

# Federal Data Center Consolidation Initiative

## 2011 Data Center Consolidation Plan & Progress Report *(date)*

1	Introduction .....	2
2	Agency Goals for Data Center Consolidation .....	2
3	Implementing Shared Services/Multi-tenancy .....	3
4	Agency Approach, Rationale and Timeline .....	4
5	Agency Governance Framework for Data Center Consolidation .....	5
5.1	Cost-benefit Analysis.....	6
5.2	Risk Management and Mitigation.....	7
5.3	Acquisition Management.....	7
5.4	Communications Strategy.....	8
6	Progress.....	8
6.1	FDCCI Consolidation Progress.....	8
6.2	Cost Savings.....	9
7	Appendix – FDCCI Templates .....	9
7.1	Appendix A: Final Data Center Consolidation Plan Templates .....	9

## **1 Introduction**

### **LIMIT: 1 PAGE**

The introduction should serve as an executive summary that answers the critical question as to the reason(s) that your agency is undertaking the Data Center Consolidation project. This introduction should highlight agency specific concerns that will be addressed as part of this undertaking. The introduction should consider how the plan addresses the following factors:

- Downward pressure on Federal agency spending will continue as part of deficit reduction efforts.
- Bureau-specific, agency component-specific, and program-specific data center footprints with increasing space allocations, energy costs, and real estate costs are not defensible when reasonable alternatives exist.
- If agencies require additional expenditures as part of the consolidation efforts, these costs should be offset by corresponding reductions in infrastructure, real property, personnel, and energy.
- Alternatives to in-house implementation, including valid commercial options to reduce costs of IT services without affecting bureau missions (IaaS, PaaS, and/or SaaS).
- If “in-house” solutions are needed to meet performance or security requirements, the agencies should maximize Department-wide services, interagency sharing, co-location and virtualization.
- Describe the steps your agency took to verify that your inventory data and consolidation plan is complete, accurate and consistent. Also identify any significant data limitations (for example: estimates).

## **2 Agency Goals for Data Center Consolidation**

### **LIMIT: 1 PAGE**

High-level asset reduction and IT infrastructure utilization improvement goals should be defined by each Agency as reflected in the Final Consolidation Plan Templates (Appendix A). These targets will be projected for Data Centers, Aggregate Gross Floor Area, Total Number of Racks and Total Number of Servers, and their corresponding utilization metrics (including server virtualization percentages). As agencies’ final asset baseline inventories would have been collected before the Final Consolidation Plan submission date, these final targets must reflect accurately both the As-Is state of agencies’ IT infrastructure and also realistic, achievable To-Be states for at least years 1 (4Q11), 2 (4Q12), 3 (4Q13), 4 (4Q14) and 5 (4Q15) of the FDCCI (or further out in time, if desired so by any agency).

Agency goals for the Final Consolidation Plan need to include both any qualitative impacts targeted by the agency (e.g. standardization, economies of scale, procurement improvements, security and operational efficiency improvements, etc.), as well as the quantitative goals, as reflected in the Final Consolidation Plan templates (Appendix A). Any assumptions or exceptions to the overall goals would need to be clearly itemized and discussed as well.

Examples of qualitative goals for Data Center Consolidation include:

- Reducing the Total Cost of Ownership (TCO) for data center hardware, software and operations, by introducing more effective acquisition and operations practices;
- Increasing the overall IT security posture of the federal government, by implementing better standardization, automation and continuous risk monitoring;
- Shifting IT investments to more efficient computing platforms and technologies, based on an Agency’s mission, user demand and technology trends;
- Promoting the use of Green IT by reducing the overall energy and real estate footprint of government data centers.

The corresponding quantitative objectives for Data Center Consolidation may include e.g.:

- Eliminating program-specific or bureau-specific “data centers” within (#) years; Possible exceptions that would need to be explained: specific regulatory, information security or system performance requirements;
- Achieving optimal virtualization and server utilization levels – i.e. Agency-specific, workload-driven risk-appropriate utilization levels.

### **3 Implementing Shared Services/Multi-tenancy**

#### **LIMIT: 1-2 PAGES**

The DCCI serves as a foundation for expanding the use of shared services within a department/agency as well as across multiple agencies. Each Department/agency plan should address what shared services your agency will focus on in conjunction with the consolidation of data centers. Examples of potential shared services include:

1. WAN Management
2. LAN Management
3. Help Desk Services
4. Cyber Security Services
5. Data Privacy Services
6. Identity and Access Management Services
7. IT Inventory and Asset Management Services
8. Server and Application Hosting Website Hosting

9. Collaboration Tools
10. Email Services
11. Electronic Records Management Services
12. Business Support Services (e.g., HR, Payroll, Acquisition, Budget)
13. Video Teleconferencing Services
14. Telephone Services

Department/agency plans should address how target shared services will be acquired/provisioned and whether your agency intends to acquire/provide services to other agencies. Please articulate if there are specific multi-tenant impediments or drivers. For example, cost, security, privacy, service level agreements, billing and payment issues, human capital, real property et. al.

## **4 Agency Approach, Rationale and Timeline**

### **LIMIT: 2-3 PAGES**

This section represents the core of the Final Data Center Consolidation Plan. It needs to include a few sentences explaining the overall Agency strategy for FDCCI, as well as a brief summary for each of the specific approaches that will be undertaken to achieve the stated goals. This section needs to demonstrate specifically how each strategic approach would relate to and support the desired qualitative and quantitative goals and what would be the high-level timeline in which each strategic approach will be implemented.

This timeline should be reflected in a master plan schedule. This master schedule represents a summary-level project schedule the purpose of which is to identify all consolidation candidates and related stage of consolidation (based on the June 30, 2011 inventory template).

For each planned strategic approach, provide a concise description of the methods to be employed, the potential alternatives and the expected benefits, e.g.:

- The primary benefit from improved server virtualization and IT equipment utilization is reduced overall energy consumption that leads to significant energy cost savings (up to 90% for virtualized IT equipment).
- Additional benefits from Virtualization & Data Center Consolidation include:
  - Reduced Facilities Maintenance & Operations costs;
  - Reduced Server Maintenance & Operations costs;
  - Improved Automation for Server Management & Provisioning.

Major Agency Components / Bureaus need to be reflected by the Agency Consolidation Plan as well, i.e. how their use of the Agency's IT infrastructure meets specific mission requirements and

how they could support the consolidation of data processing to facilities that have specialized competency and optimal virtualization and utilization levels within each Component / Bureau and within the Agency as a whole. The Agency Final Consolidation Plan needs to also reference the Agency’s approach towards a common architecture for shared services and data exchange among its Components / Bureaus and with other Agencies of the Federal Government.

The Agency Final Data Center Consolidation Plan needs to include a clear, well defined scope for implementing FDCCI and a high-level timeline for Data Center Consolidation, by identifying the specific target Agency / Component / Bureau data centers to be consolidated:

No.	Agency Component	Data Center	Location	Action to be taken	Action Taken during Calendar Year
1	ABC	ABC Data Center	City, State	Consolidated / Decommissioned	CY11

## 5 Agency Governance Framework for Data Center Consolidation

**LIMIT: ½ - 1 PAGE**

The governance framework needs to provide specific details about the oversight and internal mechanics that will measure and manage performance and risk of the FDCCI implementation within the Agency and all of its Components / Bureaus. A starting point would be to cite the goals for establishing new, or leveraging existing governance structures, both within IT and within the broader Agency leadership community. The governance framework needs to include specific metrics that will be used in performance measurement and it needs to describe the cross-disciplinary program management approach that will be employed by the Agency and its Components / Bureaus, including progress tracking, alternative cost-benefit analysis, risk management and mitigation, acquisition management and communications strategy, e.g.:

- The Agency will establish sustained IT governance at the Department and its Components or Bureaus to:
  - Eliminate redundant spending / solutions on commodity software, infrastructure and operations;
  - Eliminate isolated systems solutions;
  - Develop a common set of measures as a basis for executive decisions on infrastructure and data centers (e.g. server utilization, average virtualization, power usage efficiency).
  
- The Agency will conduct benchmarking against equivalent organizations:
  - Establish transparency to track performance measures across all Components/Bureaus;
  - Establish SLAs for “in-house” data centers and shared services;
  - Create an advisory board comprised of Agency, non-Agency, and possibly non-governmental IT executives.
  
- An integrated team with the following roles and responsibilities will execute each Data Center Consolidation effort at the Agency:
  - Project Sponsor and/or Project Champion;
  - Program Manager, Project Managers, Data Center Managers and Component/System Point-of-Contacts (POCs) for each of the systems that are being migrated.

A master Program Schedule needs to be created for the entire Agency, from the detailed implementation schedules provided by each of the Data Center Managers as well as driven by related federal government activities, e.g. OMB reporting, budget submission, beginning of new fiscal year, etc. A set of key baseline milestones from the integrated schedule need to be selected for a master schedule and for future executive reporting purposes within the Agency, and potentially also outside of the agency. A spend plan for the initiative needs to be used to plan and monitor the use of funds provided for each fiscal year.

### **5.1 Cost-benefit Analysis**

**LIMIT: ½ - 1 PAGE**

For each fiscal year included as part of your Final Consolidation plan, please state aggregate year-by-year investment and cost savings calculations through CY15. These figures should be realistic estimates of funding needed or savings to be realized from closings of facilities, the associated reduction in energy use, real property savings, personnel reductions, and IT infrastructure (network) cost savings.

The cost-benefit analysis also should address facilities that are not closing and the associated reduction in costs for consolidating systems. Alternatives considered to current in-house data center implementations (whether GOGO, GOCO or COCO) should also be discussed in this section. Please note, these figures are important not to omit, as they will help bridge the technical, policy and budgetary concerns of the budget and management offices at OMB during the review process of agency Final Consolidation Plans.

As alternative methods for providing/receiving data center services are identified, all sources for cost savings should be included. For example:

- Consolidation and/or elimination of data center facilities.
- Multiple agency tenancy at one or more data center facilities.
- Consolidation, reduction, or elimination of wide area network circuits (voice, data, and video).
- Consolidation, reduction, or elimination of local area network circuits (voice, data, and video).
- Implementation and/or expansion of green computing concepts to save energy and lower utility costs.
- Implementation and/or expansion of cloud computing services (SaaS, PaaS, or IaaS) to lower delivery costs.
- Application virtualization and corresponding reductions in host servers.
- Consolidation of intra-campus cable plants for telephone and data.
- Reduction in Help Desk and IT Asset Management service costs through consolidation.

### **5.2 Risk Management and Mitigation**

**LIMIT: ½ - 1 PAGE**

Risks need to be tracked at three levels: project, component /system and data center. Project level risks and any critical component and system level risks need to be reported to IT management. A risk management plan needs to be developed and risks need to be tracked using templates.

### **5.3 Acquisition Management**

**LIMIT: ½ - 1 PAGE**

The FDCCI-related acquisition strategy and all contracting actions necessary to execute the allocated budget should be identified and scheduled. In addition vendor management activity needs to be identified as part of the acquisition strategy. Leveraging of Agency-wide acquisition vehicles, negotiated by individual Components / Bureaus need to be considered. Leveraging of government-wide acquisition vehicles, negotiated by the appropriate Agencies need to be considered (e.g. Apps.gov, GSA Advantage, GSA Smart Buy).

Please provide an update of your agency's acquisition planning and execution:

- Identify any key contract vehicles or tasks up for renewal, competition and/or award.
- What important acquisitions need to be decided upon for FY12 – FY15?
- Are cloud solutions being used to accelerate consolidation?
- Does your agency plan to leverage any government-wide or agency-wide acquisition vehicles?
- Have any contracts been canceled as part of consolidation? Please identify any acquisition issues that have delayed consolidation.

Please exclude specific contract sensitive data.

## **5.4 Communications Strategy**

**LIMIT: ½ - 1 PAGE**

Depending on the scope and impact of the consolidation plan for your agency, your agency should consider developing a communications plan for the FDCCI implementation at the Agency. Issues to consider in this communications plan include: key internal and external stakeholder needs/concerns; senior leadership briefing reports; regular coordination (teleconferences / meetings) with key parties involved in DCCI plan implementation (e.g., end users, support teams, contractors, IT Infrastructure teams, facilities teams, IT and Agency leadership teams).

## **6 Progress**

### **6.1 FDCCI Consolidation Progress**

**LIMIT: ½ - 1 PAGE**

- Document if agency met data center consolidation targets through 9/30/11. This should reflect the consolidation targets reported in April 2011 to OMB and the June 30, 2011 inventory update. Please indicate if you are going to meet these targets by the end of the CY and if not, explain why.
- Is the agency prepared to meet CY12 targets?
- Indicate what on your plan's critical path is preventing faster consolidation.
- Since the start of FDCCI has your agency identified opportunities to fast track consolidation?



- How had the FDCCI prompted your agency to reconsider IT policies or approaches to delivering commodity IT services?
- Please highlight your successes/challenges experienced to date.

(Consolidation Progress Table to be provided.)

## **6.2 Cost Savings**

**LIMIT: ½ - 1 PAGE**

- What savings did your agency realize from CY11? Please consider IT hardware/software, energy, real property, network, storage, FTE, etc as part of calculations.
- Did this figure meet or exceed savings outlined in your August 30, 2010, consolidation plan?
- What future savings is your agency planning based on 2011 consolidation efforts?
- Were there any unanticipated consolidation costs?
- Did your agency's enacted FY11 budget impact consolidation?
- All information should be consistent with all appendix data

## **7 Appendix – FDCCI Templates**

### **7.1 Appendix A: Final Data Center Consolidation Plan Templates**

The Agency-level Projected Savings Metrics are a collection of best industry practices in capturing various dimensions of Data Center Cost Savings – from Data Center Count and Gross Floor Area Reduction to Rack and Server Count Reduction and finally to Energy Usage and Cost Reduction.

The Planned Program Cost savings shall be filled out by agencies based on their June 2011 Asset Inventory Baseline.

Federal Data Center Consolidation Initiative

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Savings Metrics	Planned Program Cost Savings 2/2010 through 4Q15
Data Center Count Reduction (#)	
Gross Floor Area Reduction (sq.ft)	
Rack Count Reduction (#)	
Server Count Reduction (#)	
Mainframes (IBM or compatible) Reduction (#)	
Mainframes (Other) Reduction (#)	
Windows Servers Reduction (#)	
Linux Servers Reduction (#)	
UNIX Servers Reduction (#)	
Other Servers Reduction (#)	
Energy Usage Reduction (kW)	
Energy Cost Reduction (\$)	

The Agency-level Savings Plan is a key element of the Initial Data Center Consolidation Plan Template. Based on its Initial Asset Inventory submission the Agency's expected physical asset count reductions are summarized in the table below:

Federal Data Center Consolidation Initiative

**Dept/Agency-Wide Savings Plan**

**Dept/Agency Name**

	Calculated from Baseline	Target				
	4Q10	4Q11	4Q12	4Q13	4Q14	4Q15
<b>Data Centers: Total number of Data Centers (#)</b>						
<b>Data Centers: Aggregate Gross Floor Area (sq.ft.)</b>						

**Total Number of Racks (#)**

<b>Total Number of Physical Servers by Type (#)</b>						
Mainframes (IBM or compatible)						
Mainframes (Other)						
Windows Servers						
Linux Servers						
UNIX Servers						
Other Servers						

<b>Aggregate Data Center Energy Usage (kWh/year)</b>						
<b>Aggregate Data Center Energy Costs (\$/year)</b>						

<b>Aggregate Data Center Building Operational Cost (\$/year)</b>						
<b>Aggregate FY Construction, Expansion, Consolidation Budget (\$/year)</b>						

The Agency-level Utilization Improvement Metrics are a collection of best industry practices in assessing various aspects of Data Center Utilization – from Virtualization and Server / Rack Space Utilization to Power Usage Efficiency.

The Typical and Target Results listed in the table below represent broad industry findings and shall serve as overall utilization benchmark guidance to the Agencies. The actual Agency Utilization Metrics will be filled-out by the Agencies via their June 2011 Asset Inventory Baseline analysis.

**Improving IT equipment 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 (reallocating underutilized racks)
- Data Center Facilities Consolidation (shutting down underutilized facilities)

The table below offers standardized average utilization metrics to support Data Center Consolidation decision making.

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

The Agency-Wide Utilization Plan is the second key component of the Agency Data Center Consolidation plan. Agencies need to provide baseline values (as of 4Q10) for their utilization metrics and incremental annual target projections thereafter. It is also based on the Initial Asset Inventory Baseline Template and reflects the work of the Agencies in improving their Data Center, Rack and Server utilization metrics, as well as PUE, Energy Usage and Virtualization:

Federal Data Center Consolidation Initiative

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**Dept/Agency-Wide Utilization Plan**

**Dept/Agency Name**

	Calculated from Baseline	Target				
	4Q10	4Q11	4Q12	4Q13	4Q14	4Q15
<b>Average Virtualization (%)</b> [Virtual Host Count / Total]						
<b>Average Number of VMs per Virtual Host (#)</b>						
<b>Average Power Usage Efficiency (PUE)</b>						
<b>Average Rack Space Utilization (%)</b>						
<b>Average Rack Floor Utilization (%)</b>						
<b>Average Power Density Capacity Equivalent (W/sq.ft)</b>						