**State of Missouri Active Directory & E-Mail Consolidation Project Executive Summary**

The State of Missouri's Active Directory/Exchange Consolidation Team combined fourteen State agencies into a single Active Directory Forest and Exchange Organization, resulting in immediate efficiencies and significant cost savings for taxpayers, while positioning the State to exploit additional technologies otherwise unattainable.

Prior to this Team's endeavor, each of the fourteen agencies had independent systems using different technologies. Our landscape appeared much like a poorly designed neighborhood with mansions on one side of the street, trailers on the other, and no one sharing a common infrastructure like water and phone or electrical lines. The consolidation was much like a home improvement show with the result being a clean, efficient, gated community.

Because of the diversity of each Agency's IT environment, the Team developed a blueprint for consolidation tailored for each Agency's unique needs. All the planning, testing, and consolidation had to occur without interruption in service and at minimal cost. Imagine renovating every house in an entire neighborhood in a way that the people living there hardly noticed all the work being done around them.

Underlying this task was the challenge that very few large enterprises had taken on a similar project independently. Vendors, quick to sell a migration strategy, told state officials repeatedly that the State of Missouri personnel did not have the expertise required to complete a project of this magnitude. The Team accepted the challenge in true Missouri "Show-Me" fashion. In spite of limited funding, documentation, and tools, the State pioneered this project, not accepting a canned vendor solution nor outsourcing the project to consultants.

The Team's successful implementation of this project has resulted in reduced operational costs, increased server utilization, improved availability, and has fostered an infrastructure able to respond more efficiently to the rapidly changing requirements of today's world. The immediate benefits included:

- **Over $2 million in actual savings/cost avoidance;**
- **Over 70% reduction in infrastructure (domain controllers, e-mail servers, and licenses);**
- **Over 50% personnel reduction by staff reallocation to other duties;**
- **Over 50% improvement in email delivery response time;**
- **Enhanced security and reduced exposure to viruses.**

In addition, in less than 18 months since consolidation began, many significant improvements have already been realized. Examples include:

- **The Department of Revenue had multiple systems with multiple passwords, which greatly increased complexity of people's jobs. The Team eliminated those multiple systems and reduced complexity to a single sign-on. This made the systems easier to use and dramatically reduced helpdesk calls for password and permissions issues.**
- **The Team eliminated 93 servers for the Department of Corrections, reducing the number of domain servers from 95 to 2. This has drastically reduced costs for server management, licensing, and hardware/software.**
- **A simplified Active Directory and Exchange structure has allowed inter-departmental sharing of resources, which results in reduced troubleshooting time and improved availability.**

Though the efforts of this Team will largely go unnoticed by design, they have paved the way for future accomplishments. Through the dedication and expertise of the State of Missouri Active Directory/Exchange Consolidation Team, the State will now be able to leverage technology in an unprecedented manner and reap untold benefits for many years to come.

**Business Case and Project Description**

The ability to easily share resources between departments and communicate in a cost effective manner is critical for the overall success of Missouri State Government, where both funding and staffing are limited. By 2004, one of the major problems that had evolved in Missouri State Government was the inability to efficiently electronically communicate internally and to the citizens of Missouri, as well as share IT resources among the State Departments.

Missouri State Government had become very inefficient in its operation. Over many decades, each individual department had implemented their own, disparate IT systems and solutions within their own departmental boundaries. These individual systems meant that hardware, software, and effort were duplicated 14 times to accomplish the same goals. Personnel and contractors who worked on different systems in different agencies had multiple logons to access all of these different systems. Underutilized resources within one department, which could be shared to benefit many departments, could not be shared due to the impossibilities of connecting all of the non-compatible systems that existed.

E-mail communication between State Departments became difficult due to the lack of a current, centralized e-mail directory and also because of the extreme delay in delivering mail between the legacy systems. There was no common directory structure or address book for these agencies which made communicating with each other cumbersome, if not impossible. Many departments had different mail gateways running on multiple vendor solutions, ranging in age from extremely old and outdated to new, making mail delivery not only impossible to troubleshoot, but causing large delays in mail delivery. Agencies that needed to share files had to try to transfer those items via e-mail between agencies or hand deliver them because there was no shared network space to grant access to resources. These inefficiencies were frustrating for both the end user and the citizens and hampered the productivity and overall success of the State of Missouri.

In 2005, after Governor Matt Blunt mandated an IT consolidation, the Missouri Active Directory/Exchange Consolidation team was formed and given the task to combine 14 state agencies from the executive branch of government into a single consolidated Active Directory forest with a centralized email platform. This consolidated environment would provide for numerous improvements, including an unprecedented sharing of resources, a common email environment for efficient delivery of email, central administration of servers/desktops/security, and provide a platform to build future enterprise solutions. The benefits derived from the successful implementation of this project would set the stage for an endless possibility of future endeavors.

**Project Timeline**
**PHASE I – Governor Mandates IT Consolidation**
In 2004, the State of Missouri Governor Matt Blunt signed an Executive Order mandating the consolidation of the 14 executive state agencies IT funding and personnel into one IT Division under the Office of Administration. Among one of the Governor's top initiatives was to consolidate email for the State. The CIO and top management of the new IT Division then initiated the formation of the Active Directory/Exchange Consolidation team and gave support for the completion of this project.

**PHASE II – Active Directory/Exchange Consolidation Team**
With the Governor mandate and top management support, the Active Directory/Exchange Consolidation Team was formed.  Technical personnel representing several of the agencies involved in the consolidation were selected as members of the team.  In addition, advisors were appointed from the judicial and legislative branches of government, who were not part of the consolidation.  This combination of personnel gave the Team a good representation from all faucets of Missouri's government.

This team met twice a week beginning in July, 2005 and was tasked with completing their initial analysis, research, documentation, and implementation plan by October 1, 2005.  The Team was responsible for creating a plan that would result in a single Active Directory forest and a centralized email platform.  The Team was to develop standards for the new systems and to determine how to migrate all data through in-house developed solutions.

The specific goals of the Team were defined.  The Team would develop standards and outline a plan for migration into a single Active Directory structure and email platform with minimal disruption to the end user, all data transferred successfully, and with little funding.  A management, maintenance, and governing structure for this new environment would also be developed.  The anticipated goals for the successful completion of this project were to improve security and availability, reduce servers and licensing, better utilization of computing resources among all departments, standardization, ensure scalability, and position the State of Missouri to exploit future opportunities such as consolidated Desktop Management.

After much research and testing, the team delivered their plan as required by October 1, 2005, and provided a plan that would successfully meet all of the objectives.

**PHASE III – Consolidation Implementation**
In January, 2006, this team moved into the implementation stage, migrating domain and email data through scheduled, phased migrations.  Thus far, 80% of the agencies in the consolidation have been migrated to the single Active Directory forest and Exchange Organization and the team is on schedule to deliver the completed project by the December 2007 deadline.  This project has been very successful and Departments that have already been consolidated in the new forest are working successfully without issues.  These migrations have already resulted in cost savings/cost avoidances for the State of Missouri of over $2 million.   These savings/avoidances for the State of Missouri have occurred by eliminating hardware and software that was duplicated in agencies or no longer needed, as well as the sharing of computer hardware between agencies to upgrade older hardware instead of purchasing new.

The implementation stage of this project will continue throughout this year and is slated to be completed by December, 2007.  Implementation is being accomplished by reassigning resources from this team to assist other agencies during consolidation, resulting in no additional costs to the implementation project and providing little interruptions for the customers.  No outside vendors were utilized to accomplish this goal.  All work has been accomplished by state personnel.

This team has met their objectives which they were assigned and has set an example of success, efficiency and effectiveness for the State of Missouri that will be leveraged for future IT consolidation projects.  They have proven that when agencies consolidate their resources, personnel, hardware, software, and work closely as one team, large tasks can be accomplished with little interruption to the customers and in a timely fashion, while providing savings to the State of Missouri.  This is an example that is being noted and reviewed by numerous vendors and other States.

## Significance of the Project to the Improvement of the Operation of Government

The Active Directory and Exchange consolidation project has had a major impact upon the way Missouri does business. It has streamlined Missouri State Government by sharing the very infrastructure that access, security, communications and the day-to-day business is conducted upon. This consolidation alone has changed the face of Missouri Government business in ways that will be realized for many years to come. In less than 18 months since consolidation began, many significant improvements have already been realized.

**Faster Mail Delivery:** By consolidating email and implementing a single mail gateway built on new technology, the State of Missouri not only improved their ability to fight virus and spam mail from entering the environment, but email delivery times were significantly improved. Mail that was taking days to deliver now arrives in seconds or minutes. By centralizing this function, the administration of this product was also improved, including the troubleshooting process for these functions.

**Modern Environment:** This consolidation is built upon modern technology which aids not only in the efficiency of the environment, but the recoverability and reliability of the systems is also greatly enhanced. Most of the Exchange Organization is built upon blade center technology which is SAN attached for disk storage. These servers are clustered to provide fail-over capabilities and to minimize downtimes for customers. The consolidated Active Directory forest and Exchange systems are built as centralized models which allow for management and maintenance to be performed by a centralized management structure, eliminating the need for duplicate staff in each agency to perform the same functions which has freed up personnel resources for other needs. This centralized environment also affords us easier and better patch management, virus protection, and upgrades paths.

**Public-Access to Forest:** We have had a need in the State of Missouri to allow individuals the ability to obtain access to data and resources the State provides to the Citizens of this State. Because of this need, we have created a public forest that is separate from the private forest which citizens can authenticate in one location and gain access to many different resources available to them. This has eliminated their need to have multiple locations to obtain these resources, eliminated multiple logon's for these individuals, and has aided their ability to have easier access to Government by removing the complexity which has caused them delays and confusion in the past.

**Business Continuity and Disaster Recovery:** By consolidating these agencies into one Active Directory forest and subsequently one e-mail organization, we have taken the disaster recovery issues and eliminate them by 13. Now instead of having to recover 14 separate systems, we only recover one. This has also aided in business continuity by providing one place for these agencies to collaborate and share resources.

**In-House Tools Developed:** We have had several tools developed to automate consolidation or assist customers in moving from their old environment to the new environment. These tools have been developed in-house by our own staff. This has eliminated delays for the customers, automated these processes to eliminate mistakes made by manual processes, has afforded us the opportunity to move at a faster pace for these consolidations, and has saved the State of Missouri considerable amounts of money by avoiding the purchase of third-party tools to accomplish the same tasks. One of the tools developed was the automation of updating customers Outlook profiles without loosing their PST data attached to their old profiles. This eliminated the need for technical staff manually manipulating these profiles for customers during migration and not having to manually touch 30,000 customers profiles, which in turn saved the State of Missouri considerable time and money.

**Low Impact Transition to Agencies:**  One of the major requirements consolidation was to provide a low impact transition to agencies.  We are very proud of this endeavor because this was able to develop a migration plan both for the Active Directory side and the Exchange side that provided little or no impact or interruption of business for the customers.  Ninety-Six Percent (96%) of the Active Directory migrations were conducted during the normal business hours of our customers without causing downtimes for an individual customer of more than 20 minutes on average.  One-hundred percent (100%) of the E-mail migrations were conducted on a Friday evening; mail for these customers was operational within two minutes of making the switch to the new organization.  The historical data moved from the old mail organizations into the new organization was available to all customers by Monday morning following the Friday switch over to the new system.  These migrations also resulted in a success rate of approximately 97-98%.

**Single sign/access to multiple systems:**   A simplified Active Directory and Exchange structure has allowed inter-departmental sharing of resources.  This has reduced redundant authentication requirements.  For example, the Department of Revenue had multiple systems with multiple passwords, which greatly increased complexity of people's jobs.  The Team eliminated those multiple systems and reduced complexity to a single sign-on.  This made the systems easier to use, and dramatically reduced helpdesk calls for password and permissions issues.

**Reduction in Hardware/Software Costs:**  This consolidation has resulted in a major reduction in hardware and software.  By consolidating servers for both the Active Directory migration and the Exchange migration, the Team eliminated 93 servers for the Department of Corrections, which reduced the number of servers from 95 to two.  This has drastically reduced costs for server management, licensing, and hardware/software.

<u>**Public Value of the Project**</u>
One of the major benefits of this project was the benefit it provided to the citizens of the State of Missouri.  This consolidation project has not only given the citizens of Missouri a more efficient and easy model to access the data they may want to obtain, but this project has resulted in a real cost avoidance/savings to the taxpayers of Missouri.  Examples of the project reductions/avoidances/savings include:

•**Over $2 million actual savings/cost avoidance;**
•**Over 70% reduction in infrastructure (domain controllers, E-mail servers, and licenses);**
•**Over 50% personnel reduction by staff reallocation to other duties;**
•**Over 50% improvement in email delivery response time;**

**Enterprise Wide Antivirus Solution for Mail**:  In the past, each agency negotiated with vendors to obtain antivirus protection for their own mail organization.  By consolidating e-mail into one organization, we were able to negotiate for one antivirus solution instead of multiple solutions.  This consolidation alone saved the State of Missouri $67,444 in year one.  The cost savings in year two and year three will be $91,570 each year.  The three year savings for this consolidated item will be $250,584.

**Leveraged Existing Resources**: Start-up costs for any project are historically the hardest to obtain and the highest costs involved in the project. This project was undertaken with a very minimal, if not non-existent, budget. Due to a minimal budget, this team had to utilize existing personnel and technology resources to move this project into production. Hardware and software from agencies were reused, where possible, to eliminate costs for new equipment, and start-up costs. Internal personnel were utilized for their technical expertise instead of utilizing contractors for the knowledge needed. This efficient use of resources already available to the State of Missouri saved the State over $1.5 million dollars in cost avoidances.
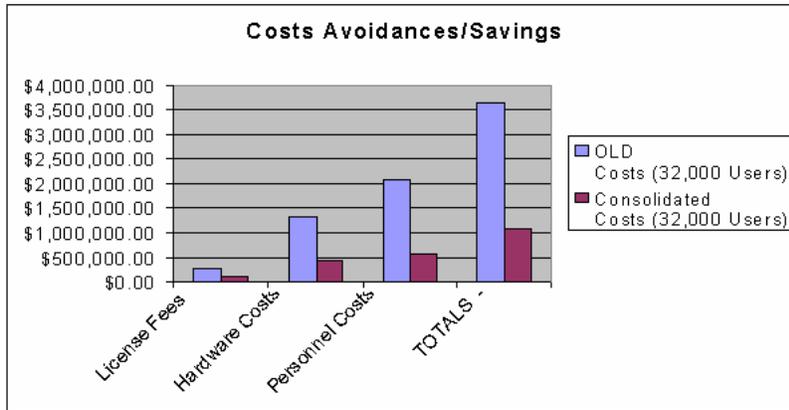


**This chart shows the three major areas in which this project has realized a cost avoidance/savings for the State of Missouri**

The reduction of personnel needed to support this enterprise project has allowed ITSD to realize a considerable decrease in cost associated with this project by reallocating personnel to new projects, eliminating the need to add additional personnel for new tasks.

Using the cost avoidances/savings over a five year projection, this enterprise solution will result in cost avoidances/savings of approximately $12,800,000.

**Consolidation Time Line:** Consolidation is a large task, and takes considerable time and planning for this to move forward. However, on this project, this team was required to provide results in a very short timeline while minimizing impact so that cost avoidances/savings could be realized quickly. The chart below shows the implementation pace and the large accomplishments in numbers this team has achieved in a very short period of time.