



**Nomination Category: Enterprise IT Management Initiatives**

## **Executive Summary:**

Centralization and consolidation are hardly new topics to State Government. What is new and interesting is the scope of consolidation that is now possible and the significant savings and government transformation that are being realized. The critical ingredient to this level of success—at least in the Michigan example—has been collaboration.

In the past three years Michigan's Department of Information Technology (MDIT) has closed 21 separate hosting centers, saving millions of dollars while improving our overall quality of service. Specific benefits of Michigan's Data Center Consolidation are well documented:

- \$9.5 Million saved to date (with an estimated 5-year ROI of \$19.1 million)
- Eliminating over \$375,000 a year from facilities environmental and leased space cost.
- Savings of \$403,000 per year in hardware maintenance cost.
- Avoided \$7,313,245 in capital costs to upgrade legacy data centers/computer rooms
- Regain 29,062 sq foot of floor space.

But the ROI is only half the story.

Michigan's successful efforts of the past—mainframe consolidation, telecommunication consolidation and the print center consolidation projects—were all accomplished with clear, imperative and visible executive mandate (in the form of an Executive Order from the Governor). But what happens when the mandate cools, when the urgency fades and agencies begin to tally the costs? Consolidations of this magnitude are measured in terms of years, not months.

With the data center consolidation, the MDIT executive team set out to build a strategy that would stand the test of time and changing political priorities. In the midst of the most challenging economic climate in decades, Michigan needed a project that delivered ROI, but not at the political and financial expense that a “forced death-march” would impose.

MDIT took a dramatically different approach to the Data Center Consolidation Project. From the onset of planning, the Data Center Consolidation team collaborated with technical and client staff to determine the most effective means to move their systems with the minimum risk at the minimum cost. The MDIT Strategic Management Team (SMT) worked directly with our agency partners to find both creative fiscal solutions and to educate clients on the risk their current environments posed.

In the end, the collaborative approach is what has seemed to matter the most. A commitment to collaboration has given Michigan a technology climate where agencies now openly request to get their remote locations closed (the project team now has a “waiting list” of locations targeted for closure). Our approach has helped cement a reputation for quality, built trust with our clients and set the stage for more fundamental initiatives that reach across government boundaries (IE Virtualization, SOA, Shared Services).

**Project Description:** Michigan's Data Center Consolidation project consists of the migration of hardware and application systems from thirty-seven Lansing area computer/server rooms into three target hosting centers also in the Lansing area. The project started in early 2004 and is ongoing today with nineteen computer/server rooms closed to date.

**Problem area that the project addresses:**

Prior to MDIT, server rooms had been individually maintained by Michigan's nineteen different executive branch agencies. The level of technical support varied widely from department to department, but even the best of the individually managed facilities struggled to achieve even a "Tier II" status as defined by the Uptime Institute. Michigan's economy was slowing and the state's financial situation had begun to take its toll. Upgrades to facilities infrastructure and regular maintenance went undone. In late 2003 the Lansing area data centers began to show the strain, four separate data centers experienced site-level outages in just six months. Failures were commonplace and "emergency investment" was being forced into locations that could no longer support critical processing. Costs were on the rise and as privacy concerns began to surface throughout the public sector, Michigan found itself with critical data spread geographically across the State, on thousands of storage devices with inconsistent legacy backup solutions. MDIT developed a comprehensive four phase approach to the Data Center Consolidation Project.

**Phase I: June 2004-Dec, 2004**

**Conduct Risk Assessment: *Know the facts.***

In June 2004 MDIT contracted for an independent risk assessment on 29 of the legacy data center/server rooms and the three target Hosting Centers in the Lansing area. The study determined that legacy computer/server rooms lacked the stability found in the three target hosting centers. Physical visits to each server room provided new reasons why the servers should be moved: centers were located in areas that flooded each spring, oscillating fans were substituting for cooling systems, critical servers plugged directly into wall outlets, fire suppression systems that triggered accidentally, non-existent wiring standards, and room temperatures commonly over 85 degrees. The study turned up other "interesting" findings (among our favorites are a mouse trap used to protect network cables from rodents and a termite infestation that was being tracked as a "science project.") Limitations in the three target Hosting Centers were identified as well. Additional enterprise storage, power, network bandwidth, physical security, floor space and backup power solutions would be needed to address the demands a large-scale consolidation would require. All these improvements would need to be planned and implemented to meet consolidation demands, but scarce capital meant that investments would have to be made with a small percentage of savings delivered from the migrations themselves.

**Phase II: Dec, 2004-Oct, 2005**

**Develop Support Strategy and Prepare: *You only get one chance to make a first impression.***

Consolidation requires that the facilities, infrastructure and support staff be up to the challenge. Applications targeted for migration included the state's revenue collection, law enforcement support, emergency management systems, health facilities, human services eligibility and prisoner tracking systems to name a few. The criticality of these functions left no room for error or degradation of performance once migrated.

Upon completion of the risk assessment, work began immediately to bring the three target enterprise hosting centers to a Tier 3 level. Given limited capital, MDIT staff looked at every alternative to move improvements forward. A homeland security grant was used to purchase and install backup diesel generators. Savings were garnered from any possible source, vendor contracts were renegotiated and the

project was planned specifically to realize savings throughout implementation to cover additional capital improvements.

More importantly, this phase of the project included the implementation of an ITIL based organization. Incident Management, Problem Management, Change Management, Release Management and Configuration Management practices were developed and implemented. Existing state employees were trained and reorganized into new Technical and Data Center Services groups based around ITIL components:

- **Service Management Center:** Responsible for enterprise monitoring of hosting center solutions.
- **Configuration Management:** Responsible for comprehensive CMDB and hosting best practices.
- **Facilities Management:** Oversees the data center facilities.
- **Solutions Engineering:** Ensures that new and migrated solutions meet the Tier 3 standard.
- **Storage Management:** Oversees centralized enterprise storage and backup infrastructure.

The effect of these changes was dramatic. Even before consolidations began, statewide processes started to take hold as the Data Center staff became the champions for change management. A daily conference call was initiated in 2004 that created a forum to communicate and review all open incidents, problems, and changes. The “Day Start” call is attended daily by hundreds of technical staff supporting all of Michigan’s 19 agencies.

A dedicated PMO (made up of 2 FTE’s) was assigned to create and maintain detailed project planning templates and a common migration approach for each consolidation. Strategies for taking “lesson-learned” and process improvements were integrated into the consolidation approach to ensure that every subsequent data center migration built upon the experience of the last.

### **Phase III: Feb 2005 - Oct 2005**

**Communicate and Create Momentum:** *Open dialogue and common sense can go a long way.*

Once MDIT’s support teams were ready to take on a challenge of this magnitude, the job of making agency collaboration a reality loomed. Two factors were key to MDIT’s success:

- 1) MDIT’s executives reasoned that if a picture is worth a thousand words, an actual visit *combined* with pictures could be many times more valuable. So the department based clients and state officials to the new hosting center facilities and gave them VIP tours where they were educated on the benefits of centralizing processing. Visitors were treated to photos and risk assessments of their current centers; most clients had no idea how vulnerable their data centers and their data had become.
- 2) After careful financial analysis, MDIT made a commitment to charge agencies no more for their data processing than they were paying, and promised an eventual, if not immediate, reduction in data center costs.

### **Phase IV: July 2005-Present, Consolidate: *Implement with care.***

In July of 2005, plans and procedures were put to the test when MDIT staff consolidated their first data center in an emergency session. The Child Support data center’s cooling systems had failed and their UPS batteries had melted. HASMAT teams were deployed to clean up the mess and MDIT project teams effected a flawless migration over a two day period. Quality and executive commitment from MDIT

management have been paramount to the project's success. Every migration (regardless of size) goes through the same core project process:

1. Assign core team of agency, application, network and systems administration resources.
2. Perform discovery and inventory of current server room.
3. Develop initial move scenario and establish target move date (include engineering diagram and cost estimate).
4. Prepare target data center and develop detailed "Move Day Plan" (including application verification plan, and next day support team).
5. Execute move of equipment to the target hosting centers.
6. Prepare legacy data center space for reuse as office space.

To date, we have successfully consolidated 21 computer/server rooms without *a single hour* of downtime. Michigan has 16 additional rooms scheduled for 2007, with all remaining rooms to be closed by the end of 2008. Some 273 servers have been migrated into the enterprise Hosting Center environment, and 310 legacy servers have been salvaged.

**Significance to the operations of government:** The Data Center Consolidation project has had a profound affect on Michigan's government operations. Benefits from the project have been beyond the expectations of the project team. Initial rationale centered primarily on cost savings, but the collaborative approach that was taken has delivered benefits on an scale that was unexpected.

**Critical Systems Support:** The list of critical business functions positively impacted by the project covers nearly every area of state government. Systems for the departments of Agriculture, Civil Rights, Labor and Economic Growth, Michigan State Police, Transportation, Education, Natural Resources, Treasury, Environmental Quality, Military and Veterans Affairs, Human Services and Community Health have benefited from the consolidation. Specific benefits have varied based on the particular situation but have included: proactive systems monitoring, physical security, 24x7 support, ongoing equipment upgrade planning and disaster recovery implementation to name a few.

**Communication:** Imagine the power of your most seasoned technical staff throughout the state working, collaborating and communicating each and every business day. Implementation of ITIL practices has made this a reality in our state. ITIL has allowed us to react quickly during emergencies, communicate effectively statewide, it makes projects easier to implement, leveraging technology a reality, and true "cross boundary" transformation an legitimate possibility.

**Repeatability:** Data Center Migration project processes are well documented and fully repeatable for other local and state governments. The MDIT Data Center Operations Team has developed an outreach program sharing best practices with many of our local governments and private sector companies (most notably the City of Detroit, Ford Motor Company and Polk enterprises). Michigan's business case and marketing approach has been shared among the States (through NASCIO).

**Improved Privacy:** Enterprise storage solutions have allowed MDIT centralize and consolidate critical data from all over the State into our hosting centers. Today, we have over one Petabyte of data on the centralized storage devices. This data is now stored on current technology, secured behind firewalls, intrusion detection systems and is backed up regularly.

**Improved Security and Disaster Recovery:** Security solutions and disaster recovery response within the Tier 3 hosting centers is at now at optimum levels. In 2007, Michigan experienced 2 separate "zero-day" virus

attacks that caused statewide outages. All servers contained within the hosting centers were patched within 1-2 hours of the initial outbreak. All application systems in the target hosting centers were quickly restored to service and no data was compromised. Remediation efforts for remote servers continued for nearly two full business days.

Alignment to State Priorities: The project offered MDIT the opportunity to meet gubernatorial goals to save money, retool for disaster preparedness and is part of a major “shared services” initiative underway in the State. Also, the 2006 MDIT strategic plan commits to either retire or consolidate 1,000 servers this fiscal year. This initiative brought the department 310 servers closer to that goal.

Reuse Adding Efficiency: MDIT salvaged un-needed or older technology, combining workloads on enterprise servers. More than 50% of the servers inventoried (310 in total) have been eliminated reducing costs by \$403,000 per year and allowing support staff to focus on higher priority systems instead of facilities or aging infrastructure.

Improved Trust and Credibility: The true test of any technology effort is voluntary compliance or adoption rates. When the costs and quality are not in debate, customers should follow. While credibility is a tough measure to quantify, MDIT’s Data Center Consolidation project has matured to the point where agencies are now openly requesting consolidation of their systems and hardware. Agency requests are eagerly acknowledged and are put on the “waiting list” for 2008.

**Public Value of Project:**

The first measure of fiscal success is in reductions of the rates for technology services. MDIT’s Infrastructure Services Group uses a charge back model that defines rates for the series of technology services that are provided. Rates typically include the total cost of supporting an enterprise function, including staffing, license, equipment and maintenance costs. Each year, since beginning the Data Center Consolidation, MDIT has lowered rates for most of its enterprise services. A rate schedule and demand summary for some of our most widely used services has been included below for your consideration:

<b>Monthly Hosting Rate</b>	<b>2003 Charge</b>	<b>2006 Charge</b>	<b>Reduction %</b>	<b>Changes in Demand (2003-2006)</b>
Level 1 Storage (Per GB)	\$15	\$8	<b>47%</b> rate reduction	<b>224% Increase in enterprise storage</b>
Data Warehouse Storage (Per GB)	\$250	\$40	<b>84%</b> rate reduction	<b>199.25% Increase in warehouse storage</b>
Facilities & Monitoring (Per Server)	\$400	\$200	<b>50%</b> rate reduction	<b>377% Increase in servers monitored</b>
Data 100MB Port (Per port/month)	\$75	\$50	<b>33%</b> rate reduction	<b>456% Increase the number of data ports</b>

**Table 1: Sample Hosting Rate Reductions with Demand Trends**

Rate Reductions don’t necessarily guarantee costs have been reduced. But when MDIT coupled rate reductions with an efficient investment strategy, the combination has resulted in dramatic and quantifiable savings for Michigan agencies every year since the project’s inception. A table containing the total annual

savings realized for all data center services billed by MDIT is included below. The savings reflected are annual totals and have increased year over year as the consolidations were implemented.

	2003	2004	2005	2006
<b>Data Center Services</b>	<b>\$0</b>	<b>\$270,282</b>	<b>4.43 Million</b>	<b>4.8 Million</b>
<b>Annual Cost Reduction</b>				

**Table 2: Data Center Cost Reductions to Agencies**

**Total 3 Year Savings: \$9.5 Million**  
**Projected 5 Year Return: \$19.1 Million**

In addition to the ROI detailed above the Data Center Consolidation Project has included the following benefits:

- Eliminating over **\$375,000** a year from the facilities environmental and leased space cost.
- **\$7,313,245** Cost Avoidance - Projected capital costs to upgrade 29 legacy data centers/computer rooms to Tier II data centers. Note: Risk assessment provided estimates for only 29 of the 37 sites now included in the consolidation project.
- **25,570 sq foot** of floor space regained for other use (so far).
- Decreased travel expenses for support staff that had to travel to the 37 sites to support and maintain the equipment.
- All savings and rate reductions were realized during a time of unprecedented increase in demand for enterprise technology services.
- Capital investments in the three target hosting centers were also accomplished during this time frame; costs of improvements have been deducted from the savings.

The Public Value of the Data Center Consolidation does not stop with dollars. The Michigan State Police have struggled under a severe budget crisis throughout our state’s economic downturn. A lack of funding left many local police posts with unsupported and failing technology. Servers decommissioned throughout the migration process were redeployed to posts throughout the state, helping keep our troopers on the road and productive. It’s difficult to quantify the value of a citizen that gets their tax return in on time because the call center is available during a power outage, or a child support check that is not delayed due to another “computer problem?” Whether the costs we cut help save a program in rough budget waters or facilities improvements keep the servers running in an emergency, the Data Center Consolidation project team has been proud of its role in improving the quality of service for nearly every taxpayer in our state.