



Department of Transportation

# Data Center Consolidation Plan

Department of Transportation  
Version 7

# Federal Data Center Consolidation Initiative

## 2011 Data Center Consolidation Plan & Progress Report *(9/30/2011)*

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## 1 Introduction

The Department of Transportation (DOT) serves the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today and into the future. To achieve this mission, DOT has developed mature shared services programs that provide selected IT services for all of the Operating Administrations (OAs) in DOT. DOT also has other programs to consolidate services across the enterprise. The maturity of these programs ensures that centralized services are supported by an optimal, efficient infrastructure. In the past year, DOT has conducted an exhaustive inventory of IT assets and data centers to ensure that the starting baseline for all DOT organizations is accurate and detailed. This very thorough inventory resulted from a multi-year validation effort.

In support of our progress in the areas of asset visibility and infrastructure optimization, DOT has developed a comprehensive and aggressive strategy to further optimize our data center environments with an aim to site consolidation, improved energy consumption, and cost transparency in the IT domain.

Concurrent to these efforts, the former Federal CIO, Vivek Kundra, published the Data Center Consolidation Initiative (FDCCI) on February 26, 2010. Mr. Kundra announced a Government-wide initiative to:

- 1) Promote the use of Green IT by reducing the overall energy and real estate footprint of government data centers,
- 2) Reduce the costs of data center hardware, software and operations,
- 3) Increase the overall IT security posture of the government, and
- 4) Shift IT investments to more efficient computing platforms and technologies.

DOT fully embraces OMB's vision to reduce the cost of data center operations and energy consumption. We view FDCCI as an opportunity to leverage new technologies and surplus data center capacity to achieve further cost savings and cost avoidance. The key tenets of the DOT Data Center Consolidation Strategy are shown below and define the strategy in achieving the end state goals found in section 2:

- Maximize use of DOT's major data centers in order to achieve economies of scale by repeatedly consolidating, where possible, to a small group of DOT "magnet" data centers with a core competency related to consolidation
- Improve DOT-wide IT service management and standardization
- Focus on IT capital investment in blade technologies and virtualization software
- Drive IT cost transparency and energy consumption transparency in data centers
- Reduce the data center footprint within buildings
- Communicate DOT direction clearly and often

DOT views FDCCI as a long-term project that will take five years to implement the initial OMB milestones across the department with continued optimization and savings beyond the five-year mark. DOT will ensure that, to the extent possible, the FDCCI Plan, the Strategic Sustainability Plan, and all DOT and modal Infrastructure Exhibit 300s are aligned.

*For planning and implementation purposes, DOT is making a distinction between data center consolidation for the National Airspace System (NAS) and the rest of DOT. The NAS data center consolidation effort is a core component of FAA's NextGen Facilities transformation initiative, which itself is part of the overall NextGen investment portfolio. NAS data center facilities will be consolidated in accordance with the current Exhibit 300 baseline for NextGen, which assumes the requisite funding to begin NAS data center consolidation in FY2017.*

*For OMB FDCCI reporting purposes, however, DOT will include (but will not aggregate) NAS data center consolidation in all of its FY inventory updates.*

The following plan details the goals, approach, and timeline that support DOT's effort to further optimize its IT data center infrastructure. Although DOT focuses on quick win reductions in the near term, the Department will make the hard choices necessary to enable large-scale infrastructure consolidation. Additionally, as DOT is focused on becoming more innovative and agile, it is critical that DOT's IT infrastructure consolidation efforts are successful in driving improved IT service management that enables fast provisioning of critical services. In the coming years, we intend to make DOT a model of shared services and data center excellence for the public and private sectors. By offering common hosting services using repeatable consolidation services, DOT's consolidation efforts will, as a first priority, make good business sense.

## 2 Agency Goals for Data Center Consolidation

### **AGENCY GOALS**

The goals of the Department of Transportation are consistent with OMB FDCCI objectives:

- **Reduce the cost of IT data center infrastructure** by achieving economies of scale by sharing services and infrastructure
- **Improve network security** by driving consistent standards, better compliance, and increased visibility across the reduced footprint
- **Implement better energy management practices** and increase energy consumption transparency in DOT data centers
- **Increase agility in IT data centers** by focusing on fast provisioning of IT hosting services and customer centric application hosting support

### **PLANNING APPROACH AND CURRENT ACTIVITIES**

DOT's data center infrastructure, both in size and scale, reflects the department's historical approach to providing strong regional support for aviation, highway, railroad, maritime and other transportation services and functions. Over the last several decades this infrastructure has grown incrementally and, to some extent, organically to support continued growth in IT

applications and services. DOT is now implementing a rigorous planning process with all of its stakeholders to determine the best path for optimization and to reverse the historic trend. DOT has begun proactive communications with its modes, ensuring them that data center consolidation and optimization will lead to long-term efficiencies and not diminish the level of IT support it currently provides.

DOT has engaged in a number of activities since OMB first launched the FDCCI. Specifically, DOT has:

- Submitted the initial and final versions of DOT's FDCCI plan based on OMB definitions, and submitted three subsequent revisions to the final plan based on OMB feedback, including this current revision. DOT also responded to peer-review questions
- Submitted the initial and final FY10 Asset Inventory Baseline, including two subsequent revisions to the final baseline and has also submitted final FY11 Asset Inventory
- Initiated application mapping
- Formed working groups and steering committees to ensure organizational commitment
- Developed draft models for estimating data center capacity requirements and for performing cost-benefits analysis
- Initiated discussions with IT executive managers about potential labor union issues due to data center consolidation
- Initiated FY11 consolidation of two (2) Tier I-IV data centers and nine (9) server rooms in accordance with the FY11 Savings Plan target
- Continued aggressive virtualization in data centers and server rooms
- Managed numerous communication activities with the Government Accountability Office (GAO) as part of the GAO audit of FDCCI at DOT
- Explored FDCCI inventory management tools for ongoing OMB and other dashboard reporting

DOT will continue these activities so that it has a solid foundation and sustainable strategy for data center consolidation. These planning activities are critical for deciding, with greater precision, the exact data centers and server rooms that can be consolidated, in what order, and what timeframe. Until then, DOT has provided modest estimates on data center/room consolidations and modeled the associated reductions in servers, racks, power consumption, etc.

In coordination with application mapping and other ongoing analysis, we anticipate some updates to the Savings Plan and the Utilization Plan within the next several months. We expect a higher level of confidence in our targets as a result of this additional analysis and planning.

### **TARGETS**

These quantitative targets are over a five year period.

**27%** reduction in Tier 1-4 data centers

**18%** reduction in server Rooms/closets

**10%** reduction in racks

**26%** reduction in servers

**10%** savings in energy consumption

**10%** savings in building operational costs

**25%** virtualization target

**8:1** VM’s per host for Windows Servers; **3:1** VM’s per host for Non-Windows Servers

KPI targets are based on consolidation/virtualization and capacity planning models that require additional verification and validation over the next several months. Reductions are generally not straight-line forecasted across fiscal years as DOT anticipates smaller reduction gains in the first couple of years while capacity planning across the magnet and regional data centers is finalized. Our current virtualization target is conservative; we are examining methods to boost that number. The overall consolidation strategy has also been modified to align with IT budget constraints.

### 3 Implementing Shared Services/Multi-tenancy

Currently DOT provides a variety of shared services for a majority of OAs under the COE. These and other DOT shared services include:

Customer Services	Computing Services	Network Services
Tier 1 Service Desk	Hosting and Housing	Data Network Management
Tier 2 Deskside Support	Data Center Operations	Voice Network Management
Desktop Refresh	Change Management	Infrastructure Cabling
Customer Communications	Release Management	Wireless Telephony
Financial Management System (Delphi)	Test Environment	
Labor Distribution Timekeeping System (Castle)		

*Figure 1: Shared Services/Multi-Tenacity Diagram*

DOT serves as a Federal Shared Service Provider (SSP), leveraging one of its Magnet Data Centers to provide financial systems, services, and related support to other agencies. In this capacity DOT currently hosts both applications and disaster recovery for the US Coast Guard, Department of Homeland Security, Department of Commerce, General Accounting Office, Commodity Future Trading Commission, Consumer Product Safety Commission, National Credit Union Association, and the National Endowment for the Arts.

DOT’s role as a Federal SSP has provided us with many lessons regarding the challenges of consolidating and sharing IT services. DOT will use this knowledge as we further augment enterprise services. DOT will continue to mature its IT service management using ITIL best

practices. This will provide a common language and framework to share, manage, and provision IT services across the COE in line with customer expectations. DOT will build on its success incrementally and instill confidence on a gradual basis, particularly among parts of DOT with a long track record of owning and managing their own infrastructure. DOT will drive toward shared services by:

- Immediately focusing on “quick wins” – consolidation of multi-tenancy data centers.
- Conducting a shared service analysis for briefing to OAs. This analysis will propose a roadmap for specific modes and identify services that can be provisioned by private clouds. DOT will then focus on receiving OA agreement.
- Improve IT Service Management by maturing current service strategy and service design processes. Develop a service management governance structure for infrastructure management, and develop common standards for reporting and agreements

Initially the DOT Shared Services approach will focus on server and application hosting services, email services, and collaboration services (enterprise collaboration tools). DOT will begin planning but does not anticipate driving all OAs toward a shared services model for network management services. Some potential services may take a longer timeframe than the five-year DCCI project.

## 4 Agency Approach, Rationale and Timeline

The updated inventory submitted to OMB on 6/30/2010 documents 32 data centers and 217 server rooms/closets/other throughout the country, including multiple Magnet Data Centers configured to support all DOT requirements. Magnet Data Centers are targeted as long-term homes for DOT’s IT infrastructure and as DOT IT infrastructure centers of excellence that possess a core competency in consolidation activities.

The DOT data center footprint reflects the Department’s historical approach to providing strong regional support for aviation, highway, railroad, and other transportation services and functions. It also reflects the year-to-year growth in the number of IT applications and services that DOT supports, similar to other agencies.

### *Approach*

DOT will reduce its footprint by reducing the number of Tier I-IV data centers by (9) and the number of Tier V-VIII server rooms/closets/other by 54 by the close of FY15. Also DOT will continue planning for additional reductions that go beyond FY15 targets. To achieve the FY15 targets, DOT will apply the following approach:

- ***Establish Magnet Data Centers as cost and energy efficiency centers of excellence.*** The Magnet Data Centers are integral to consolidation efforts. DOT will continue to standardize within those data centers, optimize physical configurations for power and cooling, improve disaster recovery capabilities, and coordinate capacity planning - with

the overarching goal to develop a core competency in data center consolidation activities.

- **Virtualize.** OST and OAs will virtualize as much as possible across all data centers. DOT is already virtualizing extensively within the Magnet Data Centers as well as in some regional data centers. Virtualization is DOT's primary strategy for reducing its overall data center footprint.
- **Decommission data centers that sprawl across individual buildings.** DOT will identify facilities that contain multiple data center rooms and consolidate rooms within those facilities to the extent possible. DOT will also focus on leveraging "magnet" data centers for excess capacity, utilize other agency data centers, or make arrangements with a commercial provider. **Consider outsourcing for capacity needs.** Where feasible and as consolidation plans require, DOT will look to cloud solutions to meet ongoing capacity needs. At the same time DOT will continue to benefit from recent, sizeable investments in its Magnet Data Centers.
- **Develop Enterprise Standards for TCO Modeling and Energy Consumption. Where practical,** DOT will develop standard approaches and tools for capturing, measuring, and reporting the costs associated with data centers and energy consumption. Driving transparency and reporting of financials and energy at an Enterprise level will ensure better management of DOT's total investment in data center infrastructure.
- **Focus on people from the start.** Any sort of infrastructure consolidation effort impacts people – their power, their influence, and sometimes their jobs. It is critical that the DOT CIO communicates early and often to provide predictability to impacted personnel. It is also very important to communicate the purpose and rationale to attain alignment early. Lastly DOT CIO needs to address human resource or contract issues that may arise as a result of the effort.

### **Migration Planning**

A key component of DOT's FDCCI strategic planning process will be a technical 'Migration Impact Assessment'. The Migration Impact Assessment will address critical infrastructure components at the Magnet Data Centers to ensure that service levels for existing operations (either at the locations to be closed or at the Magnet Data Centers) will be maintained. Specifically, the following issues include, but are not limited to the critical infrastructure components that will be addressed in the Migration Impact Assessment:

- Technical ability of the Magnet Data Centers to easily increase bandwidth and/or improve data transactional speeds to ensure service levels are maintained;
- Technical ability of the existing Magnet Data Centers to maintain current service levels for pre-existing services as new services and support requirements are consolidated;
- Operational ability of the existing Magnet Data Centers to establish, manage, and meet a set of pre-defined service levels for the activities that will be consolidated;
- Where no pre-defined service levels exist, operational ability of the Magnet Data Centers to establish and document service level expectations for existing activities (with a focus on closet or other less formalized activities) that will be consolidated at the Magnet Data Centers;

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- Technical ability for Magnet Data Centers to test and confirm their ability to meet service level expectations prior to formal consolidation of activities (e.g., cut-over);
- Operational assessment of any “mission critical” systems that cannot or should not be consolidated due to the sensitivity of the application or information provided by the system;

These assessments will assure the viability of the Magnet Data Centers to serve as long term homes for DOT’s IT infrastructure. They will also focus on making DOT Magnet Data Centers IT infrastructure centers of excellence. The assessments will also support the Consolidation Design and Transition Plan.

### Program Master Schedule

DOT views FDCCI as a long-term project that will require approximately five years for implementation across the department. This five-year timeline includes OMB planning and implementation milestones through 4Q13 and extends into 4QFY15.

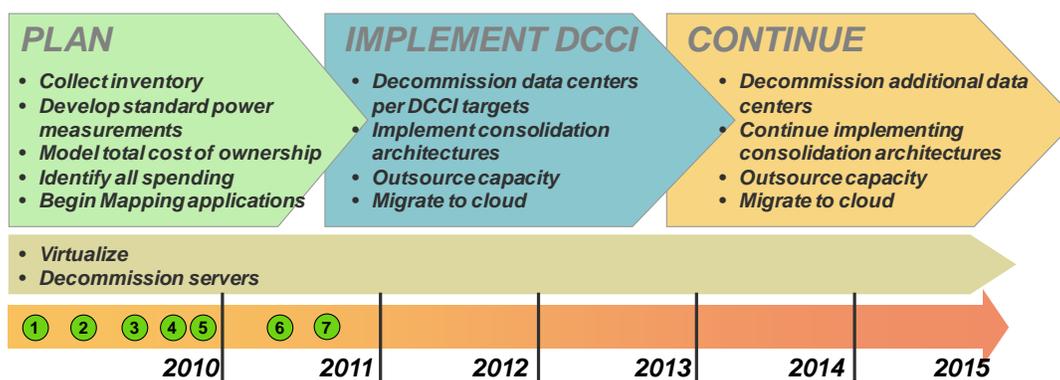


Figure 2: FDCCI 5-year Timeline

1. Initial Data Center Consolidation Plan (6/30/10)
2. Final Asset Inventory Baseline (7/30/10)
3. Final Data Center Consolidation Plan and All Final Targets (8/30/10)
4. OMB Approved Data Center Consolidation Plan (12/31/10)
5. Initial Application Mapping (12/31/10)
6. DOT FDCCI Plan released to Public (10/7/11)
7. Begin Consolidation Analysis and Design (through 2013)

In addition to the milestones identified here, we will be completed the shared service assessment and briefing of the OAs in October 2010, conducted Tier I-IV Data Center assessments through December 31, 2010 and began logistics and contract support actions in 1<sup>st</sup> QTR FY11. Although our final architecture blueprint is scheduled for completion on 9/30/11, we will have other efforts working in parallel to drive quick win consolidation and prepare Magnet Data Centers for increased capacity. Please see the complete list of decommissioned DOT data centers later in this section.

### ***Magnet Data Center Approach***

DOT has experience with IT consolidation and being an enterprise service provider experience as a result of our Common Operating Environment. From this experience, we realize that bureaus and programs that transition from a provider role to a customer role want assurance that the service levels that their end customers have become accustomed to is continued when the transition is made to a centralized, enterprise environment. In the absence of this assurance, key IT managers and personnel necessary for the migrations and overall initiative success are likely to dig their heels in and resist the effort.

DOT's FDCCI Strategy focuses on turning the target, end state data centers into centers of application hosting excellence that will garner trust from its new customers. As word spreads across the DOT IT community of the excellent, reliable service that is provided by these "magnet" data centers, new internal customers will be encouraged to migrate sooner rather than when forced as a result of the data center decommissioning timeline. Our experience has shown that migration timelines and costs are reduced dramatically when all stakeholders have a vested interest in the "to-be" environment.

DOT intends to have a combination of private (DOT owned, DOT managed) cloud and public cloud (private owned, private managed) environments. For the private cloud, DOT will centrally manage all underlying contracts and service level agreements. From an end user perspective, the private/public cloud will be transparent and only differ based on security and data privacy requirements. It will apply information assurance best practices to ensure the highest quality of cybersecurity. Additionally, it will work to be ISO 20000 compliant by implementing ITIL best practices in service management. This focus on ITIL best practices will ensure that all DOT Magnet Data Centers focus on customer service and quality from the start. Service levels will be agreed to, measured, and managed so that customers will have confidence that the service levels that they have grown accustomed to with the existing IT support teams will be continued in the consolidated DOT environment.

The scope of applications designed for Magnet Data Centers will initially be determined by the governance bodies outlined in this document. It is anticipated that most standard application and systems will be able to be hosted in one of these Magnet Data Centers. Although it is anticipated that Magnet Data Centers will provide development and test environments, DOT and FAA will continue to have "laboratories" that provide unique capabilities critical to modeling and simulation. The to-be state will be comprised primarily of Magnet Data Centers, regional service centers for FAA and DOT, and modeling and simulation laboratories. In future years, exceptions to this to-be state will require approval from the appropriate IT governance bodies.

DOT understands that the single biggest challenge to large scale IT infrastructure consolidation initiatives is organizational change management. The Magnet Data Center Approach is focused on making the FDCCI initiative a transition to a better state where stovepipes are broken down and economies of scale are achieved that lend to improved services via efficiencies and improved centralized competencies. If the vision of the "to-be" state is anything short of a gold standard of IT service, customers will be reluctant to shut down their own IT operations regardless of the mandate. DOT's Magnet Data Centers will provision IT services at a quality and

speed commensurate with the best commercial service offerings in order to attract customers from across DOT but also encourage innovation and agility in DOT IT applications and services.

**IT Cost Transparency and Energy Consumption Transparency Approach**

Increased cost and energy consumption transparency is a critical component of the DOT FDCCI Strategy. Increased transparency will make IT managers and data center providers more cost and energy conscious by focusing their attention on metrics that will ultimately be visible to DOT senior leadership. The metrics will also enable improved business decision making by providing quantifiable inputs into business cases.

A key component of cost transparency is standardized total cost of ownership (TCO) models that account for all lifecycle costs required to deliver IT capability. Additionally, standardized cost and energy consumption definitions will be outlined in the CONOPS to ensure a consistent approach to measuring IT costs and energy consumption levels. Transparency will not occur immediately as it takes time for IT organizations to develop the capability to capture costs and energy consumption accurately. The CONOPS will outline guidance for DOT organizations to implement improved IT cost accounting and energy consumption transparency.

**Final Server Closet and Data Center Consolidation Lists**

\* These Tier V-VIII data centers are in buildings targeted for collapse in alignment with the Executive Order 13514 Sustainable Building Initiative requirement.

\*\* Tier I-IV and Tier V-VIII data centers highlighted in yellow represent locations that have been decommissioned to date. Please note that some Tier VIII data centers have been consolidated ahead of schedule.

#	Agency Component	Server Closets	Action to be taken	Action Taken during Calendar Year	Tier Classification (from "Real Estate" tab of Final Inventory Baseline)
1	PHMSA	DOT 3	Decommission	Q4 2011	5 – Server Room/Closet
2	FTA	DOT 4	Decommissioned	Q4 2011	5 – Server Room/Closet
3	NHTSA	DOT 5	Decommission	Q4 2011	5 – Server Room/Closet
4	NHTSA	DOT6	Decommission	Q4 2011	5 – Server Room/Closet
5	FRA	DOT 1	Decommissioned	Q3 2011	6 – Other Room, Lab, etc...
6	NTHSA	DOT 2	Decommissioned	Q1 2011	5 – Server Room/Closet

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#	Agency Component	Server Closets	Action to be taken	Action Taken during Calendar Year	Tier Classification (from "Real Estate" tab of Final Inventory Baseline)
7	FAA	DOT 7	Decommissioned	Q4 2011	5 – Server Room/Closet
8	FAA	DOT 8	Decommissioned	Q4 2011	5 – Server Room/Closet
9	FAA	DOT 9	Decommission	Q4 2011	5 – Server Room/Closet
10	FAA	DOT 10	Decommissioned	Q3 2011	5 – Server Room/Closet
11	FAA	DOT 11	Decommissioned	Q3 2011	5 – Server Room/Closet
12	FAA	DOT 12	Decommissioned	Q3 2011	5 – Server Room/Closet
13	PHMSA	DOT 13	Decommission	Q4 2012	5 – Server Room/Closet
14	FTA	DOT 14	Decommission	Q4 2012	5 – Server Room/Closet
15	OST (FHWA)	DOT 15	Decommission	Q4 2012	5 – Server Room/Closet
16	FRA	DOT 16	Decommission	Q4 2012	5 – Server Room/Closet
17	OST (FHWA)	DOT 17	Decommission	Q4 2012	5 – Server Room/Closet
18	FAA	DOT 18	Decommissioned	Q4 2012	5 – Server Room/Closet
19	FAA	DOT 19	Decommission	Q4 2012	5 – Server Room/Closet
20	FAA	DOT 20	Decommissioned	Q4 2012	5 – Server Room/Closet
21	FAA	DOT 21	Decommission	Q4 2012	5 – Server Room/Closet
22	FAA	DOT 23	Decommission	Q4 2012	5 – Server Room/Closet
23	FAA	DOT 24	Decommission	Q4 2012	5 – Server Room/Closet
24	FAA	DOT 25	Decommission	Q4 2012	5 – Server Room/Closet
25	FAA	DOT 26	Decommission	Q4 2012	5 – Server Room/Closet
26	FAA	DOT 27	Decommission	Q4 2012	5 – Server Room/Closet
27	FAA	DOT 28	Decommission	Q4 2012	6 – Other Room, Lab, etc...

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#	Agency Component	Server Closets	Action to be taken	Action Taken during Calendar Year	Tier Classification (from "Real Estate" tab of Final Inventory Baseline)
28	FAA	DOT 29	Decommission	Q4 2012	5 – Server Room/Closet
29	FAA	DOT 30	Decommission	Q4 2012	5 – Server Room/Closet
30	FAA	DOT 31	Decommission	Q4 2012	5 – Server Room/Closet
31	FAA	DOT 32	Decommission	Q4 2012	5 – Server Room/Closet
32	FAA	DOT 33	Decommission	Q4 2012	5 – Server Room/Closet
33	FAA	DOT 34	Decommission	Q4 2012	5 – Server Room/Closet
34	FAA	DOT 35	Decommission	Q4 2012	5 – Server Room/Closet
35	NHTSA	DOT 36	Decommission	Q4 2013	5 – Server Room/Closet
36	FTA	DOT 37	Decommission	Q4 2013	5 – Server Room/Closet
37	NHTSA	DOT 38	Decommission	Q4 2013	5 – Server Room/Closet
38	FTA	DOT 39	Decommission	Q4 2013	5 – Server Room/Closet
39	FRA	DOT 40	Decommission	Q4 2013	5 – Server Room/Closet
40	NHTSA	DOT 41	Decommission	Q4 2013	5 – Server Room/Closet
41	FRA	DOT 42	Decommission	Q4 2014	5 – Server Room/Closet
42	FTA	DOT 43	Decommission	Q4 2014	5 – Server Room/Closet
43	NHTSA	DOT 44	Decommission	Q4 2014	5 – Server Room/Closet
44	NHTSA	DOT 45	Decommission	Q4 2014	5 – Server Room/Closet
45	FTA	DOT 46	Decommission	Q4 2014	5 – Server Room/Closet
46	MARAD	DOT 47	Decommission	Q4 2014	6 – Other Room, Lab, etc...
47	FAA	DOT 48	Decommission	Q4 2014	5 – Server Room/Closet
48	OST (FHWA)	DOT 49	Decommission	Q4 2015	5 – Server Room/Closet

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#	Agency Component	Server Closets	Action to be taken	Action Taken during Calendar Year	Tier Classification (from "Real Estate" tab of Final Inventory Baseline)
49	SLSDC*	DOT 50	Decommission	Q4 2015	5 – Server Room/Closet
50	FHWA*	DOT 51	Decommission	Q4 2015	5 – Server Room/Closet
51	OST (FHWA)	DOT 52	Decommission	Q4 2015	5 –Server Room/Closet
52	FAA	DOT 53	Decommission	Q4 2015	5 –Server Room/Closet
53	FAA	DOT 54	Decommission	Q4 2015	5 –Server Room/Closet
54	FAA	DOT 55	Decommission	Q4 2015	6-Other Room, Lab, etc...

#	Agency Component	Data Centers (Tier I-IV)	Action to be taken	Action Taken during Calendar Year	Tier Classification (from "Real Estate" tab of Final Inventory Baseline)
1	OIG	DOT 22	Decommissioned	Q1 2011	Tier II
2	OST	DOT 56	Decommission	Q4 2014	Tier II
3	FAA	DOT 57	Decommission	Q4 2011	Tier I
4	FAA	DOT 58	Decommission	Q4 2014	Tier I
5	FAA	DOT 59	Decommission	Q4 2015	Tier I
6	FAA	DOT 60	Decommission	Q4 2015	Tier II
7	FAA	DOT 61	Decommission	Q4 2015	Tier II
8	FAA	DOT 62	Decommission	Q4 2015	Tier I
9	FAA	DOT 63	Decommission	Q4 2015	Tier I

## 5 Agency Governance Framework for Data Center Consolidation

DOT will utilize industry best practices to establish and implement an FDCCI governance structure that will limit operational impact of management overhead while increasing the value of management oversight. Specifically, DOT will leverage, as much as is reasonable, existing governance infrastructure (e.g., committees and boards) to address major FDCCI activities at the Executive, Operational, and Tactical planning levels. DOT will increase management attention throughout all three of these levels to ensure all major areas of FDCCI project planning are addressed. The thirteen major FDCCI activities associated with those levels of governance are listed below:

- Executive Oversight
- Performance Metrics
- Executive Operations
- Technical Standards and Enterprise Architecture
- Operational Oversight (Planning & Implementation)
- Risk Management
- Change Management and Communications
- Acquisition
- Modal Management
- Staffing & Personnel Plans
- Budget
- Component/System Management
- Data Center Management

To address issues related to these thirteen activities, DOT has established a Data Center Consolidation & Cloud Computing Integrated Project Team (IPT). The purpose of this transition team is to provide executive sponsorship, leadership, and management of the data center consolidation and cloud computing initiatives. The transition team provides a forum to discuss, coordinate, evaluate, approve and resolve any data center consolidation and cloud computing operational issues within the USDOT operating environment. The team, which will be Chaired by the USDOT Chief Technology Officer and Vice-Chaired by the FAA Director of the Office of IT Optimization and USDOT Associate Chief Information Officer for IT Shared Services (with membership from all of DOT's Operating Administrations) will meet monthly (or as deemed necessary by the Chairperson) to ensure DOT is successful with its FDCCI program. This team will also focus on utilizing existing DOT governance mechanisms to perform FDCCI oversight and implementation activities at the Executive, Operational, and Tactical levels as depicted in the diagram below:

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	LEVEL	FDCCI ACTIVITY	GOVERNANCE MECHANISM	ESCALATION
Integrated Project Team (IPT)	Executive/Strategic	Executive Oversight	IT Review Board (IRB)	n/a
		Executive Operations	Executive Committee	IRB
	Operational/Cross Modal	Standards and Architecture	Technology Control Board (TCB)	Executive Committee
		Operational Oversight	CIO Council	Executive Committee
		Risk Management	(to be determined)	Executive Committee
		Change Management & Comm	(to be determined)	Executive Committee
		Acquisition & Budget	(to be determined)	Executive Committee
		Performance Metrics	(to be determined)	Executive Committee
		Staffing & Personnel	(to be determined)	Executive Committee
		(Other Activities as needed)	(to be determined)	(to be determined)
	Tactical/Technical	Modal Management	Modal CIOs	CIO Council
		Data Center Management	Data Center Managers	CIO Council/TCB
		Component/System Mgt	Component/System Managers	CIO Council/TCB
(Other Activities as needed)		(to be determined)	(as appropriate)	

*Figure 3: FDCCI Plan Governance*

Using this governance framework as a starting point, DOT will ensure that charters are drafted, roles and responsibilities are established, and representatives are identified to oversee the supervisory duties required for each FDCCI activity. Although not specifically addressed in this framework, service and cloud activities (along with other Tactical/Technical level activities) will be assessed to determine if they require specific governance mechanisms to support their role in the overall FDCCI process.

FDCCI supporting documentation will follow the timeline below:

Documents	Sept.	Oct.	Nov.	Dec.	Jan.
	FDCCI Charter				
DOT FDCCI Charter	9/30/2011 ▲	10/17/2011 ▲	11/1/2011 ▲		
	Risk Mgt & Mitigation				
DOT FDCCI Risk Mgmt. Plan		10/21/2011 ▲	11/10/2011 ▲	11/30/2011 ▲	
	Strategic Communications				
DOT FDCCI Strategic Communications		10/28/2011 ▲	11/21/2011 ▲	12/15/2011 ▲	

- ▲ Draft Completed
- ▲ Comments and Revisions
- ▲ Final Document / Signature

*Figure 4: FDCCI Documentation Timeline*

## 5.1 Cost-benefit Analysis

Currently DOT expects that it will have to use existing contracts and resources to support the cost of migrating from legacy data centers to magnets. This includes the cost to conduct application mapping, acquire virtualization technology, conduct server refresh in the magnets, acquire additional storage capacity, conduct lift-and-shift of some legacy infrastructure to the magnets, and potentially upgrade magnet data center infrastructure. The long-term savings and avoidance that DOT eventually realizes from this major consolidation will not be realized in time to pay for these migration and transition activities. Specifically regarding FAA data center consolidation activities there is an ongoing investment analysis effort to secure additional investment funds in late CY13.

Larger cost savings and cost avoidance are likely to be encountered in H/W, S/W and workforce economies of scale over several years, beyond FY15. However, capital investment costs (new blade servers, virtualization software, data center infrastructure) as well as increased Magnet Data Center operational costs will largely offset any potential costs savings.

In August 2011 OMB distributed a model with which Agencies can estimate the total cost of ownership (TCO) of their data centers and data center infrastructure as well as estimated cost savings through consolidation and optimization. DOT is refining its own TCO model, which includes a method for estimating cost savings. DOT's model is similar to OMB's but is customized for the DOT environment. Once DOT has finalized this model, it will replace the various tables identified above with a single, more readable table that captures all relevant elements with more precise data. DOT will also use this model to represent NAS TCO estimates but will continue to report the NAS TCO separately.

DOT is currently in the process of implementing this TCO and cost savings model in time for FY13 budget finalization but has not completed it for this revised plan's public release (October 7, 2011). In past submissions of the DOT FDCCI Plan DOT included estimates for cost savings that are no longer relevant to the Agency data center consolidation effort. These estimates have been removed from this submission.

## 5.2 Risk Management and Mitigation

Detailed project planning and implementation initiatives are integral to attain the desired FDCCI end-state. A comprehensive Risk Management Plan is also essential to account for and mitigate all project risk in a manner that dovetails with the governance approach (e.g., at the Executive, Operational, and Tactical planning levels). This plan will be incorporated within the Consolidation, Design and Analysis document. To map achieve this plan, integrated project risk management planning and related mitigation efforts will address the following specific technical areas as they relate to tactics, operations, and overall strategic planning:

- **Executive – Overall Project planning:** This level of risk management planning requires that the overall DOT FDCCI plan have a strategic enterprise-wide Risk Management and Mitigation plan to address activities across all DOT Datacenters.
- **Operational – Data Center planning:** This level of risk management planning requires individual Risk Management and Mitigation plans for each data center that is effected

maintain an overarching Risk Management and Mitigation plan to address all activities with that data center, regardless of whether the consolidation effort involves external datacenter consolidation activities or is simply limited to internal consolidation.

- **Tactical – Component/System planning:** This level of risk management planning requires that each major component or system (e.g., server migration or consolidation, software cloud migration, shared services migration, etc.) have specific Risk Management and Mitigation plans.

All plans associated with these three planning areas will include the follow sections:

- Executive Summary;
- Listing of all Federal and DOT regulations and standards (e.g., IT Infrastructure Exhibit 300 Risk Management Plan and Risk Registry), as well a checklist as to how they apply and when they will be addressed;
- Oversight process (to include schedule of meetings, required attendees and reporting template), in which an initial approval and continuous review of each of the three component plans is linked to the appropriate FDCCI governance structures;
- Lessons Learned from other similar organizations – to include both government and commercial;
- A listing of major risks and critical milestones as they relate to People, Process, Technology & Administration (e.g., long-term contract challenges, acquisition and procurement issues, etc.) and the proposed risk mitigation responses to each major risk;
- Using the listing of major risks from each of the three risk management areas, a consolidated list of risk management milestone to identify all major risks and critical milestones as they relate to any/all FDCCI project plans (e.g., implementation, acquisition, etc.);
- In conjunction with the consolidation of risk management milestone, a consolidated risk mitigation response process and any required templates (and reporting procedures) that will be employed to document risks as they are encountered and addressed.

The DOT Deputy Chief Information Officer has been identified as the DOT FDCCI Risk Manager. He will be responsible to compile and manage an overall Executive FDCCI Risk Management and Mitigation Plan, as well as ensure that individuals are appointed and responsible to create risk management and mitigation plans as the Operational and Tactical levels. Additionally, each regional data center and each Magnet Data Center will be required to identify an FDCCI data center risk manager.

A DOT FDCCI PMO will oversee all high impact and enterprise wide risks (i.e. budget, management challenges etc.) to ensure that the critical risks are anticipated, managed, and mitigated as required. Any high impact or enterprise risks that cannot be managed and mitigated by the DOT FDCCI PMO will be referred to the DOT CIO and Executive Sponsors as soon as the risk is deemed unmanageable.

### 5.3 Acquisition Management

An FDCCI-related acquisition strategy will be created to identify all contracting actions and related funding activities needed to execute the allocated budget. As much as possible, this strategy will identify and use existing contract vehicles, and related acquisition mechanisms (e.g., FAA hardware, software, or desktop BPAs, Software Assurance ELA, etc.). Leveraging of Agency-wide acquisition vehicles, negotiated either by individual Components / Bureaus or by the appropriate Agencies (e.g. Apps.gov, GSA Advantage, GSA Smart Buy) also need to be identified and utilized as appropriate. Due to the potential that some strategic acquisition activities may require extended timelines to implement, it is critical that the acquisition strategy be completed and vetted as early as possible in the overall FDCCI planning process. Moreover, oversight of the acquisition strategy (and related acquisition activities) must also be included within multiple levels of the FDCCI governance framework. This plan, at a minimum, will include:

- Executive Summary;
- Listing of pertinent Federal and DoT acquisition guidelines and a summary as to how or why they apply to FDCCI;
- Listing of pertinent contract vehicles/mechanism (with POCs) that are available or expected to be utilized for the FDCCI;
- Oversight process (to include schedule of meetings, required attendees and reporting template), in which an initial approval and continuous review of acquisition activities is linked to the appropriate FDCCI governance structures;
- Lessons Learned from other organizations government organizations performing similar consolidation activities;
- A listing of major risks, extended timelines that may result in acquisition delays, and critical milestones required to support FDCCI acquisition activities;

An FDCCI Acquisition manager will be identified to create and manage this plan as well as represent all acquisition activities at the appropriate FDCCI governance meetings.

### 5.4 Communication Strategy

Due to the sensitive nature of the cost (and possibly personnel) reductions associated with the FDCCI, a custom-tailored communications strategy will help assist DOT to reduce inherent organizational resistance while also helping to improve user buy in of specific FDCCI activities. Key issues of this plan will include the following:

- **Goals & Outcomes**– What are the goals of the Communication Strategy and what metrics will be used to understand how effective communications are throughout the transition?
- **Critical Success Factors** – What are the critical communication activities that will most positively affect overall DOT FDCCI success?
- **Stakeholders** – Who are the DOT FDCCI stakeholders, what are their expected reactions, and what is the best way to manage their expectations in order to obtain their full buy-in and engagement throughout the transition?
- **Audiences** – Who is/are the key audiences for all FDCCI communications?
- **Theme** – What are the key themes to be presented in all FDCCI communications?

- **Messaging** – What media outlets (e-mail, leadership briefings, department meetings, town halls, etc.) will be utilized and how often will messages be sent out, meeting be held, etc.?
- **Issues** – What problems, challenges, or miscommunications might the organization encounter when the Communication Strategy is implemented? Additionally, how can the Communication Strategy to rapidly support risk management activities?
- **Communications Schedule** – What are the dates for major activities and message releases?
- **Budget** – What will it cost to implement the strategy?

An FDCCI Communication Specialists will be identified to draft, vet, and implement the Communications Plan as well as attend appropriate FDCCI governance meetings.

## 6 Progress

### 6.1 FDCCI Consolidation Progress

DOT has consolidated a total of 1 Tier I-IV and 10 Tier V-VIII data centers up to September 30, 2011 with plans to close an additional Tier I-IV data center and 3 Tier V-VIII data centers by the end of the 2011 calendar year. These numbers directly align with the targets reported in April 2011 and the updated DOT FDCCI inventory submitted June 30, 2011.

OA cooperation takes time. It is a long process to identify possible consolidations, present them to management and then to users, and then work the technical side of migrations. DOT has found that fast-tracking these consolidations can lead to confusion from affected management and users and not enough time for technical issues to be resolved. Strategic communications is a very important activity to help gain stakeholders and to ensure users are aware of the technical activities that will affect them.

One major activity that affects the schedule of consolidations is application mapping. Application mapping is a very difficult and time consuming activity, but it is also a step that cannot be skipped for successful completion of migrations. DOT has learned to concentrate on this step and validate data collected more than once.

FDCCI has brought data center consolidation to the forefront of major DOT IT initiatives. It is an initiative that aligns with the DOT COE efforts to consolidate and standardize IT services across the Agency (exclusive of FAA and OIG).

## **6.2 Cost Savings**

DOT estimates a total of approximately 5 million dollars by the close of CY11. These calculations take into account HW/SW, energy, property, network, storage, and FTE as well as, migration, and HW/SW build-out costs. These calculations were not included in August 30, 2010 DOT FDCCI Plan submission.

Migration costs have been more than what was first reported. The complexity of the technical migration issues have caused schedule delays and increased costs in some migrations.

The DOT FY11 budget did not impact planned DOT consolidations for CY11.