Tennessee Enterprise Shared Services Program

Executive Summary

Like other states, Tennessee governmental agencies have become increasingly dependent on IT systems to support their primary business operations. However, in many cases, the practices surrounding IT infrastructure management have not kept pace with the increasing criticality of these systems and the increased risks associated with operating in the post-internet world.

A legislator recently asked a State CIO, "How can the State keep up with the ever-growing cost of IT…? Where is the money going to come from…? How can you do more with less…?"

Unfortunately, many state agencies have been forced to balance IT budgets by cutting corners on infrastructure, staffing, and best practices.

It is not uncommon to find undocumented, yet critical systems, located under desks, on outdated equipment, with un-patched operating systems--lacking change control, redundancy, or disaster recovery capabilities. Bringing these critical systems into an appropriate infrastructure and managed environment, while maintaining or reducing costs, is a challenge faced by many state CIOs. The efficiencies gained through resource sharing (e.g. people, hardware, and software) between multiple governmental agencies may be the best means to contain costs while improving security, redundancy, best practices, and providing enterprise disaster recovery.

The state of Tennessee is addressing these issues with the Tennessee Enterprise Shared Services (TESS) Program. TESS is a holistic program governing all of the services that should be consolidated at the enterprise level. The State has chartered individual projects for each shared service that it has centralized and has assigned dedicated enterprise level resources (e.g. people, hardware, and software) to that effort. TESS brings all of these shared services projects together into a single coordinated effort.

The State has completed consolidation of email systems, content filtering, anti-virus, wide area networking (WAN), local area networking (LAN), an eGovernment portal, and file and print services. In addition, approximately 50% of the State's 1600 servers have been consolidated to our central Data Center. TESS is now taking consolidation to the next level by providing additional shared services, such as Enterprise Content Management (ECM), Enterprise Business Intelligence, Enterprise Reporting, Geographic Information Systems (GIS) database mapping, and building two new data centers to support Enterprise Disaster Recovery.

With TESS came the adoption of a new division of labor between the State's central IT organization, the Office for Information Resources (OIR), and the individual agency IT organizations. Under this new paradigm, agency IT is responsible for the agency's vertical business applications: workstation support and continuity of business. Central IT (OIR) is responsible for IT Infrastructure: shared services and disaster recovery. This partnership allows agencies to focus on vertical business line development and desktop support while OIR focuses on commodity IT efforts. We believe this arrangement strikes a strong balance between agility for agency business needs and overall efficiency.

Tennessee Enterprise Shared Services Program

Project Description (Business Problem and Solution)

The State of Tennessee is concerned that it has critical servers sitting in general office spaces without regular backups, maintenance, or physical security. We are concerned that critical applications are vulnerable to single point failures and that support knowledge often resides with one person in an agency who could disappear with the next staffing change. We are concerned that agencies with limited resources are unable to appropriately maintain and upgrade their own technology resources. We are concerned with duplication of systems across agencies as licensing costs for database and other software spiral out of control. We are concerned that individual agencies may not be able to achieve the breadth and depth of expertise required to adequately secure their IT infrastructure and critical data in our increasingly complex IT environments.

To deal with these issues, the State has embraced IT consolidation and shared services as the most effective approach to providing a highly available, secure, consistent, and standardized IT environment; robust and knowledgeable staff, and Disaster Recovery services across the enterprise. Tennessee could not afford to have each agency provide its own data center, fully redundant network, power and HVAC, trained staff, security, backup systems and disaster recovery capabilities. It was evident that centralization and shared services were critical to improving the State's IT security posture, its ability to effectively manage its technology resources, and provide Enterprise Disaster Recovery services.

This approach has been formalized with the Tennessee Enterprise Shared Services (TESS) Program which looks at over 200 IT functions performed by governmental groups across the State and identifies those that would benefit from centralization. TESS is aided by the State's comprehensive Information Systems Planning process which requires submission and approval of three-year Information Systems plans from all executive branch agencies that outlines the agency's technology strategy, identifies major information resource management issues facing the agency, and presents planned information technology projects describing the initiative, objectives, costs and benefits. This process has allowed the State to focus on developing systems and services that are designed to meet the agencies business needs while reducing duplication of effort, redundant systems, and staffing.

Over the years, the IT pendulum has swung back and forth between centralized and decentralized IT. Centralization and consolidation gains overall efficiencies while decentralization provides agility. The TESS program attempts to strike a balance. It draws the line that places responsibility for vertical business applications, desktop support, and continuity of business with the agencies while central IT holds responsibility for IT infrastructure, shared business service infrastructures, and disaster recovery.

This division allows agencies to be agile and focus on vertical business line development and desktop support, while OIR focuses on commodity IT efforts. TESS allows for the consolidation of assets and functions that are <u>not unique</u> to the business objectives of the agency.

The breath and scope of the TESS program can be clearly seen in the illustration below:

Tennessee Enterprise Shared Services
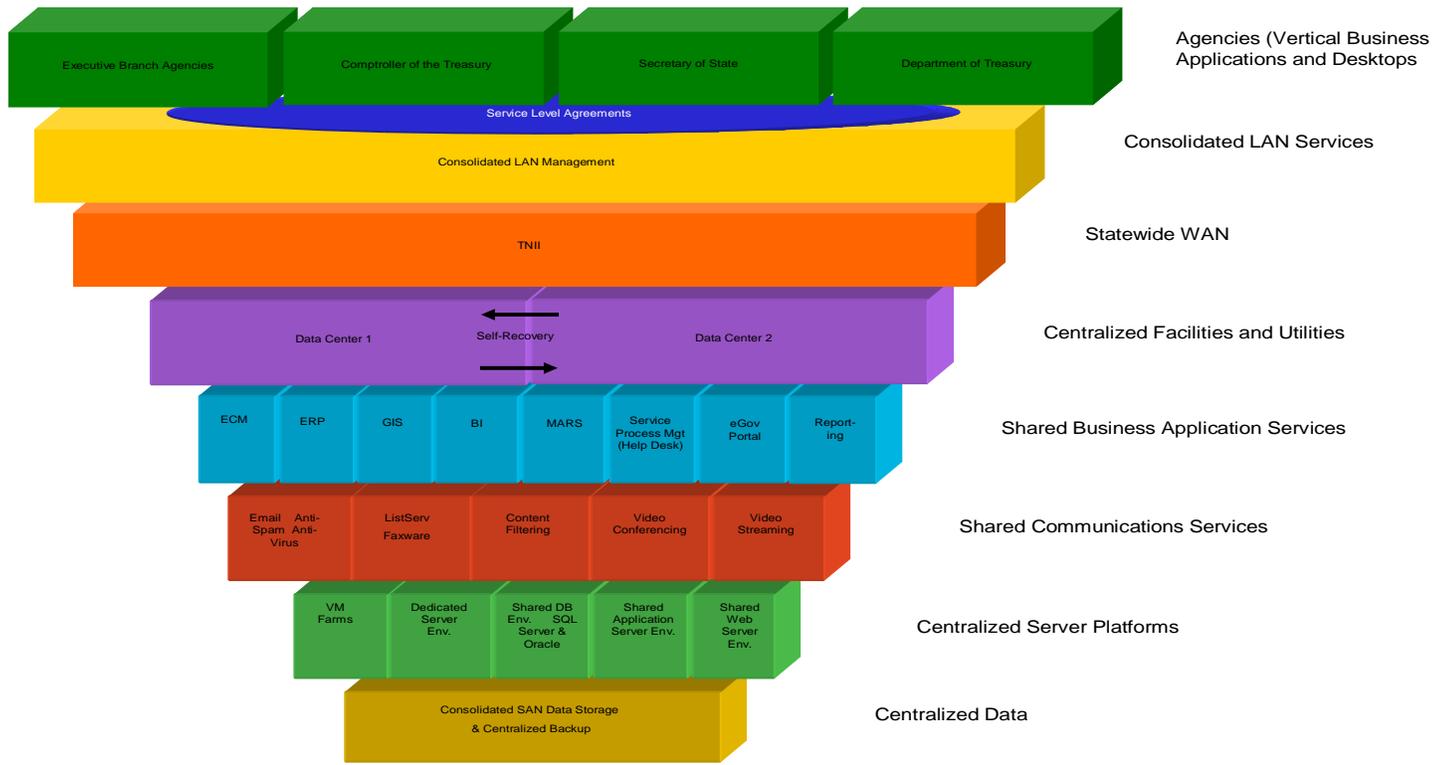
Significance to the Improvement of the Operation of Government

The State has completed consolidation of email systems, anti-virus, internet content filtering, fax, wide area networking (WAN), local area networking (LAN), the eGovernment Portal, and file and print services. TESS is now taking consolidation and shared services to the next level with completion of server centralization and transformation to a programmatic shared business services model. All services are supported by documented Service Level Agreements and performance metrics.

TESS enables agencies to focus on business line applications without the need to worry about:

Data Management	Redundant Server Hardware
A Fully Redundant and Fault Tolerant Network	Network Performance
Disaster Recover	Sever Performance
Database Backups	Efficient Hardware Utilization
Production Control	Redundant Data Centers
Server Lifecycle Maintenance	Network Security

TESS's **Centralized Data Services** eliminates under-utilized hard drives by consolidating data on an enterprise Storage Area Network (SAN) solution with centralized backup and recovery. Utilization rates improve to a staggering 60-80% from a mere 5-15%. This structure also provides high availability to the OS and data sets.

Tennessee Enterprise Shared Services Program

Approximately 50% of the State's estimated 1600 servers have now been centralized to the State's Data Center. The majority of new servers are being virtualized to VM farms, shared application and web clusters, or shared database servers. Server virtualization has proven particularly effective, resulting in better than a 12 to 1 reduction in physical servers and a 33% increase in our server-to-system administrator ratios. Remaining agency-located servers are required to be moved to the State Data Center as they reach end-of-life status unless an exception is granted. Server consolidation is expected to be completed in three to four years.

Many service offerings in the **Shared Communications Services** layer such as content filtering and anti-virus provide increased security to the State's infrastructure and data. Others, like video conferencing and video streaming improve productivity of State employees and cut down on travel costs. As an example, Tennessee's consolidated email service is provided to over 42,000 State employees. Anti-Spam processes 500,000 transactions per day and quarantines 80% of this total volume. An additional 1% is rejected due to Anti-Virus detection.

The concept of **Shared Business Application Services** has allowed smaller state agencies to embrace business technologies that they previously could not have afforded or been able to support. These include such critical functions such as Enterprise Content Management and Business Intelligence. We were surprised to find large agencies just as eager to participate and eventually secured licensing for all 40,000 state employees. We have expanded the Shared Business Application Services layer to include: GIS base mapping, the Multi-Agency Licensure application, Enterprise Reporting, and are currently implementing ERP.

Shared services reduce operating and maintenance requirements, which ultimately lower the Total Cost of Ownership. In addition, centrally managed services make it easier to assure that a base level of consistency, reliability, and security is provided for all critical business applications. Sharing services allows the development of larger pools of more highly trained staff and supports the development of "Centers of Excellence". Shared services promote the development of standardized process and procedure, uniform best practices, and robust, high-availability environments. Finally, these shared service environments greatly simplify the requirements for Disaster Recovery and make this critical function affordable.

Public Value of the Project (Benefits to Service Recipients, Taxpayers, Agencies, or the State)

State agencies with adequate resources can develop high-end solutions while agencies with limited resources are often unable to produce state-of-the-art applications because they cannot afford the specialized staff and technology. TESS leverages technology investments by providing cost-effective services and levels the playing field among all agencies. Benefits to the agencies include:

Consistent service and support for the use of infrastructure
Improved technical services
Improved security of the state's systems and data
Agencies can focus on their core mission, not operational detail
Improved disaster recovery

TESS allows the agencies to provide the public with the best business solutions, and a higher and more consistent level of service. An example of this is illustrated by the general perception of the ease of technology as it is so prevalent in every facet of a person's life. Citizens expect a "single face of government". TESS provides that single face by allowing agencies to share business processes and information without regard to organizational boundaries and responsibilities. The

eGovernment Portal is the centralized service that manages the State of Tennessee's single face to citizens.

The TESS Program enables the State to optimize taxpayer dollars by efficiently using hardware, software and personnel.

VM Farms (a component of the Centralized Server Platforms Service): Utilizing virtualization technology, the State has been able to consolidate over 230 servers into just 13 physical servers in a single VM farm. The State now has over 350 virtual servers in production. This use of technology allows us to maximize processor and memory utilization on each physical server and lower the overall hardware and personnel cost by more than $775,000 annually. It also provides agencies with a low cost option to create multiple environments for test, development and QA. As of June 2007, server virtualization has saved Tennessee state government $4.5 million in hardware costs alone. Also, by utilizing centralized SAN storage, Tennessee is able to offer disk space at $2.55/GB per month, which is $1.00/GB per month less than the Gartner published industry average.

Shared Database Services: By creating shared databases services, the State has been able to consolidate 78 databases from 26 different agencies to SQL Sever and Oracle shared environments. These shared services are helping to lower the overall cost of software licensing to the State, while increasing the overall reliability and security of all the databases. It also provides agencies with a low cost option to host their small to medium sized database applications. This consolidation represents up to $500,000 in cost avoidance for licensing alone.

Shared Application Services: Other shared environments were developed for application and web servers. Only two full-time people are needed to operate and manage the application servers for 21 different agencies. This provides lower overall personnel, hardware, and software licensing costs to the State. It also provides agencies with technology expertise and a robust infrastructure that the agencies could not otherwise afford.

Shared Business Applications Services: This is a rapidly expanding growth area for TESS. The State's shared Enterprise Content Management (ECM) solution is a FileNet enterprise infrastructure with licensing procured for all 40,000 state employees. This infrastructure has been operational for one year and is currently utilized by the Department of Revenue, Department of Human Services, Department of Safety, and the Comptroller. Projects are underway for Finance and Administration ERP, Commerce and Insurance, and the Department of Labor. Utilization of shared infrastructure for content management is calculated to reduce state costs by $10M over a five year period.

TESS has provided immediate cost benefits to the agencies and the State by reducing costs related to server administration, hardware, software licensing, support contracts, space, power, cooling, and facility maintenance. Centralized Shared Services lowers the Total Cost of Ownership and increases cost avoidance for both the agency and the State, resulting in a positive ROI. The Cost Benefit Analysis for the VMWare shared service shown below is an example of a typical ROI analysis done for every service that the TESS program centralizes.

Total Cost Avoidance: Virtual vs. Physical
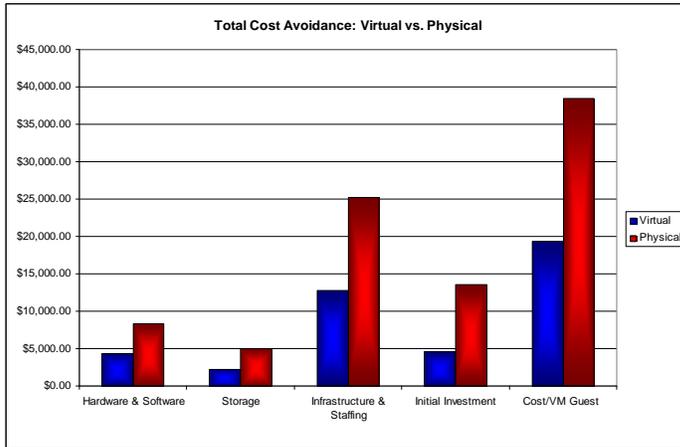
The difference between the State's total costs for a physical server versus the actual cost of a VMWare server.

VMWare ROI: At the current rate, the State will recoup the initial investment costs by the third year and achieve a return on investment (ROI) of over 119% by the fourth year.

Perhaps, most importantly, TESS centralization and shared services provides the cost avoidance and efficiencies that enable the ability to improve the State's security posture, implement standardized and consistent best practices, expand the depth and breath of staff expertise, facilitate high availability environments, and provide enterprise disaster recovery services throughout state government.