



TECHNOLOGY LIFECYCLE MANAGEMENT:
A MODEL FOR ENABLING SYSTEMATIC
BUDGETING AND ADMINISTRATION OF
GOVERNMENT TECHNOLOGY PROGRAMS

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FOUNDATIONS OF TECHNOLOGY LIFECYCLE MANAGEMENT (TLM)

Government agencies have spent millions of dollars in capital and human resources to bring order and structure to their IT infrastructures. New policies and initiatives continue to drive agencies to deliver measurably better results in providing the services and performing the functions for which they are accountable. To meet government-mandated performance metrics, each agency should adopt a long-term strategic methodology that aligns technology, services, and the management of the IT infrastructure to business objectives.

Technology Lifecycle Management (TLM) is a multi-phased approach that encompasses the planning, design, acquisition, implementation, and management of all the elements comprising the IT infrastructure. The convergence of in-depth technical knowledge, astute business processes, and expert engineering and financial services into a solid business model enables agencies to proactively address systematic budgeting and long-term management of their IT infrastructures.

With an accurate picture of how the IT infrastructure may evolve over the next 1, 3, or 5 years, organizations can correlate their technology acquisition strategy with a financial model that will help them realize the full benefit of their technology assets. Consequently, it is vital for organizations to understand the processes involved in each of the following TLM phases:

- Assessment and identification of business objectives and appropriate application of technology
- Technology acquisition specific to IT infrastructure requirements

- Integration and implementation by certified engineers
- Support services such as custom warranty and maintenance packages, help desk services, and systems monitoring
- Technology refresh to ensure upgrades are timely and relevant
- Asset disposition under pre-negotiated terms

Pay-for-use plans and flexible financing further expand the benefits of TLM by shifting the burden and risk of technology ownership and management away from the organization and spreading the costs over the useful life of the asset.

Organizations that employ TLM can realize significant gains in performance, productivity, and service-delivery metrics without negatively impacting budgets.

TLM: A CLOSER LOOK

ASSESS AND IDENTIFY

The first step in TLM is to assess the business and technology objectives and identify end-user needs. A key element of this process is to address every phase of the technology lifecycle so that future business needs, technology requirements, financial considerations, and expansion plans are anticipated and addressed from the start. This involves developing logistics, deployment timelines, technology health-check schedules, refresh cycles, and asset disposal plans. A long-range view that anticipates and addresses next-generation technologies should protect the IT infrastructure from obsolescence due to unexpected budget shortfalls or the inability to scale to meet expansion requirements.

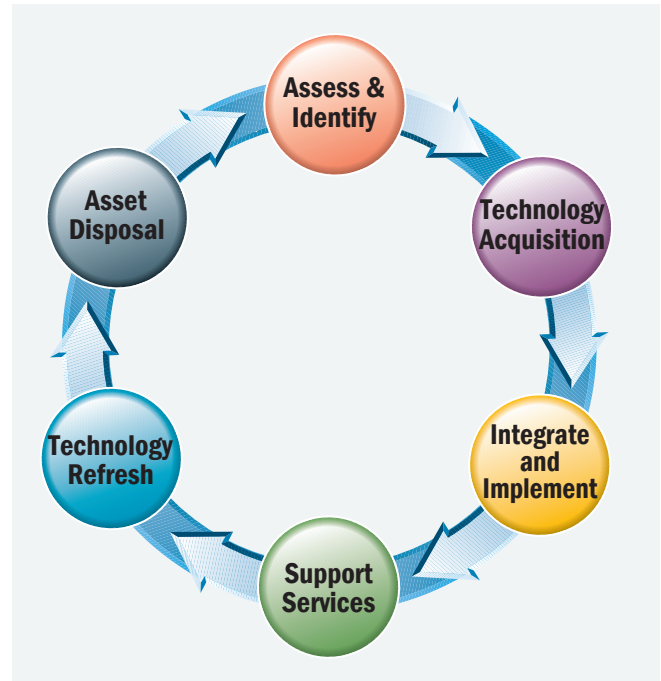
The results of the business requirements analysis and technical environment evaluation by certified specialists are evaluated and documented in both short-and long-term recommendations. This report also should include:

- An acquisition strategy
- Financial plans aligned with budget availability
- A plan for ongoing support
- A project implementation plan
- An asset tracking and retirement strategy

Completing this phase requires several high-level initiatives.

Business Initiatives and Objectives and Needs Analysis

The assessment of an organization's objectives and the identification of the business processes form the framework for the recommended IT architecture. This serves as a working model for the development of an IT



infrastructure that continually supports each agency's underlying business processes and objectives.

Technical Environment Evaluation

It is vital that the procuring organization understand the business processes supported by the IT infrastructure. A technical evaluation by certified specialists identifies the best technology architecture for each environment. The results drive the requirements for the IT components and services to be integrated into the existing infrastructure. Consequently, the agency can right-size the technology architecture for flexibility to meet current and future user demands, performance requirements, and applications.

Through close examination of existing customer resources and the legacy systems comprising the current

infrastructure, a team of experienced technologists can then evaluate the technology that will meet forecasted capacity and enhancement requirements over a span of years. Analyzing the lifecycle of the technology, correlating quantifiable costs and benefits to each lifecycle stage, and providing financing options can accelerate deployment of the IT infrastructure.

Technology Selection and Acquisition Strategy

Specifications for the appropriate technology are created from the results of the technical evaluation and needs analysis. The end-user needs analysis, which involves identifying and categorizing specific business, operational, and technical needs, and defining requirements and expectations from the customer/user perspective, provides the details for an outcome plan. When developing this plan, consideration must be given to factors such as customer resources, legacy systems, forecasted capacity, laws and regulations, and anticipated areas of enhancement.

A strategy for vendor selection is developed based on a review of COTS products and a determination of how each product can satisfy criteria for innovation, longevity, and viability as they relate to the business objectives.

Technology Validation and Refresh Cycles

Regularly scheduled reviews and assessments of the IT infrastructure systems enable organizations to ensure that the technology integrated into their IT infrastructures continues to perform to expectations. When it becomes evident that the currently installed technology no longer has the capacity or capability to support the organization's business need, components can be swapped for new or updated technology.

Effective financial planning and management make appropriate technology refreshes easier by proactively developing a replacement strategy for assets prior to initial deployment. This approach enables consistent budgeting, offers the flexibility to respond to change, and promotes continuous performance improvements. Spreading acquisition costs over the life of the asset protects agencies from experiencing both spikes and short-falls in their capital budgets.

Logistics Planning and Deployment Scheduling

Once an organization has determined its refresh cycle, a deployment schedule can be developed based on an analysis of the age and capabilities of the technology integrated into the existing infrastructure. Depending on the state of the current computing devices, the size of the organization, and budgetary cycles, the deployment may need to occur all at once or be phased in over time. Phased trade-in programs are useful in streamlining the implementation and integration processes by cycling older technology out of the organization as part of the new technology acquisition plan.

Asset Disposal Strategy

A complete assessment of the costs and resources required to manage assets through the entire technology lifecycle enables an organization to plan for the disposal of the devices when they reach the end of their useful life. Asset disposal factors to consider include potential resale value, disposal costs, and services required to securely uninstall data and remove equipment. Although predicting resale values and asset disposal costs is not typically a core skill of an organization's internal IT resources, it is a critical element in managing the costs of the IT infrastructure.

Costs for contracting with environmental specialists must be factored in if outside services are needed to comply with environmental and security regulations. Regardless of the method of disposal (donation, resale, or destruction), there are additional costs associated with the destruction of data stored on the equipment, which may require degaussing the hard drives or using commercially available erasure tools.

Financial Planning

Technology acquisitions historically involve large appropriation requests and capital expenditures. Because the benefits of investing in technology are often derived over time, it is difficult to capture ROI incrementally. At the same time, the long budget cycles inherent in capital appropriations create an understandable bias toward owning technology assets, as users fear future budget cuts could prevent them from procuring needed equipment. Under this scenario, the entire budget justification, appropriation, and procurement must be repeated for each technology refresh, upgrade, and addition to the infrastructure.

A paradigm shift has made it increasingly common for organizations to classify their IT infrastructures as an operating expense rather than a capital investment. With pay-for-use programs and financing, organizations can manage and expense their IT infrastructure as a service.

A proactive financial strategy supports the technology lifecycle by:

- Recognizing the need for flexibility to acquire new technology, refreshes, and upgrades
- Responding to the limited useful life of technology assets

- Developing a pay-for-use program and outsourcing the responsibility of ownership, implementation and maintenance services, and asset disposal
- Expediting the delivery of business objectives through technology
- Addressing IT as a service

Once the technology and implementation resources are identified, a refresh cycle determined, and a disposal strategy developed, the organization has a good picture of the financial resources required to implement. This approach simplifies the budgeting process and leverages out-year funding. It can be useful to accelerate deployments, when budget constraints would have otherwise dictated a phased implementation with potentially incompatible platforms. The funding of pay-for-use programs using operations and maintenance budgets treats the use of technology as a service. In this view, ownership is not a requirement, and is often not preferred. This utility approach has become a recognized best practice and supports the trend toward performance-based contracting.

TECHNOLOGY ACQUISITION

Acquiring technology assets and services involves executing the recommendations developed during the assess and identify phase of the TLM process and includes:

- Procurement of assets
- Logistics planning
- Integration and configuration
- Asset tagging
- Quality assurance

To simplify this phase, many organizations outsource some, if not all, acquisition-related tasks. A common practice is to have a technology solution provider project manage the acquisition, deployment, and implementation of the technology. The financial planning model is also finalized during this phase. The scenario that significantly minimizes an organization's risk is to have a contractor purchase the infrastructure and recover the costs over the life of the contract using agreed-upon pay-for-use billing metrics.

INTEGRATION AND IMPLEMENTATION

Integration and implementation of the infrastructure solution will follow a detailed services methodology, mitigate risks, and maximize efficiencies by providing:

- System configuration and image loading
- Asset management, such as radio frequency identification (RFID) tagging
- Design verification and quality assurance
- Onsite or remote engineering by certified experts
- Certified project management standardized processes

Technology asset tracking involves more than simply knowing where assets are located. According to Gartner, research conducted in 2005 indicated that, "Through 2010, customers that commit a minimum of 3 percent of their annual operating budgets to IT asset management programs and tools can expect a 25 percent reduction in their total cost of ownership."

Asset management is important for ensuring IT security and the organization's ability to recover vital assets and information. Effective asset management requires a well-planned implementation of a data repository that stores and manages information on where the assets are located throughout the enterprise. Such asset tracking has become more difficult in recent years due to increases in worker mobility and the prevalence among organizations to take a siloed approach to adding computing assets.

Engineering and project management services are central to the success of any IT undertaking. The successful implementation and integration of technology depends heavily on maintaining the scope definition, mitigating risks, collaborating closely with end users, using resources efficiently, and adhering to the budget. Regardless of the size of the project, engineers with certifications specific to the underlying technology must implement all IT infrastructure components. PMI-certified project managers are needed to oversee the entire project and can streamline the process by maintaining a repository of detailed plans that are customized to each implementation as well as by efficiently managing multiple resources and developing a close partnership with the customer. Project management that follows Earned Value Management Standards (EVMS), the highest standard in project management methodology, helps to maintain the integrity of schedules and project costs.

SUPPORT SERVICES

TLM vendors must be able to provide post-implementation support services that enable high infrastructure productivity. These services, such as on-going proactive maintenance,

are critical to keeping the IT infrastructure operating in its optimal state at all times. Support services also should include:

- Configuration and change management, technology restoration, and software upgrades
- Maintenance agreements to match the intended lifecycle duration and incorporate appropriate service level requirements. These are often integrated into pay-for-use contracts as part of the service. (Note that under pay-for-use contracts, the assets are owned by the contractor, not the organization; therefore, OEM-certified maintenance contracts are usually required by the contractor to protect the asset value.)
- Warranties that extend or uplift manufacturer warranties
- Proactive incident monitoring, technical phone and onsite support, and parts replacement
- Monitoring capabilities that include the ability to accurately manage the state of the asset and its support history
- On-going collaboration between the agency and the TLM vendor provides a forum to discuss how new technologies can accelerate IT infrastructure modernization, security, and performance objectives. The financial implications and business benefits should be evaluated to ensure that budgets and objectives will not be adversely affected.
- Periodic reviews to discuss performance metrics ensure that the IT infrastructure continues to meet agency technical and business objectives.

TECHNOLOGY REFRESH

Under a traditional capital acquisition plan, funds that were allocated for refresh may go to other departments. With TLM, the funds for refresh are secure. This enables IT departments to upgrade the IT infrastructure to keep up with increasing user demands and applications and prevent system failures and service interruptions.

Consultants and certified engineers should conduct an evaluation of assets and systems to determine the best application of technology for specific agency needs and environment. Once this is determined, a schedule for replacing technology with updated assets, services, and manufacturer changes is developed.

Refresh strategies are driven by business objectives, including security, financial, and growth requirements and vary by technology category. For example, desktop and mobile platforms have a limited useful life and upgrade potential. In contrast, larger server platforms and storage arrays incorporate extensible, modular platforms that enable them to be expanded or upgraded with processor and board refreshes, extending their useful life.

Establishing a refresh schedule based on historical performance and usage requirements in 2 to 5 year cycles will improve overall IT infrastructure performance by reducing downtime and decreasing costs.

ASSET DISPOSAL

The disposal of retired assets is addressed during the planning phase and is a standard offering of full-service TLM vendors. Some organizations may choose to cascade technology to administrative or other business

units that do not require the most advanced computing platforms. The organization should assess the true cost of repurposed technology such as security risks, patches and replacement parts, and out-of-warranty repairs.

Most organizations do not have dedicated asset-disposition capability nor do they benefit from the sale of retired assets. This phase of TLM can become the responsibility of the contractor, relieving organizations of the responsibility to manage their own asset disposal when equipment reaches end of life.

Special attention needs to be paid to data security during this disposal process. Regardless of the disposal technique, disk drives will need to be either erased or physically destroyed. If the asset is to be redeployed elsewhere, a new standard image should be applied to the equipment before redeployment. In addition to coordinating the disposal of computing assets with internal departments, it is increasingly important that computing assets are disposed in a safe and environmentally friendly manner.

OUTSOURCING CONSIDERATIONS

The effective administration of TLM requires that organizations work with a responsive partner with multiple skills, competencies and a successful track record to support this model. Although many organizations have considered adding internal staff to perform TLM functions, it is very difficult to find and retain engineers with all the certifications required to implement and maintain the IT infrastructure. Additionally, one organization typically would not have the number of dedicated PMI-certified project managers required to manage the entire process.

It is important to consider which functions are central to the organization's core competencies and support key business objectives. Because technology itself is not considered a strategic objective, management mindshare typically is not focused on the processes involved in developing, managing, and supporting the IT infrastructure.

After conducting a thorough analysis, many organizations recognize that TLM is not a strategic function. This leads them to determine that outsourcing the long-term financial responsibility, risks, operations, and management of the IT infrastructure to an experienced contractor offers the best outcome.

TLM eliminates the many restrictions, distractions, and inefficiencies that occur when technology is acquired using a component-based, incremental approach. Because the IT infrastructure must evolve to keep pace with changing organizational missions and next-generation technology, TLM provides advantages that include:

- Financial pay-for-use agreements to preserve capital budgets
- Engineering services, support and warranty services
- Asset management
- Image loads and integration services
- Management/deployment of complex systems
- Project management
- Management of technology refresh schedules
- Secure disposal of retired systems and data degaussing

TECHNOLOGY LIFECYCLE MANAGEMENT VENDOR SELECTION

The contracting approach and content of a solicitation for proposals may vary with the services required from the chosen vendor. Acquiring IT as a service, complete with a statement of objectives and measurable service level agreements (SLAs), is the optimal procurement method.

A key selection criterion is based on a vendor's internal processes that enable it to perform timely and accurate integration, imaging, asset tagging, and shipping of technology as well as the levels of expertise of its engineering resources. In addition, there is significant value when a vendor has ISO certification and follows Earned Value Management standards to ensure quality processes are employed at every phase.

This focused attention on services and quality will help lower program risk and decrease the likelihood of overall indirect and unexpected costs. The result should be a lower and more predictable total cost of ownership (TCO).



SUMMARY AND RECOMMENDATIONS

Effective organizations proactively develop strategies that leverage resources, anticipate future requirements, and focus on business goals and performance objectives. As technology and other computing platforms become central to supporting the mission of the organization, effective planning for the management of these platforms has become vital.

Ensuring the viability, relevancy, and long-term value of the IT infrastructure also requires proper financial management. The benefits of proactively addressing capital requirements can help minimize risks, lower TCO, and leverage existing and out-year operations budgets. Using longer-term funding programs, where an organization spreads out the acquisition and support costs over the technology lifecycle, aligns the timing of costs to the anticipated benefits.

TLM enables the effective management of IT resources to ensure they are appropriately focused on the organization's mission. By comprehensively evaluating business, technology, and financial drivers, an organization can deliver realistic lifecycle scenarios that set user expectations and enable their IT infrastructure to be managed as a service.

Organizations that make the decision to outsource TLM should have a realistic assessment of their business priorities and available resources. This information provides the framework for selecting a vendor that has the experience and expertise to implement, manage, support and finance long-term, flexible technology-based infrastructure solutions using highly-skilled professional services.

ABOUT GTSI

GTSI Corp. is the first information technology solutions provider offering a Technology Lifecycle Management (TLM) approach to IT infrastructure solutions delivered through industry-leading professional and financial services. GTSI employs a proactive, strategic methodology that streamlines technology lifecycle management, from initial assessment to acquisition, implementation, refresh, and disposal. TLM allows government agencies to implement solutions of national and local significance quickly and cost-effectively. GTSI's certified engineers and project managers leverage strategic partnerships with technology innovators. These experts use proven, repeatable processes to design, deploy, manage, and support simple to complex solutions, to meet governments' current and future requirements and business objectives. GTSI is headquartered in Northern Virginia, outside of Washington, D.C.

GTSI FINANCIAL SERVICES

GTSI has dedicated finance professionals who apply their deep understanding of government policy and regulations into a procurement strategy that gives agencies fast access to technology that meets their needs. GTSI Financial Services provides flexible financing options for the entire technology lifecycle. By procuring technology and services using the operating and maintenance budget, agencies have more flexible and predictable access to technology and services as they are needed.

GTSI PROFESSIONAL SERVICES

GTSI Professional Services provide expertise for custom-designed IT architecture and implementation that address business and technology requirements. GTSI seasoned engineering and project management resources carry certifications in leading vendor technologies and methodologies, including Project Management Institute and Earned Value Management standards. These IT infrastructure architects and systems engineers plan, design, engineer, integrate, deploy, and support complex, scalable IT infrastructure solutions with a lifecycle management approach. GTSI supports a wide range of integrated solutions in areas such as enterprise software, mobility solutions, network infrastructure, data management and enterprise computing, asset management, and cyber and physical security.

TECHNOLOGY LIFECYCLE MANAGEMENT

GTSI uses a Technology Lifecycle Management methodology and combines professional and financial services with strong industry partnerships into a comprehensive framework for managing each phase of the IT infrastructure. By proactively planning for each phase with a long-term approach, funding and management of IT programs can be better aligned with the realization of benefits, helping to reduce total cost of ownership and risk, while increasing flexibility and efficiencies.



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