manage cloud services

- Heterogeneous virtualized infrastructure provides platform choices
- Unmatched scalability to launch, monitor and maintain tens of thousands of VM’s concurrently
- Workload mobility and recoverability for superior management
- Secure multi-tenancy

More than just cloud provisioning – manages the cloud infrastructure AND what’s inside the cloud!
Core Service Automation Management

The only solution with the flexibility and choice of network and storage options and the ability to span platform architectures

- Automated service provisioning
- Advanced image management
- Multi-tenant service catalog
- Extendable via an open API
- Web 2.0 self-service portal
- Wizard-like service creation

Visibility, Control and Automation across the service delivery and business infrastructure
Extension for Cloud Service Level Management

Create and deliver differentiated value for your business and your customers

- Real-time cloud service management
- Identify and proactively resolve performance problems
- Proactively manage network traffic
- Automate network device configuration
- Focus on the customer experience
- Provide business service dashboards

Improves service availability and enhances your customer’s experience
Extension for Network and Performance Management

Leverage the world’s leading network management portfolio: IBM Tivoli Netcool

- Visualize cloud based services across a heterogeneous infrastructure
- Improve the performance of your cloud network
- Manage and visualize network traffic
- Reduce operational costs
- Improve visibility of network bottlenecks
- Automate the management of network devices and configuration

Automate your network and cloud service quality management
Assurance of the Cloud

Portal – Business Service Management & Consolidated Operations

Service Quality, SLA and Customer Experience Management

Fault/Event Management
Performance Management
Configuration Management
Enrichment & Automation

Discovery & Data Collection

Wired Access
Radio Access
LTE, UMTS, GPRS, GSM, CDMA, EVDO, Wimax

Wide Access
Mobile (PS, CS), Wireless, IP, NGN

VAS
Multimedia, IMS

IT Resources and Applications

Consolidated view of your entire infrastructure including configuration and dependency information

Maximo TSRM Service Desk
Customer Care
Enterprise Sales
Network Operations
Executive Team
IT
Other

Broad Network, Service, IT, Transactional and Operational Data Source Support
Extension for Advanced Security Management

*Inspire confidence with secure services and content*

- Detect rootkits and suspicious behavior
- Protect against new hypervisor threats
- Deliver preemptive protection
- Identify and isolate threats
- Seamlessly federate identities
- Ensure compliance and audit control

*Industry leading security protects your cloud from becoming a malware superhighway*
IBM is investing in cloud computing to meet internal and client needs.

IBM CIO Cloud Implementations:

<table>
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<tr>
<th>Analytics</th>
<th>Collaboration</th>
<th>Development and Test</th>
<th>Desktop</th>
<th>Storage</th>
<th>Business Services</th>
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<tr>
<td>Blue Insight</td>
<td>LotusLive</td>
<td>Dev/Test</td>
<td>Workplace Cloud</td>
<td>Network Storage Cloud</td>
<td>Production Cloud</td>
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<td>140,000 users</td>
<td>85% of all web conferencing</td>
<td>Time to build a dev/test environment from 1 week to 1 hour</td>
<td>Estimated savings up to 30%</td>
<td>Up to 40% savings in storage costs</td>
<td>1,000 potential applications identified</td>
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- Fit for purpose middleware platform
- Common Compute Platform (Compute/Network/Storage)
Thank you!