Federal Cloud Computing Initiative (FCCI) Update

Presented to:
Cloud Security Alliance (CSA) DC Annual Federal Cloud summit

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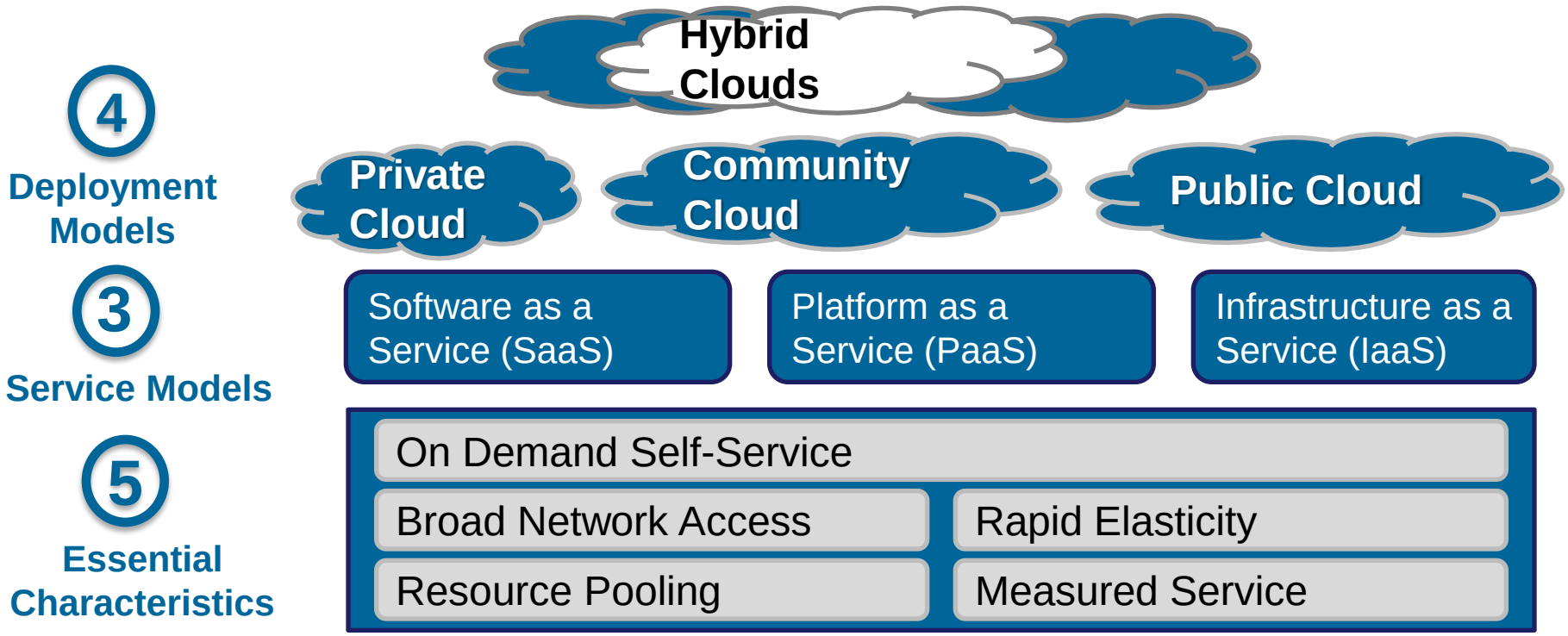
June 22, 2011

What Is the Cloud?

GSA



"In 10 years, 80 percent of all the computing done in the world could be done in the cloud. This is that big." *- Michael Nelson, Brookings Institution Panel on the Future of Cloud Computing, 2010*

Cloud Computing is the next "pay-as-you-go" utility model!

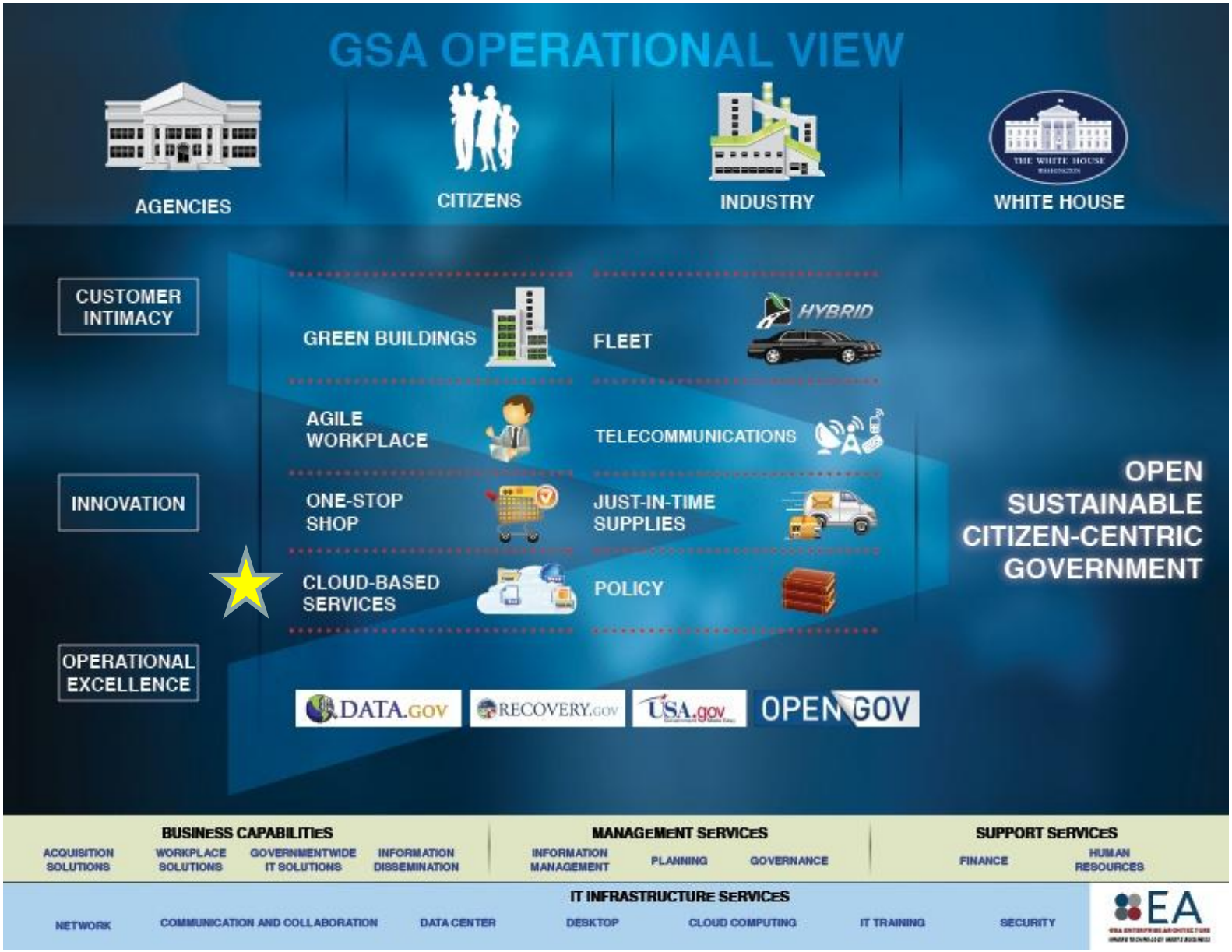
Cloud Computing And Business Transformation

GSA

Topic	Past	Current/Future
Procurement	Multiple, lengthy project-oriented procurements	Pre-competed, pre-certified products and services
Business Model	Static, bill by year or month	Dynamic, pay-per-use, utility-based billing models in addition to traditional methods
Governance	Project-based, uncoordinated	Support of multiple organization partners, funding sources
Infrastructure Footprint	Siloed, decentralized, low utilization	Higher degree of centralization and virtualization, higher utilization
Funding	Project-based and allocated by organizational structure	Support of cross-organizational initiatives, ease of utilizing MOUs
Security Compliance	Decentralized, paper-driven C&A processes	Leveraging centralized C&As with point testing of specific controls, as needed
Organization Alignment	Uncoordinated, adversarial	Coordinated, collaborative, business-case based

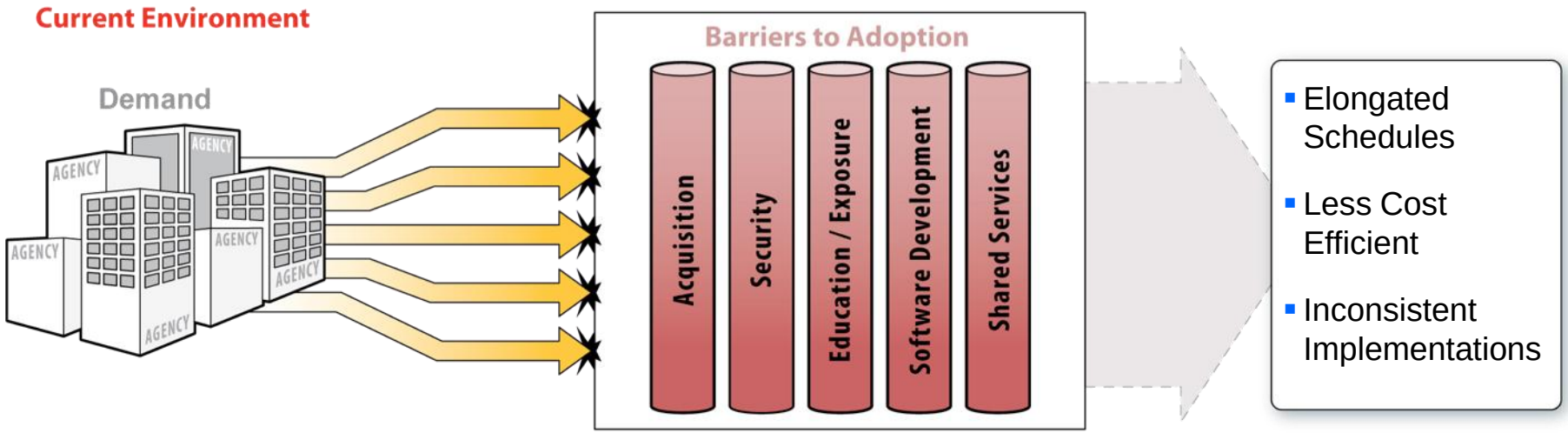
Agencies need a new way of doing business and focus on mission

GSA Enterprise Architecture View (Notional)

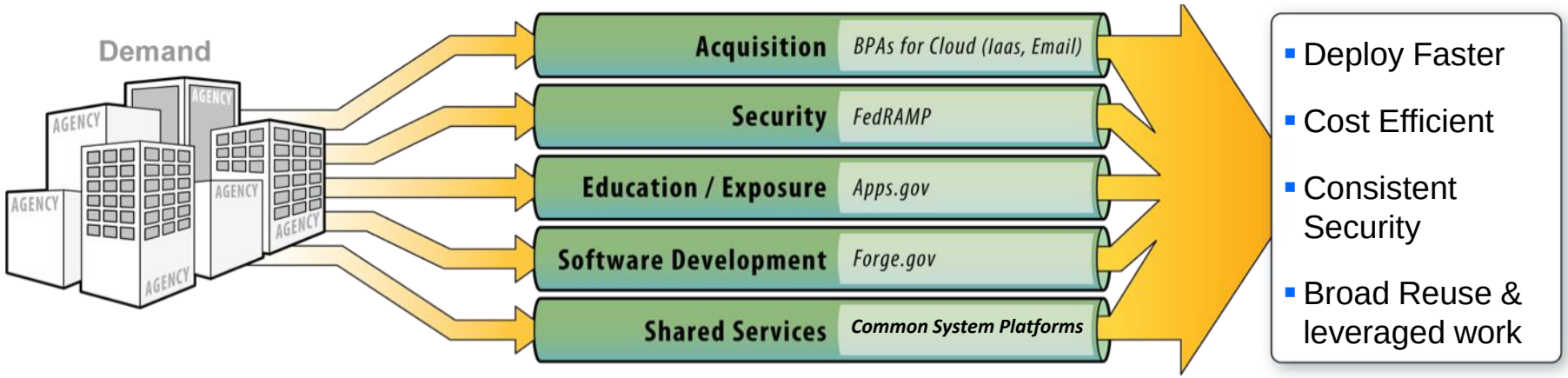


Source: GSA OCIO, Chief EA, Dr. Brent Brunk

GSA is Breaking down Key Initial Barriers to Cloud Adoption



GSA is leading by example and breaking down barriers….



A Context for Federal Cloud Computing

GSA

Background	• Fiscal pressures are forcing agencies to begin shifting to the cloud	**Cloud spending growing 27% CAGR annually[1]** **Other IT spending is up 5.5% annually**
Opportunity	GSA uniquely positioned to: • Reduce barriers • Create compelling Cloud services	**Estimated Federal Cloud spend:** **2009 -- $370 million** **2014 -- $1.2 billion[1]**
Choices	• GSA, NASA, NIH, DOI, DoD, and DHS already offer some Cloud services • Agencies may choose to consolidate rather than shift to cloud	**Cloud facilities: GSA, NASA, DOI, DoD** **Cloud services: GSA, USDA, DOI** **GWACs/MACs: GSA, NASA, NIH, DHS, DoD**
Cloud Computing Barriers	• Cultural: legacy system inertia, skill sets, education & exposure • Technical: security, portability • Business: acquisition, implementation	**GSA can reduce or remove these barriers government-wide**
Early GSA Leadership	GSA is taking foundational steps: • Reducing barriers • Collaborating government-wide	**GSA has already established working groups and relationships with over 55 different agencies and is leading by example**

Source: [1] http://www.input.com/corp/press/detail.cfm?news=1444

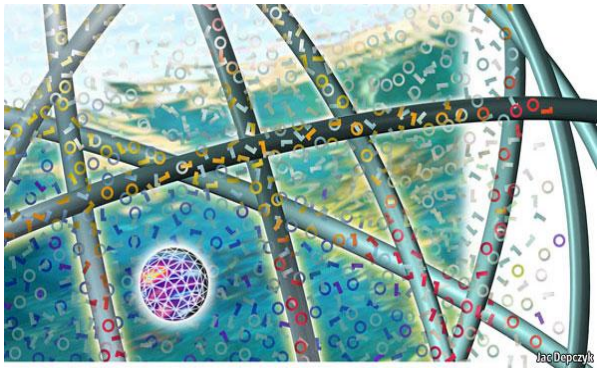
Context: The Next Revolution?

Federal Computer WEEK
Strategy and business management for government leaders

6 bold tech predictions: Fact or fantasy?

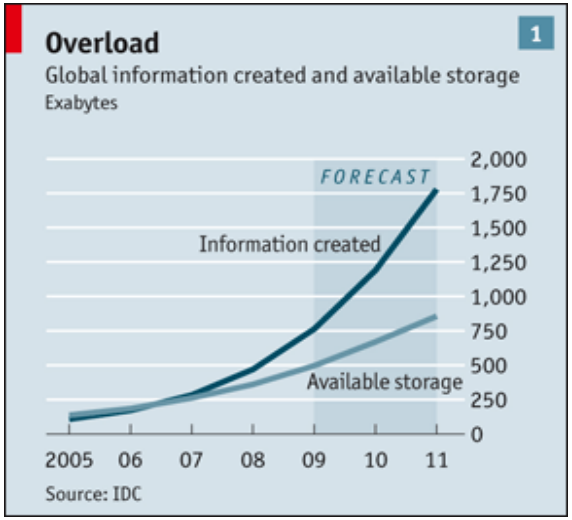
FCW (December 8, 2010)

1. **20% of businesses will own no IT assets by 2012 (Gartner)**
2. **75% or more of jobs in stand-alone IT departments will disappear by 2015 (Corporate Executive Board)**
3. **One trillion devices will be connected to the Internet by 2013 (Cisco) – Current=35B**
4. **The government can save $1 trillion in 10 years by harnessing certain proven technologies (Technology CEO Council)**
5. **25% of personal computing devices sold will be tablets by 2015 (Forrester Research)**
6. **Data will grow by 800 percent in the next five years with 80% Unstructured Text and Media (Gartner)**



Volume of digital information increases 10X every 5 years

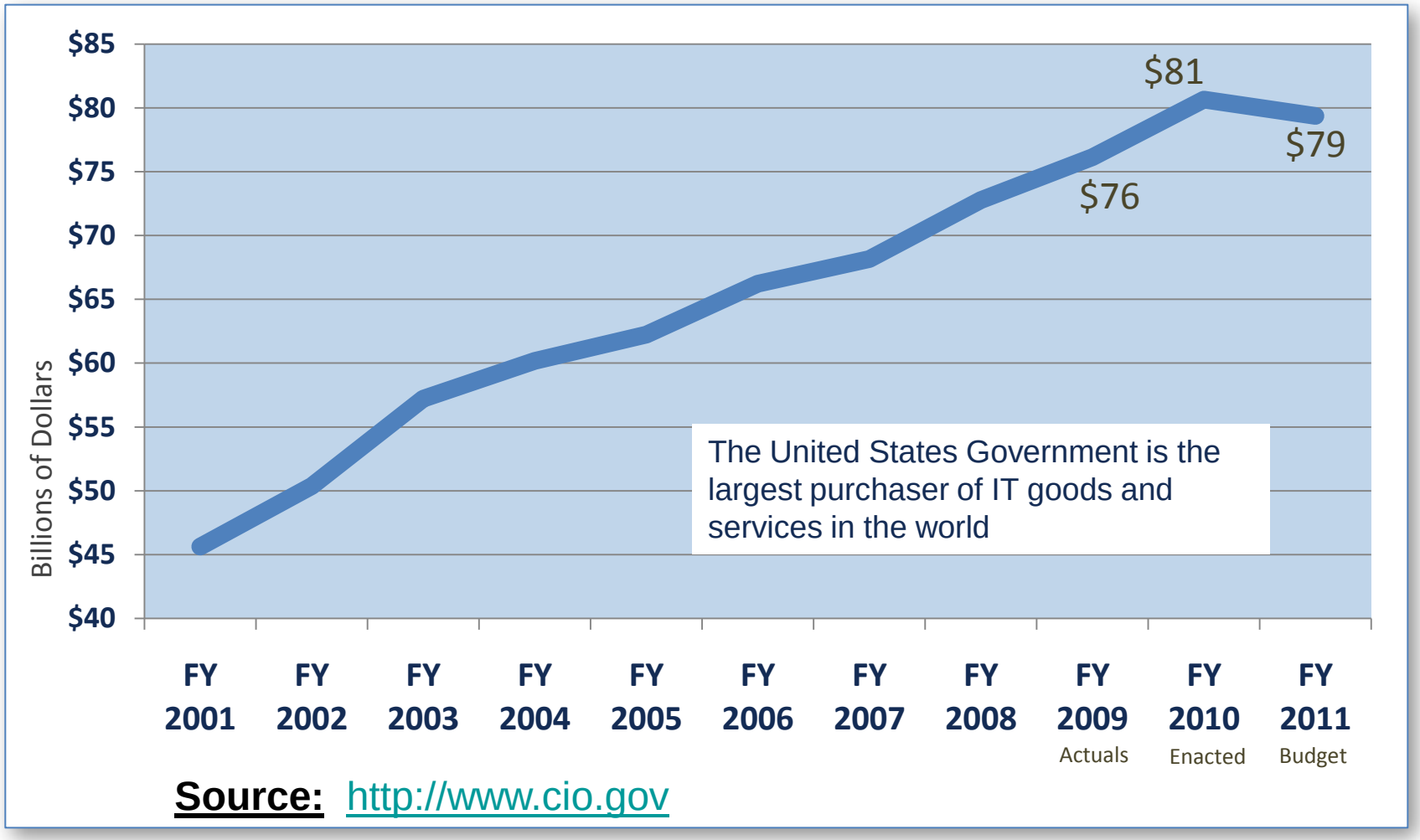
Source: IDC



And….the data is replicated many times over!

Mobile will be bigger than desktop internet in 5 years
-- Mary Meeker, Morgan Stanley, April 2010

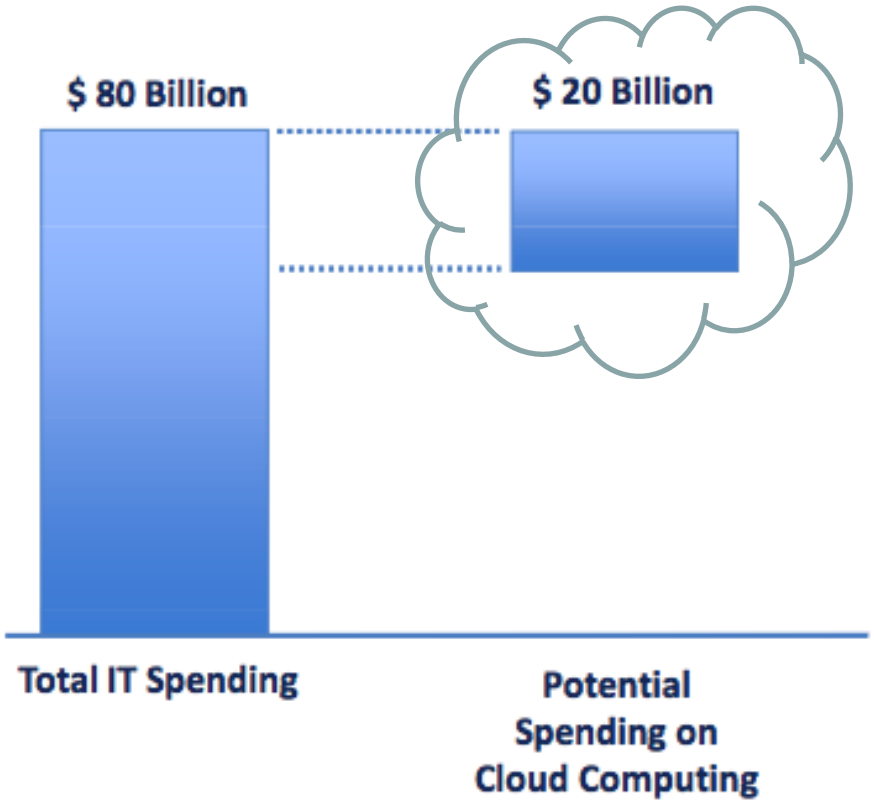
Context: The Government Spends Billions in IT



Source: http://www.cio.gov

~ 10, 000 Systems and ~25% IT Infrastructure

Context: Federal Government Cloud Computing Potential



Efficiency
- Improved asset utilization
- Aggregated demand and accelerated system consolidation (Federal Data Center Consolidation Initiative)
- Improved productivity in application development, application management, network, and end-user

Agility
- Purchase "as-a-service" from trusted cloud providers
- Near-instantaneous increases and reductions in capacity
- More responsive to urgent agency needs

Innovation
- Shift focus from asset ownership to service management
- Tap into private sector innovation
- Encourages entrepreneurial culture
- Better linked to emerging technologies (e.g., devices)

Source: Federal Cloud Computing Strategy (http://www.cio.gov)

Context: Economics are Motivating the Transformation

New Budget Submission Requirements

Beginning FY 2011

Agencies will be required to complete alternative analyses that includes cloud computing alternatives as a part of their future budget submissions.

By September 2011

Alternative analyses for all newly planned or performing major IT investments.

By September 2012

By September 2012: alternative analyses for all IT investments, making enhancements to an existing investment.

By September 2013

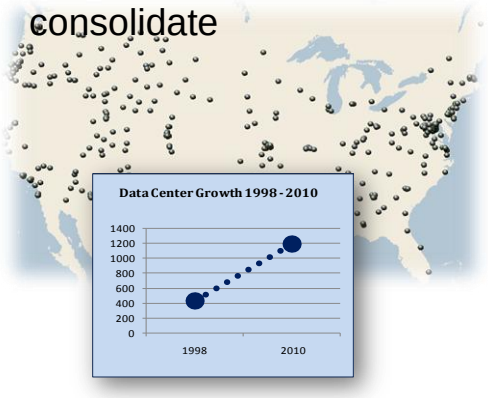
By September 2013: alternatives analyses for all IT investments in steady-state.

Source: FY2011 OMB Report on Information Technology

Context: Improve Performance & Deliver Better Service* (Source: http://www.cio.gov)*

Rationalize Service Delivery Models*

- Private sector is consolidating data centers while government data centers are growing
- Government needs to reverse this trend and consolidate



Shift Services to the Cloud*

- Leverage shared services through the cloud
- Launched Apps.gov to simplify procurement of cloud services

flickr
amazon.com
salesforce.com
Success On Demand.
Microsoft
Google Apps
Socrata

Simplify Access to Services*

- End-to-end digital service platforms
- New platforms for delivery – e.g., Mobile Computing

Data Centers = 2094!

Cloud is Here!

Mobile is Growing/Next!

Context: IT Reforms, Cloud and Data Centers

Date	Title of Topic	Key Highlights
June 8, 2010	Closing the IT Gap*	Identify 5% of Bottom Performing Programs
October 25, 2010	Closing the IT Gap – an update	Moving to consolidate data centers and deploy cloud computing technology to reduce IT, real estate and energy costs
November 19, 2010	Driving IT Reform: an Update**	5 Strategies – including "adopting light technologies and shared solutions" (Cloud and Data Centers)
December 9, 2010	25-point Implementation Plan to reform Federal IT***	**Each Agency CIO will be required to identify three "must move" services** and create a project plan for migrating each of them to cloud solutions and retiring the associated legacy systems. **Of the three, at least one of the services must fully migrate to a cloud solution within 12 months and the remaining two within 18 months**. **Close number of data centers by at least 800 by 2015 (40%)**

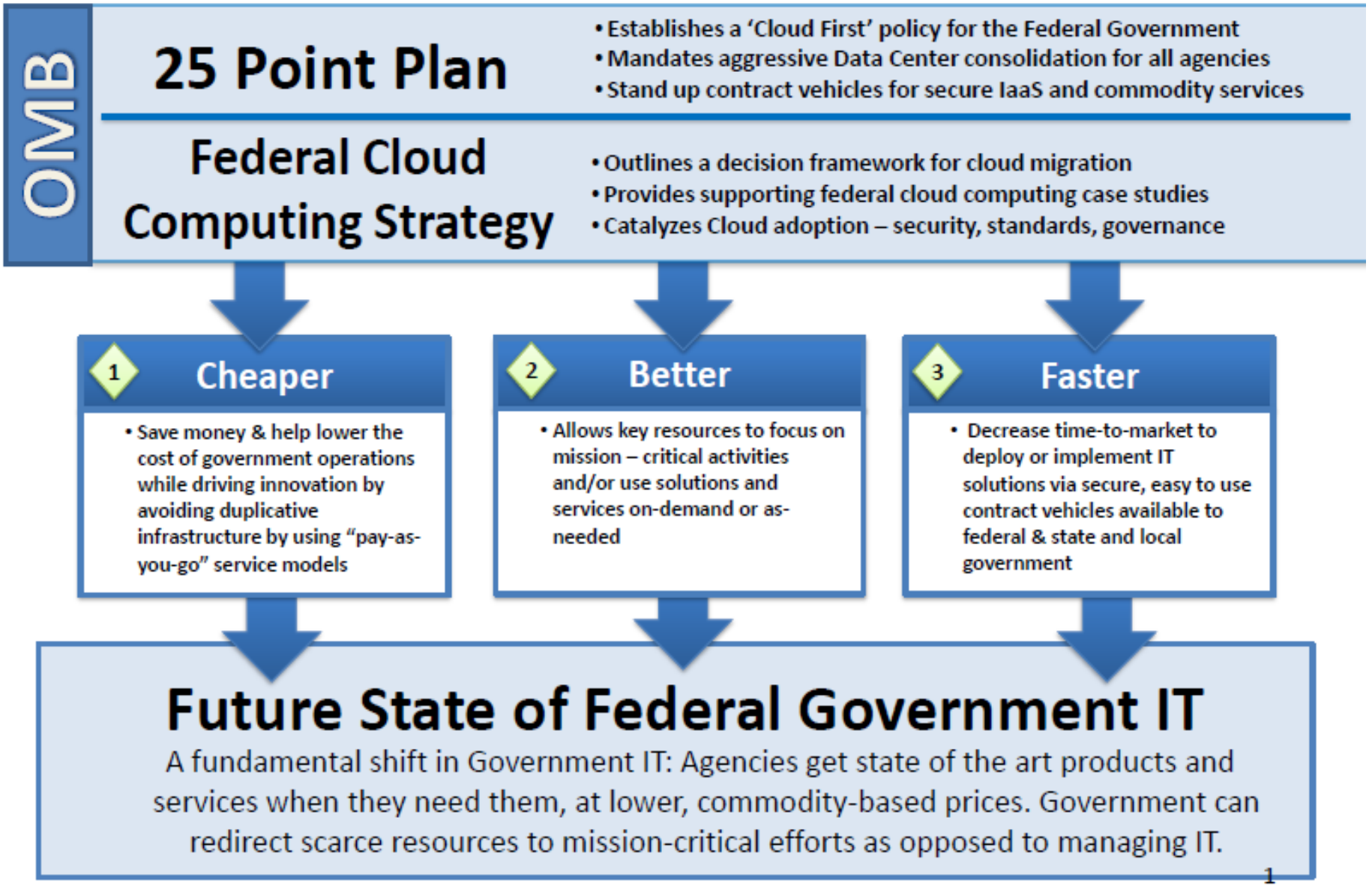
***http://www.whitehouse.gov/omb/blog/10/06/08/Closing-the-IT-Gap**

****http://www.whitehouse.gov/blog/2010/11/19/driving-it-reform-update**

*****http://www.cio.gov**

Aligning with OMB's Vision for IT

GSA



Federal Cloud Computing Initiative (FCCI) Program Overview

- Federal Cloud Computing Initiative began in March 2009 at the request of the Federal CIO, Vivek Kundra
- Mission: Drive the government-wide adoption of cost effective, green, and sustainable Federal cloud computing solutions
- The Cloud Computing Program Management Office (PMO) was established at GSA in April 2009
  - PMO manages the Cloud Computing Executive Steering Committee, which reports to the Federal CIO Council.
  - 4 additional government-wide governance groups were established within the program:
    - Cloud Computing Advisory Council.
    - Cloud Computing Security Working Group.
    - Cloud Computing Standards Working Group.
    - SaaS Email Working Group.

Federal Cloud Computing Initiative (FCCI)

GSA

Changing the Way Government Leverages Technology….

Better

- **Drive Innovation**: Work with private industry encouraging innovation and furthering competition among providers to drive best value solutions for the Government
- **Use Only What's Needed**: Eliminate high upfront costs by aligning costs with actual use or consumption of IT resources
- **Put the Power in the Hands of the End Users**: Move operating complexities to the Cloud, allowing Agencies to focus on core mission objectives

Faster

- **Provide One-Stop Shop**: Simplify acquisition of IT services by making it as simple as buying a book, booking an airline ticket, or making a dinner reservation online
- **Turn Up of IT Quickly**: Services can be provisioned in hours or days versus traditional IT methods which may take months to deploy
- **Scale Rapidly:** Deliver elastic computing, allowing Agencies to rapidly expand or contract IT resources to support unplanned events or spikes in usage

Greener

- **Energy Efficiency**: Create virtualized hardware and software services so Government uses only what's needed, avoiding overbuilding data center and server capacity
- **Reuse Across Agencies**: Provide shared, resource pooling, for greater reuse and ability to leverage underutilized IT resources across Government Agencies

Budget Realities are Dictating Cost Savings…

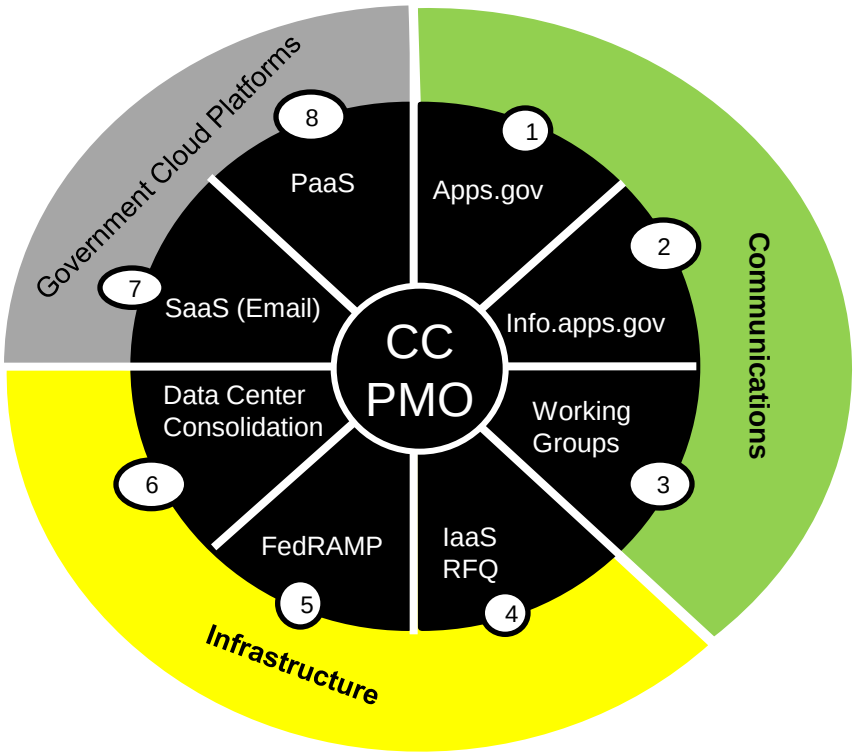
GSA Cloud Computing PMO Overview

Promoting adoption and removing obstacles in the government-wide acquisition and utilization of cost effective, green and sustainable Federal cloud computing solutions.

- Apps.gov
- FedRAMP
- Data Center Consolidation Initiative
- Infrastructure-as-a-Service
- Software-as-a-Service Email
- Platform-as-a-Service (Geospatial etc.)

http://info.apps.gov

FCCI Major Program Activities



1. **Apps.gov 2.0:**
   Online procurement of SaaS solutions for government.

2. **Info.apps.gov:**
   Informational website to communicate the latest news and information regarding the FCCI.

3. **Federal Working Groups:**
   GSA has established several inter-agency working groups to develop standards, set policies and agree to the overall vision for the FCCI.

4. **Infrastructure as a Service (IaaS):**
   The GSA has awarded a Blanket Purchase Agreement for IaaS. This will serve as a foundation for Cloud Computing services within the Government.

5. **FedRAMP:**
   Establish and operate a Government-wide Authorization Program for performing security C&A and continuous monitoring for commercial Cloud Services.

6. **Federal Data Center Consolidation Initiative (FDCCI):**
   Completed the FDCCI Government-wide study; Supporting the Federal CIO Council in Managing the Government-wide data center consolidation program including guidance, data collection and assisting agencies develop and implement data center consolidation plans.

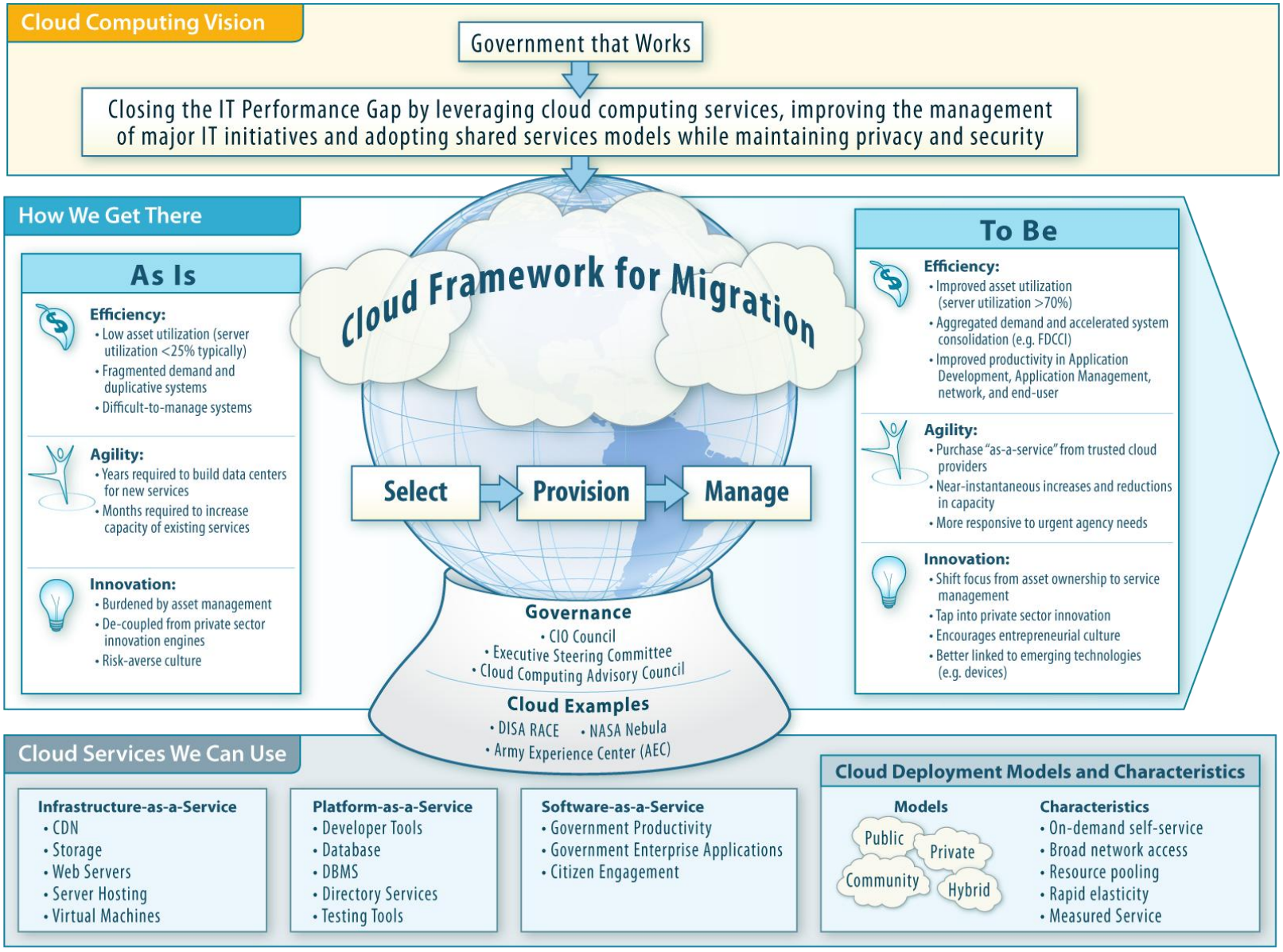
7. **Software-as-a-Service (SaaS) - Email:**
   GSA CC PMO is leading the Cloud SaaS Email Working Group to define and acquire SaaS Email services for Federal Government through an RFI and RFQ process.

8. **Platform-as-a-Service (PaaS) -** Geospatial
   Working with government agencies in developing a geospatial platform pilot for sharing data and developing applications for geospatial purposes.

Federal Cloud Computing Framework (Notional GSA View)

GSA

Notional



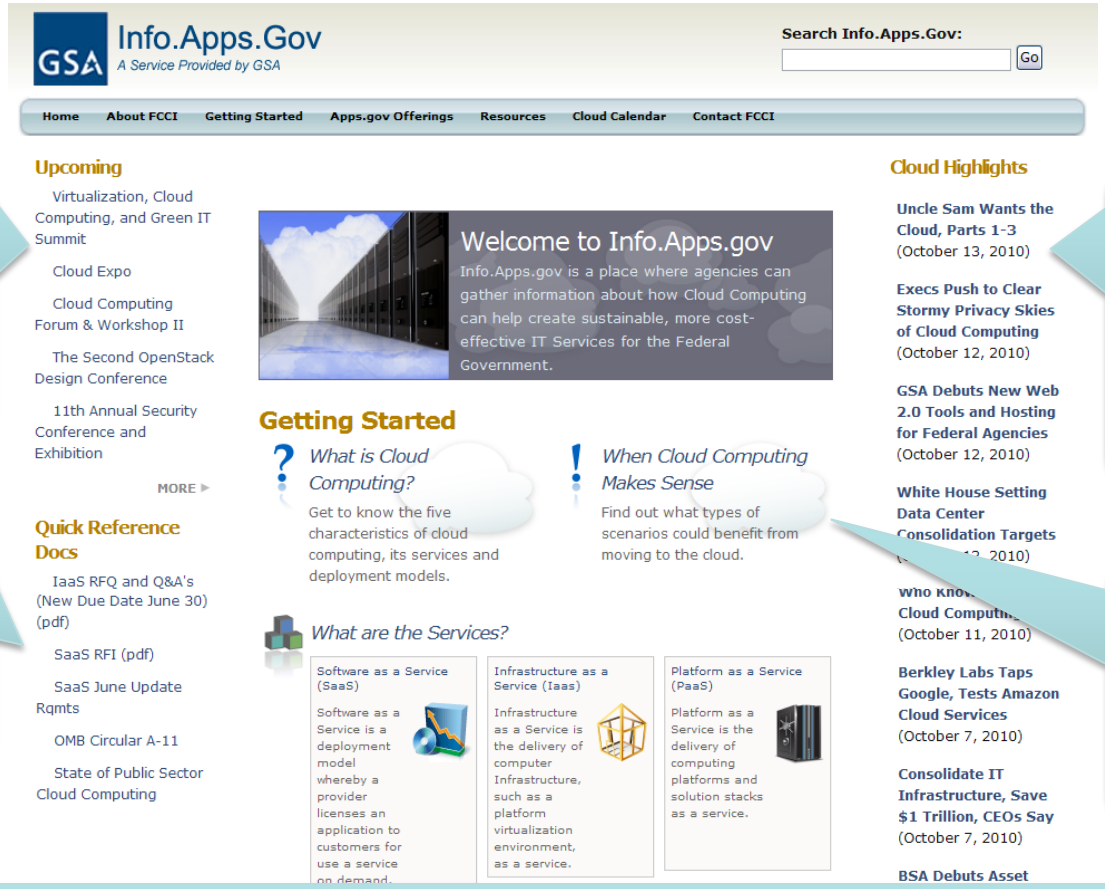
Apps.gov is Live!

Cloud Services

First Federal storefront site to commoditize cloud services so that buyers may cross-compare products and purchase (launched September, 2009). Currently offering SaaS and Social media products – IaaS Coming soon!

Cloud Computing InfoPortal: Info.Apps.gov

GSA



Keeping you informed in upcoming events!

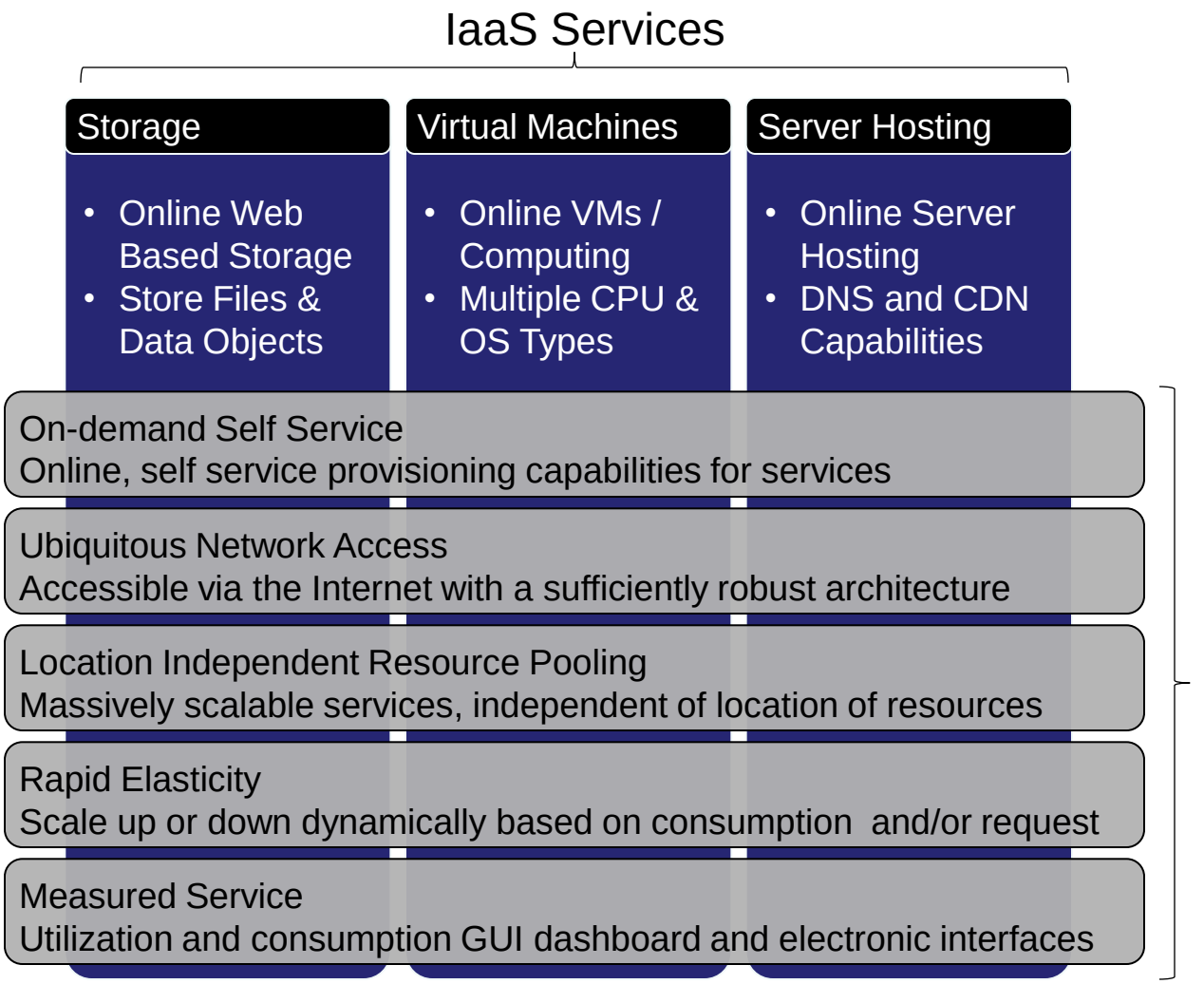
Reference Documents at your fingertips!

News and Information on Cloud and Data Center Topics

Provides tools to navigate the cloud landscape.

Launched in April 2010, Info.Apps.gov is a central Government site providing information about cloud computing and how to procure/use cloud services. It helps create sustainable, more cost-effective IT Services for the Federal Government. It is built on open source and it is hosted in the Cloud!

Infrastructure-as-a-Service (IaaS)



- **Awarded October 2010**
- **12 Awardees completing security authorizations with GSA to support "Moderate" Level Security for Government ~4Q FY11**
- **Services will be made available through purchase on apps.gov**
- **Tools will be made available to agencies to help simplify the acquisition process: SOO templates; Buying Guide; Pricing Calculator**

RFQ Required Cloud Computing Characteristics

http://info.apps.gov

Infrastructure-as-a-Service (IaaS)

GSA

12 Awardees across 3 Lots:

- **Cloud Storage**
- **Virtual Machines**
- **Web Hosting**

carahsoft

GENERAL DYNAMICS
Information Technology

verizon

SAVVIS

APPTIS

CGI

at&t

clwservices
INCORPORATED

Insight

AUTONOMIC
RESOURCES

Eyak Tek
Eyak Technology, LLC

COMPUTER TECHNOLOGIES CONSULTANTS
Your IT Solutions Provider

Software-as-a-Service (SaaS): Email in the Cloud

- Inter-agency SaaS Email Working Group established in June 2010 – developed requirements. SOW completed by GSA
- RFI completed
  - 13 respondents and RFI responses leveraged to create RFQ requirements. Pre-solicitation day held November 1 to solicit vendor and government feedback. Incorporated feedback into SOW.
- RFQ Procurement released (May 9, 2011) – responses due June, 2011
- The Cloud Email Early Adopters speaking panel held in June 2, 2011; The EaaS Working Group developed a sample business case & cost/time guidelines, cost estimator, bandwidth calculator
- GSA completed security authorization of Google Apps which may be leveraged by other agencies. USAID leveraged Google Apps security authorization package to greatly reduce timeline for system implementation

http://info.apps.gov

Platform-as-a-Service (PaaS): "Geo-Cloud" Vision

GSA

Large pool of agency applications identified for cloud migration

FGDC App 1

FGDC App 2

More …

Apps Need Platforms

Federal Platform Reference Implementations

"Geo-Cloud" Community Platform

Platforms Amplify IaaS Savings

Platform Savings

Platform building time & effort	Reduced maintenance costs	Faster deployment	Cost effective development / test

Infrastructure as A Service Savings

Hardware Savings	Operations Savings	Scalability Savings

Cloud Services Improves Citizen Focus and Efficiency for Government Portal, USA.gov

	Problem	Solution
	GSA wanted to reduce costs, add scalability and flexibility to USA.gov	Migrate to a cloud platform that resulted in significant lower cost, improved scalability.
	Hardware-Based Hosting	**Cloud-Based Hosting**
Time to upgrade	9 months including procurement	1 day maximum
Service Cost	~$ M per year hardware and service	~$K per year cloud and service (~67% less)
Downtime	2 hour/month average	Zero

Cloud Computing Improves Flexibility and Reduces Cost at USA.GOV

Federal Risk And Authorization Management Program (FedRAMP)

Unified Government-wide Risk Management Program

- Provides joint security authorization and continuous monitoring
- Agencies participate by leveraging the results for covered products
- Agencies **retain their responsibility and authority** to ensure their security needs are met in the use of systems

Vendor Benefits

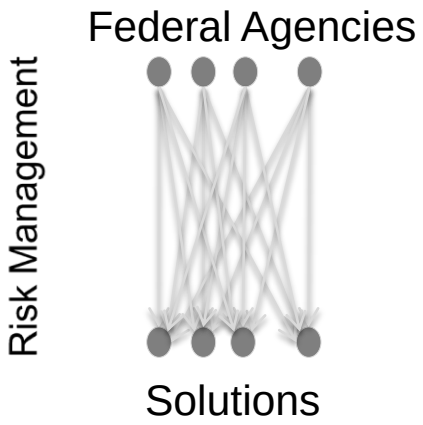
- Government-wide authorization and security compliance cost reduction

Agency Benefits

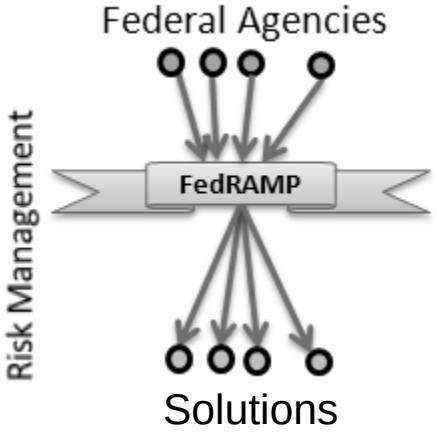
- Cost savings through reduced duplication
- Rapid acquisition
- Increased security assurance

Unified Controls/Continuous Monitoring + Policy + Business/Operations Model Coming Soon….at info.apps.gov!

Problem: Independent agency risk management has inefficiencies



Solution: Unified risk management eliminates inefficiencies



FedRAMP is Unifying Cloud Security…

Problem

- The current security framework in the Federal Government has duplicative efforts across Federal Agencies.
  - Each agency completes a security authorization for each IT system – regardless if that system has been authorized by another agency.
- Additionally, agencies place competing incompatible requirements on the same system and as well as inconsistent application and interpretation of FISMA security requirements.

Solution

- The Federal Risk and Authorization Management Program (FedRAMP) provides a unified risk management framework for cloud computing systems.
- FedRAMP includes an inter-agency vetted and compatible FISMA security requirements.
- FedRAMP will provide effective and consistent assessment of cloud services with associated cost savings.
- Continuous monitoring focus will be on near-real time data feeds from cloud service providers.
- Utilizes the "Approve Once, Use Many" concept.

FedRAMP Accomplishments

- GSA, DoD, DHS agree to a baseline set of Security Controls based on FISMA requirements.
- Published FedRAMP documentation (Proposed Security Assessment and Authorization for U.S. Government Cloud Computing).
- Held 5 industry days for industry and government input and buy in.
- Public comment period on published FedRAMP documentation:
  - Received over 1,000 comments.
  - Convened 3 cross-government review teams representing 20+ agencies.

Cross-Government Collaboration

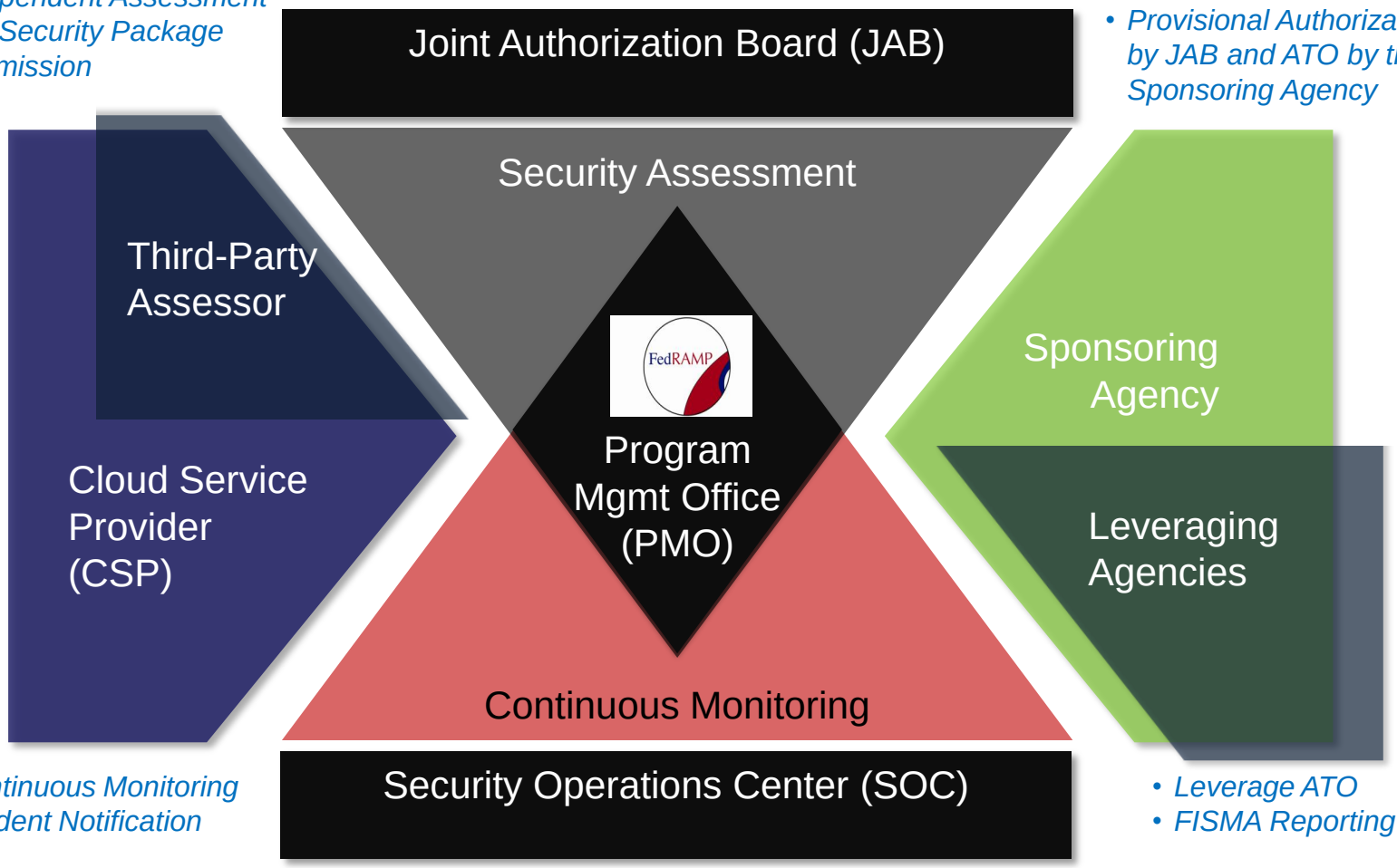
- FedRAMP documentation is a product of the Cloud Computing Security Working Group managed by GSA with participation by 15+ agencies.
- All FedRAMP documentation has been vetted through extensive collaboration with NIST, ISIMC, and the Federal CIO Council.
- Working closely with NIST and NSA to develop a framework for more effective and efficient continuous monitoring of authorized systems.

FedRAMP Concept of Operations (Notional)

FedRAMP Core Operations Consists of the JAB, PMO and SOC which interacts with the CSPs , Third-Party Assessors and Government Agencies

- *Independent Assessment and Security Package Submission*

- *Provisional Authorization by JAB and ATO by the Sponsoring Agency*

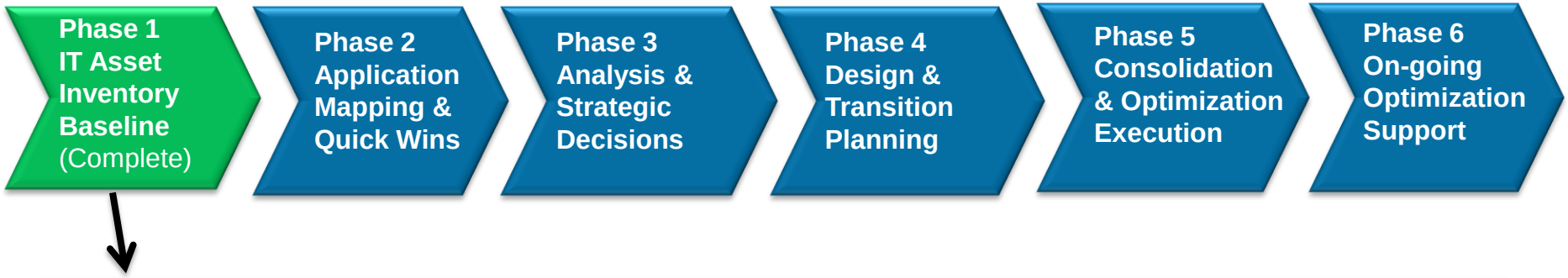


- *Continuous Monitoring*
- *Incident Notification*

- *Leverage ATO*
- *FISMA Reporting*

Federal Data Center Consolidation Initiative (FDCCI)

The Initiative's Six Key Phases



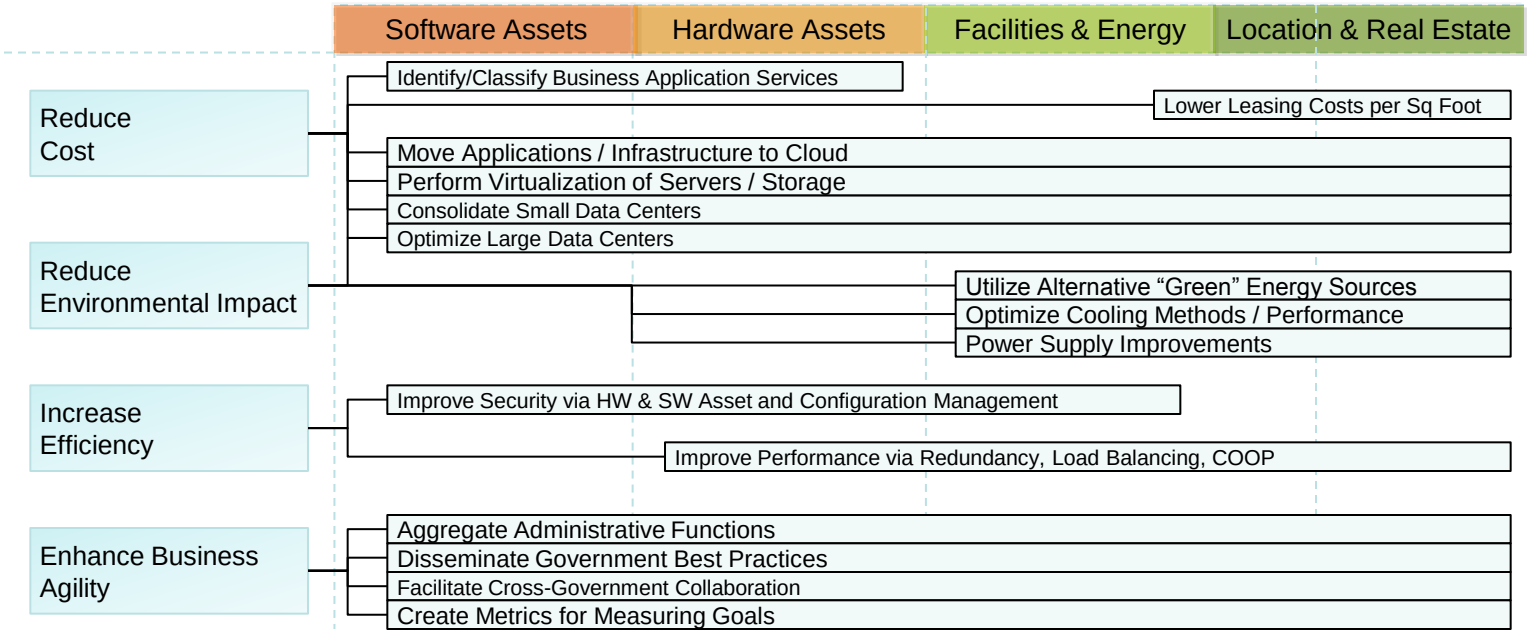
Milestones – Phase 1	Due Dates – Phase 1	Status – Phase 1
Initial Data Center Asset Inventory	April 30, 2010	Complete
Initial Data Center Consolidation Plan	June 30, 2010	Complete
Final Data Center Asset Inventory	July 30, 2010	Complete
Final Data Center Consolidation Plan	August 30, 2010	Complete
Approval of Final Data Center Consolidation Plans	December 31, 2010	Complete

- In February 2010, the Administration launched this Initiative - The scope of the Initiative is limited to CIO Council agencies
- Three agency guidance workshops were provided by the team as well as peer reviews were conducted of the agency's Initial and Final Plans
- Per the CIO Council Memo published October 1, 2010; "As of July 30, 2010, based on agency submissions, there are 2,094 Federal data centers"

http://www.cio.gov

Federal Data Center Consolidation Initiative (FDCCI)

- **GSA is providing support to OMB and CIOC on the FDCCI in meeting the strategic goals of the program**
- **GSA is assisting agencies on developing long-term consolidation plans which leverage multiple approaches including Cloud Computing / Virtualization technologies.**
- **Four Major Strategic Goals matched with four focus areas as follows:**



FDCCI - Utilization Improvement Metrics (Notional)

GSA

Improving IT asset utilization is the key driver for reducing energy consumption per unit of performance. This can be achieved primarily by:

- Server Virtualization (increasing the number of virtual servers per hosts)
- Server Consolidation (decommissioning underutilized physical servers)
- Rack Space Consolidation (relocating underutilized racks)
- Data Center Consolidation (shutting down underutilized facilities)

Utilization Metrics	Typical Results	Target Results (Notional)
Average Virtualization (%)	0-10%	*30-40%*
Average Virtual OS per Host (#)	5-10	*15-20*
Average Server Utilization (%)	7 – 15%	60 – 70% *(application dependent)*
Average Rack Space Utilization (%)	50 – 60 %	80 – 90%
Average Power Density Usage Equivalent (W/sq.ft.)	50 – 100 W/Sq Ft	150 – 250 W/Sq Ft
Power Usage Efficiency (PUE)	3 – 2	1.6 – 1.3

Note: These are NOTIONAL Numbers and NOT Official Goals

FDCCI Status Update

GSA

- Collected and reported on data for Data Center Consolidation for 2011
- DCCTF Kicked off in February
  - Established Working Groups
    - ❖ Total Cost Modeling – develop a TCM that can be leveraged by entire group
    - ❖ Consolidation Playbooks best practices – develop playbook outlining the consolidation steps
    - ❖ Alternative Infrastructures – identify alternatives to traditional infrastructure – SaaS, IaaS, PaaS, hosting, etc
    - ❖ Government Grid - Establish multi-tenant, data center resource sharing capabilities across agencies
- PMO is supporting the DCCTF and its working groups and is currently focused the following deliverables:
  - Assist agencies with the consolidation process, by developing detailed infrastructure consolidation plan created from the repeatable Playbook-based approach
  - Develop a Total Cost of Ownership model
  - Develop templates and collect inventory for June 2011 inventory update

Data Center Consolidation – Agency Reporting Schedule

Deliverables	Agency Task	Agency Deadlines	FDCCI PMO Task	PMO Deadlines
1. INITIAL ASSET INVENTORY	**Conduct an initial inventory of data center assets.**	**April 30, 2010**	• Assist Agencies with the analysis and comparison of data center count, rack and server count, and supported Major Systems across the Federal Government; Identify potential areas of asset consolidation, reuse and cost savings.	**May 31, 2010**
2. INITIAL DATA CENTER CONSOLIDATION PLAN	**Develop an initial data center consolidation plan.**	**June 30, 2010**	• Assist Agencies in identifying and proposing potential areas where optimization through server virtualization or cloud computing alternatives may be used and offer a high-level transitioning roadmap.	**July 30, 2010**
3. FINAL ASSET INVENTORY BASELINE	**Collect the final asset inventory baseline containing more detailed data.**	**July 30, 2010**	• Analyze detailed utilization patterns and virtualization and cost savings opportunities. This will serve as the foundation for the final data center consolidation plans.	**Aug 30, 2010**
4. FINAL DATA CENTER CONSOLIDATION PLANS	**Develop final data center consolidation plans. Reflect data center consolidation plans in FY12 budget**.	**Aug. 30, 2010**	• Evaluate and provide guidance and feedback on technical roadmap and approach for achieving the targets for infrastructure utilization, rack density and consolidation.	**Nov 30, 2010**
5. ONGOING MONITORING	**Conduct ongoing annual monitoring, reporting staring in FY11. Reflect data center consolidation plans in next FY budget**.	**June 30, 2011 Sept. 30, 2011**	• Maintain and analyze updated asset inventory annually (FYQ3) • Consolidate reporting on FDCCI progress (FYQ4)	**Sept 30, 2011 Dec 31, 2011**

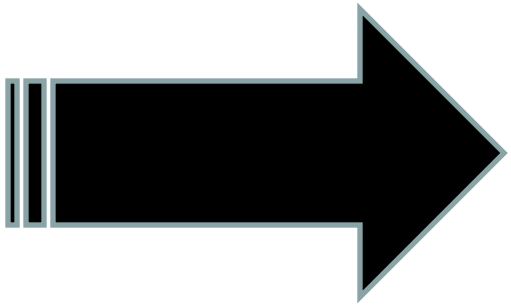
The Road Ahead…

GSA

Complete and Stabilize the Foundations for FedRAMP, IaaS, SaaS and FDCCI

1 Cheaper	2 Better	3 Faster
IaaS Security and Acquisitions	• Complete all security ATO's for cloud vendors • Support agency acquisitions of IaaS solutions • Complete ATO's for agency applications on the new IaaS solutions	
Cloud Email Security and Acquisitions	• Complete security ATO's for cloud vendors • Support agency acquisitions of IaaS solutions • Maintains Library of Approved Systems	
FDCCI Essential Tasks	• Develop a "Total Cost" model for agencies • Create a consolidation playbook for agencies • Upgrade and maintain the inventory tracking portal	
FedRAMP Launch and Manage	• Establish the FedRAMP program management office • Create a Security Operations Center (SOC) • Create an archive for maintaining completed security plans • Establish the Joint Authorization Board (JAB)	

“The Best Way to Predict the Future is to Create it”*…



*__Source__:
Alan Kay, Stanford
Peter F. Drucker

http://Apps.gov

http://info.apps.gov

http://www.fedramp.gov

http://www.cio.gov