

Federal Data Center Consolidation Initiative
United States Agency for International
Development (USAID)
2011 Data Center Consolidation Plan
&
Progress Report
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1 Introduction

The United States Agency for International Development (USAID) in keeping with the direction from the Executive Office of the President, Federal Data Center Consolidation Initiative (FDCCI) initiated the migration of its primary data center, the Telecommunications and Computer Operations Center (TCOC) to a Managed Data Center (Infrastructure as a Service (IaaS)) provider. With this migration, USAID intends to transform the TCOC to provide expanded capabilities to mission-based staff in a more efficient, cost-effective manner.

The TCOC migration project is aligned with the USAID IT Strategic Plan and Architecture Road Map and the Federal Data Center Consolidation Initiative (FDCCI) objectives:

- Reduce data center energy consumption and office space requirements;
- Reduce the costs of data center hardware, software, and operations;
- Increase overall IT security and IT offerings,
- Make future IT investments more efficient.

In early 2011, USAID completed a Requirements Study and a Business Case Analysis with multiple approaches for moving the TCOC to a data center external to USAID. The selected approach for the TCOC migration is a hybrid approach with a multi-phased migration strategy employing both a physical (forklift) move of part of the infrastructure and physical-to-virtual (P2V) and virtual-to-virtual (V2V) migration for infrastructure and applications readily virtualized. This hybrid approach physically moves the TCOC to an external data center and virtualizes roughly 75 percent of the infrastructure before moving to the commercial data center provider.

This approach is expected to generate a number of benefits to USAID:

- Improved end user experience and capabilities
- Standardize IT infrastructure and IT operations
- Increase asset scalability and utilization
- Dynamic scaling of resources and infrastructure to meet USAID demands
- Allows USAID to self-manage the Infrastructure as a Service (IaaS)
- “Federal-Only” cloud secured by multiple firewalls
- Enhanced security

The planning and migration implementation services for the TCOC Migration project will be via task order(s) under existing BIE contracts. The Infrastructure Engineering and services from the IaaS provider will be via Schedule 70 to Commercial Federal Group Data Center.

2 Agency Goals for Data Center Consolidation

The global nature of USAID’s work makes the development, delivery and maintenance of agile and scalable information technology (IT) services essential for mission delivery. Our high level goal is to transform the TCOC to provide significant capabilities to worldwide, mission based staff in an expedient and cost-effective manner using the Information as a Service (IaaS) model. Simply, our goal is to improve operation effectiveness while reducing costs. Our strategy is (1) to leverage the offerings of a commercially managed data center provider with new hosting technologies and with comprehensive managed services offerings and (2) to migrate the TCOC to a “Federal Only” pod inside the Commercial Data Center.

USAID views this transformation of TCOC as pivotal in achieving several objectives consistent with the FDCCI and in realizing USAID’s enterprise architecture for effective and efficient IT service delivery and the cloud computing. These FDCCI and USAID objectives are as follows:

- Promote the use of green IT by reducing overall energy and real estate footprints of government data centers;
- Reduce the cost of data center hardware, software, and operations by moving the infrastructure to a managed data center and virtualizing the remainder to dramatically reduce operations costs;
- Increase the overall IT security posture with secure IaaS introducing advanced security tools and methodologies;
- Shift the IT investments to more efficient computing platforms and technologies while eliminating the heavy costs associated with hardware and software refresh or replacement and shifts them to the managed centers.

USAID’s quantitative objectives include the following:

- Eliminating the TCOC at the Ronald Reagan Building in FY2012 and reducing the USAID data center footprint by 4256 square feet.
- Reducing energy and space consumption by virtualizing up to 75% of the servers in the TCOC environment.
- Providing automated and standardized monitoring of IT systems for availability and performance to improve service levels across USAID in accordance with NIST 800-53rev3 controls at the “Moderate Impact” level for FISMA compliance.
- Eliminating 60% of the TCOC IT Assets and technology refresh and replacement costs.

3 Implementing Shared Services/Multi-tenancy

In July 2011, USAID awarded a contract via Schedule 70 to Commercial Federal Group Data Center to provide Infrastructure as a Service (IaaS) for the transformation and migration of the TCOC. The TCOC infrastructure considered for transformation and modernization consists of the following:

- USAID's primary production network AIDNET,
- USAID's dedicated development and test environment DEVNET, and
- The TCOC's De-Militarized Zone (DMZ).

In migrating the TCOC, USAID's primary data center, to the Commercial data center provider for IaaS, USAID becomes a tenant in the multi-tenancy Commercial Data Center. It is currently a provider of IaaS to the many federal agencies.

This Tier III+ facility is a carrier-neutral Network Access Point with advantages for linking USAID to the rest of the world. USAID has over 80 missions overseas.

Using the Commercial Data Center's cloud architecture and relocating the TCOC, USAID is able to meet its key service objectives and have a far greater reach to support the international mission of USAID. The facility provides access to more than 160 global carriers. The coordination and integration of the operational components and networks of USAID with DOS will be facilitated with this move since DOS is currently uses this commercial provider. Overall physical and logical security will be significantly increased due to the reinforced design of the Network as well as the secure operations (SOC) that provides tools to protect the infrastructure and will protect the USAID cloud.

The multi-tenancy commercial data center service provider environment provides USAID the power to provision computing resources for applications in minutes, not days. As a multi-tenancy data center service provider, they provide USAID a secure, reliable, carrier-neutral facility with direct backbone access to the world's major carriers. Via this massive connectivity, the commercial provider's facility offers USAID the resources to meet its mission anywhere in the world with any available service from any network provider.

4 Agency Approach, Rationale and Timeline

In February 2010, the Administration launched the FDCCI with the previously mentioned objectives. The USAID TCOC meets the formal definition of a data center and the target center for consolidation. USAID OCIO developed the business requirements and migration approach for moving the IT infrastructure and servers hosted in the TCOC to an unspecified external data center and for transforming the TCOC.

Along with meeting the FDCCI's objectives, the TCOC migration effort needed to: (1) modernize the TCOC, (2) facilitate the transition to cloud computing in accordance with USAID's Cloud Computing Initiative as defined in its *Enterprise Architecture Transition Roadmap*, and (3) improve its service to staff, missions, partners, and stakeholders globally.

The TCOC transformation would require USAID to embrace new technologies needed to scale, accelerate, and improve telecommunications and computer operations delivery. The TCOC infrastructure considered for migration and modernization consists of the USAID primary production network, its dedicated development and test environment, and the TCOC's De-Militarized Zone (DMZ).

The CIO performed several studies which shaped the decision making process to close the TCOC and migrate to a commercial data center provider. The OCIO, Business Infrastructure Engineering (BIE) developed an *IT Refresh Strategy* for USAID's aging infrastructure and a *Requirements Study* to determine the feasibility of virtualizing USAID's applications at the TCOC and moving them to an off-site data center.

In early 2011, the OCIO developed the *TCOC Migration Approach*, which assessed 5 strategies, and approaches to migrate the TCOC to a data center external to USAID. Each approach represented a tradeoff between cost, schedule, risk and technical performance. In the course of evaluating each approach, a combination or hybrid of the existing approaches emerged and was label Alternative 6.

The recommended Alternative 6 presented the best cost savings with higher levels of security, reliability, effectiveness, and which posed less risk. In addition, Alternative 6 best meets the transition approach objectives, business requirements, and technical requirements of the TCOC transition. Alternative 6 is a Hybrid solution to migrate the TCOC infrastructure and applications to a data center using P2V, V2V, and forklift.

This alternative executes a multi-phased migration strategy that employs both a physical (forklift) move of part of the infrastructure and virtual-to-virtual and physical-to-virtual (P2V) migration for infrastructure and applications readily virtualized, and thus the term - Hybrid.

Federal Data Center Consolidation Initiative

USAID expects to migrate over 80 percent of the TCOC within a 5-month period to a data center external to USAID, while virtualizing over 75 percent of the infrastructure.

This approach to migrate, modernize, and **transform** the TCOC best aligns USAID strategic goals to the goals of the FDCCI and the Federal Cloud Computing Initiative. The combination of virtualization and physical relocation facilitates USAID meeting the four objectives of:

- Reduce data center energy consumption and office space requirements;
- Reduce the costs of data center hardware, software, and operations;
- Increase overall IT security; and
- Make future IT investments more efficient.

This approach enables the re-purposing of the space from the TCOC data center for office use and enables the housing of 25-50 staff eliminating USAID operating expense (OE) costs.

The High-level Phasing Plan for USAID is as follows:

Phase 1 (USAID/TCOC)	FY 2010- 2011	OCIO, Business Infrastructure Engineering, <u><i>IT Refresh Strategy Plan</i></u> <u><i>OCIO USAID Telecommunications Operations Center Approach</i></u> <u><i>Document</i></u> <u><i>Business Case for Telecommunications Migration</i></u> Plan and Preliminary Design for the TCOC Migration Project: <ol style="list-style-type: none"> 1. Updated Requirements Document 2. Updated Bill of Materials 3. Implementation Proposal
Phase 2 (USAID/TCOC)	FY 2011- 2012	-P2V Migration infrastructures and services readily virtualized -Contract with a Commercial IaaS provider
Phase 3 (USAID/TCOC)	FY 2012	Physically move infrastructures and applications not readily virtualized to the Commercial Data Center as a collocated data center.

5 Agency Governance Framework for Data Center Consolidation

USAID's robust governance model that supports, guides, and regulates all of the Technology Projects is being used for the governance of the TCOC Migration Project. *USAID's IT Project Governance Manual Version 4.0* and companion guide - *The IT Project Governance Guidebook Version 4.0* provides the details of this governance process which applies to all IT projects including infrastructure projects hosted at third party locations as is the TCOC Migration Project. As part of USAID's IT Governance process, the TCOC Migration Project is subject to compliance reviews and audits conducted by the USAID OCIO on a Quarterly basis. In these Project Management Reviews (PMRs), USAID IT Governance focuses on five areas:

- Alignment of the IT strategy with business strategy,
- Dissemination of enterprise strategy and goals throughout the Agency- Communication,
- Resource Management – optimal investment and management of critical IT resources,
- Risk Management – identifying mitigation strategies for major risks to minimize their impact and identifying contingency plans when the risk event occurs
- Measurement of performance- measuring and reporting throughout the project

The TCOC Migration Project recently completed its Risk Management Plan, the Communications Plan, and is putting its final touches on the Performance Measurements for the governance of the TCOC.

Stakeholder and customer forums are used for discussion of critical performance areas:

- The migration schedule and its impact on the USAID missions
- Performance measures and service level agreements to ensure no degradation in service
- Strict configuration management controls – a freeze on changes as migration nears

The TCOC Migration Project is sponsored by the Office of Chief Information Officer, the Business Infrastructure Engineering Director who is supported by two COTRs and a Project Manager. Weekly reviews are conducted for each of the two contractors: a Planning and Migration Implementation contract service provider and with the commercial data center IaaS provider.

5.1 Cost-benefit Analysis

By migrating, the TCOC, USAID will no longer own its primary data center. The Cost Savings are expected but cannot be identified at this point since equipment and service requirements are still being identified and contracts must be negotiated.

The costs to migrate and virtualize TCOC applications are almost recouped in the first year from:

- Savings in not having to refresh so much IT equipment
- Reduced utility (energy) costs
- Reduced office space costs

Costs avoidance includes the following:

- Re-purposing of vacated Data Center
- Reduction in Data Center Downtime
- Implementation of green data center technology
- Operating expenses (hardware/software)

Benefits derived by this approach include the following:

- Streamlined data flow
- Reduction of carbon footprint
- Highly scalable and elastic delivery of IT infrastructure and applications
- Synergies with new hosting technologies and comprehensive managed services for improved operational effectiveness
- Supports two USAID enterprise architecture initiatives – Enterprise Data Management and Cloud Computing that will benefit from IaaS
- Supports project objectives for USAID planned projects such as Mission Corporate Application Servicer (CAS)

5.2 Risk Management and Mitigation

In the USAID planning process, over 70 detailed risks were identified through interviews with stakeholders and USAID officials. These risks were then reviewed with stakeholders and technical professionals and the team applied the Agency's requirements management standard for categorizing risks, resulting in four groupings of TCOC requirements: functional, operational, performance and security.

There were twelve (12) risks assessed as having high impact and high probability of occurrence and that encompass both management and technical domains associated with the TCOC Migration. These twelve (12) critical risks were identified through team-facilitated work sessions with TCOC stakeholders. A Risk Management Plan is being developed to track these twelve critical risks and mitigations strategies are being identified and employed to reduce the risks associated with each of the 12 risks.

5.3 Acquisition Management

USAID decided that the migration of the TCOC should be accomplished via two procurement vehicles: (1) GSA Schedule 70 for procuring the new hosting environment and (2) the existing CIO/BIE contract vehicle for the planning, design, and migration to the target data center environment. This dual approach ensures that the best, most knowledgeable contractor performs the migration and the other builds the new TCOC hosting environment.

1. Enterprise Cloud provider – Infrastructure as a Service (IaaS)

Using GSA Schedule 70 as a contracting mechanism, USAID identified a cloud provider with strong communications to the USAID Mission areas and providing a Commercial data center with Secure IaaS. A blended FFP and T&M contract was planned with the FFP being used for the CORE Managed Services with T&M for supplemental security, engineering, or support services on an as-needed basis. The Commercial personnel will be most knowledgeable of their data center and for obtaining the optimal performance.

2. Engineering Provider to Plan and Implement the Migration

Using an existing IT Engineering Contract, issue a firm, fixed price task order to the USAID CIO's prime IT engineering contractor supporting the Business Infrastructure Engineering (BIE) division, to plan and implement the migration of TCOC to the new data center. Currently TCOC is operated as a Government Owned Contractor Operated (GOCO) facility. Currently, the TCOC Contractor is tasked to perform data discovery and planning which includes a Work Breakdown Structure (WBS), Bill of Material, and detailed migration approach and strategy. This detailed TCOC migration plan is being developed and will subsequently result in a task order for the actual migration to the Commercial Data Center.

5.4 Communications Strategy

USAID is developing a Communications Plan to ensure the successful migration of the TCOC to the Commercial Data Center. Key internal and external stakeholders have been identified along with their needs related to the virtualization and to the TCOC migration. Senior leadership informational and update briefings are conducted routinely along with regularly scheduled briefings to the key parties involved in the TCOC migration plan implementation. There have been a number of forums as part of the detailed planning process to bring together IT infrastructure teams, application owners, IT and agency leadership teams, and development and operational contractors.

6 Progress

6.1 FDCCI Consolidation Progress

In the June 30, 2011 Inventory reported to OMB, USAID identified 11 sites as Data Center sites. These varied in size from 216 sq. feet to 4256 sq. ft. with 4 being over 500 Sq. feet. Of these eleven (11) sites reported, OMB identified five (5) USAID that were reported as an “Invalid Facility” or a facility that was inaccurately classified as a Data Center, Server Room, or Closet. See the Summary Table below for the USAID’s reporting to OMB.

SUMMARY TABLE				
	≥ 500	< 500	Unknown	Total
All Data Centers	5	4	2	11

USAID has closed two data centers and the TCOC is planning to migrate to the IaaS commercial data center in early FY2012. USAID will meet all of its targets for CY2011 and CY2012. See the specifics on the eleven reported data center sites.

Table 6.1 USAID’s Inventory Reporting to OMB as of June 30, 2011

Data Center Name	Information Validity	Phase of Closure	Gross Floor Area (sq.ft.)	Data Center Classification
OFDA Computer Room*		Considering	750	> 500 sq.ft.
Laurel Teleport	Invalid Facility			Unknown
MCC	Invalid Facility		216	< 500 sq.ft.
IG Computer Room	Invalid Facility		360	< 500 sq.ft.
TCOC at RRB 7th Floor*		Stage1: Inventory	4256	> 500 sq.ft.
SA-44	Invalid Facility		50	< 500 sq.ft.
BIMC			400	< 500 sq.ft.
TECHHUB		Closed	535	> 500 sq.ft.
Potomac Yard in Crystal City	Invalid Facility		209	< 500 sq.ft.
OFDA’s Quincy Site		Closed	1000	> 500 sq.ft.
OFDA’s Wilson Site*			750	> 500 sq.ft.

* Active Sites that are over 500 sq. ft.

6.2 Cost Savings

USAID identified a commercial data center provider as the cloud provider of choice for hosting the TCOC and for providing IaaS. The Commercial provider's strong network and communications capabilities complement USAID's global mission requirements. In July 2011, they were awarded a contract to provide USAID Cloud architecture and relocate the TCOC to their Data Center. The commercial data center, with its high density of global telecommunications, will provide USAID greater reach to support the international mission of USAID.

The contract is constructed as a blend of Firm Fixed Price and Time & Materials contract with the FFP being used for the CORE Managed Services with T&M for supplemental security, engineering, or support services on an as-needed basis. The contract will be modified before USAID completes transitioning the TCOC to this site since the "Discovery" process has determined that USAID's final requirements have changed. Savings will be realized in each of the successive FY after the migration. Migration is scheduled to start in the first half of 2012.

7. Appendix – FDCCI Templates

7.1 Appendix A: Final Data Center Consolidation Plan Template

USAID understands the need to identify the Data Center Cost Savings from Data Center Count and Gross Floor Area Reduction and Server Count Reduction and to Energy Usage and Cost Reduction. Unfortunately, the costs for the Energy Usage are not broken out for USAID for their primary data center since GSA, the owner of the building, has never identified those costs for USAID. Therefore this information is unavailable.

USAID is currently inventorying all of the assets on the floor. Until the detailed planning is completed by our two contractors, USAID doesn't know the exact amount of virtualization that will happen in the TCOC move. USAID is currently in the discovery process for the TCOC migration. Once this phase is completed, more exact numbers will be reported for the P2V, V2V, and forklift. Our baseline values and best estimates are reflected in the template below.

Dept/Agency-Wide Utilization Plan						
USAID						
	Calculated from Baseline	Target				
	4Q10	4Q11	4Q12	4Q13	4Q14	4Q15
Average Virtualization (%) [Virtual Host Count / Total]	10%	15%	75%	80%	85%	90%
Average Number of VMs per Virtual Host (#)	10	14	15	16	18	19
Average Power Usage Efficiency (PUE)			2.0	2.0	1.9	1.8
Average Rack Space Utilization (%)	60%	70%	75%	80%	85%	90%
Average Rack Floor Utilization (%)	60%	70%	75%	80%	85%	90%
Average Power Density Capacity Equivalent (W/sq. ft.)	50wsf	70wsf	120wsf	130wsf	140wsf	150wsf