

Federal Data Center Consolidation Initiative

Data Center Consolidation Plan for the U.S. Small Business Administration

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1 Introduction

As technology advances to become more efficient over time, it is imperative that government agencies periodically examine technology practices to identify wasteful or inefficient processes, standards, and operating procedures. Under guidance from the Office of Management and Budget (OMB) and in conjunction with the Federal Data Center Consolidation Task Force (FDDCTF), the U.S. Small Business Administration (SBA) established the following plan to examine and improve use of technology resources to accomplish the Federal Data Center Consolidation Initiative (FDCCI).

The Data Center Consolidation Initiative addresses the following areas for SBA:

- Reducing the number of locations where agency data is centrally processed and stored.
- Increasing overall data center hosting service levels provided to the agency.
- Increasing physical security levels of data center hosting services.
- Reducing the amount of physical resources technology systems consume.
- Modernizing and updating agency systems to employ latest technology levels.
- Tightening control of system provisioning, maintenance, and retirement processes.

The initiative leads to more efficient use of time and resources, increased service levels and security posture, and data center hosting systems which are better aligned with agency strategic focus areas.

2 Agency Goals for Data Center Consolidation

In order to measure the progress and effectiveness of the SBA Data Center Consolidation Initiative, SBA has established several high-level goals. These goals will be refined and quantitative metrics will be applied as the plan continues to mature.

SBA plans to achieve the following goals under FDCCI:

- Reduction in the total number of locations where agency data is stored.
- Reduction in cost overhead associated with hosting agency-owned data center environments including:
 - Space.
 - Cooling.
 - Electrical.

- Facility maintenance and infrastructure support.
- Reduce the number of total systems supported by the agency through right-size planning, utilization studies, migration of appropriate systems to cloud-computing environments, and retirement of underperforming systems.
- Reduce the cost of necessary agency-owned system hardware currently in operation by employing technologies such as 64-bit computing, blade server systems, virtualization, and thinly provisioned storage.
- Include an alternate processing data center site for disaster recovery purposes.
- Ensure physical security requirements are met at facilities where agency data is processed and stored.
- Simplify agency physical security controls for data center facilities by consolidating multiple physical sites.

Position the agency for easy conversion to managed services and cloud computing technologies in order that the amount of hardware assets directly maintained by the agency becomes minimal.

3 Implementing Shared Services/Multi-tenancy

SBA is doing well in a shared-services approach due to the budget limitations of a smaller agency with limited resources. However, there is still room for improvement in several key areas:

- **Consolidating messaging systems:**
 - SBA is actively moving forward with a plan to consolidate to one, agency-wide messaging system in FY12.
- **Leverage common application platforms:**
 - OCIO is aligning the agency to have a “Common Application Support Environment” (CASE) which agency program offices can develop toward, conform to, and operate within as a standard architecture and platform.
 - This common platform will allow SBA to eliminate many silo applications and enable data warehousing, collaboration, and reporting on an unprecedented level within SBA.
- **Implement Unified Communication technology:**
 - SBA currently uses many stand-alone telecommunication systems for its facilities.
 - A unified-communications platform across the agency has the potential to save the agency in recurring telecommunications charges per year.
 - SBA is currently planning and piloting VoIP technologies in FY12.
- **Reduction of government-owned hardware and maturity to cloud services:**

- In the out-years of FDCCI, after the physical migrations are complete, SBA will implement policies to stand-down purchase of new server and storage equipment for processing services and transition those to cloud and managed services offerings.
- SBA hopes to be substantially free of the burden of providing direct support and ownership for data processing equipment within 5 years.

4 Agency Approach, Rationale, and Timeline

4.1 Agency Approach

The overall agency approach is to consolidate two of SBA's existing government-owned data centers into industry-standard data center space. Once this is established, critical systems can be transferred and the two government data centers subsequently closed.

The stabilization of the two existing government-owned data centers will involve many activities that include both critical and non-critical assets, with varying levels of interdependencies and tolerances for downtime. With such wide-ranging conditions for the migration targets, it is likely that there will not be a single strategy or approach to migration that will be appropriate in all cases. Some systems may be able to be moved and verified independently, while others will need to be migrated and tested as part of an integrated move group. Some systems may require full replication and parallel operations prior to cutover, while others may be able to be shut down and physically moved and restored within the target environment without the safety net of a fully replicated failover system.

SBA will utilize a phased and targeted approach that structures and prioritizes the migration based on needs, complexity, risks, and benefits. In defining and implementing a sound migration approach, SBA will do the following:

- Understand and categorize consolidation and migration targets in terms of priority, criticality, dependencies, availability and performance requirements, level of understanding of configuration and data/information flows, access requirements, etc.
- Define and employ multiple migration strategies, using the strategy appropriate for a given application, system, group, etc., based on the aforementioned evaluation factors, costs, and risks.
- Handle simpler, lower risk items first, proving success and competency and documenting and applying lessons learned along the way.
- Understand dependencies and complexities associated with higher risk item and develop a plan to migrate in tightly coupled move-groups, accommodating dependencies and tolerances for downtime.

- Define a detailed cutover plan and associated back-out procedures.

4.2 Approach Methodologies

The following methodologies will be utilized in various capacities to realize the benefits of a coordinated data center consolidation initiative:

I. Continue investing in the latest technology to establish a new era of agency computing infrastructure

Rationale: Investing in 64-bit, blade-server, and virtualization computing technologies allows the agency to utilize fewer computing systems by providing more capacity per system. Blade-server technology garners a better level of flexibility and shared technology resources at the chassis-level. Employing virtualization technology allows for maximum flexibility, agility and “right-size” system capacity as needs change over time.

Direct Benefits:

- Less floor-space, electrical, and cooling requirements per data center dramatically saves cost of operational overhead.
- Establishes a foundation for core server/system consolidation work to begin.
- Moves the agency forward from 3-4 year-old technology systems to current state-of-the-art practices.

Additional Benefits:

- Allows for more flexibility and shorter response times for system provisioning.
- Allows for better “right-sizing” of resources to actual system performance trends.
- Reduces the complexity of infrastructure resources, allows for documenting existing resources and change management control procedures.
- Drives the agency to a single agency centric data center environment. Providing a standard and streamlined approach from operational processes.
- Provides an opportunity to document and align existing resources and needs.

Timeline:

- Initial new systems purchased in Q4 of FY10; modestly expanded in FY11; and will be heavily leveraged and expanded for consolidation/virtualization in FY12.
- Continued consolidation of other systems in FY12 and beyond.

II. Tighten system provisioning processes and tie all systems to an agency line-of-business

Rationale: SBA has centralized change management through the agency's Enterprise Change Control Board (ECCB). This change has allowed the agency to tie all systems to the agency's lines-of-business and improved operational efficiencies. In addition, the agency's system engineering team has been aligned to tie each system to an agency line-of-business while maintaining this technology resource investment catalog in conjunction with the enterprise architecture team.

Direct Benefits:

- Establishes one technology standard which systems will conform to over time.
- Reduces responsibility for technology resource utilization to one standard approach.

Additional Benefits:

- Each system is tied to a specific line-of-business and tracked over its lifecycle.
- Only necessary systems are implemented into production through proper governance and change-control procedures.
- A more enterprise approach to system management is available instead of a bureau-specific mindset.
- Stakeholders are informed of new systems, changes, and system retirements.

Timeline: To continue maturing in FY12.

III. Retire unnecessary systems and re-size underutilized systems

Rationale: FDCCI system inventories in conjunction with system-to-line-of-business rosters will produce a baseline to begin determining which systems have an identified business justification. A retirement list of systems which cannot be tied to a line-of-business will be scheduled for decommission. Underutilized systems can be identified for migration to the virtual platform where their capacity can be periodically adjusted.

Direct Benefits:

- Reduces the number of systems to only what is necessary to support the agency mission.
- Better utilization of computing resources through shared services and virtualization.

Additional Benefits:

- Allows for more nimble performance adjustment of systems when demand surges or recedes over time.

Timeline: To be completed by the end of FY12.

IV. Transfer systems into industry-standard data centers via interagency agreement with a large federal partner

Rationale: Transferring computing systems into industry-standard data center facilities will increase the service-level the agency currently receives from systems hosted at agency facilities which are subject to various environmental factors. In addition, industry-standard data center services are generally billed by space, heat, and electrical consumption and provide quantifiable costs that can be easily tied to agency budget items more so than the indirect cost of housing technology systems at various shared agency spaces. Add a sentence to include Government Hosted and commercial hosted facilities

In FY12, SBA will continue to explore hosting solutions to include floor-space sharing model with commercial and government offerors. Through these options, SBA will be able to leverage world class data centers while simultaneously allowing SBA to take advantage of excess capacity within these data centers. It also allows SBA to benefit from the economies-of-scale through large volume of computing systems needs which would otherwise be unavailable to a small agency such as SBA. This arrangement maximizes data center utilization and through agency partnership allows SBA and DHS to become better stewards of taxpayer dollars and government resources.

Direct Benefits:

- Removes SBA's need to directly support data center locations.
- Allows SBA and DHS to leverage larger economies-of-scale than SBA would be able to command alone.
- Removes risk of housing SBA data in sub-standard facilities.
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- Removes the intangible overhead costs associated with hosting data centers within agency owned or leased facilities.

Additional Benefits:

- Allows exact accounting for data center resources within the agency budget.
- Takes advantage of industry-standard data center multi-tenancy to reduce environmental impact caused by multiple data centers.

- Leverages cutting-edge infrastructure to support computing technology which may be far superior to infrastructure in use at smaller agencies today.
- Reduces cost overhead for system authorization due to consolidated physical space within a minimal number of highly secure facilities.
- Allows government or commercial offerors to utilize data center floor space which might otherwise go unused as excess capacity.
- Easily integrates into government or commercial offeror's MPLS WAN network architecture with minimal disruption of core transport services.
- Enables the capability to leverage many additional government or commercial offeror provided services allowing SBA to focus on SBA core work.
- Allows SBA to mature into Infrastructure as a Service (IaaS) and other managed services offerings available through DHS.
- Allows SBA to utilize the government or commercial offerors centrally designed and managed security environment, including Trusted Internet Connection (TIC).

Timeline: FY12 and beyond.

V. Migrate commodity computing services to managed services and cloud solutions

Rationale: Moving systems from SBA owned equipment into shared-service cloud architectures allows the agency to reduce cost by removing the burden of direct hardware support for those systems.

Direct Benefits:

- Significantly reduces costs by removing the agency's responsibility for:
 - Computing hardware resources.
 - Licenses.
 - Operating system overhead, maintenance, and lifecycle cost.
 - System administration resources for maintaining "back-end" systems.
- Leverages shared-services and multi-tenancy models to be a better data center citizen for the federal space.

Additional Benefits:

- Reduces overhead for FISMA Security Authorization and Continuous Monitoring of systems by many systems sharing a single virtual space with identical logical security controls.
- Allows agency system administration resources to focus on mission-specific computing systems while removing the need to support as many generic, commodity systems such as messaging, collaboration, and web services.

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Timeline: FY12 and beyond.

4.3 Timeline

Though consolidation planning is still somewhat fluid due to acquisition constraints and continued system inventory and application mapping, the agency's notional project schedule is as follows:

No.	Agency Component	Data Center	Location	Action to be taken	Action Taken during Fiscal Year
1	Enhance critical General Support Systems (GSS)	Headquarters and Denver	Washington, DC and Denver, CO	Virtualize	FY11
2	Inventory and assess eligible General Support Systems (GSS) for retirement	Headquarters and Denver	Washington, DC and Denver, CO	Decommission	FY11-FY12
3	Establish co-location space for SBA systems in industry-standard datacenters	New Primary and Secondary	New Primary and Secondary	Consolidate	FY12
4	Transfer GSS Alternate Processing Systems to Secondary Data Center	Denver to DC2	Denver to DC2	Consolidate	FY12
5	Establish DSS Alternate Processing Systems at Secondary Data Center	New Secondary	New Secondary	Establish	FY12
6	Close Denver Data Center	Denver	Denver, CO	Decommission	FY12
7	Transfer GSS Primary Systems to Primary Data Center	Headquarters to New Primary	Washington, DC to New Primary	Consolidate	FY12
8	Transfer DSS Primary Systems to Primary Data Center	Headquarters to New Primary	Washington, DC to New Primary	Consolidate	FY12
9	Establish Internet-Facing Architecture at Target Data Centers	New Primary and Secondary	New Primary and Secondary	Establish	FY12
10	Migrate Internet-Facing Services from Legacy Data Centers to	Headquarters	Washington, DC	Consolidate	FY12

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No.	Agency Component	Data Center	Location	Action to be taken	Action Taken during Fiscal Year
	Target Data Centers				
11	Close Headquarters Data Center	Headquarters	Washington, DC	Decommission	FY12
12	Examine Lessons-Learned and Cost of Ownership from Target Datacenters	New Primary and Secondary	New Primary and Secondary	Plan	FY12
13	Decision Point to Consolidate additional Data Centers	DC4 and OC2	Sterling, VA and Irvine, CA	Govern	FY12-FY13
14	Transfer Alternate Processing Equipment from Secondary Commercial Site to Secondary Target Site	OC2 to New Secondary	Irvine, CA to New Secondary	Consolidate	FY14
15	Vacate Alternate Processing Site	OC2	Irvine, CA	Decommission	FY14
16	Transfer Primary Processing Equipment from Primary Site to Primary Target Site	DC4 to New Primary	Sterling, VA to New Primary	Consolidate	FY15
17	Vacate CPrimary Processing Site	DC4	Sterling, VA	Decommission	FY15
18	Assess and Migrate Candidate Systems to Managed Services or Cloud Computing as Opportunities Arise	New Primary and Secondary	New Primary and Secondary	Cloud Computing	FY13+

5 Agency Governance Framework for Data Center Consolidation

5.1 Technology Investment Oversight

SBA has in place an excellent Business Technology Investment Council (BTIC) to govern new technology initiatives and actively monitor existing investments. All significant IT investments regarding data center consolidation will be brought before the Council in a structured manner and examined before approval to proceed.

5.2 Change Control

SBA utilizes an Enterprise Change Control Board (ECCB) on a twice-weekly basis to approve and track any technology requests for change that may be required. All data center consolidation related requests for change will be submitted, examined, and voted upon by ECCB stakeholders before action is taken. All FDCCI interested stakeholders are also represented at ECCB meetings.

5.3 Project Management and Enterprise Architecture

The data center consolidation initiative at SBA will be assigned to a qualified Information Technology Project Management Office (ITPMO) project manager for daily project management administration. This includes proper alignment with enterprise architecture (EA), quality-assurance (QA), and information technology infrastructure library (ITIL) best-practices.

6 Cost-benefit Analysis

SBA will need to initially increase costs to establish new processing options with increased service levels necessary to begin the agency-wide migration. However, as facilities are closed and systems consolidated or migrated to cloud computing services, SBA will begin to realize cost-savings resulting from consolidation initiatives in FY12 and more substantial cost savings through years FY14+ as consolidation initiatives begin to have a larger impact.

6.1 Immediate cost-savings effects:

- Introduction of more energy efficient and higher capacity blade server systems and thinly-provisioned storage infrastructure.
- Consolidation of legacy bare-metal systems into virtual machines (reduces environmental requirements for basic system hosting).
- A reduced cost of system administration overhead for a virtualized environment vs. a bare-metal environment.

6.2 Mid-term cost-savings effects:

- Initial migration of systems into industry-standard data centers will reduce environmental burden on government owned data centers and replace it with more efficient industry-standard data centers.
- Allows the agency to reduce floor-space dramatically within agency-owned data centers.
- Consolidation will highlight systems to be decommissioned.

6.3 Long-term cost-savings effects:

- Decommission agency-owned data centers and vacate commercial co-located data centers through direct agency procurement actions.
- Primarily rely on industry-standard maintained data centers at more efficient costs through inter-agency agreement at larger volumes.
- Reduce procurement overhead for direct data center and hardware support services.
- Consolidate all data center support services into minimal amounts necessary.
- Consolidate physical security controls to simplify security authorization processes.
- Migrate systems to Infrastructure as a Service (IaaS) and cloud computing services.

7 Risk Management and Mitigation

As with all SBA technology initiatives, the Project Management Office will maintain an actively updated risk register for identified risks which will be reported during regular status update meetings.

In addition, SBA has contracted with the MITRE Corporation to leverage subject matter expertise and program experience with many other consolidation projects within the federal sector. MITRE will assemble a consolidation plan based on best practices yet tailored to SBA's specific needs as well as critiquing the agency's business case for consolidation to highlight areas of cost savings and total-cost-of-ownership over time.

8 Acquisition Management

SBA plans to continue with existing commercial data center hosting and support contracts in place today for the foreseeable future. However, the agency will begin to leverage commercial and government offeror's agreements for hosting and service which will eventually lead to the option of ceasing direct data center support contracts as facilities are decommissioned.

It is important to note that the FDCCI project is not dealing with operating system, application, database, web, or disaster-recovery support changes of any type. Only the physical support aspects of data center consolidation are being considered and existing staffing levels for both government and contractor support staff for other aspects of system lifecycle will not be changed as a result of this effort.

9 Communications Strategy

The data center consolidation initiative is sponsored by the agency CIO who will report status information to senior executive leadership and the Business Technology Investment Council

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(BTIC). In addition, regular status meetings will be held by the agency FDCCI Program Director and project manager to coordinate and inform initiative working groups on a more frequent basis as necessary.

Additionally, all end-user communication will be handled through the existing “Information Notice” processes to distribute notification of major system changes.

10 Consolidation Progress

Agency progress to-date on consolidation actions are as follows:

No.	Agency Component	Data Center	Action to be taken	Action Taken during Fiscal Year	Status
1	Enhance critical General Support Systems (GSS)	Headquarters and Denver	Virtualize	FY11	In process and continuous.
2	Inventory and assess eligible General Support Systems (GSS) for retirement	Headquarters and Denver	Decommission	FY11-FY12	FY11 Inventory Complete and multiple systems identified for retirement or virtualization.
3	Establish co-location space for SBA systems in industry-standard datacenters	New Primary and Secondary	Consolidate	FY11-FY12	In Q4 FY 11, SBA signed an Interagency agreement with DHS/FEMA that enables SBA to utilize DHS's data center hosting and support services.
4	Transfer GSS Alternate Processing Systems to Secondary Data Center	Denver to New Secondary	Consolidate	FY12	Planning underway.
5	Establish DSS Alternate Processing Systems at Secondary Data Center	New Secondary	Establish	FY12	Acquisition in progress.
6	Close Denver Data Center	Denver	Decommission	FY12	Not started.
7	Transfer GSS Primary Systems to	Headquarters to	Consolidate	FY12	Planning underway.

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No.	Agency Component	Data Center	Action to be taken	Action Taken during Fiscal Year	Status
	Primary Data Center	New Primary			
8	Transfer DSS Primary Systems to Primary Data Center	Headquarters to New Primary	Consolidate	FY12	Planning underway.
9	Establish Internet-Facing Architecture at Target Data Centers	New Primary and Secondary	Establish	FY12	Not started.
10	Migrate Internet-Facing Services from Legacy Data Centers to Target Data Centers	Headquarters	Consolidate	FY12	Not started.
11	Close Headquarters Data Center	Headquarters	Decommission	FY12	Not started.
12	Examine Lessons-Learned and Cost of Ownership from Target Datacenters	New Primary and Secondary	Plan	FY12	Not started.
13	Decision Point to Consolidate additional Data Centers	DC4 and OC2	Govern	FY12-FY13	Not started.
14	Transfer Alternate Processing Equipment from Secondary Site to Secondary Target Site	OC2 to New Secondary	Consolidate	FY14	Not started.
15	Vacate Alternate Processing Site	OC2	Decommission	FY14	Not started.
16	Transfer Primary Processing Equipment from Primary Site to Secondary Target Site	DC4 to New Secondary	Consolidate	FY15	Not started.
17	Vacate Primary Processing Site	DC4	Decommission	FY15	Not started.
18	Assess and Migrate Candidate Systems to Managed Services or Cloud Computing as Opportunities Arise	New Primary and Secondary	Cloud Computing	FY13+	Assessment and parallel planning efforts underway.

11 Conclusion

Working with the Federal Data Center Consolidation Task for and the Office of Management and Budget, the U.S. Small Business Administration has a unique opportunity to greatly simplify data center support and hosting considerations for the agency through partnership with a larger federal agency. This plan will reduce costs, gain efficiency, and allow SBA to spend its limited resources to deliver upon mission objectives more closely instead of focusing on commodity overhead associated with maintaining its own data center facilities.

The utmost urgency must be applied and a commitment to consolidating systems and data centers with a vision for closing facilities as quickly as possible in order to maximize the cost savings which are possible through this approach.