Cloud Computing Basics

Cloud Computing: What Does it Mean?

• Style of computing
• Close public/private sector productivity gap
• Shift purchase of IT from a commodity to a service
• Paradigm Shift (once in a generation)
• Driven by consumer space
• Will fundamentally change relationships between providers and users
The Case for Change

Manufacturing Capacity Utilization

Sources: Board of Governors of the Federal Reserve System
Eurostat (Data for E.U., France, & Germany)
Central Bank of Brazil
Statistics Canada
The Case for Change

**Efficiency**
- Low asset utilization (server utilization < 30% typical)
- Fragmented demand and duplicative systems
- Difficult-to-manage

**Agility**
- Years required to build data centers for new services
- Months required to increase capacity of existing services

**Innovation**
- Burdened by asset management
- De-coupled from private sector innovation engines
- Risk-averse culture
Potential Spending on Cloud Computing

Total IT Spending

-$ 80 Billion

Potential Spending on Cloud Computing

-$ 20 Billion

$0.0 B $0.5 B $1.0 B $1.5 B $2.0 B $2.5 B

2012 IT Spending ($B)

DHS
Treasury
DOD
VA
DOT
Commerce
HHS
State
Energy
NASA
Interior
USDA
USACE
Labor
Justice
GSA
HUD
SSA
NRC
ED
SBA
NSF
SI
OPM
NARA
USAID
EPA
Early Adopters

- **Dept of Defense**
  - Army Experience Center (AEC)
  - Implementation cost 1/20 of estimate to upgrade legacy system ($54 K vs. $1 M+)
  - Reduce recruiter workforce required to handle the same workload

- **Dept of Defense**
  - Air Force – Personnel Services Delivery Transformation
  - $4 M annual savings
  - Improved customer search times from 20 minutes to less than 2 minutes

- **Recovery Accountability & Transparency Board**
  - Recovery.gov
  - $750 K savings
  - Reallocate $1 M to identify fraud, waste, and abuse

- **HHS**
  - Electronic Health Records (EHS)
  - Reduced time to go live time from 1 year+ to 3 months
  - Supports more than 100,000 Primary Care Practitioners

- **GSA**
  - Cloud Email Migration
  - $15 M savings
  - Migrated 17,000 users
  - Eliminated redundant infrastructure at 17 global locations

- **Dept of Agriculture**
  - Cloud Email Migration
  - $27 M savings
  - Migrating 120,000 users
  - Consolidating 21 fragmented email systems
Cloud Computing: Benefits

Cloud Computing: Smarter, Cost-effective IT solutions.

• By using cloud computing solutions, Federal Agencies can
  ❖ Measure and pay for only the IT resources they consume
  ❖ Increase or decrease their usage to match requirements and budget constraints
  ❖ Leverage the shared underlying capacity of IT resources via a network
• Cloud computing allows for increased EFFICIENCY
  ❖ Improves asset utilization
  ❖ Aggregates demand and accelerates system consolidation
  ❖ Improves productivity in application development, application management, network, and end-user
• Cloud computing makes IT more AGILE
  ❖ Purchase cloud ‘as a service’ from trusted providers
  ❖ Near instantaneous increases and reductions in capacity
  ❖ More responsive to urgent agency needs
• Cloud computing spurs INNOVATION
  ❖ Shift focus from asset ownership to service management
  ❖ Tap into private sector innovation
  ❖ Encourages entrepreneurial culture
## Cloud Strategy: Catalyzing Adoption

<table>
<thead>
<tr>
<th><strong>Security</strong></th>
<th><strong>Standards</strong></th>
<th><strong>Procurement</strong></th>
<th><strong>Governance</strong></th>
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<tbody>
<tr>
<td>Centralize certification and accreditation for cloud solutions</td>
<td>Define and evolve standards to ensure interoperability, portability, and security</td>
<td>Develop procurement vehicles to accelerate the purchase of cloud solutions</td>
<td>Set policy and enforce budget priorities</td>
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<td>Prioritize security controls to counter the most serious threats</td>
<td>Propose and test interim standards</td>
<td>Maximize strategic sourcing to buy cloud solutions</td>
<td>Align with regulatory and legal frameworks</td>
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<td>Use near real time security dashboards to facilitate continuous monitoring</td>
<td>Publish cloud computing business and technical use cases, a neutral reference architecture and taxonomy</td>
<td>Eliminate redundant and inefficient vendor certifications</td>
<td>Drive government-wide adoption</td>
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<td>Integrate identity management</td>
<td></td>
<td>Integrate needs of State and local governments</td>
<td>Collaborate with international entities</td>
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Cloud First Policy: Purpose

_Shift from Asset Ownership to Service Provisioning._

• “Cloud First” is intended to accelerate the pace at which the government will realize the value of cloud computing

• Requires agencies to evaluate safe, secure cloud computing options before making any new investments

• Agencies should be evaluating their technology sourcing plans to include consideration and application of cloud computing solutions as part of the budget process
Cloud First Policy: Implementation

**How Are Agencies Implementing Cloud First Agency-wide?**

- Agencies must modify their IT portfolios to take advantage of the benefits of cloud computing in order to
  - Maximize capacity utilization
  - Improve IT flexibility and responsiveness
  - Minimize cost

- For new IT deployments
  - Agencies shall default to cloud-based solutions whenever a secure, reliable, cost-effective cloud option exists

- For existing deployments
  - Agencies shall continually evaluate cloud computing solutions across their IT portfolios, regardless of investment type or lifecycle stage

- For all Agency cloud evaluations
  - Utilize the Federal Risk and Authorization Management Program (FedRAMP) as it becomes operational
  - Leverage government-wide and enterprise cloud computing procurements
Cloud First Policy: 3 Must Moves

Agencies Are Required to Move 3 Services to the Cloud.

• What / When
  ❖ One project to the cloud by December 2011 and
  ❖ Two additional projects by June 2012

• Identification of Projects
  ❖ Agencies identified all of the projects to be moved to the cloud in February of 2011
  ❖ These projects were made public on CIO.gov in May and can be found at: http://www.cio.gov/itreform/cloud_migrations.cfm

• Designed to build momentum to migrate to cloud

• Will help develop best practices regarding cloud and cultural change

• Problem
  ❖ Agency security authorizations are inconsistent, redundant, costly and inefficient
  ❖ Little incentive for agencies to leverage security authorizations because of inconsistencies amongst agency applications

• Solution: FedRAMP
  ❖ FedRAMP will create a consistent, standard approach to providing security and continuous monitoring of cloud systems by
    ✓ Establishing a standard set of security requirements, processes, and framework vetted across government and industry
    ✓ Standing up a Joint Authorization Board with DOD, DHS, and GSA providing guidance and provisional authorizations for cloud systems

• Benefits
  ❖ FedRAMP will allow agencies to leverage standardized security authorizations and continuous monitoring of cloud computing systems
  ❖ Reduce costs, staffing and time to completion for cloud security authorizations
Cloud Procurement: Vehicles

25 Point Plan → GSA Must Create Acquisition Vehicles for Cloud-based Commodity IT Services.

- Infrastructure as a Service (IaaS)
  - Blanket Purchase Agreement (BPA) based on IT Schedule 70 GWAC
  - Web Hosting, Cloud Storage, and/or Virtual Machines
  - 12 vendors were awarded a contract across these service offerings

- Email as a Service (EaaS)

- Future GWACs
  - GSA is working with the E-Gov office in order to determine the next cloud based commodity IT service to target in the next GWAC (HR, FM, GIS, Data Center, migration services, et. al.)
Federal Cloud Computing Strategy

• Decision Framework for Cloud Migration
  - Select, Provision, Manage

• Provision
  - Aggregate demand at Department level where possible
    - USG Shared Service Strategy
    - Commodity IT (OMB M-11-29)
  - Ensure interoperability and integration with IT portfolio
    - Continual
  - Contract effectively to ensure agency needs are met
    - Metrics
  - Realize value
    - Repurpose/decommission legacy assets
    - Train staff for higher value work
    - Refine processes to further business needs
Acquisition Lessons Learned: White Paper

Two-tier Approach.

• Existing Cloud Contracts
  ❖ Examined 15 different projects across the US Government.
  ❖ Interview Existing Cloud Projects to ask about
    ✓ Requirements development
    ✓ Security, privacy, e-discovery, FOIA, etc.
    ✓ Lessons learned

• Multi-disciplinary approach
  ❖ Agency Attorneys
  ❖ Procurement Officials
  ❖ CIOs
  ❖ Program Officials
What is Unique About Cloud Contracts?

- Themes identified in the two-tier approach were nearly identical

- Identify areas unique to cloud contracts / how agencies should address
  - CSP and End-User Agreements
  - SLAs
  - System Integrator Relationships
  - Security
  - Privacy
  - FOIA
  - E-Records

- Tactical Guidance (Appendix A)
  - Approximately 60 questions
  - “Check list” for agencies to use when developing a contract
Consumer Considerations

- Obligations -- Expectations, price and terms
- Scalability -- What providers can and cannot do
- Total cost of ownership
- Integration -- “Accessorizing” your cloud
- Agility -- Align business and IT needs
- Risk -- Do not overestimate provider capabilities
- Commoditization impact on business
- Razor sharp requirements and SLAs
Provider Considerations

• Sales models to change as cloud market matures
• Portability and interoperability enhanced roles
• Shift away commonplace service models
• Enhanced communication so buyers understand minimums
• Enterprise IT has different needs than average consumer
• Cloud changes, not releases, buyers from oversight responsibilities
• Help buyer understand deployment cycles
Charge to Audience

• If it walks like a duck, talks like a duck...

• Change as a constant

• Work to build environment of trust

• Power of now