

## DEFENSE BUSINESS BOARD



# DoD Information Technology Modernization: A Recommended Approach to Data Center Consolidation and Cloud Computing

Task Group

January 19, 2012

*\*These are the final briefing slides as approved by the Defense Business Board during the public meeting held January 19, 2012. The full DBB report will contain more detailed text which will reflect the totality of the points discussed and modifications adopted by the Board during their deliberations.*

# Task Group Overview

## Terms of Reference

How should the Department of Defense (DoD) apply best business practices to Information Technology (IT) modernization, Data Center Consolidation (DCC), and the efficient, effective, and secure implementation of Cloud computing to support DoD business approaches and its war-fighting mission?

## Task Group

Mr. David Langstaff (Chair)

Ms. Bonnie Cohen

Mr. Patrick Gross

Mr. Atul Vashista

Mr. Kevin Walker

## Military Assistant

Lt Col Edward Lengel, USAF

# Task Group Report

- Approach
- Context
- Findings
- Recommendations
- Conclusion
- Appendix

# Approach: Critical Considerations

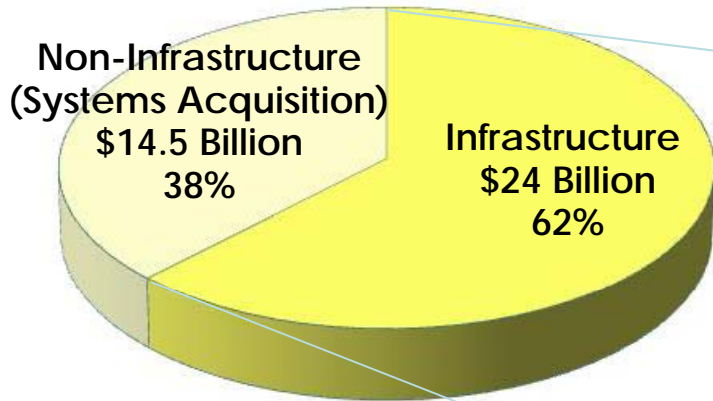
- Align with DoD mission requirements
  - Do no harm
  - Support and enhance DoD mission
- Recognize cost saving imperative
  - Identify cost reductions
  - Seek operating efficiency and asset utilization gains
  - Consider positioning for future gains
- Address security concerns
  - Understand current system risks and vulnerabilities
  - Understand cloud-specific risks
  - Mitigate transition as well as ongoing operating risks
- Identify and capture 'lessons-learned' experiences
  - Public sector: DoD and other government agencies
  - Private sector: industry, service providers, domain experts, and consultants

# Approach: Interviews

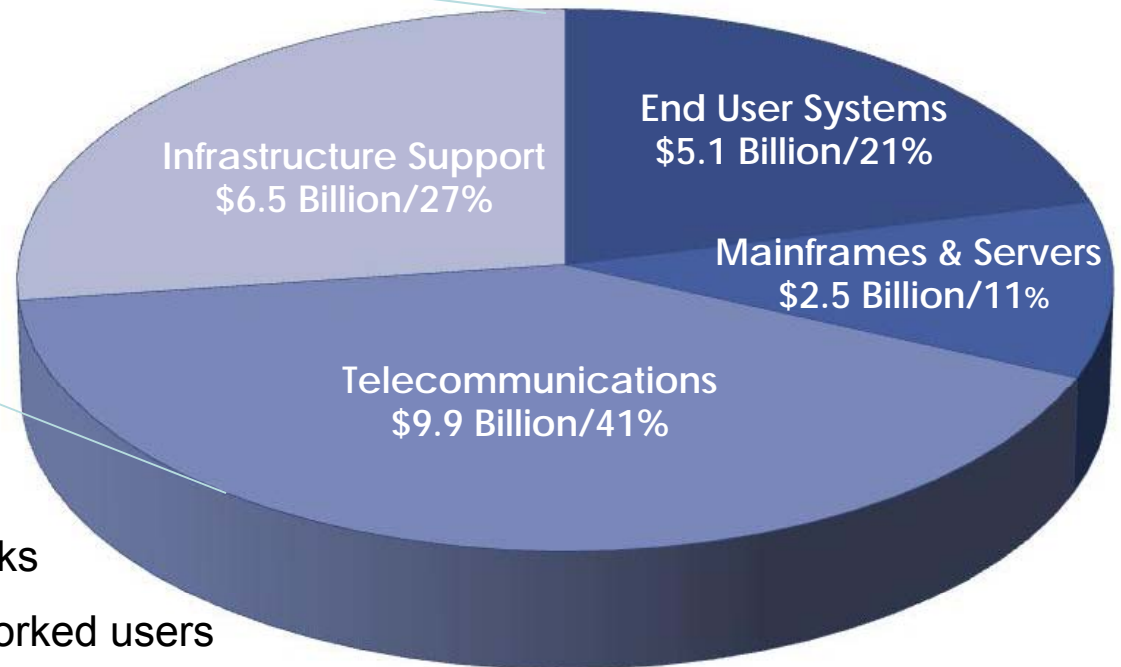
- Public Sector
  - CIO and Staff, DoD
  - CIO, US Air Force
  - CIO, US Army
  - CIO, US Navy
  - CIO, Defense Intelligence Agency
  - CIO, Defense Logistics Agency
  - CIO, Dept of Homeland Security
  - CIO, US Government
  - Director and Staff, NSA
  - Vice Chairman, Joint Chiefs of Staff
  - Principal Deputy Under Secretary of Defense, AT&L
  - Director of Computing Services and CTO, Defense Information Services Agency
- Private Sector
  - Amazon
  - Chevron
  - Citigroup
  - CGI
  - CSC
  - First Data Corporation
  - Forrester Research
  - Gartner Group
  - IBM Corporation
  - Kimberly Clark Corporation
  - Palantir
  - Thompson, Cobb & Bazilio
- See Appendix for documents reviewed

# Context: DoD IT Today

- **FY12 DoD IT Budget \$38.5B**



- **DoD IT Infrastructure \$24.0B**



- **DoD IT Scale**

- 772+ data centers
- 6,000+ locations; 15,000+ networks
- 70,000+ servers; 3 million+ networked users
- 7 million+ IT devices
- 5,000+ applications
- Approx. 90,000 full-time employees

*These are the final briefing slides as approved by the Defense Business Board in the public meeting held January 19, 2012.\**

# Context: DoD Readiness for DCC/Cloud

- Interviews indicate wide support across DoD for DCC/Cloud
  - Cost savings and efficiency benefits are widely understood
  - Budget imperatives create environment for making major changes
  - Early DoD initiatives already showing positive results
- Despite stated willingness to work together, passive resistance is likely
  - Loss of visibility, control, dedicated staff, and contractors
  - Required cultural and job changes will pose significant challenges
  - Requests for exceptions will proliferate
- Concerns expressed about loss of mission capability
  - Particular concern expressed about migration process
  - Recognition that current workforce may be inadequately trained
  - Desire for greater transparency, service focus on output metrics, and service-provider accountability

***Key issue requiring explicit decision: IT optimization at what level?***

# Findings

- Cost Savings
- Return on Investment (ROI)
- Security
- Mission Effectiveness
- Mission Transformation
- Implementation



# Findings: Visible and Hidden Costs & Spending

- Staff, hardware, software, enterprise purchases

- Excessive purchasing due to long procurement/deployment cycles
- High support costs to maintain independent systems, multiple networks, and duplicative infrastructure
- High labor costs due to inefficient staff utilization
- Underutilization of servers and untracked O&M purchases

# Examples of Cost Savings and Efficiencies

CATEGORY	REDUCTION	EXAMPLE
Data Centers	Number: 50% Cost: 25-50%	Typical payback is 5 years
Servers	70%	80 → 4; leverage virtual machines
Server Provisioning	95%	73 days → less than 1 day
Application Development	90%	45 days → 4 days
Bandwidth Utilization	70-90%	ROI in less than 1 year
Personnel	40%	Most organizations retrain support staff into applications staff

***Cost-saving estimates: 25-50% in total annual expenditures  
DCC/Cloud initiatives illuminated robust 'shadow' IT infrastructure.***

# Findings: Return on Investment

- Private sector ROI tends to be case-specific; often DCC/Cloud migrations are combined with other initiatives
- However, some conclusions can be drawn:
  - ROI achieved consistently ahead of projected goals in both dollars and time
  - Sustained reductions achieved only with initial up-front investment
  - Unanticipated positive secondary effects were considerable
- Continuation of status quo has a negative ROI
- Additional non-IT ‘invisible’ ROI achieved by reduction of procurement and deployment cycles and redeploying staff to higher value activities

***While there are no ‘rules of thumb’ regarding ROI benchmarks, in all reported cases ROI was greater than originally anticipated.***

# Findings: Security

- *Myth:* Cloud-based systems are 'less secure'  
*Reality:* Current systems are difficult to defend  
Security will decline over time  
Properly designed Cloud systems can be more secure
- *Myth:* Cloud will lead to lower performance levels for the user  
*Reality:* Cloud can offer enhanced and breakthrough performance
- *Myth:* 'All eggs in one basket' creates a new critical failure risk  
*Reality:* Realistically one never goes to 'one basket'  
Cloud provides greater insurance v. critical failure risks

# Findings: Mission Effectiveness

- Significant benefits came from unexpected areas
  - Increased speed of data to users; facilitated information sharing and collaboration
  - Greater enterprise understanding due to increased visibility across all operations
  - Staff productivity improvement due to shift of focus from infrastructure maintenance to applications development, support, and service
- Large gains derived from change in personnel/staffing model
  - Staff can be where best talent resides; does not need to be location-specific
  - Fewer systems, networks, and enclaves require support
  - Allows significant reduction/redeployment of contractor staff
- Current system hurts effective mission operations
  - Architecture makes it nearly impossible to share critical data on a timely basis
  - Proprietary systems and closed architecture make in-theatre upgrades difficult
  - Lack of common standards make collaboration difficult
  - Lack of portable ID forces individuals to be 'reinvented' with every change
  - Weak security creates need for more enclaves and dedicated networks

# Findings: Mission Transformation

- Enables 'thinner' computing and new operating model
  - Reduces hardware, software, upgrade, and maintenance costs
  - Increases quality and timeliness; decreases risks of 'in-theatre' support
  - Increases portability of IT systems; lowers risks of loss; improves mission security
- Increases value of data; improves situational awareness
  - Decreases fragmentation of data; increases accessibility
  - Facilitates 'big data' analytics
- Changes balance and costs of network defense/attack
  - Decreases points of entrée; fewer networks to penetrate
  - Enables stronger security, redundancy, and recovery; allows more rapid upgrades
  - Increases required sophistication and costs to attackers
- Shifts emphasis of cyber security from network protection to data integrity and identification/authentication
- Provides platform for future innovation

# Findings: Implementation - Authority

- Strong governance and leadership are the most important factors
  - Without it the initiative will fail; must be ‘owned’ by CEO, not CIO
  - Must have authority to say ‘no’; passive resistance can not be tolerated
- Establishing clear strategy and ‘Concept of Operations’ is essential
  - Address both transition and steady-state operations
  - Include risk analysis and mitigation strategies
  - Focus on training and retraining of personnel
  - Develop specific milestones, deadlines, and metrics
- Legal and policy barriers work against success; must be resolved
  - Title 10 sets redundant authorities over business systems
  - Requirement that every Service must ‘own its own data’ is unclear
  - Federal acquisition regulations are out of synch with speed of technology change and evolving mission requirements



# Findings: Implementation – ‘Aim’ before ‘Fire’

- Current system configurations will be difficult to rationalize and maintain given proliferation of systems across DoD
- Successful migrations have followed a sequenced approach:
  - Step 1: Applications normalization, standardization, and rationalization
  - Step 2: Data center rationalization and consolidation
  - Step 3: Data and security rationalization
  - Step 4: Cloud migration of appropriate components
- Standardization on numerous fronts will strengthen security
- Consolidation and Cloud initiatives are already underway but may be inconsistent with goal to optimize at DoD enterprise level
- Sequenced approach to migration will provide transparency, build confidence, and reduce risk



# Findings: Implementation – Change Management

- Incentives around common goals are critical to changing behavior
  - Early successes were encouraged, visible, and rewarded
  - Applying some of savings to fund future upgrades delivered long-term buy-in
  - Emphasis on staff retraining rather than reduction created powerful motivator
- Encourage pilot programs; don't fight the entire system
  - Build on current initiatives as long as compatible with strategy and Concept of Operations (ConOps)
  - Create 'user-pull' by moving desirable and 'easy/safe' apps to Cloud first
  - Communicate benefits and value of the change (steady-state), not the process
- Risk Management
  - Sequenced approach to migration will greatly reduce risk
  - Use commercially-proven technology where possible; avoid the 'cutting edge'
  - Expertise and track record are key

***Owners must be willing to trade control for greater efficiency, lower costs, and increased effectiveness.***

# Recommendations

1. Establish single strong governance authority
  - DEPSECDEF must 'own' initiative; CIO drives effort, but it cannot be a CIO initiative
  - CIO must have ability to drive change, say 'no,' and force compliance
  - CIO must develop standardized and transparent metrics across DoD
  - Do not create a new committee to oversee effort; will create confusion
2. Develop a coordinated, integrated strategy to optimize at the DoD level
  - Establish clear timeline, milestones, budget, and Concept of Operations
  - Engage Service/Agency CIOs as chief implementers accountable to the DoD CIO
  - Leverage DISA role; insist on commercial-like service level agreements, metrics, and accountability
3. Streamline legal and procurement authorities to address policy barriers
  - Align Title 10 responsibilities with IT modernization governance authority
  - Establish rapid and consolidated procurement capability for IT purchases

# Recommendations

4. Use sequenced approach to data center consolidation
  - Normalize, standardize, and rationalize critical elements first
  - Prioritize around applications, then infrastructure, and then data/security
  - Set deadlines for termination of legacy systems, personnel, and contractors
  - Launch Cloud pilot initiatives that offer immediate user benefits
  - Accelerate Cloud when its purpose and desired benefits are clear
  
5. Utilize commercial business model to set targets/manage expectations
  - Establish multi-year budget plan; require audit-level transparency; use ROI metric
  - Develop shared model to enable both savings and capability upgrades
  - Establish specific output-based metrics for transition, operations, continued business improvement, and mission support
  - Optimize staff for new work mix/model; invest in training
  - Utilize DoD incentive and reward programs to drive behavioral changes

# Summary

- DCC/Cloud is a strategic DoD enterprise-level imperative
  - DoD CIO has a good roadmap and can drive initiative on behalf of DEPSECDEF
  - DoD CIO needs to be a strategic partner, not a back-office support provider
- Benefits are dramatic and far-reaching
  - Cost savings, efficiency gains, and security enhancements are significant
  - New architecture provides platform for future innovation
  - Mission support improvement and ultimate transformation are greatest benefits
- Failure to act decisively is a decision, and the wrong one
  - DoD initiatives are already underway; independent and uncoordinated actions will increase barriers to coordination and information sharing
  - Costs will skyrocket and service levels will decrease given need to maintain legacy systems; future rationalization will be harder and more expensive
  - Security will fall further behind, leaving entire IT network increasingly vulnerable
  - IT costs (given DoD 'color of money') are direct tradeoff v. warfighter support

# DEFENSE BUSINESS BOARD



## Questions?

### DEFENSE BUSINESS BOARD

*Business Excellence In Defense of the Nation*

*\*These are the final briefing slides as approved by the Defense Business Board during the public meeting held January 19, 2012. The full DBB report will contain more detailed text which will reflect the totality of the points discussed and modifications adopted by the Board during their deliberations.*

# DEFENSE BUSINESS BOARD



## Appendix

### DEFENSE BUSINESS BOARD

*Business Excellence In Defense of the Nation*

*\*These are the final briefing slides as approved by the Defense Business Board during the public meeting held January 19, 2012. The full DBB report will contain more detailed text which will reflect the totality of the points discussed and modifications adopted by the Board during their deliberations.*

# Documents Reviewed

## DoD documents and briefings

- “Defense Information Infrastructure: Rationale for Defense Management Report Decision (DRMD) 918,” Cynthia Kendall, Deputy Assistant Secretary of Defense (Information Systems), September 1992
- Defense Intelligence Agency Strategic Vision Overview 2012-2016
- “Department of Defense Information Technology Enterprise Strategy and Roadmap,” DoD Chief Information Officer, September 6, 2011
- “Department of the Navy Information Management/Information Technology/ Cyberspace Campaign Plan for Fiscal Years 2011-2013,” Terry Halvorsen, DON/CIO, May 2011
- Federal Data Center Consolidation Initiative; Department of Defense 2011 Data Center Consolidation Plan & Progress Report, November 8, 2011
- Remarks by Deputy Secretary Lynn at the 2011 DISA Customer and Industry Forum, Baltimore, MD, August 16, 2011
- Title 10 USC; Subtitle A; Part IV; Chapter 131; Section 2222 Defense business systems: architecture, accountability and modernization; January 2009

# Documents Reviewed

## US Government documents

- “25 Point Implementation Plan to Reform Federal Information Technology Management,” Vivek Kundra, U.S. Chief Information Officer, December 2010
- “Cyberspace Policy Review: Assuring a Trusted and Resilient Information and Communications Infrastructure,” The White House, May 29, 2009
- “Data Center Consolidation; Agencies Need to Complete Inventories and Plans to Achieve Expected Savings,” Government Accounting Office Report 11-565, July 2011
- “Information Security: Additional Guidance Needed to Address Cloud Computing Concerns,” Gregory C. Wilshusen, GAO 12-130T, October 6, 2011
- “Information Security: Federal Guidance Needed to Address Control Issues with Implementing Cloud Computing,” Government Accounting Office Report GAO 10-513, May 2010
- “Memorandum for Chief Information Officers, Subject: Security Authorization of Information Systems in Cloud Computing Environments,” Steven VanRoekel, Federal CIO, December 8, 2011
- “State of Public Sector Cloud Computing,” Vivek Kundra, Federal CIO, May 20, 2010





# Documents Reviewed

## US Government documents (cont'd)

- “VA Information Technology Strategy,” Statement of Joel Willemsen, Managing Director, Information Technology U.S. Government Accountability Office before the House Veterans Affairs Subcommittee on Oversight and Investigations

## Industry reports and reference material

- “IT Service and Cloud Computing Transformation Strategy,” Gartner Consulting, September 2011
- “Cloud First Buyers Guide for Government,” TechAmerica Foundation
- “Security Risks in Cloud Computing; a Preliminary View from the IREC Membership,” Information Risk Executive Council, 2010
- “Enterprise Data Center Consolidation in the States: Strategies and Business Justification,” NASCIO, August 2007
- “Hype Cycle for Virtualization,” Philip Dawson, Gartner, Inc., July 22, 2010
- “Key Issues for Securing Public and Private Cloud Computing, 2011,” John Pescatore, Gartner, Inc., April 15, 2011
- “Amazon’s Corporate IT Migrates Business Process Management to the Amazon Web Services Cloud,” Amazon Web Services, April 2011

# Documents Reviewed

## Press articles and speeches

- “A Break in the Clouds: Towards a Cloud Definition,” Luis Vaquero, et al
- “Federal IT Needs A Cost-Savings Dashboard,” John Foley, *InformationWeek Government*, December 12, 2011
- “GAO Faults Pentagon Cyber Efforts, Lack Of Clarity,” Ellen Nakashima, *Washington Post*, July 26, 2011
- “Military Networks 'Not Defensible,' Says General Who Defends Them,” Noah Shachtman, *Danger Room (Wired.com)*, January 12, 2012
- “Navy, Marine Corps Under Orders To Slash IT Spending,” Nicole Blake Johnson, *Federal Times*, August 10, 2011
- “Navy Details Data Center Consolidation Plan,” Bob Brewin, *NEXTGOV* July 26, 2011
- “Preparing for the Real Costs of Cloud Computing,” Bob Violino, *Computerworld*, December 5, 2011
- “Selling Umbrellas in the Rain,” Dean Iacovelli, [www.public-cio.com](http://www.public-cio.com), February 2011
- “The Agile Infrastructure; Digital Spotlight Datacenters,” Robert L. Scheier, *Computerworld*, December 2011



# Documents Reviewed

## Press articles and speeches (cont'd)

- “The Coming Cyber Wars,” Richard Clarke, Boston Globe, July 31, 2011
- “Under Pressure: The Pentagon Faces a Business Challenge at Military Scale,” John Foley, *InformationWeek*, November 28, 2011