AAMVA

American Association of
Motor Vehicle Administrators


# System Modernization
## Best Practices


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SYSTEM MODERNIZATION WORKING GROUP

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# Executive Summary

The necessity for system modernization is commonly understood and acknowledged across jurisdictions that handle motor vehicle and driver licensing systems. For many, supporting computer systems were built in the 1960s and 1970s using languages that are now outdated and unsupported and that were built long before customer service became such an important part of DMVs' mission. The journey into modernizing legacy systems takes significant time, money, and resources, and failure or project closure without completion is at an all-time high.

Although many documents are available publicly that detail system modernization project failures and successes, the expertise of motor vehicle administrations' participation in legacy modernizations up until now has been largely undocumented. The expertise of both motor vehicle agencies and industry was sought in the development of this document. It provides a roadmap to assist those in or about to begin their modernization journey, and it paves the way for success.

Modernization of legacy systems and processes is a complex, costly, and often overdue activity for most organizations.

System modernization projects require commitment at every level of government and necessitate a significant investment in time, money, and resources. The work begins years well before development of any procurement document and continues throughout the life of the system. There is no one-size-fits-all solution. To determine their best path, agencies should complete a market analysis and learn about available options. Take the time to reach out to other jurisdictions who have system modernization experience. Go see their operations. Learn what they did and why and incorporate their lessons learned into planning efforts.

Comprehensive planning efforts are required long before project kick-off. The need for modernization should be clearly articulated to gain the buy-in of legislators and executives. It is imperative that the project have the support of stakeholders and that champions and detractors be identified. Regular informative communications and status updates will help address their concerns.

It is possible, even likely, that during the execution of a modernization program, unanticipated event(s) will impact the scope, budget, schedule, or quality of the project. Even the best planned projects face challenges. A comprehensive governance plan can help ensure success. An executive steering committee can provide direction, make decisions, and ensure the project aligns with the strategic goals of the organization.

Adequate resourcing of the project team is vitally important. Technical and business experts are key players. An experienced, dedicated project manager (PM) is a crucial member of the team. The knowledge and experience a skilled PM can bring to the project cannot be understated. An experienced and dedicated enterprise architect is another essential team member. If a project management office is available to the agency, its participation can increase the chance of success.

If choosing to outsource any portion of the work, an award to the successful vendor should be a

deliverable-based, fixed-price contract and should include penalties, liquidated damages, or service credits. The agency should plan to pay a percentage of the overall cost upon acceptance of specific deliverables, defining deliverables that are critical to the project's success and based on the methodology or solution being implemented. Data cleansing efforts are a separate project, equal in size to the modernization effort. Vendor and agency project teams should be co-located to ensure timely communications and to reinforce a team philosophy. To ensure the project stays within budget and within scope, require all scope changes to go through a formal change control process.

Development of a comprehensive organizational change management (OCM) plan is critical to garnering buy-in and ultimately, to the success of the program. Agencies with system modernization experience have found that the OCM plan often has a much bigger impact on the organization than originally anticipated. Some agencies have engaged additional resources to provide effective communication with staff, business partners, and stakeholders affected by the project.

It is important to establish a comprehensive training plan and engage trainers early. Require trainers to attend project meetings so as changes are made to the program, they can also be made to training materials. Agreements with agencies that interface with the system are needed to ensure a mutual understanding of the effort and of resources required by everyone involved.

An independent verification and validation (IV&V) vendor can provide unbiased project assessment and reporting. The IV&V vendor can provide recommendations on how to best correct any issues noted, and ideally, may be able to predict issues before they occur to the team avoid pitfalls. Engaging an IV&V vendor is strongly encouraged.

Project delays are a common occurrence. To make up delays, jurisdictions and vendors tend to reduce the time allocated for system testing. Decreasing testing time should be avoided to reduce the possibility of system defects after implementation. To ensure quality testing of functionality and to potentially avoid change orders, be sure to allocate sufficient time and resources for testing.

To minimize risk, an agency should prepare for the unexpected. The unanticipated need for additional resources, equipment, or contractor support, for example, will likely occur as the project progresses and as the heretofore paper project becomes reality. If an agency prepares for the likely occurrence of unanticipated expenses, it will be better positioned to enable project efforts to continue because it had the foresight to request contingency funding.

Perhaps most important, do not ignore warning signs of a potentially troubled project. As soon as concerning issues arise, fully assess the situation and take immediate corrective action. It is far better to admit to and immediately address potential problems rather than letting the situation continue to derail, possibly resulting in a project halt.

The guidance in this document is based on the more than 180 years of project experience by members of the System Modernization Working Group and an additional 100 years of experience by the group's technical consultants. It contains lessons learned through project successes, struggles, and failures. It provides a roadmap for a successful system modernization experience. We wish you good luck!

Additional resources on system modernization, including project documentation from agencies with system mod experience, can be found on the AAMVA System Modernization Resources webpage at http://www.aamva.org/system-modernization/.

# Chapter 1 Before Getting Started

Information technology (IT) projects require detailed planning, management, and execution. Project efforts start years before procurement efforts can begin. Before embarking on a legacy modernization effort, significant planning and discussions need to occur with both the business and technical staff. Most jurisdictions have come to the realization that it is no longer a question of "if" legacy systems are replaced but rather "when." Starting with the "when" is part of the critical thinking that needs to occur before a system modernization journey is initiated.

*Consider engaging others in the visioning effort. The dean of the Eli Broad School of Business at Michigan State University led Michigan's efforts to define the university's vision. Think about local resources that can assist in keeping costs to a minimum. After the vision and goals of the modernization effort have been identified, define steps to make the vision a reality. Ensure the vision has executive sponsorship and agreement.*

The "when" of legacy modernization revolves around funding and is not a simple answer, nor a quick decision. As soon as funding discussions begin, the "what" of a modernization effort starts to unfold. There are multiple paths an agency may take — code remediation, a simple upgrade to the existing environment, or a complete database re-organization. End-to-end business process reengineering (BPR) should be considered to provide for increased efficiencies. Complete BPR efforts before defining requirements. BPR efforts may also be required during the requirements gathering phase because reengineering may not be possible until some system upgrades are completed.

Depending on the ultimate goal(s) of the agency, the journey may unfold differently. So where to begin? First, decide what is to be accomplished. Define the vision and develop goals that are in line with the mission of the agency. Both IT and business should be included in discussions from the onset. The effort of defining the vision can be done internally through sessions with leadership, or an independent contractor can be engaged to assist.

Planning and early discussions with business, IT, stakeholders, and legislators will facilitate the need for modernization and mapping the path. Develop the vision before funding, project initiation, or procurement document development can take place. Then and only then will the agency be ready to build a business case that will assist with funding requests and with aligning the project to overall agency goals.

After a jurisdiction has determined its vision, the program can start to take shape. System modernization program efforts include multiple projects, each supporting an element of the vision. Separate efforts may include a data cleansing project, a BPR project, and an infrastructure modernization project, to name a few. Efforts that should begin before system modernization include BPR, data cleansing, and data security.

It is imperative that the decision to use an independent verification and validation (IV&V) or oversight vendor be made early in the modernization program. An

experienced IV&V vendor can use the knowledge it has acquired on a multitude of projects to steer the agency's modernization effort clear of pitfalls. A baseline assessment should be performed to ensure the jurisdiction has an accurate analysis of what need to be corrected moving forward. The IV&V vendor can evaluate the technical infrastructure, project management methodologies, benefits and design realization, requirements management, security, organizational change management, and many other aspects of the program.

There is no one sure-fire "method" for successful program initiation and completion. Jurisdictions should reach out to their peers in other jurisdictions early in the process and gather and evaluate as much information on similar projects as possible. Each has its own approach, but all have helpful information to share, including lessons learned. Members of the project team should talk to their peers in other jurisdictions — driver experts should talk to the other agencies' driver expert, vehicle expert should talk to vehicle expert, IT to IT, and so on. Jointly prepare a detailed list of questions to ask and information to gather. The system modernization resource page on the AAMVA's website is another good source of information.

In-person visits with other jurisdiction's project staff can be invaluable. Visits allow a closer examination of how a system modernization project is managed and how it affects the agency. Detailed discussions on planning, change management, implementation, training, staffing, resource allocation, testing requirements, implementation needs, contingency planning, and more can take place. Seeing the operation first hand can better prepare for deployment. Document facts learned about both successful and less than successful projects. Such evaluation documents will serve as a valuable resource as the agency determines their project path.

*"Too often, organizations think of IT projects as just being about technology, but successful system modernization efforts focus on people and process and view technology as the support needed to enable an organization to achieve its desired business model. It is important for motor vehicle administrations to remember that twenty-first century technology is not meant to replicate 1980s business processes, so you have to be willing to embrace all aspects of change that come with a new system. Most important, you need to make sure that your team members at all levels of the organization are informed and prepared well in advance for what the future will look like for them because the best technology will fail if you don't have a team properly prepared to use it."*

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## Summary and Recommendations

To start any legacy modernization effort, a good rule, taken from Stephen Covey,[1] is to begin with the end in mind. Agencies need to define the future state and develop plans around that vision. During initial project steps, learn all there is to learn from others who have taken the journey and visit those who have both failed and succeeded to determine what contributed to those outcomes. Integrate plans with business and IT to ensure alignment. Remember, the more time spent on planning the roadmap, the easier the journey.

1 *The 7 Habits of Highly Effective People*®, Stephen R. Covey, https://www.stephencovey.com/7habits/7habits.php.

# Chapter 2 An Analysis of Internal Versus Vendor Support

When organizations embark on system replacements, most do not think ahead to the longer term implications of maintaining and supporting the system(s). Simply managing the implementation can be challenging for project teams and executives. However, maintaining the new systems is a key component of success and a key driver of overall cost. Decisions about long-term support need to be made before release of a request for proposal (RFP) so details of the agency's direction can be included in the bid document. At this point in the process, consideration should be given to a commercial off-the-shelf, or COTS, system, and implications for long-term maintenance, including licensing fees, support, and flexibility, should be explored. If the agency is considering using existing resources and internally supporting the system, now is the time to determine the implications of in-house support. Blending information technology (IT) with COTS is another potential solution agencies may wish to consider.

Discuss and make decisions regarding long-term maintenance early in the process. Take time to consider what is available in the DMV marketplace and how it "fits" with the overall IT strategy of the agency. If a long-term IT direction is not in place, have those conversations before releasing a bid to enable all parties involved, including the selected vendor, to be on the same page regarding the future of the application. There are risks in whatever direction is chosen. Remember also, this decision should be a shared vision with the IT organization. If the IT part of the organization does not have a long-term strategy in place, hold joint discussions to ensure alignment before moving forward.

Without a proper maintenance and support plan, an enterprise system can quickly become misaligned with the operational needs of the business. Agencies can elect to handle maintenance in-house, outsource maintenance to a third-party provider, or use the vendor that completed system development and implementation to provide support. Read on for a closer look at the pros and cons of in-house support, contracted support, and a blended model.

## Internal Supported Systems

For those considering maintaining and supporting the system internally, some of the advantages and disadvantages follow.

### *Pros of Internally Supported Systems*

Benefits of an internally supported system include:

- **Use of internal resources** – Using existing staff allows the agency to maximize the productivity level of internal staff and ensures balancing of workloads.
- **Communication efficiencies** – Because staff is internal, teams will likely be co-located, providing easy access to appropriate personnel when needed. Staff may already know each other, making communication easier. Existing relationships usually foster quicker response times between colleagues.
- **Knowledge of dependencies** – Internal staff tend to understand the full IT organization and system dependencies, including key interfaces with other systems and the implications of the

dependencies, thereby reducing the learning curve.

- **Knowledge of culture** – Internal employees have an integrated understanding of the organization and its policies and culture and are familiar with the strategic direction of the organization.
- **Direct ownership** – IT is responsible for ensuring high availability and disaster recovery of the system. It offers autonomous control over data and provides a greater sense of ownership.
- **Internal knowledge** – Internal staff will have significant knowledge of system development standards and procedures, thereby reducing the learning curve.

### *Cons of Internally Supported Systems*

Cons of internally supported systems include:

- **Lack of expertise** – Because many new systems are customized or developed for the agency's vision, internal staff may not possess the specialized skills required to adequately maintain and support the new system. They may not possess the required IT skills.
- **Lack of time or availability** – IT staff is regularly tasked with multiple projects that place constraints on their time and limit their ability to provide support to the project. IT staff may simply be unavailable because of other operational priorities. Agencies may wish to consider staff augmentation to help support the existing system, allowing internal IT staff to move to the new platform.
- **Cost** – Contracting with a full-time IT professional can be an expensive endeavor. Overhead costs associated with providing a computer, desk, and telephone extension drive costs higher. Costs associated with the ongoing training necessary to keep up with the latest technology trends and programs are also a consideration for internal IT staff.
- **Outdated technology** – Because of the cost and breadth of scope required to constantly upgrade to the latest and greatest technology, organizations do not always have the tools necessary to compete with the capabilities third-party vendors can provide.

When considering whether the IT organization can and should manage support of the new system, agencies need to understand their own bench strength. If a solid foundation of staff exists, standardized configuration management principles are in place, and use of staff augmentation for existing projects is possible, then consideration should be given to keeping maintenance of the new system in-house.

Decisions about long-term support need to be made early in the process. Take time to consider what is available in the DMV marketplace and how it "fits" with the overall IT strategy of the agency.

Today, IT outsourcing is generally defined as contracting with outside vendors to perform various IT functions, including data entry, data center operations, application development, maintenance disaster recovery, and network management and operations. Vendors may be individual IT professionals, consulting firms, companies that build systems, employee leasing companies, full-service providers, and even CPA firms.

To stay on top of outsourcing trends, it is crucial to stop and reflect on several important questions before

recommending hiring of a third-party vendor to provide maintenance or support for the new system.

- What problems will outsourcing solve?
- Will a vendor save money for the organization?
- What are the risks, disadvantages, or hidden costs?
- What are the long-term effects of outsourcing?

Whether the jurisdiction has expertise in outsourcing or is simply considering the option, taking a look at the pros and cons of IT outsourcing is beneficial.

## Vendor Supported Systems

The following provides a glimpse of both the advantages and disadvantages of outsourcing support to a third party.

### *Pros of an Outsourced System*

- **Specialized skills** – If the task(s) to be completed is highly specialized and requires specific skills or expertise — graphic design, website development, payroll, human resource compliance — the agency can benefit from the collective experience of a team of professionals. Outsourced IT companies usually require their IT staff to have proper industry training and certifications.
- **Increased flexibility** – In some instances, the support required is seasonal or needs to be scaled up or down quickly. IT staff have to respond quickly to changing demands. Vendors often have a wide range of resources, skills, and capacities readily available, but internal IT staff may have limited capabilities. Agencies often hire outsourced staff with the understanding that they will be employed for only a limited time. Thus, they can more easily reduce or add people to the workforce without jeopardizing their reputation as a stable employer. More important, the use of outsourced workers buffers regular employees from fluctuations in demand and enables the organization to establish a stronger relationship with its regular workforce than would otherwise be possible. A third party is able to bring in an expert for a defined period of time to perform a specific task(s) without making a long-term commitment. Even if the hourly or project rate is higher than hiring an employee, the agency may save thousands of dollars by not committing to an annual salary and benefits.
- **Shift in focus** – Outsourcing to a third party allows both the agency and staff to focus on core competencies. Every organization has limits on available resources. Outsourcing permits an organization to redirect internal resources from noncore activities to those with a greater return in serving the customer. Be sure to map out core competencies well ahead of time if looking in this direction.
- **State-of-the-art technology** – The volatility of IT can quickly make IT skills obsolete. Software is updated and replaced very rapidly. By the time an entity invests in and trains its full-time staff, the technology may no longer be state of the art. Outsourcing specialists should be well trained and up to date to survive and can bring current skillsets to the project.
- **Shared risk** – Outsourcing helps the organization shift certain responsibilities to the selected vendor. Because the outsourced vendor is a specialist, it may be able plan risk-mitigating factors better than internal staff who may not have the same expertise.

### *Cons of Vendor Outsourcing*

- **Loss of control** – Critics argue that an outside vendor cannot match the responsiveness and service levels offered by in-house support, largely

because the outsider is not subject to the same management direction and control as employees.

- **Data exposure** – Concerns exist with outside vendors about confidentiality of data, strategic applications, and provisions for disaster recovery. Additional steps should be taken to mitigate the risk of exposing confidential information or Personally Identifiable Information (PII) data to a third party. Consider and implement steps necessary to protect jurisdictional assets.
- **Licensing fees** – Make sure to understand any and all licensing fees that usually accompany long-term maintenance plans. When outsourcing to the vendor who created the system, long-term licensing fees may be required. Be sure to understand the implications of not staying current with licensed software.
- **Limited leverage** – A vendor is required to provide the level of IT services specified in the contract using the technology platform it deems appropriate. Unless specifically spelled out in the contract, the agency may lose the flexibility of moving to new computing platforms. There may be questionable savings and the risk of being held hostage to one vendor or subcontractor exists. IT professionals argue that outsourcing allows the user to become a hostage of the vendor. The agency may lose technical staff and be locked into the vendor's proprietary software and hardware. In a long-term contract, the agency has more leverage in negotiations, but the vendor has more leverage after outsourcing is underway.
- **Subcontractors** – Outsourcing vendors in search of hard-to-find technical skills often subcontract portions of their contracted work to small, unknown companies without the knowledge of their customer. Such subcontractors can cause problems, including system exposure to viruses, poor communications, high costs, and low-quality service. Consider how the agency can protect itself from such threats by requiring the vendor to hold any subcontracts to the same processes and standards to which the vendor is subjected.
- **Evolution of technology** – Because IT evolves so fast, predicting beyond three years is highly speculative. Hence, signing long-term IT outsourcing contracts is risky.
- **Cost** – Although general employee expenses may be lower in terms of cost per hour when compared with in-house costs, fees associated with contract amendments can add up quickly. In making a comparison between vendor and internal staff, be sure to include overhead and benefits costs of internal staff.
- **Security** – Don't forget that jurisdictional databases contain PII data and that special requirements may need to be established with vendor(s) responsible for support of systems, including standard security protocols and identity checks on support staff. Such requirements should be clearly spelled out in any contracts or agreements (service-level agreement or SLAs). Specifics on who pays for services should be spelled out. A list of audit checks to be performed by the jurisdiction should also be included.

Some agencies are able to easily select between the two models identified above based on a scan of their IT organizational strength. Occasionally, agencies need to "blend" internal and vendor support. An agency may be able to capitalize on the strengths of both internal and vendor support. However, success depends on how well the SLA is written. A mutual understanding of who is responsible for each activity related to support of the system should be well defined and documented to avoid issues.

## Blended Supported System

The following provides a glimpse of both the pros and cons of a blended support system.

### *Pros of Blended Support*

- **Staffing** – Using the best of the agency and the vendor can provide optimized support. Both parties should be committed to ensuring the best and brightest remain on the maintenance team. Contractual terms as they relate to staff requirements need to be clear. The agency should do its part in providing (and not removing) solid performers.
- **Knowledge of dependencies** – With a blended staff, internal knowledge is retained, allowing efficient maneuvering through the IT organization. Be sure staff help "teach" the vendor the ropes. Do not always take on tasks such as enterprise architecture (EA) approval. Without interdependencies, the bond will start to deteriorate.
- **Knowledge of culture** – With a blended staff, internal employees have an integrated understanding of the organization, its policies, and its culture and can assist vendor staff in following correct processes.
- **Direct ownership** – With a blended staff, internal IT staff will understand what is critical to the agency and can assist the vendor in navigating.
- **Expertise** – A blended staff provides expertise that if used wisely can move the organization to superior performance. The team has to be well managed to work effectively and efficiently.

### *Cons of Blended Support*

- **Communication** – The most difficult part of any relationship is communication. If blending agency and vendor staff, it is imperative that communications be open and direct. The very fact that agencies will hold meetings that do not include vendor staff and vice versa can result in communications quickly becoming a challenge. There are obvious ways to mitigate issues with communications, but it is something that should be proactively managed every day.
- **Line of responsibility** – Having both agency and vendor staff support on the team can result in confusion as to who is doing what and why. Clear lines of authority should be established to ensure each party understands its responsibilities. Without clear documentation and standards, the team — and their efforts — will suffer.
- **Morale** – Blending staff can be tricky and can cause morale issues if agency staff do not feel they are receiving assignments that challenge them and align to their expertise. Ensuring there is equality in assignments will help. It can be tough to balance because training, mentoring, and knowledge transfer may all be required elements to ensure agency staff have the required skill set.

Many options should be considered in the decision to outsource or maintain and support systems internally. Ultimately, it may be that what works best for the organization is some combination or hybrid of the two. The most important factor in determining which option is right for the organization is to weigh the individual risks and benefits to both options before committing to an approach.

## MOTS/COTS versus CUSTOM

One additional note related to maintenance and support, is the larger decision related to using a modified off-the-shelf (MOTS) program versus having the modernized system custom built. MOTS is sometimes referred to as COTS — commercial-off-the-shelf — which also requires customization.

Similar pros and cons exist because MOTS systems typically have licensing fees and may tie the agency to a particular vendor for a long period of time. Custom-built systems may take longer to develop and implement and requires extensive oversight. The status, quality, and bandwidth of the IT department should also be considered in this debate.

### *Pros of MOTS/COTS*

- **Speed of delivery** – Typically, MOTS/COTS systems have quicker implementation timeframes. They also provide the ability for an agency to verify that the system is operational in another jurisdiction(s).
- **Less emphasis on detailed requirements** – If an agency doesn't have the time or funding to complete an extensive business process reengineering effort and to develop detailed business rules, deployment of a MOTS/COTS package will likely be more successful. Do not forget that MOTS/COTS does require customization.
- **Start with a framework** – Business staff cannot always articulate the "future" state easily, especially because the system they have used for decades is all they know. COTS/MOTS solutions have been developed with the EA already chosen, which can be detailed for the agency. Starting with a framework and walking staff through what can be done is typically easier for staff and allows them to see what the final product will look like almost immediately.

### *Cons of MOTS/COTS*

- **Less flexibility** – Because a MOTS/COTS package starts with a framework, some of the agency's workflow may have to change to accommodate the established framework. This is not always the case, but to meet timelines and demands, agencies are sometimes required to modify their business to "fit" within the framework.
- **Licensing fees** – Because a MOTS/COTS package is a framework, keeping up with the licensing of the framework is something the agency should include in their budgeting process. Not updating the framework is probably not an option, but agencies should understand what would happen if licensing fees are not paid. This is not to imply that licensing fees are not required with a custom-built system; they are simply paid to more than one vendor.
- **Ownership** – A framework developed by a vendor is typically "owned" by that vendor. Agencies acquiring a MOTS/COTS should understand they are in a long-term relationship with the vendor, and certain aspects of the framework are not going to change. Agencies may still support the ongoing work and necessary change, but should realize they do not own the framework tied to their core business. Owning versus using the system and the pros and cons of each are critical considerations for agency.
- **Customization** – Assume customization will be required with a MOTS/COTS package. Customization can become costly if not managed properly and may include significant maintenance, support, and system enhancement costs.

### *Pros of a Custom-Build Solution*

- **Ownership** – A custom-built system becomes part of the agency's assets. The agency will own it and can make modifications either to the underlying system or smaller subsets as desired. Along with technical ownership comes the "pride" of the IT shop for developing the code, having it in their possession, and knowing it is theirs to maintain.

- **Flexible** – As the name implies, custom-built software allows for a high degree of customization. Business and IT need to ensure that definitive scope documents exist so the design stage can eventually be exited. The look and feel of the system and the approach to building it are at the discretion of the agency.
- **Ease of maintenance** – Agency staff who built the system are also charged with its maintenance. System enhancement and defect fixes are completed more efficiently.
- **Reuse** – Reuse of an existing application and existing business logic allows for incremental modernization of legacy systems.

### *Cons of a Custom-Built Solution*

- **Delivery time** – Typically, but not always, custom-built software takes longer to build; therefore, the timeframe to implement is longer.
- **Scope management** – When completing custom-built software, if scope is not managed correctly, the project will suffer and elongate. Managing the business needs against timelines and budget is a precarious balancing act that can quickly become unruly.
- **Cost** – The price of a fully customized system often ends up to be more expensive than budgeted because of unanticipated costs for infrastructure, hardware, and licensing and as a result of change requests.

## Summary and Recommendations

Agencies need to weigh the pros and cons when deciding on their legacy modernization journey, particularly when it comes to MOTS/COTS or custom builds, and then ultimately how the system will be managed over time. All of these decisions should be carefully considered before writing and issuing an RFP.

It is imperative to make decisions early in the process regarding both the type of legacy modernization solution (e.g., custom, MOTS/COTS, or code remediation) that best fits with the agency's goals and long-term maintenance and support models. Before writing an RFP, the pros and cons should be evaluated, and discussions on a custom-built system versus MOTS/COTS or other possible solutions – such as code remediation – should take place with both the business and IT staff. In addition, there should be a review of the pros and cons of how the system will be supported once implemented. Some organizations find the answers to these questions simple, while others struggle to determine what is best for the future of the organization long term. Take the time to make informed decisions early as such discussions will drive if and what is ultimately bid.

# Chapter 3 Business Case Development

Modernization of legacy systems and processes is a complex, costly, and often overdue activity for most organizations. To gain support and obtain approval for modernization efforts, an agency should first prepare a well-thought-out business case. A strong business case aids in marketing, governance, and decision making and helps provide clear direction during the course of the program. This chapter provides some tips, lessons learned, and advice in developing an effective business case for system modernization.

A successful business case demonstrates the customer-focused need for change, resource needs, risks, impacts to stakeholders, and return on investment along with a basic discussion of strengths, weaknesses, opportunities, and threats (SWOT) to the project. It should demonstrate a link between the agency's vision and goals and the project scope, describe the partnership between business and information technology (IT), and demonstrate a comprehensive approach to the solution. The business case is used to seek project approval and serves as a high-level program document. After the project is approved, the activities and needs identified in the business case should be fully detailed in the project plan.

An independent verification and validation (IV&V) vendor can assist in providing input to the business case, in validating foundational assumptions, and in verifying conclusions between the business and IT. As the program progresses, the IV&V vendor will provide reports and findings as evidence that the product being developed satisfies the goals of the business case.

## Critical Success Factors

In writing a business case, explain what the modernization program is about and identify the benefits and values modernization will provide. Clearly articulate the need for modernization by addressing:

- business drivers supporting business vision and strategic planning objectives, e.g., reduce wait times, streamline processes, improve efficiencies, etc.

A well thought out business case provides the building blocks for a system modernization project.

- policy or legislative drivers supporting jurisdictional priorities and policies, legislative mandates, etc.
- human resource drivers to retain knowledgeable staff with appropriate skills, address depleting resources required to maintain legacy systems, identify resource needs for the project, etc.
- technical drivers to eliminate legacy technologies and architecture, reduce data, eliminate functionality redundancies, reduce the number of technical platforms used, increase time and effort to implement legislation and policies for the legacy system, determine in-house or hosted solution, etc.

- financial drivers to reduce costs, increase revenues, enhance service delivery models, reduce fraud, protect privacy, reduce maintenance costs on legacy systems, etc.

The business case should use jargon-free, plain language throughout the document and address, at a high level, items to be fully developed as part of the project plan, including:

- current government priorities and how the modernization business case is consistent and in alignment; demonstrate the need for action
- options and recommendations to show due diligence
- documentation that thorough formal and informal consultation has taken place
- an effective communication plan, including stakeholder management strategies
- implementation, evaluation, and monitoring plans that are realistic and thorough
- a maintenance and support plan that meets ongoing business needs and allows for continued improvement or modernization
- a plan to address any potential legal and stakeholder implication
- financial, legal, or political expert advice being sought; provide update briefings as appropriate
- all costs and any internal offsets or staffing cost alternatives
- a description of the urgency to make any recommendations a priority for the agency and the jurisdiction
- a risk analysis and associated mitigation strategies, developed in line with the jurisdiction's established processes to ensure successful implementation

Baseline performance metrics, including wait times, transaction processing times, transaction volumes, and system performance, downtime among others, need to be established for the current system for comparison post-implementation. This type of information will assist in measuring the success of the new system.

## Executive Summary

Write the executive summary last to ensure it addresses the full scope of the program. In a few paragraphs, briefly explain the modernization proposal, vision, goals, why approval is required (funding, legislation, etc.). Include an explanation of the benefits that modernization will provide. Make a strong business case for the need for modernization. Include business, resource, technical, policy, and financial drivers (e.g., enhanced service delivery, reduce fraud, protect privacy, reduce maintenance cost on legacy systems). Identify stakeholder concerns and potential opposition. Highlight the inherent risks or impacts of not proceeding with modernization. Communicating the costs associated with not doing modernization and identifying such risks re critical pieces of the story.

## Background and Vision

The business case should include a background of the current system or circumstances leading to the modernization program and a brief overview of the scope of the projects. Unplanned proposed system changes, often occurring during the development and execution phase of the project, increase current and future costs, perhaps exponentially depending upon the length of the project. Whenever possible, anticipated revenue and costs should be forecast through the lifecycle of the project thereby setting realistic expectations of stakeholders. Setting and maintaining such expectations builds confidence and demonstrates accountability to both citizens and governing bodies charged with allocating taxpayer funds.

The business case should also include a plan for dealing with impacts made by external factors such as legislation or mandates likely to require additional functionality be built into both existing and future systems, creating "pay now and pay later" scenarios. While some impacts cannot be fully appreciated during the development of the business case, predictions can be made based upon the vision of executive leadership vision.

This section provides the context needed for decision makers to understand the modernization proposal and why a decision is required.

The overview should describe the vision of the modernized future state, how it supports business objectives. It may include:

- government mandates and political commitments (e.g., online service delivery [digital or mobile], paperless environment, security, etc.)
- improvements in efficiencies and effectiveness
- direct link to government performance targets (e.g., improve road safety)
- enhancing the customer experience
- a 360 approach to government services provided by the various agencies and organizations involved in the program
- IT strategy including, but not limited to, digital public services, cybersecurity, and business innovation
- information regarding relevant historical projects, experiences, and lessons learned
- a description of agreements in place relevant to the program
- other information that may be helpful to make the business case

## Options

Provide an explanation of the options considered and why the selected recommendation is being made as the best course of action. Identify options based on:

- best practices research
- other jurisdictions' approaches and experiences in system modernization completed as part of getting started (see Chapter 1)
- input from key stakeholders and existing participants
- industry or market analysis
- cost analysis of options

Options should be different enough to offer real choices but should use same criteria for comparison. All options should be viable (e.g., politically acceptable and "doable"). The status quo should be one of the options; clearly outline financial, resource, and other costs of maintaining current systems. Do not discount options that "haven't been done before" but do consider the associated risks and potential mitigation strategies for each. Detail the impact on IT. Include plans to maximize the use of, and investment in, IT enterprise-wide technologies if the technology can be leveraged by other areas of the organization and if in alignment with the agencies architecture and architectural roadmap. Address details of the proposed options, including:

- any updated or new program outcomes
- key performance indicators
- governance and decision-making structures
- shifts in accountabilities, roles, responsibilities, and delivery approaches
- new partnerships or contracting arrangements

## Financial and Fiscal Impacts of the Recommended Solution

A high-level estimate of the operating, contractual, hardware, software, infrastructure, and costs for the proposed program should include:

- estimates of the system development and support costs, including additional data warehouse needs
- business process reengineering efforts
- activities associated with data cleansing
- activities associated with training
- long-term maintenance and support costs
- new, larger, or reconfigured facilities (for system modernization projects and ongoing)
- reclassification of existing staff, addition of temporary staff, and new program staff
- decommissioning costs
- return on investment (ROI), such as replacing legacy system costs with modernized technology or elimination of manual, paper processes with automated processes
- similar or comparable actual costs from other jurisdictions when possible

If significant procurement is required, include information on how the agency's prescribed procurement processes will be met. The agency may wish to consider hiring an independent third party to estimate or validate costs.

### *Implementation*

Describe at a high level how the program will be implemented, which may include:

- timelines, deadlines, key milestones, and major deliverables (and phasing if applicable)

> *"Executive engagement and a structured governance process were integral to the success of our system modernization efforts in removing barriers and ensuring project teams had necessary resources. We were able to overcome workload and training challenges by working as a cross-organizational team to achieve the common goal of improving the customer experience."*
>
> **Whitney Brewster**
> *Executive Director*
> *Texas Department of Motor Vehicles*

- the need for a project management framework and how it will be established for contract management; oversight; progress monitoring; issue, risk, or change management; and financial monitoring

## Stakeholders

As described in Before Getting Started, the agency should identify and speak to stakeholders of the program. The business case should document stakeholders and how they are affected by the program. Methods of communication and messaging timelines should be addressed. The stakeholder process, more fully described in "Chapter 4 – Governance," provides insight into identifying and managing stakeholders. A key element of the business case is to determine who may oppose the project and why.

## Strategic Goals and Performance Measures

A business case should demonstrate how the proposal aligns with agency or government strategic goals and service area performance measures. Under most performance measurement systems (also known as

key performance indicators, or KPIs), performance measures exist for the agency's activities linked to broader government priorities. All submissions should demonstrate the link and impact to the agency's performance measures. Performance measures should state, clearly and concisely, what will be measured. If the agency does not have standards for performance, numerous tools are available to assist.

## Summary and Recommendations

The business case process defined in this chapter should not be considered inclusive of all the information to be included in a business case. To be effective, the business case should address the most critical factors needed for executive management and legislators to be comfortable with decisions regarding the modernization project. Take the appropriate amount of time at the beginning of a system modernization program to research, plan, and write an effective business case. When the document is thorough and clearly articulated, it garners a broad spectrum of buy-in early in the process. It becomes the basis for the project plan.

# Chapter 4 Governance

Every year, jurisdictions and agencies invest millions of taxpayer dollars into modernization efforts to meet objectives outlined in the agency's business case. Any number of factors can occur during the execution of a modernization program that impact the scope, budget, schedule, and quality of the projects. Even the most carefully planned and well-thought-out projects can run into challenges. Developing a comprehensive governance plan can help ensure each project's success. Governance should be designed for the length of the system versus the length of the project.

> *"Governance is defined as the process of developing, communicating, implementing, monitoring, and assuring the policies, procedures, organization structures, and practices associated with a given program. Governance is oversight and control by individuals in executive and management roles organized into the needed structures to apply policy and procedures to the management of the overall program."*
>
> **Project Management Institute**
> *www.pmi.org*

Governance helps plan for unanticipated changes by the business in staffing, resource, or stakeholder needs that may have significant impact on the scope of the program. As an example, the finance department wants to make significant changes to the manner in which funds are distributed. The change will result in funds being distributed two days faster than the process planned under modernization. Other examples may include a key stakeholder group requesting new functionality or enactment of new legislative mandates.

These situations may seem unlikely at the beginning of the program. However, as projects progress, such unanticipated events WILL occur, both internal and external to the project. When considering the requests described in the previous paragraph, they appear logical and valid. However, such situations could have a significant impact to a project, so it is important to address the potential for unanticipated changes early in the program.

Effective program governance requires the agency to agree on and document a process before the start of any modernization effort to deal with unanticipated scenarios. There is no way to anticipate unknown future needs, but you should plan for them to arise during the course of the modernization projects.

## Governance Overview

Development and implementation of a governance structure will enable decisions to be made in a timely manner and ensure that modernization projects are not derailed. A documented process should be something everyone agrees to support at inception of the program and to adhere to for the duration. Program governance ensures:

- modernization projects are not derailed
- verification that projects are executed in accordance with best practices
- objectives for the project are met
- jurisdiction leadership is informed and part of the decision-making process

## Establishing Program Governance

It is important to convey to program team members and stakeholders that program governance is not established to micromanage modernization projects but rather to ensure the projects deliver the stated outcomes and adhere to management guidelines established in the program management plan. Governance should be discussed and planned with key stakeholders during the program initiation phase.

Stakeholders who serve on various committees and boards or who are part of the organization's leadership form the overall program governance structure. A decision escalation matrix or governance flowchart should be established early in the process to define the process for each level of decision making.

## Governance Board and Structure

It is important to note that establishing a governance board does not ensure success of expected outcomes. Adherence to the structure is imperative to avoid problems and delays hampering modernization efforts and ensures continuity throughout the life of the program as governance board members change. Decisions made by governance bodies should align with strategic goals of both the program and the jurisdiction. Governance bodies are charged with making decisions to help the project teams achieve success. A governance meeting schedule should be established that provides the flexibility for ad hoc meetings when major decisions or discussions are needed between regularly scheduled meetings.

Governance board decisions should reflect the strategic reasons for the original decisions to approve, fund, and resource the program. The governance board, along with established structures, should recognize and manage risk in a way most likely to achieve desired outcomes and mitigate the potential for failure. Agencies should build on current governance structure and include additional stakeholders and approval paths as needed.

## Implications of Lack of Governance

Two key objectives of governance are to provide transparency and effective decision making. Inadequate governance has a negative affect the program and may be a result of:

- unclear or poorly defined roles, responsibilities, and accountabilities
- breakdown in communications, resulting in decisions being made without having all pertinent information
- lack of awareness of decisions made outside the governance board
- lack of program or project direction, control, and continuity
- unclear lines of authority and accountability
- lack of involvement of key stakeholders in the decision-making process
- misalignment or lack of adequate resources to complete a project(s)

## Summary and Recommendations

Implementing a governance process provides an efficient, effective, and consistent manner to make decisions affecting the outcome of modernization projects. The governance process ensures accountability for all areas of the program and sets the tone for commitment to the effort. Executives should receive regular accurate information to measure the performance of the projects against time, budget, resources, and quality. Risks and issues should be presented and mitigation strategies drafted and implemented.

# Chapter 5 Legislation and Funding

A request for funding and legislative approval for system modernization is a key component of any system modernization program and is likely an ongoing process. Depending on the jurisdiction's governmental structure, the agency may need to seek buy-in from the governor, minister, legislature, or other body for the system modernization program. Champions and detractors should be identified and appropriate messaging developed to address potential concerns and to keep everyone informed on the program status.

## Educating Legislators

Early in the program, share the business case, a high-level program schedule, and legislative factors that could impact the program's timeline. Request a moratorium on new statutory changes that may impact the program and institute a code freeze for the current system until the new system is implemented. When meeting with legislators or their representatives, explain the proposed system and how it fits with their initiatives. Tie the system modernization program goals to political goals if possible — highway safety, revenue collection for road use tax, dedicated vehicle fund, etc. It is important to include key support personnel in legislative communications because they can help provide continuity of information across legislative terms. Identify champion stakeholders and ask them to sign a letter of support that can be shared with legislators. Include stakeholders in legislative meetings to demonstrate their support when possible.

Do your homework and build a solid business case. Identify opposition and educate legislators to help secure legislation and funding for the project.

## Identify Opposition

Take steps to identify and mitigate potential opposition before the legislative session begins by determining whether objections are valid and need addressing or whether common ground is possible. If opposition exists, be prepared to address it first during a conversation. Clearly communicate benefits to be gained with the new system.

## Identify Funding Sources

Identify potential funding sources such as operational funding, restricted or appropriated funding (e.g., dedicated transaction fee), and alternative revenue opportunities, including grants. Funding will be needed after the program is implemented for maintenance and support services, so if possible, do not allow appropriated, restricted, or fee-based funding to sunset or expire. It is critical that the agency receives

appropriate spending authority for any funding received. Consider the need for a contingency fund for future business needs, legislative additions, other changes, and unexpected requests that may arise. Work to ensure that support for continued funding is in place.

## Accounting and Auditing

As detailed in the business case, it is important to communicate a return on investment (ROI). Agencies should demonstrate fiscal stewardship, demonstrate success, and build trust for future projects with the legislature. Any necessary contracts, funding sources for each, and the agency responsible for managing the funds should be identified. Agencies are usually required to complete an audit of the program, review expenditures, and complete a report of their findings for the legislature. This may be completed by a contracted third-party vendor or jurisdictional auditing entity. The agency should assume it will be audited and engage the auditing entity early in the process to prepare for a successful audit.

## Summary and Recommendations

As with any large-scale project, funding and approval from appropriate legislative members and executives should be considered a top priority. Identifying possible objections at an early stage is imperative to the project. Be prepared to clearly communicate why specific tasks are performed to help provide an understanding of the potential benefits of the system and increase legislators' receptiveness to the project.

Communication is fundamental when requesting a large amount of funding for system modernization programs. Knowing what sources of funding will be necessary for the project before and after implementation will assist with receiving appropriate spending authority. Furthermore, communicating a specific ROI and providing prior experience in successfully managing large funds within the agency can assist in receiving necessary funding. It is vital that team members and subject matter experts educate legislators thoroughly about the required funding and the long-term effect the lack of funding would have for the program.

# Chapter 6 Enterprise Architecture

The goal of enterprise architecture (EA) is to create a unified information technology (IT) environment (standardized hardware and software systems) across the organization or jurisdiction, showing a clear linkage between business and IT. More specifically, the goals are to promote alignment, standardization, reuse of existing IT assets, and sharing of common methods for software development across the organization. The goal is for EA to make IT cheaper, more strategic, and more responsive.

When a new business strategy is proposed, a new or modified EA solution may be needed. A gap analysis should identify differences in the current or "as is" environment to the proposed or "to be" environment. The gap analysis will assist in development of an architecture roadmap that defines the initiatives required to migrate from the current state to the future state. Be sure to consider other projects directly related to the modernization effort (e.g., workstation upgrades, network hardware or connectivity).

It is imperative to the program's success that an experienced enterprise architect be part of the project team and assist in designing the solution. An enterprise architect will bring critical architectural development tools, frameworks, and models to the program.

## Architecture Domains

A number of frameworks can be used in the development of EA. Most contain four basic domains:

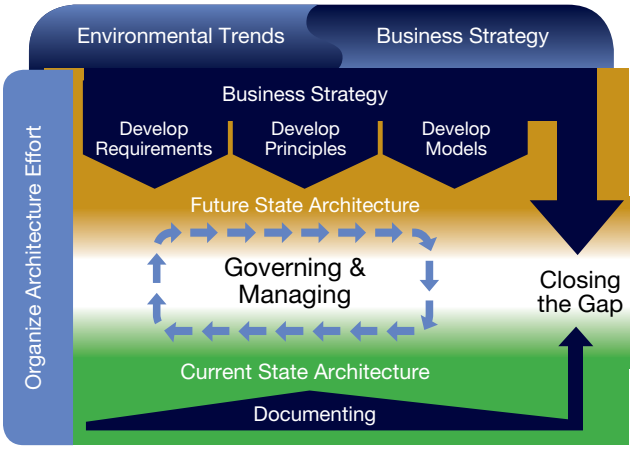
- business architecture – documentation outlining the organization's most important business processes, policies, and organizational structures
- application architecture –a map of the relationships of software applications to one another
- information architecture –identifies where important blocks of information, such as a client record, are kept and how the records are typically accessed and related to each other
- infrastructure or technology architecture – a blueprint for the gamut of hardware, storage systems, and networks

For system modernization projects, it is essential to perform an upfront assessment of the proposed application or solution and implementation strategy alternatives as a key input into the development of EA with cross-domain impact.

## Components of the Enterprise Architecture Framework

Architecture governance is the practice and orientation by which EAs are managed and controlled at an enterprise-wide level. Architecture governance typically does not operate in isolation but within a hierarchy of governance structures. It includes:

- implementing a system of controls over the creation and monitoring of all architectural




An enterprise architecture makes IT cheaper, more strategic, and more responsive.

components and activities to ensure the effective introduction, implementation, and evolution of architectures within the organization

- implementing a system to ensure compliance with internal and external standards and regulatory obligations
- establishing processes to support effective management within agreed parameters
- developing practices that ensure accountability to a clearly identified stakeholder community, both inside and outside the organization
- consider any network upgrades needed to accommodate the new EA and ensure timelines are understood

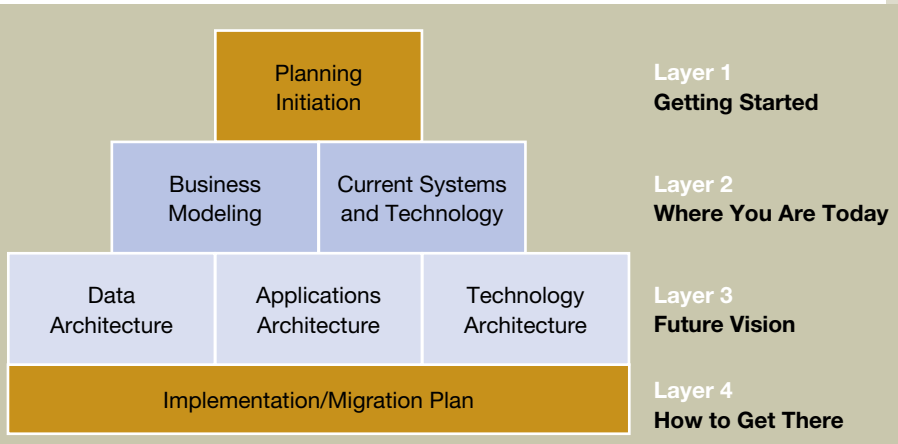
System modernization requires a documented enterprise architectural plan (EAP), which enables the organization to make effective decisions about technology as modernization efforts proceed. The plan should guide decisions about which technologies will be implemented and the infrastructure needed to provide support. EA is the planning process of defining architectures in support of the business and the plan for implementing those architectures.

Multiple methodologies exist to assist in developing a custom EAP. They include, but are not limited to:

- Zachman framework
- The Open Group Architecture Framework (TOGAF)
- Federal Enterprise Architecture (FEA)

One of the first steps in building an EAP is to build a team and empower them to make decisions. Empowering the team, however, does not replace the need for governance. Members from the business unit in the organization should also be on the team. One of the mistakes organizations commonly make is to confuse "IT architecture" with "enterprise architecture" and limiting the EA team to IT resources only. The team should investigate an EAP methodology. It is important to identify and engage related stakeholders in EA governance. In developing an EA, be sure to:

- minimize risk to a project by providing a mechanism to review architecturally significant design decisions and interfaces
- assess the impact of new projects on implemented systems and the relationship between parallel projects
- review the design and usage of product features for maintainability
- drive development of integrated solutions across the jurisdiction via oversight of architecture and solution design



Enterprise architecture planning frameworks consist of four layers.

## Summary and Recommendations

Engaging an enterprise architect early in the system modernization program is essential to defining the future solution that best fits the jurisdiction's future needs, incorporates the latest technology, and ensures that room to grow exists in the new system. EA also benefits the entire organization by identifying end-of-life infrastructure or older technology that can be replaced in parallel with the modernization effort.

# Chapter 7 Requirements and Methodology

An organization needs to effectively identify and manage requirements to ensure that the end solution meets stakeholder and user needs while adhering to business rules, security requirements, project timelines, risk considerations, budgetary constraints, and legislative or regulatory limitations. Requirements will be ongoing for the life of the system and therefore should not be so prescriptive as to limit the usability and look and feel of the system for the years to come.

*"I can't stress enough the importance of design sessions — agreeing on how much customization will take place, having the right people in the room, having a proper facilitator, and documenting decisions. These sessions impact the rest of the project and must be done right."*

**Lisa Kaspar**
*Director*
*Kansas Motor Vehicle Division*

It is important to remember that there are many approaches and levels of detail that requirements gathering can address. Identifying the purpose of the requirements is critical to defining the methodology and deliverables. Requirements used for procurement may be significantly different than requirements used for software development.

## Requirements Planning

Requirements planning can help the organization focus on adding details to the program's goals and objectives. Documenting requirements should be completed early in the project to ensure the final product meets the needs of business, information technology (IT), external stakeholders, and customers and that it delivers noticeable and measurable improvements. A requirements repository should be established for storing project documentation, which should be updated as changes are made. Requirements documentation should include the following.

- A requirements traceability matrix is key to gathering and recording requirements and should be used to support development, testing, training, and system support.
- Any business process improvement analysis to will be incorporated into the project.
- An "as is" and "to be" catalog of business processes which can then be used to help identify gaps.
- The types of requirements documents to be used, including use cases, user stories, data dictionaries, and software requirements specifications.

## Requirements Gathering Methodology

How agencies gather requirements depends on the software development methodology used for the program. Several approaches that can be used for requirements gathering.

**Agile** – In an agile iterative project, the organization does not need to document all requirements in detail upfront. Instead, the broad scope of the project is defined upfront, and then in each iteration, sufficient requirements are analyzed to support the delivery of that iteration's functionality. The organization gets the result of that iteration's delivery very quickly, which means that they have the confidence to ask for what is most important to them today, knowing that as the project progresses, they can refine what they need.

- **Waterfall or structured** – In a waterfall or structured project, the majority of requirements are gathered at the start of the project during the requirements phase. The intention is to define what needs to be delivered, and the scope includes a detailed description of what will be built. Details are known before the development phase starts.
- **Hybrid** – A hybrid approach allows for a structured approach of defining all of the business requirements needed. It allows for a transparent view into scoping of the project as well as the agility to iterate the detailed requirements through a joint application design (JAD) approach with the appropriate subject matter experts. The hybrid approach minimizes the number of change requests as the level of articulation clearly defines scope.

## Types of Requirements

Several types of requirements may need to be identified and include:

- **Functional requirements** describe the range of operations expected of the program. They define exactly what tasks the system should perform, as well as the business rules, scope of the system, product boundaries, and connections to adjacent systems.
- **Nonfunctional requirements** describe usability and performance requirements as well as the visual properties of the system. Nonfunctional requirements include the product's intended operating environment and any maintainability, portability, and security issues. They also address any cultural, political, and legal requirements to which the product should conform.
- **Business requirements** state the business needs and should clearly define the conditions for a specific business objective by breaking down the business needs into specific tasks. This effort can help assess resources needed to complete the project or to maintain the future business process.

Requirements gathering is an essential part of the project and critical to its success. Be sure to identify quality sources and give adequate time to the process.

- **User requirements** state the needs of the end user. Use cases, data dictionaries, and other software requirements documents are helpful in isolating user requirements and should be maintained for future change requests to the system.
- **System requirements** may overlap with nonfunctional requirements by stating needs that relate to system performance or maintenance.
- **Stakeholder requirements** may overlap with user requirements defining the needs of the end user or specific stakeholder groups.

An agency may choose to combine several types of requirements and not identify them separately.

## Characteristics of Good Requirements

Good requirements define what is to be accomplished versus how they are to be accomplished. Good requirements:

- include the stakeholders' vision of the end state
- are factual and relevant
- are realistic, can be accomplished, and do not contradict other requirements

- are needed for the system to function properly or to meet business or legal requirements
- are clear and not subject to misinterpretation
- can be confirmed to have been implemented correctly through observation and testing

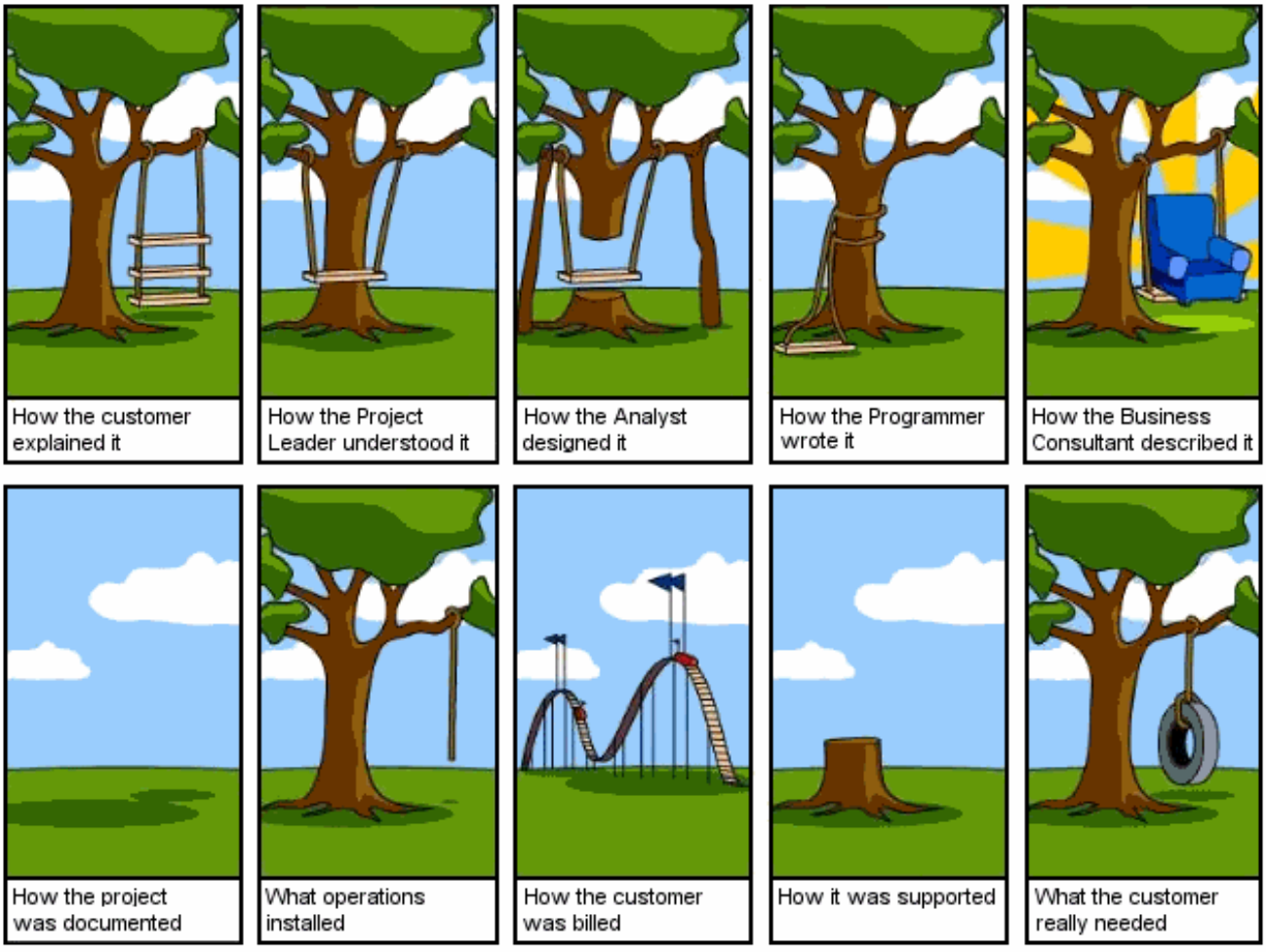
Requirements may also address those that are "absolutely necessary" from "nice to have" and should be prioritized based on the implementation timeline, budget, and agency goals.

The quality and accuracy of requirements are extremely important. It is highly recommended, regardless of where the requirement originated, that they are reviewed and approved by a single validation checkpoint. That validation checkpoint can be a single individual or a group of people, depending on the model chosen.

## Requirements Gathering

Good requirements start with good sources. Finding quality sources is an important task and may be gathered from the following stakeholders:

- customers
- internal and external business users
- subject matter experts
- database administrators
- IT administrators




Requirements gathering is an essential part of any project and critical to its success, so be sure to give adequate time to the process.

Standard operating procedures, user manuals, training guides, statutory requirements, administrative rules, policies, and so on are additional sources that should be consulted to identify requirements. A number of techniques may be used to gather requirements, and the method(s) selected may vary depending on the type or size of the project and vendor or agency established processes. Engage in regular conversations and do not assume what is needed — ask. Gathering techniques may include workshops, brainstorming sessions, surveys, and observations, to name a few. Request subject matter expert users to review, correct, and improve written requirements.

The method(s) to document requirements will depend on the project and may include one or more of the following.

- **Process models** provide a visual representation of a series of tasks, activities, or actions directed toward specific goals. They are useful for illustrating a range of complexity, from providing a very high-level view of the overall process to capturing detailed activities for a small piece of the overall process.
- **Requirements specifications** incorporates the features to be included in the project. They are usually presented in list form and are often divided into sections.
- **Data dictionaries** contain information about the data (metadata) that are stored in an application database. This tool helps explain what the stored information represents and can be used when developing data models for an application. Generally, the dictionary for a database application will include the table names, information regarding what each entity (table) represents, each field name with a definition of what is stored in the field, formatting for the field, whether the field should be unique, whether the field is required, and any default value for the field. Data dictionaries can also be used to document the date that changes to specific fields are made in the system, which is helpful for future reporting on the data.
- **Data classifications** identify who uses the data, the business purpose for it, and any security requirements. Data classifications enhance risk management, legal discovery, and compliance after the project is complete.
- **Diagramming and story boards** provide a visual understanding of input/output processes or data flow. These can be particularly helpful for developers or engineers.
- **Use cases** describe the user's experience with the system or product through scenario descriptions, often starting with a set of preconditions to the final expected outcome. Use cases may be particularly helpful for quality analysis groups in their testing.
- **User stories** typically describe what the user does or needs to complete in a particular job or function. User stories are normally one to two sentences written in a common language that can be used to invite discussion about existing processes and to obtain understanding of the desired improvement.
- **Mockups or prototypes** display essential features of an application before it is developed. These tools demonstrate what a system will look like, not how it will be developed. The appearance of the images or screen elements may be very close to what is the expected final version, or they may include only the barest framework simply showing elements (buttons, text fields, etc.) and their behavior.

## General Requirements Gathering Considerations

The level of detail to include when writing business requirements should be thoughtfully considered. Very specific requirements may be necessary when defining nonfunctional requirements such as the intended

operating environment or to ensure compliance with legal requirements. Higher level requirements that define the expected outcome (not how to get there) are encouraged for business requirements to avoid ruling out newer technology or alternative approaches that could provide a better result for the intended outcome. Overly vague requirements may leave the vendor guessing as to what is really needed or expected and could result in an undesired solution or additional cost to bring the system in alignment with what is actually needed.

## Requirements Traceability Matrix

After the various requirements are gathered, they should be documented. Use of a requirements traceability matrix (RTM) is crucial because of the significant value it provides to the project. An RTM identifies and documents each requirement, including its backward traceability, its forward traceability, and its relationship to other requirements. It assists in scope and change management, communication management, cost management, time management, and risk management and helps ensure the solution conforms to the requirements. It can also be used to detect missing functionality or to identify if implemented functionality is not supported by a specific requirement. The matrix should capture the underlying statutory reference for the requirement, as well as ongoing IT and business process changes. Tying test scenarios to the RTM can be beneficial. Documentation should be updated and maintained as changes are made.

- **Backward traceability** helps ensure that the evolving product remains on the correct track. The objective is to ensure the scope of the project is not expanding through adding of design elements, code, tests, or other work products not specified in the requirements. If a change is needed in the implementation, the change or solution should be traced backward to the requirement(s), and the business should confirm it is within the scope of the desired product. Backward traceability can help identify missing requirements or whether something has been added to the functionality that should not be part of the product. Another benefit of backward traceability is the ability to determine if a defect is a code defect or a defect in the design or requirements.
- **Forward traceability** ensures the product is evolving and indicates the completeness of the product at implementation. The ability to trace a business rule forward to one or more business processes indicates the product requirements specification is complete, and the resulting product will likely meet the needs of the business. If a requirement cannot be traced forward, the possibility exists that the specifications or design is incomplete. Capturing changes in the business environment (e.g., a business rule change or a standard change) and tracing it forward to the associated requirements and all of the work products that are impacted by that change greatly reduces the risk that one of the affected work products is forgotten, resulting in an incomplete implementation of the change.

## Summary and Recommendations

Requirements gathering is an essential part of any project and is critical to its success, so be sure to give adequate time to the process. While identifying and documenting requirements, include information on primary design constraints and work-arounds that might be addressed through a different solution. Use an RTM and update project documentation each time a change is made to the system or business process throughout the life of the system. Version control is critical. Avoid the temptation to document the solution in lieu of the requirement.

# Chapter 8 Procurement and Contract Management

Depending on the approach to system modernization, multiple procurements may be required. After a jurisdiction has determined that a procurement is necessary, organizing and developing procurement documents that ultimately become contracts will take research and effort to complete. In writing any procurement document, whether it is for staff augmentation, data cleansing activities, an independent verification and validation (IV&V) vendor, or a complete build of a new system, attention to detail and a clear understanding of what is being asked are required. It is always a good practice to consider the role of a vendor or the "receiving" side of a procurement document — to be sure work statements are clear, specific deliverables are outlined, and all instructions are easy to follow. Ultimately, a procurement strategy develops into a contract, one that should be managed and followed, so take the time to make the procurement document clear and as inclusive and detailed as necessary.

## Procurement Strategy for the Vendor or Solution

The approved procurement strategy should be designed to ensure a fair, open, and transparent competitive procurement process while at the same time meeting specific requirements of a large complex modernization program. It should be developed in accordance with the applicable jurisdictional procurement policies, standards, guidelines, and approval process.

Consultations with legal and procurement advisors should be scheduled regularly to ensure ongoing adherence to all applicable procurement laws, policies, standards, and guidelines. Processes should be managed and followed to obtain the required project and funding approvals, architectural approvals, and procurement approvals. Consultation with appropriate stakeholders should continue on a regular ongoing basis.

## Procurement Methodology Development

Ensure an industry, supplier, or jurisdictional market review (external analysis) has recently been conducted to understand the vendor marketplace and the solutions offered (commercial software product, custom-built solution, others). Updates may be required depending on the timeframe in which a previous review was completed. The strategy and approach to procurement and the various levels of approval should be identified during development of the business case. An internal analysis of what is being procured, for what timeframe, and the objectives should result in identification of the procurement methodology (e.g., open, competitive, sole source) and best fit for the agency.

*Every contract should include language to define how the vendor will be off-boarded and transitioned at the conclusion of the contract (before or after the project ends).*

Agencies need to assess various procurement and delivery approaches to establish the most appropriate option. For example, if the decision is to mandate the IT solution, then the prime focus of the evaluation is on the vendor's expertise of that software and its ability to deliver on the prescribed technology platform. If the decision is to assess multiple information

technology (IT) solutions, then the focus is on both how the technology platform will be able to deliver the program objectives, as well as the vendor's ability and expertise to implement the program.

One method to consider is an additional validation step in the contract award. As an example, contract award could include all requirements of the vendor-developed project plan before proceeding to implementation. The contract could be structured to allow for an early termination by either party without liability and then proceed to the next ranked bidder. Agencies can do this in multiple ways and should work with their procurement office on how to structure payment and proper language to allow for a two-step method. The procurement process should allow for underperforming vendors to be replaced with the next highest scoring vendor without having to retender (avoids delays and additional costs).

## Deliverables and Evaluation Development

Procurement deliverables should be clearly outlined, as should the roles of both the jurisdiction and the vendor in developing deliverables. For example, a vendor is responsible for developing a schedule, the jurisdiction will provide information for schedule development and approve the schedule.

*"Develop solid contract management and project oversight principles within your organization prior to taking on a legacy modernization. Following solid standards will go a long way in guiding the effort that tends to run over multiple years and potentially different administrations."*

**Rose Jarois**
*Director*
*Department Services Administration*
*Michigan Department of State*

Including the evaluation criteria for written as well as software deliverables will go a long way in preventing later disagreement on what constitutes "acceptable." The procurement should consider both mandatory and optional scope items. After the contract has been awarded for the mandatory scope, the structure should allow time to elect to purchase options based on an internal analysis.

When developing evaluation criteria, ensure the agencies goals for the procurement are accurately reflected in scoring potential bidders. In other words, determine what defines success for the jurisdiction — the timeline, quality, or some combination. Be sure the criteria are reflected in the scoring methodology. Appendices to include in a procurement document to assist vendors in preparing their proposal include:

- project governance
- business and technical requirements
- data models
- current and target architecture

## Contract Award

Award to the successful vendor should be a deliverable-based, fixed-price contract. Acceptance of deliverables and payments are managed in accordance with terms and conditions negotiated and included in the final contract.

## Procurement Management Team

The magnitude and complexity of the modernization project will require a procurement team structured to support procurement activities. Recommended team members include subject matter experts, technical advisors, legal, and representatives from business, IT, and procurement. To maintain the integrity of the procurement process, procurement team member should sign a nondisclosure agreement (NDA) before starting on the project.

## Vendor or Contract Management

A legacy modernization project is a substantial undertaking and may involve multiple vendors with contractual obligations to the agency. Whether the agency opts for IT staff augmentation, a complete vendor supplied solution, an IV&V contract, or some combination of options, the agency has an ongoing task to ensure that the terms and conditions of the contract(s) are followed. This can be a time-consuming effort and may require a dedicated resource to manage.

Given that legacy modernization contracts can run over multiple years and include staffing changes from either the agency or the vendor, it is critical to properly set expectations. Following solid contractual practices at the beginning of the contract and ensure continuity of those practices throughout the lifecycle of the contract will help ensure success. Ensuring good contract practices are in place will not necessarily prevent a failure but can be of tremendous assistance if a failure occurs.

The following are some of critical items to consider in developing contract and vendor management plans.

- Ensure all contracts are included in the plan because managing multiple vendors is critical for the agency.
- Consider adding a contract compliance officer or similar role to the project team whose responsibility is to work with the project manager to ensure deliverables, timelines, and other contractual terms are being followed and adhered to. If jurisdictions do not use a contract compliance officer, determine who will have that responsibility in assisting the project manager.
- Develop clear roles and responsibilities for both jurisdiction and vendor staff.
- Ensure regular open communication takes place between the contractor and the agency.
- ALWAYS communicate problems and issues early on. Do not think things will improve over time. As soon as a concern is identified, be open and talk about remedies, ensuring contractual obligations are followed. Identify and address the source of the problem.
- The jurisdiction and the vendor have separate roles and responsibilities to their respective organizations. The project team should develop respect for the obligations of both parties.

*Contract management has become a single point of failure on many projects, especially legacy modernization efforts that have long durations. Ensure your jurisdiction has incorporated contract management principles and practices into the lifecycle of your modernization effort.*

- Develop a consistent process for acceptance of all contract deliverables. Determine the process flow and sign-off criteria. Continually update processes and ensure contract amendments are completed if changes occur within the agency or vendor team.
- Develop a jurisdiction contract file, organized by contract terms, that contains all deliverables and sign-offs.
- Determine if documents are going to be maintained in an electronic or paper format.
- Be sure to follow agency or jurisdiction requirements for retention and disposal of all contract related materials.
- Assume and think “audit” when developing a contract file. Set up a filing system to allow for easy and adequate response to an outside or internal audit, which can save hours of effort.

- Consider the use of an "expectations" document for all deliverables to ensure that both the agency and the vendor are clear on the objectives of contract requirements.
- Ensure scope documents are maintained and handled through formal change management processes that include updating the contract if required.
- Develop clear "go/no-go" criteria well ahead of launch to ensure clarity exists between the agency and the vendor regarding requirements and decision points to move to production.
- Develop a list of "rollback" criteria, ensuring mutual understanding of what will have to take place if significant issues are present during a rollout.
- Identify contractual checkpoints in the project plan.
- For jurisdictions requiring annual compliance reports, be prepared to complete required form(s) and demonstrate examples of items in compliance and noncompliance.
- Communicate noncompliance items to the vendor first and try to resolve them at the project level before contract issues are escalated.
- An IV&V or oversight vendor can assist with contract compliance requirements. Agencies need to clearly specify expectations of the IV&V vendor in this process so they have a clear understanding of their role.
- Communicate the role of the IV&V to all parties, agency members, and to all other vendors.
- Remember, the IV&V vendor is also a contract with terms and conditions that should be followed.


Keeping a close eye on contracts will help ensure deliverables are produced and timelines adhered to.

Think in terms of the complete lifecycle of the project when planning for contract and vendor management. As with most items, clear and open communications will go a long way to assist both the agency and contracted vendor in developing and maintaining an open and effective working relationship. Best practices require all parties to articulate expectations, establish frank and open communications, and set a clear plan on how contract documentation and sign-offs will occur.

## Vendor Performance Analysis

The vendor should be subject to formal performance analysis. This may be completed through regular performance measurement, a performance scorecard, or contract compliance report encompassing multiple areas of performance analysis. Self-reporting by the vendor should not be the sole method of performance evaluation. The purposes of vendor performance analysis are to identify areas in which the vendor is performing as expected and to identify required corrective action in order to maintain delivery effectiveness and compliance if necessary. Require vendor(s) to sign a service-level agreement (SLA) that includes penalties, liquidated damages, or service credits. Monitor and administer the SLA to ensure vendor compliance.

## Vendor Payment Schedule

The vendor is paid according to the payment schedule associated with the release schedule developed during contract negotiations. Plan to pay a percentage of the overall cost upon acceptance of specific deliverables. The remaining percentage (hold-back) is part of the final payment upon acceptance of project implementation.

## Contract Administration

Key contract compliance activities will ultimately assist both the jurisdiction and the vendor. Following are several items to be considered when setting up contract files and processes.

- **Key personnel** – The vendor provides a listing of its project team, including the key personnel identified in the vendor proposal. Contract clauses should outline the conditions of key personnel including requirements to be on site and penalties for changing members without appropriate notice or approval. The project team maintains the list of key personnel. The contract or SLA should contain procedures for replacement of key personnel. Ensuring the contract is current if key personnel are changed is the agencies responsibility, as is following the contract for "how" the change should occur.
- **Vendor team forecasting** – The vendor may be required to maintain and provide a three-month rolling forecast of project team members (to be updated monthly). This information allows the agency to plan for office allocation, system access, ID setup administration, and access requirements.
- **Security clearance requirements** – The vendor should comply with all security policies and procedures as outlined in the established agreement.
- **Annual security statements** – Receipt of signed resource security statements should be included as a requirement in the contract or as part of the onboarding of vendor staff. Receipt of other required documents, such as signed moral rights waivers, should also be included as a requirement.
- **Asset management** – A spreadsheet should be set up to track assets (e.g., computers, telephone, printers) allocated to on- or offsite vendor team members.
- **Document management and filing** – Responsibility for document management and filing should be established and maintained by the agency. A repository for documentation and links to file locations should also be maintained. Documents should be updated as activities and needs change; it is worth the time to do so.

*Review Chapter 20, entitled, Signs of a Troubled Project, for additional remediation steps related to contract management.*

- **Scope management** – When a formalized change control is initiated to add or remove scope, contract documents should be updated to reflect the specific change. Not doing so can create issues in the future. Follow a formalized change control process and ensure responsibility for maintaining the integrity of the contract document is included.
- **Project software management** – A master spreadsheet of all project software should be developed and maintained and should include:
  - the initial purchase order for software licensing and first-year maintenance and support

- timeframes and subsequent purchase orders associated with the renewal of software support and maintenance
- responsibility for managing software renewals should be part of the project team's efforts
- impacts to timelines should be managed appropriately through the change control process (if required)

- **Peripheral management** – A master spreadsheet should be developed on new peripherals acquired and used by the project team. Examples include scanners, bar code readers, and other such devices.

## Upon Contract Completion

Project teams should follow retention guidelines related to the completion of a contract. Ensure the contract contains inclusive language from initiation to closure and associated activities for either, regardless of when or why closure is initiated. When it comes to closing out a completed contract, following retention guidelines may be all that is needed, but files typically require attention to ensure that only required documentation is retained. If a project is being closed out for any other reason(s), such as termination for cause, termination for convenience, or other closing method, then a very different set of documentation retention requirements may be followed. Legal advice should be sought. Ensure that files are adequately maintained through the lifecycle of any project that uses contracted vendors and that all contractual obligations are followed. Do not underestimate the effort for this work; it should be considered part of the project lifecycle and staffed adequately.

## Summary and Recommendations

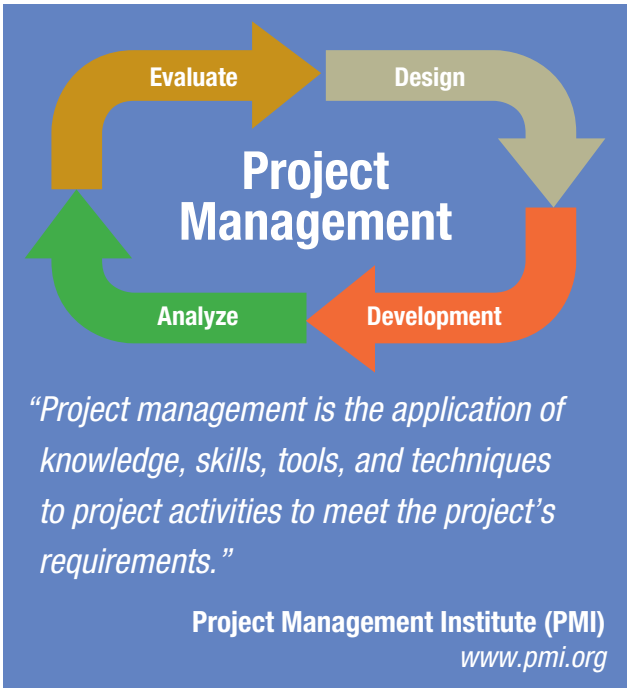
Ensure sufficient time is allotted to develop any procurement document and understand that it ultimately becomes part of the contract requiring monitoring and adjustments during the legacy modernization journey. Research what others have done and use multiple resources in developing the procurement document itself. Learn from other jurisdictions that may have insights into identifying new or emerging approaches. When through the procurement effort, the level of effort required for oversight and management of contracts and deliverables cannot be underestimated. Many jurisdictions completing legacy modernization efforts have learned the hard way that contract management can be a single point of failure for a system modernization project. Ensure adequate resources and processes are in place to track contractual requirements against project activities.

# Chapter 9 Project Management

Project management is a methodical approach to planning and guiding project processes from start to finish. Project management principles can be applied to almost any type of project. Project management standards and practices are flexible and adaptable to the needs of each organization and project and are intended to help with oversight. A project management plan (PMP) is required for each separate project. An overall PMP should integrate key elements from the separate projects. Effective project management is essential to ensuring a project's success, and its intent is to enable both the agency and the vendor(s) to be proactive during the project.

A project management system is the application of knowledge, skills, tools, and techniques to manage project activities to meet project requirements. When undertaking a small, medium, or large project, the use of standardized project management processes or phases will help ensure that the project is managed appropriately, from inception to successful conclusion.

All projects are unique. In particular, large-scale modernization or system enhancement projects are extremely unique and complex. To be successful, a sound project management methodology should be in place. A dedicated trained, certified project manager (PM) is essential. A PM with Project Management Professional certification who has experience in systems modernization or large-scale technology projects is preferred. The Project Management Professional certificate is issued by the Project Management Institute (PMI) and ensures the person meets rigorous testing standards established for project management. Project management begins at the inception of the idea for the project, so the sooner a PM is brought on board, the more benefits realized.




## Project Management Office

Projects can range from simple to complex and may require extremely intricate implementation. This often causes delays in delivery of promised objectives, scope creep, quality issues, or cost overruns. Modernization projects often have a higher level of complexity because they require multiple projects be completed to achieve success. The collection of projects is formally referred to as a program. As a result, many organizations create Project Management Offices (PMOs) to gain efficiencies, ensure projects are delivered within budget, and improve delivery. Establishing or using an existing PMO increases the chance of success for a modernization project. A PMO, combined with a mature governance process, should provide transparency and increased productivity.

If a PMO does not exist, the agency should determine the type of PMO to be established. The PMO can provide governance for the projects in the organization's portfolio, or it can assign PMs from the PMO to manage all projects using established methodologies. The PMO may only do strategic reporting on the organization's portfolio at an enterprise level within the organization.

One important factor in establishing a successful PMO is support from key members of the organization. The authority of the PMO should be clearly identified and the expected benefits clearly described. If key members of the agency do not support a PMO, it will not be beneficial to continue with its establishment. Executive buy-in is critical.

## Project Management Plan

The PMP is a "living" document prepared early in the planning phase of the program. It should evolve as the program progresses and updated as activities, processes, staff, and other things change. The PMP identifies key elements of the project management strategy as well as the activities and deliverables of the project.

The purpose of a PMP is to provide a comprehensive baseline of what has to be achieved, how it is to be achieved, who will be involved, how and what will be reported and measured, and how information will be communicated. The PMP helps the management team maintain a constant focus toward delivering the project in accordance with the agency needs. It should be used as a guide for decisions made on the project and for clarification of ambiguous requirements. The document should be used as a reference throughout the project to ensure the project is managed consistently and in line with established policies and procedures. The PMP should be available to all project members because it provides essential project information. It can be used as an introduction for new project members.

The PMP can be condensed or expanded based on the size of the project and the amount of time dedicated to each section. The more sections included, the more time required to keep them current. For smaller projects, a section can be as simple as a narrative or flow chart. A PMP should include:

- **Executive summary** – A clear and concise summary of the current status of the project, including any major issues impacting the project's scope, budget, schedule, quality, or safety.
- **Purpose of the document** – It is important to include the purpose of the PMP at the start of the document. This is especially important if a formal project management process is new to the organization.
- **Business need** – Clearly identify the problem that needs to be solved. Define the business justification and describe the benefits of undertaking the project.
- **Project descriptions and scope of work** – The complete description of the project and the overall program, along with the history of its development and important decisions, should be documented in the PMP. A clearly defined project scope should also be included. The scope statement should include all of the requirements to be executed, verified, and delivered. A clearly defined scope of work will document which items of work have been dedicated in the baseline cost budget which will assist in controlling and minimizing future potential scope increases. The PMP should clearly define the project scope of work, including construction, environmental work, utilities, and right-of-way. A roadmap of the defined project can be included for added clarity.
- **Budget and schedule estimates** – Estimating the project budget gives the PM the ability to make better decisions regarding the time, cost, and scope of the project. It is important to include the project budget in the PMPs

so stakeholders will understand the funding required to successfully complete the project. The project and program schedules provides the PM with a list of milestones, tasks, and deliverables, including anticipated start and finish dates.

- **Project assumptions** – Create a list of assumption of events that will occur for the project to be successful. Assumptions are usually outside the control of the project team.
- **Constraints** – Identify limitations and restrictions on the project. The project team should balance limitations to successfully complete the project.
- **Project team, stakeholders, and end users** – Create a list of project team members, stakeholders, and end users. It is important to identify an executive sponsor who will champion the project and provide leadership and guidance throughout the project lifecycle. Another important position that should be identified is the PM. The PM acts on behalf of the sponsor to manage the project to successful completion.
- **Project organization** – Document the structure of the project and can be used to understand project resources and their roles.
- **Resource management** – Describe the process for ensuring the project is adequately staffed to ensure the successful completion.
- **Responsibility assignment (RACI) matrix** – Describe the various roles in completing tasks or deliverables for a project or business process. It is especially useful in clarifying roles and responsibilities in cross-functional or agency projects and processes.
  - **Responsible** – Those who do the work to achieve the task. Each role should have an associated responsibility, although other roles can be delegated to assist in the work as required.
  - **Accountable** (also approver or final approving authority) – The individual ultimately responsible for the correct and thorough completion of the deliverable or task and the individual who delegates the work to those responsible. There should be only one accountable role specified for each task or deliverable.
  - **Consulted** (sometimes counsel) – Those whose opinions are sought — typically subject matter experts — and with whom there is two-way communication.
  - **Informed** – Those who are kept up-to-date on progress, often only on completion of the task or deliverable, and with whom there is one-way communication.
- **Communication management plan** – Outline the communication needs of all stakeholders. Document what information will be distributed, how it will be distributed and to whom, and the timing of distribution. Also document how to collect, store, file, and make corrections to previously published materials.
- **Scope management plan** – The PMP should document the philosophy regarding scope management. The plan should include processes for approving scope changes and for verifying that the planned scope of work is actually completed.
- **Change management plan** – Describe — either as a work flow diagram or a narrative — how a proposed project change should be documented and submitted for consideration. A proposed change should be documented as completely as possible on a standardized template or change request form.
- **Project decision log** – List all key decisions made on a project outside of the change management plan, such as legal interpretations. It is a useful tool that can solve potential project

disputes. Examples of decisions to include in a log include:

- what was agreed upon and why
- a reference for the decision
- when the decision was made
- who agreed to it
- where additional information or supporting documentation can be found

- **Risk and issue management plans** – Include in the risk plan a list of all potential risks that may occur during the project, along with the mitigation plan for how to handle each in case it becomes reality. The plan should result in maximizing the probability and consequence of positive events and minimizing the probability and consequences of adverse events. An issue management plan should be used to document issues as they arise and describe how the issues will be addressed. The plans should be evaluated throughout the lifecycle of the project. It is critical to manage all risks and issues in a timely manner.

*Using a PMO ensures project management standards are developed and followed, helping to ensure the success of the modernization program.*

- **Quality assurance (QA) plan** – Define quality assurance activities for the project, including test and acceptance processes, documentation and operational support transition, a milestone checklist, requirements verification processes, schedule and communication activities, and continuous improvement processes. Activities include requirements, design, and testing reviews, phase gate reviews, and review boards.
- **Transition plan** – The plan should identify the transition team, post-deployment defect resolution, and process and system tasks to be transitioned and to whom and should include contract deliverables for transition period milestones. The plan should include activities designed to return to a normal operational state by business and information technology.
- **Performance indicators/success criteria** – Critical success factors should be closely linked to project objectives. Project objectives are quantifiable criteria that should be met for the project to be considered successful. Project objectives include cost, schedule, and quality measures. For each objective, identify the critical success factor specific to that objective that would confirm successful achievement for the project.
- **Common acronyms and terms** – Include a list of commonly used acronyms and terms used throughout the PMP.
- **Signature and acceptance page** – Include a page for approvers to sign indicating their acceptance of the PMP.

## Summary and Recommendations

The need for effective project management is often underestimated. Following proven project management principles is imperative for any modernization program. A dedicated PM using project management knowledge, skills, and tools helps ensure the modernization program is delivered timely and within budget and scope.

Using a PMO ensures project management standards are developed and followed. It can serve as a source of guidance for PMs and the entire project team. Any modernization program encounters risks and issues unforeseen at the beginning of the program. However, by using a mature PMO and sound project management principles, organizations will be equipped to handle unanticipated challenges and still achieve successful implementation.

# Chapter 10 Security

A system modernization program should not drive security for the agency or the jurisdiction. Ideally, security protocols are already in place for the organization. If security is not in place, the system modernization program may indeed drive security needs. If the agency does not have a cybersecurity team, it should consider hiring a consultant to fulfill that need during the project. Many times this role is overlooked or thought of as unnecessary, but that is not the case. Many aspects of security need to be considered during modernization, and such responsibility should not be trusted to just anyone. The role needs to be filled by someone educated and trained in security practices and guidelines, and this person should be included as early in the project as possible.

The individual filling the security role should be responsible for:

- documenting the security plan
- developing a user agreement for system and data access
- establishing industry acceptable security standards and guidelines
- defining security roles and access levels and develop auditing best practices (including facility security — building and data center access)

Security activities should address system security, cybersecurity, and physical security. A modernization project requires vast amounts of resources. Providing for physical access to existing or new locations by program resources should be addressed as soon as possible. Cybersecurity includes controlling physical access to hardware, as well as protecting against harm that may come via network access, data and code injection, and malpractice by operators — whether intentional, accidental, or because someone was "tricked" into deviating from secure procedures.

A strong security plan and implementation of proven security measures can help protect DMV data.

## Security Plan

The security plan should, at a minimum, include:

- the person(s) responsible for security decisions and tasks
- how the projects will adhere to outlined federal or jurisdictional security requirements
- internal security practices or guidelines the projects will follow
- tools to be used to assist with system security (to alert to possible threats)
- processes and a schedule for vulnerability assessments and audits

If a vendor solution is used, additional security steps are necessary to protect data and accesses.

## User Agreements

Every jurisdictional or vendor employee with access to data, facilities, or the system should be required to sign a user agreement before receiving system or facility access. The agreement should outline proper physical access, proper use of the system and associated data, any restrictions for copying or exporting data, and federal or jurisdictional criminal penalties for violating the agreement. The agency should work with the purchasing or contract unit or responsible administrator to ensure that all contract or partner agencies have signed the proper agreement(s) before receiving access to data, facilities, or the system.

Agreements that outline file layouts for data exchanges are also needed with external users such as courts and law enforcement. File layouts will change with the modernized system and data elements may change or appear differently. Any time a file layout is changed, agreements should be amended to reflect the new layout and appropriate training should be provided.

If the agency is considering outsourcing the technical environment (e.g., servers), careful review and establishment of strict security requirements is recommended. Requirements may include an annual audit of hosted facilities, information technology infrastructure security controls and processes, and any other applicable jurisdictional requirements.

## Standards and Guidelines

It is important to document security standards and guidelines as they will be referenced during the program lifecycle and for the life of the system. Standards and guidelines should be addressed in either the program plan or the agency security plan and can include:

- background investigations, including fingerprint, criminal, or driving history checks
- card key access requirements for each physical location according to standard access roles
- data security standards (encryption and protection of data at rest and in transit)
- compliance standards (e.g., Real ID, Social Security Administration [SSA], Health Insurance Portability and Accountability Act [HIPAA], Payment Card Industry [PCI], Criminal Justice Information Systems [CJIS],)
- data governance for Personally Identifiable Information (PII)
- data breach notification planning

## User Roles

The cybersecurity team should assist in the definition of appropriate user roles for the new system. The team can lend guidance on the type of user roles that make sense for the "to be" environment. The team should not be responsible for creating user roles but can ensure that what is created will work with the existing environment and user authentication software.

User roles should be defined for each employee assigned to the project. They should be reassessed as employees leave the project and any time user roles change. Security roles include access to both systems and data. Data governance — such as masking PII from certain users — can be addressed through user roles or in a separate application environment with limited data fields or scrambled data. A user role matrix will assist in tracking and assigning accesses.

## Auditing

A computer security audit is a manual or systematic measurable technical assessment of a system or application. Manual assessments include interviewing staff, performing security vulnerability scans, reviewing application and operating system access

controls, and analyzing physical access to the systems, should be completed. Automated assessments include reviewing system generated audit reports or using software to monitor and report changes to files and settings. Audited systems can include personal computers, servers, mainframes, network routers, and switches.

The cybersecurity team should define the methods and processes to be used for conducting security audits. The objectives should be clear and findings documented to identify areas of improvement and report on the overall status of system security.

## Summary and Recommendations

Following the measures outlined in this chapter is essential to ensure the appropriate level of security is achieved for data, facilities, and members of the project team. Security measures should be developed for the life of the system or facilities and not be limited to program activities. If a security officer is not part of the organization, an individual should be hired or allocated to fill the role for the lifecycle of the program. Be sure to include documentation from security activities into the project management plan repository for audits and future reference.

# Chapter 11 Data Cleansing and Migration

At a high level, there are two overarching activities that should be completed in sequential order for overall project success. They are "data cleansing" and "data migration," and both can be broken down into a number of smaller activities. Data cleansing is usually considered as part of a system modernization program because it is inherently tied to data migration. These activities are time consuming, and the impact to the project is often incorrectly assessed when developing the project management plan. Data cleansing efforts should be considered similar in size to the modernization effort.

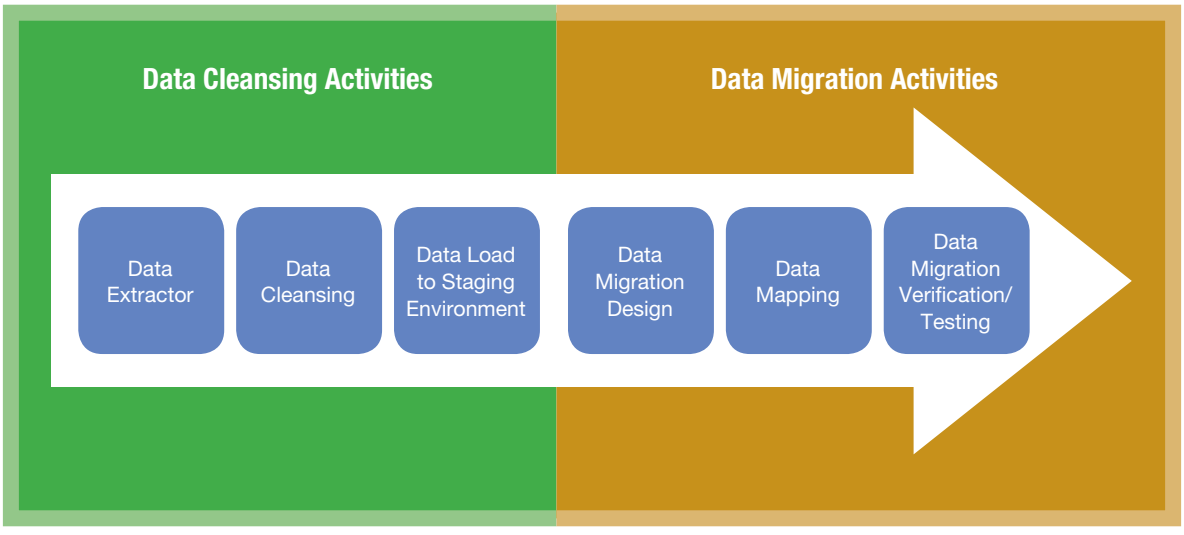
## Data Governance

Data governance should be considered as part of daily operations of which data cleansing is one element. To achieve success in this area, a data steward can be hired, or an employee with expertise of the data maintained in the system can be assigned data steward duties. Data stewardship ensures the integrity, quality, and consistency of the organization's data.

The data steward oversees changes to the data, cleaning and purging of data on a regular cycle, and consistency in the use of data for reports or extraction. Data stewardship is still in its infancy for many jurisdictions. The more "big data" are used for federal or jurisdictional initiatives, the more important they become.

## Data Cleansing Activities

The goal of data cleansing is to have one complete and accurate record for every individual in the database. Consider data cleansing a separate project from the modernization effort. It is critical to the success of the modernization project. The modernization project is at huge risk if data-cleansing efforts are not done as completely and correctly as possible before data migration is completed. Depending on the size and complexity of the data and potential resource constraints, the agency may wish to consider issuing a procurement to solicit a vendor to provide data cleansing services.




Data modernization activities.

The business staff charged with identifying data issues, and the information technology (IT) support staff responsible for data integrity should work in partnership on data cleansing activities. Both should be included in decision-making processes and in identifying goals for the cleansing effort. Select members from each area to serve as dual data stewards responsible for overseeing communication and decision-making efforts. Data steward roles are critical before and after implementation of the new system. Be sure data stewards are clear on their individual responsibilities and authorities to ensure data cleansing is as complete as possible.

Review current data retention requirements before data cleansing efforts begin. If some retention requirements seem unreasonable, change them if possible. Document changes to data retention and the risk of making or not making each change.

Before data can be migrated to a new solution and new data architecture, data should first be analyzed and cleansed before the solution design. At a high level, the purpose of data cleansing is to:

- analyze source data to detect, correct, and prepare the data for the future solution
- identify data anomalies in the current system design
- identify incomplete or invalid values in data fields
- identify mismatched values between related data fields
- identify obsolete values
- identify corrupted, multiple, and duplicate records
- consider implementing legacy changes to prevent additional impact to data cleansing activities (e.g., prevent alpha characters from being placed in a numeric field)
- develop rules to correct data anomalies before data migration
- determine if any new system rules are required to prevent further data anomalies in the legacy system

To achieve data cleansing, three main activities are performed:

- data extraction
- data cleansing
- data load to the staging environment

*Data cleansing efforts will take several years to complete and should never really end, even after the new system is in place. This effort cannot be started too early in the process, nor will the agency ever be completely finished with data cleansing. The agency should plan for ongoing auditing and cleansing of system data to ensure database records remain as accurate as possible.*

Free form fields may require special attention and procedures for cleansing and conversion. As part of data cleansing activities, use separate landing and staging databases. The "landing" database will store the raw data from the legacy system in the original format (i.e., "as is"). The "staging" database will store the data once cleansed (i.e., "to be"). Data staging will also allow further analysis and assessment against the new modernized solution design and requirements before migration. Maintaining two separate databases allows for greater control and minimizes the need to perform additional data extractions if cleansing rules do not update data as intended. It also eliminates any potential impact to the legacy system.

After a cleansing strategy has been finalized, create a risk assessment document for any decisions made.

Documenting decisions on how to cleanse the data and what data may change as a result of the cleansing allows the organization to assign a level of risk to each change. Some risk may be acceptable, and justifying the level of acceptable risk is easier when a risk assessment is completed.

## Common or Shared Customer Considerations

If the plan is to change any common field used in interfaces with the new system, the data cleansing plan and methodology should be communicated to all involved parties. Decisions should be coordinated and documented to keep data cleansed and to prepare for migration.

***Do not** underestimate the manual staff hours needed to identify, amend, and remove data. This will be a long and time-consuming effort for many resources already fully engaged with other responsibilities. Consider that it is impossible to identify all data issues either during the first analysis or after the initial cleansing effort, whether completed manually or with a tool(s).*

## Data Extraction

Data extraction is the process of taking the full dataset from the source system and loading it into a common database platform. When performing a data extraction, using the direct load method preserves the state of the data from the legacy application. The data cleansing process will use this data in its original state from the source system as input and then perform cleansing on any data issues identified.

To ensure the quality of the data and meet the deployment window timeline, the following requirements are needed:

- All of the data from the mainframe should be loaded "as is." Reconciliation should be done qualitatively and quantitatively to ensure the loaded data are the same as the original sources.
- Because some data extracts may be very large in size, to minimize the time needed for these processes, tuning of the environment may be required, and different methods and techniques for loading may be used.
- The scope of data extraction and loading should cover all structured data loads.
- Transformation rules should be developed before extraction (e.g., code 17 = corrective lenses). It should be noted that this process can also be done in conversion.

## Determining Tools and Utilities

A key consideration is the tool set used for data extraction. The right toolset should efficiently extract data from the legacy system and load it into the staging database. This process should occur during the same deployment window as the new system go-live.

Another key consideration for determining the toolset is the built-in functionality to receive error and exception reports and to run debugging on the code used. This functionality is important because loading data from the legacy system into the new database may be in a different format (e.g., moving from a nonrelational database to a relational database) and structure. These reports make it easier to track down problems within the data and then work with the business owners to determine whether issues can be fixed within the legacy system before data migration.

**Do not** underestimate the manual staff hours needed to identify, amend, and remove data. Data cleansing will be a long and time-consuming effort for many resources already fully engaged with other responsibilities. It is impossible to identify all data issues either during the first analysis or after the initial cleansing effort, whether completed via tool or manually. Iteratively work through any issues identified.

## Additional Considerations

Activities to consider as part of data cleansing include the following.

- Maintain the same naming standards as used the legacy system.
- Verify the loaded data against the extracted legacy system data before data cleansing begins.
- Consider multiple data refreshes before the new modernized solution going live if there are any change(s) on legacy data or to rehearse and estimate the production deployment timeline.
- Develop data dictionaries and revise data files for the new system.

## Issue or Defect Tracking Repository

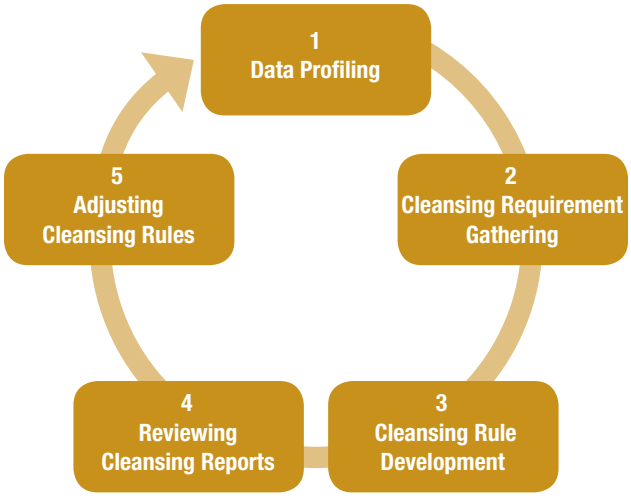
An issue or defect tracking repository allows for better monitoring of issues and should be used to document system rules, data anomalies, and approved recommendations. The issue- or incident-handling process is completed in two stages:

- analysis of the issue or incident, which involves issue identification, verification, assessment, analysis, and cleansing recommendation by the business to address the issue
- implementation of the approved cleansing recommendation

To perform data cleansing, activities are required to define, build, and validate the approved cleansing rules established to correct data issues.

## Data Profiling

Data profiling is managed by the data steward and involves looking at data stored within the many tables housed in the legacy database to identify potential data issues and identify potential violations to current system rules. All data issues and questions identified should be logged and tracked in the issues or defect tracking repository and assigned to the appropriate team member for resolution.




The goal of data cleansing is to have one complete and accurate record for every individual in the database.

All data issues or questions that require business input are assigned to the data steward, who consults with appropriate agency program areas. S/he will provide recommendations to address how the data may be corrected. Mapping from the legacy system to the staging database — and vice versa — needs to be completed as a future information resource.

## Data Cleansing Recommendations

Data cleansing recommendations are identified throughout the lifecycle of the data profiling process. The data steward should consult with program areas (owners of the data) to investigate, answer questions, or cleansing rules that should be approved by management.

After data profiling is completed, each data issue or question should have a cleansing recommendation logged in the issue or defect tracking repository. Formal documentation should be prepared that lists all cleansing recommendations requiring approval by management.

## Data Cleansing Rule Development

During data cleansing, business rules on how to correct data issues are loaded into the staging database, where code development can correct identified issues. A detailed audit log should be maintained for data cleansing rules. To identify the data cleansing rules applied, separate columns should be created in the staging database for all fields to store the cleansing action performed (cleansed, deleted, rejected, flagged) and the original source value before the cleansing action.

Perform a count of the number of invalid records before cleansing and count again after records are cleansed. An additional validation check should be completed to ensure the correct number of records were cleansed. The counts should be equal between the two columns (e.g., before and after). The only time counts differ is when records were dropped or rejected in staging.

## System Test for Cleansing Recommendations

At least one test case should be created for every cleansing recommendation. All of the recommendations should be listed in an approved document and stored in the issues or defect tracking repository.

For every cleansing recommendation, there should be an associated test case. The test case will include the test case number, test date, test status (executed, retested), test result (pass, fail, associated defect number), and issue number. Test cases should ensure that data integrity is intact when data are moved from the landing database to the staging database. Test cases should also ensure the data are cleansed as required. Each test case should generate a report to compare counts between the landing database, audit log, and staging database.

## Data Cleansing Report Verification

The data steward generates various reconciliation reports for review by the business to ensure records are cleansed according to approved cleansing requirements. Based on the review, changes may be required if the data cleansing rules were not applied correctly or if the rule caused conflicts with another data element. New data issues may be identified that require further investigation and subsequent development of a data cleansing rule to correct the data. After the cleansing rules have been validated by the business, the code should be locked in preparation for deployment.

## Data Masking

Data masking is required to protect sensitive data elements (e.g., name, address, photo,) if project team members or external vendors do not have appropriate security clearance to view or access such data. The security review involves consulting with the data steward to identify sensitive data elements. After they are identified, masking rules or algorithms should be developed to mask or protect (e.g., change) the data to make it structurally similar but inauthentic.

After data masking rules or algorithms are approved by management for identified sensitive data elements, the appropriate internal IT team builds and masks data elements. The new masked data set is provided for conversion or migration and testing purposes. The algorithm to identify masked data can be used to restore it to the original data set if further investigation is required. There is also a possibility that masked data may not cover all variations of the data and may not identify any existing data issues but instead creates new issues from the masked data set.

## Data Migration Activities

Data are migrated (transferred) from the staging database to the future system. Data migration activities consist of the following major steps:


### *Data Migration Design*

The design needs to be completed before data migration can begin and should consider:

- the volume of data to be migrated
- how many hours it will take to load data into the future solution
- whether it is possible to migrate any data before implementation
- whether the load of data will impact the delivery of services if the system is down for an undetermined period
- any other potential risks

If all data is not required before go live, consider migrating nonessential data after go live.

Data migration is split into two types:

- structured data – all databases for migration from existing legacy systems
- unstructured data – any data not previously defined (e.g., emails, policy manuals, paper-based documentation

Unstructured data need to be converted into a structured format (e.g., pdf file) before migration.

### *Data Mapping*

Data mapping is an extensive effort and requires validation with business, IT, and the vendor (if applicable) to ensure new business rules and requirements are met. A vendor will pose many data related questions, so it is important to review and document the current database as part of the process. If the agency is fortunate enough to have an enterprise information management program, documentation may already exist.

Data mapping consists of developing a comprehensive document to show mapping of legacy data elements to new data elements in the new system. Data mapping from legacy to the staging database may be mapped one to one or one to many. In addition, transformation rules may need to be developed to properly map legacy data elements. New data elements may exist in the staging database; however, there are no legacy data elements to map data to these new fields. When there are no existing data in legacy, default values for new business rules or requirements need to be identified by the data steward in cooperation with the business to populate fields at migration. Some default values may be updated after the system goes live and before the next transaction is conducted.

Unmapped data elements (e.g., fields from legacy that do not have a new location in the staging database) should be validated to ensure they are not required for the future solution. Any unmapped data elements that are not required can be considered "obsolete" and can be documented separately within the mapping document. Document what will not be mapped to the staging database, along with the risk associated with the decision. Obtain sign off from stakeholders

Data conversion should be viewed as a project equal in size to the system modernization project.

and ensure they understand the consequences of not converting certain data elements to the new system.

Obsolete data elements are elements the data steward, in conjunction with the business, determines will not be migrated because there is no business use or no system requirement to migrate the data to the future system. These data will remain on the staging database until conversion is successful and validation is complete. If there could a future business need for any data not migrated, data may need to be archived. If there is a need to archive data, the business needs to determine where and how data should be archived before the legacy system is decommissioned.

After legacy systems are decommissioned, access to the data in the database will no longer exist. Consideration should be given as to how long legacy systems will remain in place after migration.

### *Data Migration Verification or Testing*

Data verification occurs in multiple stages in sequential order and includes a dry run and dress rehearsal.

- **Dry run** – testing process to assess initial impacts of data migration and understand or mitigate potential issues before go-live system implementation
- **Dress rehearsal** – rehearsal of end-to-end testing from the staging database to the new system, including data migration activities to understand or mitigate potential issues before go live and to provide timing on how long the entire process may take

For both activities, plan for several cycles. The expectation is that issues will be resolved through the cycle process. At the end of each dry run and dress rehearsal cycle, produce verification reports for review, validation, and feedback. The data steward and business designees should review, validate, and provide feedback to confirm data are loaded and to address any issues.

### *Data Sampling*

Data sampling is another tool used to verify the success of data migration. Data sampling should outline various testing scenarios to ensure all business-critical data are migrated properly and according to data transformation rules. Each scenario should provide a short description on what is being tested and identify records used to support the testing process. This process should be completed by designated business who that will validate key transformation rules in the staging database. The data samples in each testing scenario should be documented and used to verify the migration completed successfully.

Sampling is a key process that can assist in identifying migration issues before implementation. This activity should be conducted as part of the cutover weekend and be part of the go/no go criteria for the modernized system. Data sampling should not be confused with the testing completed by user acceptance testing because this is a separate activity.

## Summary and Recommendations

As mentioned in the introduction, data cleansing and data migration activities are not usually given the recognition required for the amount of complexity, effort, and time needed to be successful. The project management plan should include data cleansing and migration in the overall timeline, incorporate milestones for such activities, and dedicate the appropriate amount of knowledgeable resources to ensure the success. Data governance is essential for these activities during the project lifecycle, and consideration should also be given to implementation of data stewardship for operational activities related to maintaining data integrity and quality.

# Chapter 12 Organizational Change Management

Change is happening everywhere, and it is often difficult for people to accept. The key to successfully managing the people side of change is an effective change management program. Development of a comprehensive organizational change management (OCM) plan approach is critical to garnering buy-in and ultimately to the success of the program. The OCM plan acknowledges and should align with the release strategy, project timelines or milestones, and transition to operations activities.

OCM provides a systematic approach to managing the people side of change, which is often the most challenging and critical component of an organizational transformation. It focuses on managing communication, keeps employees and stakeholders informed, helps the organization recognize and develop required knowledge and skills for the future state, and provides tools and the support structure to address emotions and behaviors commonly associated with change.

Managing change is essential to ensure users have the knowledge, skills, and motivation to implement and adopt new systems, business processes, and changes to the organizational structure. It accomplishes the following:

- sets clear expectations and measurement for success
- leverages management as leaders and communicators of the need to change
- provides accurate information to all levels of the organization and reduces rumors
- educates users on changes to their day-to-day work
- provides training to help users learn new skills
- ensures that post–go-live support is available to help users adjust to the change

**AWARENESS**
**Explaining the Need**

- Clarifying objectives, purpose of the project
- Communicate the business case
- Clarify "framing"
- Clarify scope
- Simulation

**UNDERSTANDING**
**Clarifying the Vision**

- State impact
- Answer what's in it for me (WIIFM)
- Manage expectations
- Communicate progress
- Build support for the change
- Set up two-way feedback mechanisms
- Pre-Training

**ACCEPTANCE**
**Inspiring for Action**

- Build on current awareness
- Motivate leaders to influence team members to engage in the new ways of working; recognize and reward early adopters
- Utilize change agents to motivate the larger audience
- Training
- Ownership begins

**COMMITMENT**
**Sustaining Momentum**

- Reinforce the changes through support network
- Promote the internalization of key desired behaviors
- Share successes; encourage internal best-in-class practice sharing
- Post-Training

Individuals process change in stages as they gain experience on the project and learn more about how it will affect them.

The following graphic depicts the need for OCM and expected outcomes.


OCM is designed to ensure all parties are on the same page and that a deliberate approach is used for consistency in communications and messaging. A comprehensive OCM plan includes:

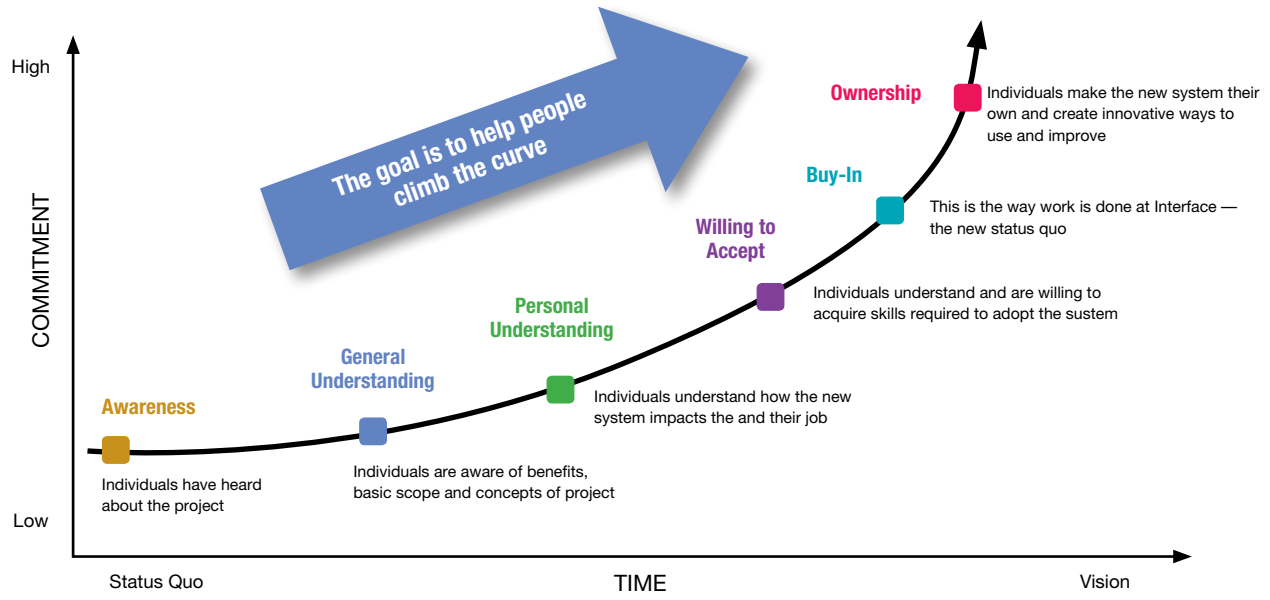
- an assessment of the organization to determine a baseline of change readiness
- identification and analysis of the stakeholder population
- identification of change agents in business and information technology (IT) arenas who are advocates of the future vision of the system, even if they are not a member of the project team
- creation and execution of key consistent messaging and communications, both internal and external to the organization
- a comprehensive training, coaching, and knowledge transfer strategy for all levels of the organization, stakeholders, and business partners

Failure to develop a comprehensive OCM plan that addresses the items listed above will result in confusion, resistance, fear, and delays.

## OCM Success

A strong OCM plan moves people along the adoption curve from awareness of an upcoming change to full ownership of the new system, as illustrated below. Garnering ownership and buy-in of staff and stakeholders facilitates success of the modernization program.

It is not possible to get 100% of users to understand all concepts and areas of the program. It is critical that



such information be communicated to users so the percentage of users able to demonstrate understanding reaches a minimum of 80% over the course of the program.

## OCM Program Governing Principles

A strong OCM program is governed by the following principles.

- **OCM is decentralized** – OCM is a process, not a function. Equally important are strong communication connections across all project tracks to build synergies and help manage key dependencies.
- **The business owns the vision** – The business owns the vision of future state processes and systems and their successful implementation from a business readiness perspective. The OCM team is a service provider and enabler to the business (works with them and provides tools, templates, and advice) but does not "do it for them" or "do it to them." The OCM team should heavily leverage change agents from business and IT staff and work actively with management throughout the projects.
- **Success is based on outcomes . . . not simply "deliverables"** – The OCM plan is successful only if it maintains business continuity and achieves the projected business and IT benefits. This is achieved by preparing employees for adoption of key changes. Completing activities and producing deliverables is necessary but not sufficient because they do not constitute success.
- **The OCM plan should be flexible and agile** – People are often resistant to change, and the OCM team and change agents should identify people-related risks and barriers that can cause problems during design, development, and implementation of the solution. The agency can then plan accordingly. It is impossible to predict all potential issues, so the plan and approach should remain flexible to respond to changing conditions. The team and change agents should help business and IT identify, understand, and address local issues before they become unmanageable. If the initial approach becomes ineffective, the team and change agents should be ready with alternative(s).


OCM is the glue that binds internal and external stakeholders to the vision and goals of the program. It helps garner buy-in from stakeholders and staff.

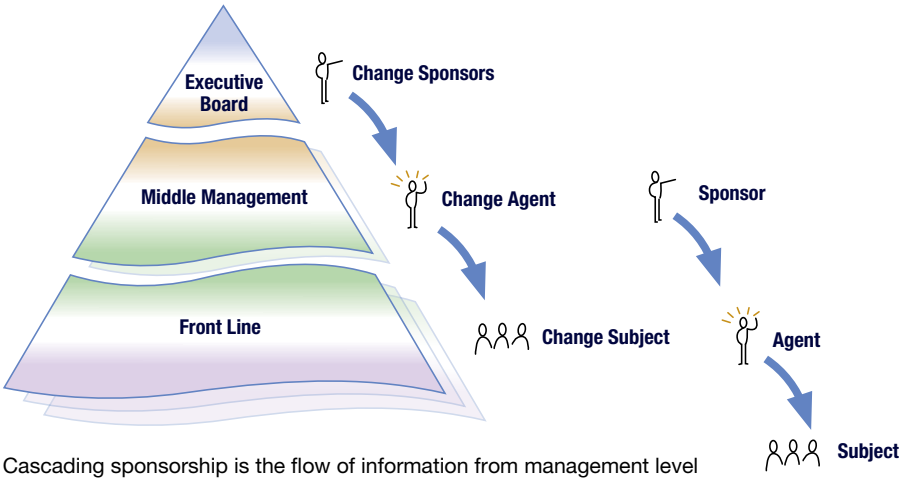
- **Participation and compliance are critical** – Success requires employees at all levels to participate in implementing and adopting decisions made by the organization. When individuals offer resistance or fail to step up to their responsibilities, they are letting down their teammates and diminishing the program's potential. Management and change agents should support their peers, subordinates, and even their superiors in "playing their position" for the team.

## Integration of the OCM Plan

OCM is an integral piece of multiple phases of the project management plan. OCM should be included in communication planning, workforce planning, and transition planning, at a minimum. As part of these plans, OCM should be incorporated in the following ways:

- change readiness assessments (employees) and employee planning
- communication focused on helping impacted users and stakeholders progress along the adoption curve, from awareness to understanding to acceptance to commitment, which is critical
- workforce and transition plans to include skill assessments, staff reallocation, job descriptions, and labor relations or collective bargaining agreements

## Change Readiness Assessments




Cascading sponsorship is the flow of information from management level to management level down to the employees to be influenced.

Change readiness assessments or surveys are a great means to establish a baseline of how prepared the organization is for change and to identify where weaknesses or areas for improvement may exist. Conducting a change readiness assessment before or as part of a project kick off can establish a base understanding of existing communications, leadership, culture, and skills. Understanding each employee's awareness of the project and future state is a good way to determine their ability to adjust to change. It also assesses how effective the communication and information sharing of the organization has been and where improvements can be made. It can also help identify personnel to be used as agents of change.

Most change readiness assessments determine whether employees understand why the project is happening, how the project will impact the employee, how often information will be shared about the project, and whether the level of information shared is adequate. They also assist in determining whether existing staff possess required skill sets and identifies whether additional training is needed.

Change readiness assessments can also be used for external users and stakeholders, and their feedback should be incorporated in the communications plan. Assessments form the foundation for the gap analysis to develop a plan for effective communication. Communication needs will vary based on the audience. Understanding the needs of the various audiences early on is critical.

Change readiness assessment surveys are most effective when conducted periodically throughout the life of the project. Consider key project milestones when feedback on readiness is most critical, such as before a launch and again eight weeks or so after launch to determine if any course corrections are necessary.

## Managing Employee Expectations

Buy-in from all levels of management is critical for change management success. Front-line supervisors and managers may experience the same questions, confusion, and doubt and have the same anxiety as nonmanager employees. It is important to give leaders the opportunity to voice and deal with their own questions when preparing them to lead the organization through a significant change. Cascading sponsorship ensures front-line supervisors assist in achieving employee buy-in by providing answers, strength, support, and direction. The leaders themselves should be aligned and committed to the direction of change, understand what changes intend to introduce, and model expected behaviors while being as honest and clear as possible.

*Ensure that collective bargaining and labor relations units (unions, HR) are included in OCM planning.*

Cascading sponsorship should be aligned to motivate and follow the new direction by acknowledging concerns and involving people in decisions through ongoing input and feedback. Providing regular and

consistent messaging with the right information, at the right time, is critical. Leaders should be willing to coach individuals through transition phases and develop a plan to assess skills and abilities to ensure success once the change is implemented.

## Stakeholder Management

It is critical to the success of a modernization project to include aspects of OCM in the communications plan. Planning for stakeholder engagement, developing strategies to reduce or eliminate resistance, and creating approaches to increase support and buy-in should take place. Awareness of the stakeholder's political connections and historical partnership with the organization is important both in terms of the impact the program will have on their success, as well as to the overall success of the program. To ensure both stakeholder and program success, the following stakeholder management questions should be addressed in the communications plan.

- Are stakeholders committed to the change?
- Do stakeholders have the ability to impact resources for the project?
- Can they provide resources to help the project or influence funding of resources needed?
- What are their needs in terms of project outcome?
- Do deficiencies exist in existing product or services they receive that could be resolved through implementation of the program?
- Have they established expectations for program outcome, including their level of participation in configuration, testing, training, and so on?
- Are they undertaking a modernization effort of their own?
- What are the risks if stakeholders are not engaged?
- Does active participation by stakeholders impact the program outcome?
- Is there a need for the stakeholder to sign-off on the project or any deliverables? If yes:
  - Does the stakeholder understand his or her role in the acceptance or sign-off process?
  - Has the sign-off process been adequately documented, including whether the program can move forward with or without stakeholder sign-off?

*"Organizational change cannot be underestimated if you want your project to be successful. The technical side is very critical, but if you do not actively address and manage the people side of the change, you will experience significant resistance from your employees and business partners, which leads to poor customer service to the public."*

**Pat Kohler**
*Director*
*Washington Department of Licensing*

## Summary and Recommendations

Change within agencies, programs, and projects is difficult. An OCM plan is a critical part of any system modernization program. It provides an approach to managing the agency's organizational structure and keeps everyone informed. Communication, ownership, outcomes, flexibility, and participation are critical principles that govern the OCM plan. Stakeholders and employees at all levels of the organization should be included. As the plan is implemented and as the project progresses, readiness assessments associated with change should be initiated. By providing and managing clear expectations at the start of the project and regularly throughout the project, the agency can garner support for the vision and goals of the program while increasing awareness, understanding, acceptance, and commitment.

# Chapter 13 Training

The key to an effective training plan is to begin the planning process early. If training needs are not addressed in a timely manner, there will not be enough time to adequately prepare staff to use the new system. Training preparation identifies the business process changes created with the development and deployment of the new system. The successful development and delivery of training materials will prepare users and stakeholders for system implementation. The training plan describes the strategies, activities, and tasks necessary to provide the business unit with the skills necessary to operate the new systems successfully. Be sure to provide for continuous training for the life of the system.

*Engage trainers early and require they attend project meetings, enabling them to continually update training materials as changes are made to the program.*

## Business Objectives

The primary business objectives for a modernization training and performance support strategy are to:

- identify the system user groups that need to receive training
- conduct outreach to the identified system user groups to estimate the number of users needing training and to understand high-level demographics
- describe a sample end-to-end training approach and related activities for a "high impact" system user audience, including considerations of training delivery methods
- describe suggested training approaches used for "moderate-impact" and "low-impact" system user groups
- describe suggested pre-implementation, point of implementation, and post-implementation support strategies for system end user groups

## Training Plan

Establish a comprehensive training plan that includes:

- training resources including personnel, tools, facilities, equipment, and budget
- constraints, dependencies, and limitations affecting training
- training formats to be used (e.g., classroom, computer based, sandbox, train the trainer, virtual)
- training delivery schedule and end user training requirements
- subject matter expert (SME) and management support to assist with training activities; support is needed for design, development, review, approval of final content, and evaluations of training effectiveness
- a centralized tracking system to track enrollment, participation and completion of training for all end users
- process to update training materials
- trainers participating and attending project meetings so they stay up to date on changes to the program and how such changes will affect training so timely revisions can be made

- a needs assessment before and after training to determine the effectiveness of training and to identify any changes needed
- a small control group of users to assess effectiveness of training materials before training is deployed

## Training Content

At a minimum, training content should include the following:

- scope
- objectives
- background
- skillsets
- equipment
- roles and responsibilities
- new business processes and system functionality
- knowledge assessment
- evaluation

Be sure to consider additional training needs for external users for any change to the system or screens, no matter how small or insignificant it may seem. Changing a field for example could have a huge impact to courts or law enforcement.

## Keys to Training Success

The key to training success is to develop training that is:

- user centric
  - Training should be tailored to both the business needs and training needs of users.
  - Content should be relevant and contain realistic test scenarios and test data.
  - Sufficient exercise opportunities should be provided.
- process oriented
  - Assuming the training analysis confirms this, training should combine both process and system knowledge.
  - It should demonstrate how new system functionality is integrated in the overall process context and is not isolated.
  - It should demonstrate functionality to be eliminated or changed.
- modular
  - Learning content should be built modularly (e.g., by function) to increase flexibility and reusability.

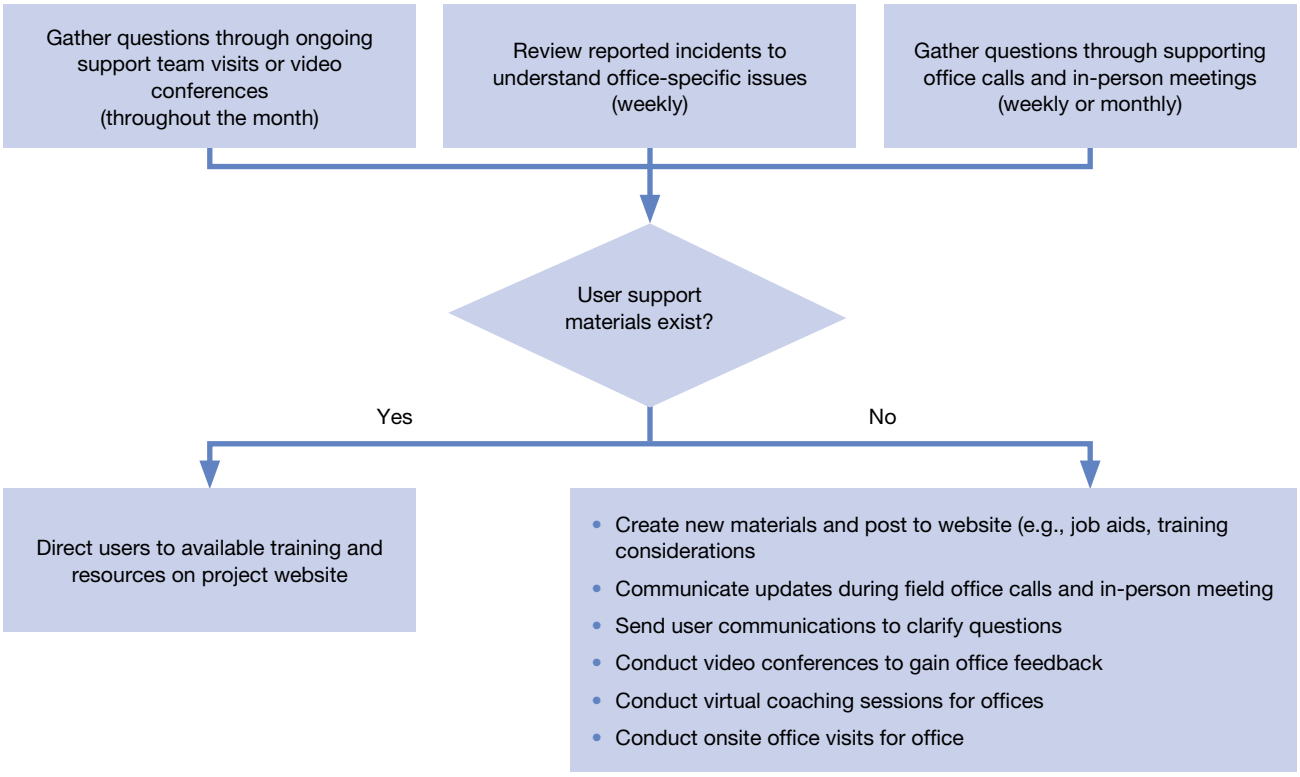
  - Training modules should be tailored the audience (e.g., employees, stakeholders, third-party agents) and should consider generational differences (e.g., experienced computers users vs. inexperienced computers users).
- sustainable
  - Learning should not be a one-time event but carried out continuously through performance support.
  - Training concept should be adaptable for future rollouts and new releases.
- efficient
  - A mix of different learning methods should be implemented to optimize cost, time, and learning success.
- standardized
  - All training processes and materials should be as standardized as possible to optimize development and maintenance processes, as well as to increase consistency in appearance and quality.

## Additional Considerations

Effective training methods and training materials are critical to building the understanding, skills, and capabilities employees need to use the new system. Job aids and online resources should be used during formal training and made available for on-the-job use to help users learn to efficiently navigate the new system. The following are suggestions for training during the various stages of a system modernization effort.

### *Pre-deployment*

- **Change awareness** – Change awareness involves advising users of the programmatic and procedural changes that will be implemented as part of the new system. This is important because it allows impacted users to provide input and preferences early in the process. Such input can then be integrated into the training program. It creates a supportive and informed network for impacted users by engaging in regular communications about program-related changes.
- **Change network** – A change network is a structured group of individuals who manage user support at a local level, coordinate implementation "on-the-ground," report on progress, and monitor and mitigate issues. At least one deeply knowledgeable system user representative from each office location should be part of the group to ensure comprehensive coverage across the jurisdiction. Establishing a change network allows for local, sustained support at the peer level. The change network serves as extensions of, and connections among, project teams, sponsors, and system users.
- **Super users** – Super users will provide local business process context, and act as a liaison or SME for the new system. When system users encounter issues or problems of a nontechnical nature, super users will provide additional support via selective refresher training, reference documentation, or coaching. Super users will also identify post–go-live problems, determine




Office support team high-level process flow.

issue escalation, and serve as user advocates on problem resolution. If the agency decides on a change network or super-user approach, it is important to include these users in additional demonstrations and user testing to increase their confidence in the new system and their ability to assist others.

### *Point of Deployment*

- **Command center** – As part of implementation planning, agencies should establish a command center to provide user support during deployment. The command center serves as a central point of escalation, issue triaging, decision making, and information sharing during and post–go-live of major system releases. Improvement in training can be assessed by command center personnel and provided to the office support team for handling.
- **Office support team** – The office support team works directly with the command center to expedite user support delivery during deployment. The team works directly with users through onsite visits or via virtual support. The team answers questions, directs users to available training or resources, and creates new reference materials as needed. The team should include project team members knowledgeable about system functionality.

## Post-deployment

- **Online help –** Online help offers system users immediate, context-sensitive support and instruction at their point of need. It should incorporate detailed system information, including policies and step-by-step procedures. Online help is meant to support and improve system user performance during and after formal training. Because it is computer based, updates are immediately available to all system users, and extensive turn-around time required for paper-based procedural documentation is eliminated.
- **Job aids** – Job aids are a component of training delivery and continue to be important post-deployment. Job aids offer users immediate support and instruction at the time of need, acting as a "cheat sheet" for critical and frequent transaction-based activities. They are easy to use and can be placed online or at user workstations for quick access.
- **Frequently asked questions (FAQs)** – FAQs provide up-to-date answers to questions frequently posed by users. FAQs can help inform users of potential issues, updates, or work-arounds as appropriate. The initial content for the FAQ can be appropriated from training and testing materials.

## Summary and Recommendations

Training plans and materials are most effective when knowledgeable people are involved in their development, when processes are thoroughly documented, and when supporting technologies are readily available. An effective training plan delivers information employees need to know to execute new business processes. Combined with formal instruction, a robust training strategy enables users to become more quickly proficient in their new role. The training plan should allow for feedback and input to improve training materials.

# Chapter 14 Communications

Effective communication is the cornerstone of a successful project. Communication planning and implementation need to be at the forefront of every modernization effort. Having an effective plan, evaluating it constantly, and modifying it as needed serve to remind all project participants of the importance of communicating in a clear, concise, effective manner.

## Communications Plan

Internal and external communication plans should be developed and published for the duration of the project. Plans should identify the frequency of communications, how they will be distributed, who should receive a copy, who is responsible, the medium to be used, high-level key messages, appropriate dates, and stakeholder contact information.

Pertinent communications should be dispersed in a timely manner using a variety of available media sources. Do not assume that a few generally used media sources are adequate. Update communication sources as new technologies emerge. Email, Facebook, SharePoint, Yammer, team rooms, Twitter, newsletters, internal magazines, press releases, and TV or radio interviews can all be used to communicate initiatives. Similar information should be shared through all of the sources used.

Communications should be designed for the intended audience and should provide pertinent detailed information without being too lengthy or overly technical. A press release template should be developed that external customers can use. Include information such as hours of operation, holidays, and so on specific to the sender. Establish distribution lists for any group or entity with whom the agency needs to share information. This is especially helpful for time-sensitive information and when providing status updates.

In an effort to provide jurisdictions with a guideline for successful implementation of a system modernization program, the following are important elements of a communication plan.

## Define Roles

System modernization projects are usually multi-year collaborative efforts among many stakeholders. Roles of business users, information technology (IT), and vendors should be clearly defined and shared. The document should be updated as appropriate, as roles change, and as new people are added to the team.

## Identify Internal Stakeholders

Internal stakeholders are those impacted by the program, but they are not part of the business. Stakeholders should be identified as the business case is developed and refined during requirements gathering. Examples of internal stakeholders include representatives from:

- accounting or finance
- procurement or contracting
- IT
- project management office
- network and security administrators

- training department
- public affairs
- legal
- human resources
- law enforcement or investigations (may also be external)
- directors, commissioners, and elected officials providing oversight for the agency

When internal users are identified, hold a kick-off meeting to educate stakeholders and provide the opportunity to ask questions about the project. Provide the project timeline, goals, tasks, and status updates to internal stakeholders initially and throughout the life of the program. Involve the public information officer early in the process to help with timely dissemination of information.

## Identify External Stakeholders

Review existing interfaces, system access contracts, memorandums of understanding, and other documentation to help identify external users. Determine external customers by reviewing system "as is" requirements document as well as the "to be" requirements document to ensure all external stakeholders are identified.

Examples of external stakeholders include representatives from:

- legislature
- governor or minister's office
- third-party agents who conduct business on behalf of the agency
- jurisdictional agencies (e.g., public safety, law enforcement, motor vehicle enforcement, human services, revenue, courts, natural resources, prison industries, treasurer)
- buyers of bulk data or records
- customers with online access to data (e.g., private investigators)
- financial, banking, or lending institutions
- new and used car dealers
- insurance companies
- motor carrier association
- unions, collective bargaining or labor relations units
- federal agencies (e.g., FMCSA, NHTSA, DOJ)
- AAMVA (e.g., CDLIS, NMVTIS, SSOLV, VLS, PDPS)

Complete a needs assessment to determine the level and timing of interactions with external stakeholders and how the program affects them. Provide the project timeline, goals, tasks, and status updates to external stakeholders initially and throughout the life of the program.

## Labor Relations or Collective Bargaining Agreements

It is critical with all changes to consider affected labor relations or collective bargaining units in planning and communications efforts. If job functions or positions are being eliminated, following labor contractual obligations and bargaining agreements is not only necessary, but it is a good business practice to engage them early. Being proactive will not necessarily eliminate issues, but it can certainly reduce friction as changes become imminent.

## Interface Agreements

Sign agreements with agencies who interface with the system to ensure a mutual understanding of the effort and resources required by everyone involved.

The interface agreement should include information from the business case, project overview, scope and requirements, and list benefits the entity will gain from the proposed new system.

Agencies requiring agreement may include:

- court system
- prison industries
- Department of Human Services
- Department of Natural Resources
- Department of Public Safety or other law enforcement entities
- Department of Taxation and Revenue
- driver services
- motor carrier services
- motor vehicle enforcement
- homeland security
- third-party agents
- federal agencies
- AAMVA


Effective and regular communications with stakeholders and staff is key to the project's success.

## Communications Resource

A dedicated resource should be identified to manage communications to all internal and external stakeholders throughout the project. This person should work closely with the agency's public information officer throughout the modernization effort to ensure communications are clear and delivered in a timely manner.

## Face-To-Face Communication

Regularly share information with anyone impacted by the project. The project manager should schedule opportunities to speak at stakeholder meetings. This effort may begin months, or even years, before implementation. System users and stakeholders need to be reminded on a regular basis why the system is needed. Information should be shared frequently. Establish a goal that no one will say, "I didn't know that" when implementation rolls around. Identify stakeholder leaders who can assist in delivering the message and advise how the project will benefit them. This allows stakeholders to hear from one of their own versus hearing only from the agency. Build expectations and excitement for the new system. For example, "We appreciate everyone's commitment as we move forward to implementation of the new system. Only 71 days to GO LIVE!"

## Solicit Frequent Feedback

Follow up with stakeholder groups to regularly request feedback. A new system provides the foundation for building blocks of the future. Share the vision for future additions and enhancements. COMMUNICATE, COMMUNICATE, COMMUNICATE! — from inception to post-implementation and beyond. Go-live implementation is a critical period, and as such it is important to share information in a timely manner. Advise appropriate

stakeholders of known issues, work-arounds, fixes, and system pushes as quickly as possible. Be sure to include positive reinforcement as goals and milestones are achieved.

## Share Metrics and Continue Communicating

Post-implementation communication is important. Metrics should be provided on how the system is performing (e.g., number of titles, registrations, or driver licenses issued) along with information on code corrections needed and the timeframe to fix them. Praise staff efforts in helping to achieve a common goal of efficiently serving customers. Continue to communicate on a regular basis with stakeholders regarding information pertinent to them. Consider completing a "year in review" to acknowledge accomplishments, celebrate successes, and share the vision of the future.

## Summary and Recommendations

Effective communications are vital to the success of the agency's modernization efforts. Ensuring that a consistent, cohesive communications plan is in place will keep everyone on the same page and facilitate communication efforts. Be sure to involve midlevel managers and supervisors to ensure communications are flowing freely throughout the organization.

# Chapter 15 People and Facilities

It is a challenge for any modernization effort to ensure the right resources are in place and that day-to-day operations continue while modernization occurs. Agencies often underestimate the staff commitment required by a modernization effort. The need to have the right staff committed to the project along with appropriate backfilled staff is essential. Having the right skill sets in place at the right time will enable the program to complete work in a quality and timely manner.

## Project Resources

Resources can be people, equipment, facilities, funding, or other items and activities required for the completion of a project. Lack of a resource may be a constraint on completion of the project activity. Organizations typically have limited resources, and therefore tradeoffs are made every day on what project resources are used and when they are needed, especially by those working on a modernization project.

*It is crucial to any system modernization project to engage a full time and dedicated project manager.*

## Workforce Planning

Workforce planning is a core function of human resource management. It is related to the identification and analysis of what an organization needs in terms of the size, type, experience, knowledge, and skills of its workforce to achieve program objectives. It is a process used to determine the future impact of external and internal environments on the organization. For a legacy modernization effort, it is extremely important to consider the skill set requirements of the "future" state for both information technology (IT) and business resources.

Workforce planning usually covers a three- to five-year forecast period and aligns to business needs and outcomes. It focuses on identifying workforce implications and current, transition, and future business strategic plans, as well as alignment to the future state.

In preparation for a modernization project, agencies should first look within their own organizations and complete assessments on both business and IT staff. Decisions on resources should be based on the agency's plan to move forward with the modernization effort and should answer questions such as those that follow.

- Will a vendor will be hired to complete all or part of the work?
- Is sufficient funding available to backfill positions on key resources?
- Does existing IT staff have the knowledge and skills to support the new technology?
- Is outsourcing the effort in the best interest of the agency?

These are just a few of the many key decisions that need to be made in preparation for the people part of resourcing the project.

## Business Resource Planning

From a business perspective, identify which leaders in the organization can carry the project forward to completion. Those who can lead the projects may have a full plate of activities outside of the project,

so determine how their daily work will be handled in the future. Enlist a full-time project manager (PM) who has the experience to lead the modernization effort. No individual can lead a project as large as a modernization while continuing to do her or his "day" job. After leadership for the program is determined, review internal resources and determine those key to the project. Ideally, the following full-time key experts are part of the dedicated project team. This list may vary depending on the makeup of the agency.

- PM
- enterprise architect
- organizational change management lead
- contract compliance lead
- data steward or migration lead
- training lead
- quality assurance or testing lead
- business and IT subject matter experts
- governance team

In addition to key resources, agencies need to enlist resources from internal and external stakeholders. These resources should also be 100% available to the project. Subject matter experts (SMEs) will have primary responsibility for detailing how each business task will work end to end, so backfilling their positions is required to continue day-to-day operations. Key decisions will typically be left to program management through established project governance processes. There is no prescribed number of staff needed, but consideration should be given to the key positions recommended above. Hiring of additional staff will also be required. The information described above should be included in the project resource or staffing plan. Typically, a project resource plan addresses resources and hours required of staff assigned to the project. A staffing plan should address ongoing work while project resources are dedicated to the legacy modernization effort.

*As SMEs are dedicated to the program, backfilling those vacancies is required until program implementation. Reassigning job duties and temporary hires are two methods to accomplish backfilling.*

In addition to a quality assurance or testing lead, a significant number of experienced staff is required for quality assurance (QA) and user acceptance testing (UAT). The overall process of testing the application is critical before a go/no go decision. Typically, jurisdictions underestimate resources required for testing. Options for testing staff may include selecting SMEs within the organization as testers or augmenting the testing team with students from local universities.

Overall, the agency has a tremendous amount of preparation in staffing a legacy modernization project. Planning is key, but getting agreement from executive sponsors on the need for key project resources is critical. Do not settle for staffing made up of individuals the business area **wants** to give up. Ensure the most experienced staff with appropriate knowledge and skills are 100% available to the project.

## Information Technology Resource Planning

On the IT side, planning is a key strategy before embarking on a legacy modernization program. It is important to discuss any long-term IT plans or visions early in the project. Determine the future technology to be supported and plan accordingly. Along with IT planning alignment, determining whether IT can support the future technology and whether staff can be fully trained are decisions that should be made early in the process. Decide whether to use staff augmentation to support the legacy system while internal IT builds the future application or whether to engage a third-party vendor to build the technology. With either decision, knowledge transfer should begin as soon as possible. IT staff plans should be fully incorporated

into the overall project resource or staffing plan, similar to business resources noted earlier.

IT constraints and commitments are further strained during a modernization program. Supporting the existing system requires many hours, and planning for changes to the existing system will tax already constrained IT resources. Planning for both the legacy needs and the modernization program is critical for success. The two systems will run in parallel for some period of time, and both IT and business staff will be impacted. Strong governance and oversight is necessary to align to the future state while at the same time maintaining the existing state.

## Staff Planning

Resource planning is an important tool in effective management of scarce resources. The timing for needed resources should be included in the project schedules and detailed in the resource or staffing plans. As the project schedule changes, the resource plan should be flexible enough to adjust as changes occur. Be sure to follow established change processes.

*Whatever the agency can reasonably do to replicate the new environment will go a long way in tweaking counters and avoiding last-minute additions prior to system go live.*

In developing resource plans, the PM may find that necessary resources may not be assigned to the program from the beginning. Resource plans for business, IT, and vendors should be locked down early in the process. Because projects are unique and temporary endeavors, PMs work in a world of "unknowns." Therefore, resource management and planning are required throughout the project lifecycle.

### *Equipment and Facilities*

Although planning for people resources in a legacy modernization program is critical, it is also important to think about a location and equipment the team will need to carry out a successful implementation. Consider the needs of project teams early in the planning process. Consider changes that may occur in field offices, the central office, and third-party or other facilities. Scanners, for example, may be added to field offices as part of the modernization effort. Determine how they will work within the current office configuration, and if changes are needed, determine how much lead time is required to make changes.

Co-locate business, IT, and vendor project teams. Dedicated meeting rooms and testing labs tend to absorb space quickly so these requirements should be included in determining space needs. Also consider space needs for the go-live command center as well as space for growth as the team members are added during various phases of the project. Depending on the scope of the program, the size of the team, and physical needs, sufficient space may be difficult to obtain in the agency's current location. Temporary space may be required so be sure to include funding for temporary space in the program budget.

In addition to space considerations, equipment needs should be identified. Include in the testing lab all devices currently found in a field office as well as any new equipment required, including PCs, printers, scanners, or cameras needed for implementation. Ensure all equipment configurations in the lab are the same as found in the field. Whatever the agency can reasonably do to replicate the new environment will go a long way in tweaking counters and avoiding last-minute additions or changes before system go live. In other words, waiting until just before a launch is too late to think about counters and work space. When introducing new equipment, consider potential process changes and consider using LEAN or other efficiency tools to evaluate how to best integrate new tools into existing business processes. Remember, the planning for equipment and facilities will impact the program budget and such costs should be included in determining program needs.

### *Future State Staff Planning*

Separate from dedicated project resources, a critical component of a modernization project is planning for the future state and the impact that changes will have to existing business and IT staff. Plan to modify, add, or eliminate positions based on changes that will occur when the modernization project is fully implemented.

One example of an impact to the business is a change from central office microfilming of documents to scanning documents in the field and completely eliminating the need for microfilming. Staff planning considerations need to be given to both positions. In this scenario, consider the following.

- Are one of the two positions being eliminated, or will new tasks be assigned?
- Are changes in position descriptions needed for both the microfilm staff and the field office position?
- Are communications to employee unions required because of workforce changes?
- What will be done with the microfilming equipment?

Careful consideration of the future state assists in planning for a change from a transaction type skillset to a knowledge-based skillset. Unless identified early in planning, staff will be frustrated, and both learning curve and adoption rates will suffer. Use organizational change management efforts to support changes.

Another potential scenario for consideration is a skillset requirement change from existing IT staff possessing COBOL skills required to support the legacy system to a completely new software skills needed to support the modernized system. Consider:

- How many COBOL programmers are needed as the project moves through implementation?
- Will positions be eliminated through natural turnover, or will they be repurposed?
- What type of training is required for IT staff? What is the cost?
- In the case of resignation or retirement, will the vacancy be filled with temporary staff to support the legacy system for the remainder of the project, or will the vacancy be filled to meet the "future" IT skill set?

## Summary and Recommendations

In preparation for a modernization effort, significant planning for resources is required for program staff needs, augmentation for operations, and potential staff changes post-implementation. Take the necessary time to properly plan program staff, facilities, and equipment early in the process so needs can be met as soon as the program is initiated. During the program and as part of the agency's change management plans, think in terms of resource implications of the new technology and what it means for the future, both from a business and IT perspective. Then plan accordingly.

# Chapter 16 System Design and Development Lifecycle

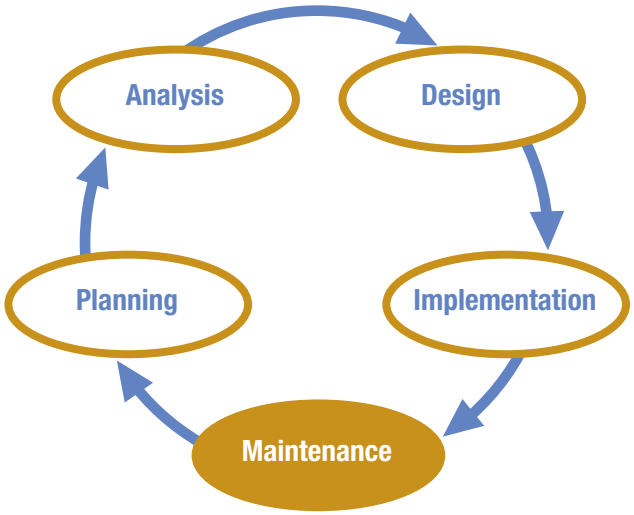
Although the system design and development lifecycle should be an integral part of current activities, special emphasis needs to be placed on this critical element of modernization. Ensuring roles and responsibilities are clearly defined creates the sense of team cohesiveness needed to get work completed as quickly and efficiently as possible. A variety of approaches may be used, but after it has been identified, follow it closely.

## Software Development Lifecycle

The software development lifecycle (SDLC) is a framework defining tasks performed at each step in the software development process. The structure followed by an information technology organization should include a detailed plan describing how to develop, maintain, and replace specific software. The lifecycle defines a methodology for improving the quality of software and the overall development process. The development process should be managed in parallel with project management methodology. SDLC is also known as software development process. Its goal is simply to build or assemble a quality business solution. The SDLC may vary greatly depending on whether the project is implementing custom software, a modified off-the-shelf (MOTS) solution, or a commercial off-the-shelf (COTS) solution. Planning may also need to consider any state standards for system development.

SDLC consists of the following phases:

- **Planning** – The most important parts of software development, requirement gathering and requirement analysis, are usually completed by business analysts. After requirements are gathered, a scope document is created to define the scope of the project.
- **Analysis** – Every process in the program is analyzed and documented for future reference and software enhancement. A set of business requirements documents, system requirements, and use cases, as well as technical design documents are typically produced as part of the process.
- **Design** – Software engineers produce design documents and write code or configure and customize a software product according to requirements. Testing to identify defects or bugs is required. The process usually includes multiple levels of testing, such as unit and system integration testing, quality assurance (QA), and user acceptance testing (UAT).
- **Implementation** – Software is deployed after passing testing and approval for release.




The software development lifecycle is a framework defining tasks performed at each step in the software development process. SDLC is a structure followed by a development team within the software organization. It consists of a detailed plan describing how to develop, maintain and replace specific software.

- **Maintenance** – Maintenance is performed to ensure smooth ongoing operations and to address any enhancement requirements or new functionality documented through change requests.

## Enterprise Architecture

Before a project or project program proceeds from one phase to the next, it is important to evaluate the work completed in each phase against the enterprise architecture. The SDLC should be used to test the validity of the enterprise architecture of the modernized system.

## Gateway Reviews

The gateway review process formalizes SDLC activities that should take place when moving from one phase to the next. It exposes projects to the experience of a team of experts at critical points in the SDLC. During the review, determine whether all of the work in each phase has been completed and approved.

## Summary and Recommendations

Multiple approaches to a successful SDLC implementation are available. The agency should choose the one that best suits the need of the agency and the program. Ensure all parties are aware of, and adhere to, the methodology.

# Chapter 17 Testing

Testing is a key component of a successful program. Identifying and communicating the testing strategy helps to validate the scope, goals, and objectives. Effective testing eliminates problems when the product is implemented and gives business and information technology (IT) confidence that the system works as designed. The overall objectives of testing are to correct defects and ensure that software and hardware is delivered in an acceptable state before implementation. Testing requirements should be considered early in the project.

A test plan should be a required deliverable and should prescribe the scope, approach, resources, and schedule of testing activities. The plan should identify functionality and features to be tested, the level of testing to be performed, personnel responsible for testing, test environment requirements, equipment acquisition, and risks associated with the plan. A tool should be used to document test cases, acceptance criteria, and to log defects.

*"Systems modernization efforts are important to advancing business operations, yet the process from start to finish may prove to be lengthy. For instance, during the final stages of a systems modernization project, it can be challenging to dedicate the time necessary to test new processes and to train individuals on the updated system. While these two tasks may be time consuming, they are critical to the effective implementation of these types of projects. Therefore, it is essential to plan accordingly and to set sufficient and realistic timelines for all stakeholders involved — all in an effort to set the organization up for successful change management."*

**Rebekah Hibbs**
*Senior Manager, Systems Integration*
*Texas Department of Public Safety*

## Scope

The scope of testing is determined by the scope of the project. For example, a full system modernization program incorporates all testing methods, while a minor fix or enhancement may be limited to a unit test and user acceptance testing (UAT). Part of the scope is to determine a strategy for data to be used for testing.

## Change Management

Any potential changes, including but not limited to missed requirements, enhancements, or new requirements identified as a result of testing, should follow the established change management process as outlined in the project management plan. Approved changes should be incorporated into the requirements, and a revision of the project scope and schedule should be executed.

## Purpose and Objectives

The overall objective of testing is to ensure requirements are met and to discover system defects or conditions that could negatively impact the user, customer, stakeholders, system usability, and maintainability. It also reduces the number of defects introduced to the production environment. Although not all issues identified during testing will be resolved before release to production, it allows business users

to identify processes requiring a workaround. Test metrics and data provide insight into the performance and status of the testing effort and informs the decision-making process.

## Testing Cycle

Testing is a process rather than a single activity. The testing cycle includes test planning, designing test cases, preparing for test execution, testing, and evaluating results. Each is described in more detail below.

**Test planning** is the first step of the testing process. It involves determining the scope and objectives of the test effort, determining the test strategy and approach, and identifying resource requirements. During the planning phase, software testers should develop test scripts and the method by which results will be documented. Test script completion should be used to provide insights into the performance and status of the testing effort. Finally, it should be used to inform the decision-making process. Agencies should mask test data to ensure data integrity and confidentiality when and if appropriate. If masking or scrambling data, extra effort is involved to ensure valid testing is taking place. If using third-party vendors to complete testing, ensure the appropriate nondisclosure agreements are signed, and that appropriate audit logs are used. Resources responsible for writing test scripts, test scenarios, and acceptance criteria should be allocated as soon as requirements gathering efforts begin.

**Test analysis and design** is the stage when test conditions are identified, test scenarios and scripts are designed, and the test environment is identified and set up.

**Test plan and script approval** is required after test scripts are developed to address each scenario in the requirements traceability matrix, user story, or use case. A minimum of one test script should be developed for each requirement to ensure all requirements are verified and to confirm the test plan provides a comprehensive level of coverage. Test exit criteria (go/no go) should be identified as part of test script development.

> *"By dedicating our brightest and most knowledgeable employees to the development, testing and training process for our new system, the State of Arkansas was able to more quickly develop a system that not only met our needs, but exceeded our expectations."*
>
> **Walter Anger**
> *Commissioner*
> *Deputy Director of Revenue, Arkansas*

**Test implementation** is the activity associated with prioritizing test scenarios and scripts, creating test data, and implementing and verifying the test environment.

**Testing** is when actual test scenarios and scripts are completed and outcomes and defects are logged. When there are differences between the actual and expected test results, reports are used to triage the defects and to further analyze the cause of defects. Test metrics are a critical tool to communicate testing status to management and stakeholders.

## Testing Considerations

It will take close coordination and communication between developers, business analysts, and the testing team to avoid delays and ensure all functionality developed is tested in a timely manner. This close coordination will limit the risk of project delays. The following requirements and risks should be considered when developing a test plan.

**Testing requirements** – Agencies should define categories for defects and how they are triaged. There should be no critical defects as defined by the business by the time software reaches UAT. Critical defects should be prioritized and worked immediately. Tests should include both business logic tests as well as user interface validation elements. Pass/fail criteria should be developed for the various scripts tested.

**Risks** – Changes in the scope or objectives will impact timelines for development and testing teams. An aggressive testing deadline increases the risk of defects being migrated to production. If development timelines are not met, testing timelines will be directly impacted. A high defect count may impact testing timelines. Any downtime of the test environment will significantly impact the testing cycle. Project timelines should be reevaluated if testing timelines are negatively impacted. The change process should be used.

**Roles and responsibilities** – Identifying testing personnel early in the program provides management with sufficient time to manage the resources needed for testing. Resource allocation depends on those that are available full-time versus those required to maintain current systems and perform other duties. The testing team should include the following roles and responsibilities:

| Role | Responsibilities |
|---|---|
| Developers | • participates in business and functional requirements gathering<br>• writes application code<br>• resolves defects or bugs<br>• supports testers |
| Business analyst team | • writes business requirements, user stories, and use cases<br>• maintains requirements and defects or bugs reporting in shared software<br>• leads testing cycle and prioritizes defects with business assistance and for sponsor approval |
| Quality assurance (QA) team | • participates in business and functional requirements gathering for knowledge transfer<br>• develops test scripts and test data for each functional requirement based on the acceptance criteria cited for that requirement, testing each requirement, documenting failed features or functionality, and retesting any defects<br>• facilitates and evaluates the structured testing<br>• maintains and manage defects or bugs in shared software |
| UAT team | • participates in business and functional requirements gathering for knowledge transfer<br>• develops test scripts for user experience and business requirements<br>• performs UAT<br>• maintains and manages defects or bugs in shared software |

## Testing Methods

Based on the size of the modernization program, a comprehensive approach to testing may include one or more of the tests described below. Testing should be tailored to the complexity or amount of software or hardware changes.

| Test Method | Description |
|---|---|
| Accessibility testing (e.g., ADA, language, and mobility testing) | Accessibility testing is a subset of usability testing in which the users are people with all abilities and disabilities. The significance of this testing is to verify both usability and accessibility. |
| Automated testing | Automated testing tools are capable of executing test scripts, capturing results, comparing results with previous runs, and documenting the condition of the test environment when the automated test was executed. |
| Deployment testing | A mock "go live" is always a good idea. If a piece is left out, it could give the appearance that the application was not tested properly. A good deployment test should reduce that risk. |
| Enterprise testing (e.g., load, performance, and stress testing) | Performance testing is intended to test the performance of the system under certain conditions. This is a nonfunctional testing technique performed to measure scalability, reliability, and resource usage.<br>Stress testing is intended to test the system's ability to cope with errors and incorrect data inputs that are beyond the limits of the systems normal operations. Stress testing will reveal the system's ability to cope with an overwhelming use of resources and its recoverability.<br>Load testing is intended to test the system's ability to move from processing low amounts of data to large amounts of data in a controlled environment. This helps ensure that the system is capable of operating at realistic and peak workloads. |
| External party testing | External party testing is collaborative testing conducted with external organizations who exchange data with the system. |

(continued)

(continued)

| Test Method | Description |
|---|---|
| Functional testing | Functional testing should be conducted by the development team. This testing ensures the software meets designed objectives and complies with operational requirements. |
| Integration testing | Tests the integration of various units of functionality. Integration testing is the phase when software modules are combined and tested as a group. It occurs after unit testing and before functional testing. |
| Parallel or pilot testing | Parallel testing is critical during large projects with many stakeholders. Having a parallel environment of current production data in a test environment can help identify issues not evident during UAT. |
| Regression testing | Validates that existing functionality continues to work as designed with new or modified code. By rerunning selected test scenarios that were originally scripted and executed in previous test types, a greater level of assurance that any new changes to the application have not resulted in a regression will be realized. |
| Security testing | Security testing is intended to reveal flaws in the security mechanisms that protect systems, firewalls, and data. All applications should undergo security-based tests according to the information security architecture and standards and policies. |
| Sprint testing | Validates the system functionality designed within that Sprint works as expected and meets business requirements defined in the user story. This is specific to the Agile methodology. |
| Structured testing | Verifies that the application interfaces with any applicable external systems (e.g., NMVTIS, PDPS, CDLIS, other AAMVA systems). Interfaces often require significant lead time and coordination with external entities. |
| Unit testing | Tests the smallest unit of functionality; testing a unit of code in isolation of other code or other dependencies. |
| User acceptance testing (UAT) | The overall purpose of UAT is to verify the application performs at an acceptable level for the business and customers before accepting transfer of ownership. UAT is "acceptance" of the application, meaning that defects and changes should be at a minimum or be nonexistent at this point. |

## Test Environment Planning

Test environment(s) planning should address the hardware and number of environments needed (e.g., QA, UAT, and training). The test environment(s) should be separate from the development and production environments. The UAT environment should be identical to the production environment and should be available before the start of testing activities. The test environment setup process should address:

- hardware (servers, desktops, and peripherals to test the application)
- operating systems
- software or data configurations

The approach to implementation may dictate data requirements. Test cases should be written to verify data conversion. If the database is being redesigned, data converted from the legacy system should be used along with data created in the new system. The testing team should have the capability to perform the test scripts; determine results; and, if needed, reset data to the pretest state. Interfaces and real-time and batch processes should also be tested. Resetting data and testing batch processes is a time-consuming process, but it is critical to the success of the testing effort.

## Defect Management

The primary goal of defect management is to prioritize and resolve defects in a timely manner. Defects discovered during testing should be logged into a tracking tool, triaged for type of defect, prioritized, and sent to development to be fixed. The pass/fail testing process should continue until all test scripts pass or all minor defects are accepted.

## Reporting

To provide management with relevant data depicting the progress, performance, and status of the software testing effort, metrics should be produced. Example reporting options are outlined below.

| Report | Purpose | Measure |
|---|---|---|
| Test case readiness | provides counts and state of test cases for the test set | # of test scripts in the test set<br># of test scripts with development in progress<br># of test scripts with development completed |

*(continued)*

| Report | Purpose | Measure |
|---|---|---|
| Test plan progress | provides insights into the progress of the test plan | # of test scripts started<br># of test scripts in-progress<br># of test scripts completed<br># of test scripts passed<br># of test scripts failed |
| Requirement test status | shows test case status for each requirement | # of test scripts never run<br># of test scripts blocked<br># of test scripts failed<br># of test scripts passed |
| Failure analysis | tracks regression | # of regression test failed |
| Test activity report | tracks the status of all test runs | # of runs per test script |
| Requirement coverage reports | depicts the level of test script coverage as it relates to the requirements set | # of requirements<br># of requirements by priority<br># of test scripts per requirement |
| Defect status report | tracks the number and status of the defect set | # of defects open<br># of defects by reason code<br># of defects by business area<br># of defects in progress<br># of defects closed<br>average time defect open<br># of critical defects open<br># of re-opened defects<br>% of defects open, closed, reopened |

*Jurisdictions and vendors tend to reduce the time allocated for testing to make up project delays. It is critical that an adequate period of time be allocated and adhered to to ensure quality testing of the system.*

## Test Closure Activities

Test closure activities are represented by way of test entry and exit criteria. The criteria identified for each test method detailed in the test plan are used to determine when test activities can be concluded.

The entrance criteria should include items specific to testing (e.g., the unit test should include business and functional requirements). Exit criteria should include results of the testing, documentation that the testing is complete, and acceptance of the results.

## Test Results and Sign-Off

A test summary report is an important deliverable that should be prepared at the end of testing activities. The primary objective of the test summary report is to provide project management, project sponsors, and key stakeholders with data representing software testing efforts and results. Test results are used to inform the project go/no-go decision-making process for major milestones.

At a minimum, the test summary report should contain the following software testing information:

- number of test cases planned versus executed
- number of test cases passed and failed
- number of defects identified and their status and severity
- defect distribution (critical, high, medium, low, by module)
- types of test performed
- lessons learned, depending on the audience

## Summary and Recommendations

Testing should be identified as a key milestone in project delivery. Sufficient time should be allotted to ensure quality testing and reduce the potential for issues at and after go live. Communicating testing needs and priorities creates a better end-product. Ensuring testing strategies and timelines are maintained is a key element in project success and eliminates a huge project risk.

# Chapter 18 System Readiness

Identifying the key elements of system readiness cannot occur too early in the program. The early work will highlight the many needs of the program and provide an opportunity to ensure that appropriate time, resources, and funding are allocated to the effort. Communication is key.

Successful system modernization implementation requires extensive planning. An implementation plan can help ensure a successful transition to the new system. The implementation plan provides information on how the new modernized system will be deployed into the environment. The plan should also include information on transitioning the new modernized system to an operational system.

The plan should contain major tasks required for implementation, along with a description of each task. The resources required to complete each task, including people, software, and hardware, should also be identified. Often the tasks identified may vary slightly based on the installation location.

The tasks in the implementation plan should be reviewed by members of the team before implementation to identify risks and issues and to develop a mitigation strategy for each. All team members should be aware of the order in which tasks should be completed and the estimated duration of each task. The implementation plan should include the steps required to revert to the legacy system if issues are discovered during implementation that cannot be solved.

## System Readiness Planning

A plan to get the system ready for users and users ready for the system should be established. Set expectations up front and include key stakeholders early in planning efforts. Define the purpose and reasons behind the project. Share the vision, goals, and objectives to help stakeholders and users understand and identify with the plan. All parties need to understand their roles and the effect the new system will have on their operation. When realistic to do so, share a simplified timeline to allow each group to begin preparing for implementation. Preparations may include limiting employee leave, adjusting the budget, advising of anticipated overtime, upgrading computers, and more.

*Mock customer days can be used as a soft opening and entail bringing in actual customers to process transactions before official opening to the public.*

## Communications

An assessment to determine communications needs with field offices and third-party partners for the project should be completed. Request their input on testing plans and schedules.

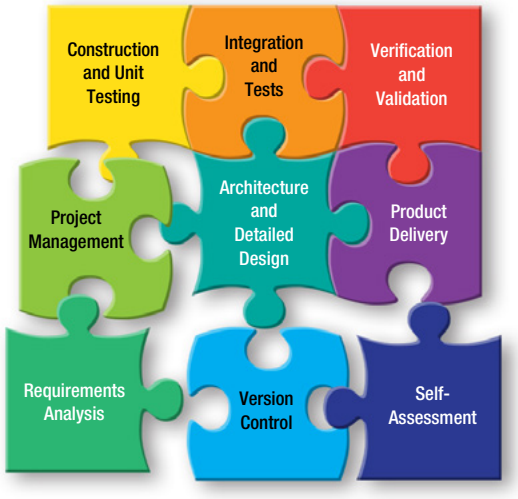
The communications plan should include press releases and other notifications to interested parties and stakeholders for release before implementation. Set expectations of longer wait times and advise customers of any procedural changes. The public's perception of the agency's success or failure of the system modernization program will depend on the effort put forth for public awareness and consumer education.

## Deployment Planning

Planning for roll-out or deployment is part of preparing for system readiness. The earlier in the process that planning can be completed, the better. Include tasks, location prioritization, due dates, and individual(s) responsible for each activity (e.g., vendor, business, information technology (IT) support team, work unit, county, or third party).

There are many deployment options to consider, including a big bang approach, phased approach, pilots, and parallel processing. The agency should assess options and choose one that best fits its needs. Selecting a deployment option is a critical step that may impact the success, delayed success, or failure of system deployment. Complete the following tasks as part of planning efforts.

- Examine system modernization efforts of DMVs in other jurisdictions and ask about their in-house and vendor experience and any lessons learned.
- Develop pros and cons of each strategy.
- Establish go/no-go criteria.
- Meet with stakeholders to ensure buy-in on go live.
- Get sign off on go/no go criteria before release, including vendor(s).




Only after all of the pieces of a system modernization effort have been successfully completed and appropriate sign-offs received can the system be deemed ready.

A detailed contingency plan is needed to prepare the agency for any problems that may arise. The contingency plan should identify next steps should fall back or resetting be required. Create a roll-back strategy plan based on predefined criteria.

## Data Migration

A detailed list of each migration task and the person responsible should be developed. Include the time needed to complete the task before implementation. Make plans for multiple mock conversion tests to optimize the outcome and ensure consistency in timing and content. Metrics should be established, logged, and reviewed. Mock or practice tests are necessary to ensure the duration for running conversion is within the timeframe for go live. The plan should include a time and process to revert back to the old system if a no-go decision is made. The more mock conversion practice runs an agency undertakes, the better the chance of success at implementation.

> *"If you have to go live with workarounds, they cannot be too complex, and they must be documented; otherwise, chaos will ensue."*
>
> **Lisa Kaspar**
> *Director*
> *Kansas Motor Vehicle Division*

## Deployment Preparations

To prepare for implementation, significant planning is required. Preparations include the following activities.

### *Establish a Go-Live Command Center*

Identification of a command center should be part of the project management plan. Consider the following:

- equipment and phone lines needed
- the number resources needed to staff the command center

- skill sets needed – recruit command center staff who can respond to issues and consider, including:
  - program manager
  - vendor representatives
  - subject matter experts (internal and external)
  - data conversion specialist
  - IT help desk

The command center team should meet in advance of go live and review communication strategies and triage and change order processes. Training materials (e.g., job aids, frequently asked questions) should be readily available to command center staff. Utilize data analytics for calls and emails received by the command center. Valuable information can be garnered from analyzing information such as the type of calls received, length of calls, business areas impacted, and so on. For example, 85% of the calls received are in regards to financial reconciliation. Such information can identify additional training and resources that may be needed. Continued analysis can determine if actions taken or training provided was successful.

At go live, consider having experienced staff onsite at larger locations to troubleshoot concerns quickly and provide an immediate path to resolution. It may be necessary to make onsite visits to assess any location experiencing difficulties. It may take a team of IT, business users, vendor, and local IT to decipher the issue and determine the appropriate fix. Be prepared for processes, batch jobs, reports, and so on that may have been overlooked in planning. Assemble a team to follow up with other system users, including stakeholders identified in the project management plan.

Plan for remedial training for locations needing additional assistance online, onsite, or at the central office. Each week, review the level of staff needed to meet the demands of the command center and adjust accordingly. When the command center is no longer needed, implement a transition to business as usual. Maintain a lesson learned document throughout the project and include experiences of the command center. Take the time to debrief and review lessons learned. Have the document readily available for the next system readiness assessment.

*System implementation can be stressful, so remember to celebrate successes daily, weekly, and monthly as appropriate.*

When implementing a new system, troubleshooting becomes difficult because existing problems unrelated to the new system can exist in the system environment. It is critical to complete a root cause analysis for any problem identified to ensure understanding of the source of the problem. Consider the use of a troubleshooting (SWOT, Tiger Team) team to isolate and resolve critical issues as they arise.

## Summary and Recommendations

System readiness should be thoroughly covered in the project management plan to ensure that all aspects of implementation are taken into consideration early to allow for changes and adjustments as they may be needed. Planning and communicating needs and timelines will help identify gaps. A clear, well-defined plan should be communicated to all involved entities. Do not underestimate the communication and outreach required during system readiness.

# Chapter 19 Long-Term and Ongoing Operational Support

In planning for system modernization, attention should be given to long-term support. Consider whether the agency has sufficient resources as well as a desire to handle maintenance and support. If not, outsourcing support to a third-party vendor is an option to consider. If a third-party vendor is used, transition and knowledge transfer requirements should be included in the request for proposal (RFP) and be part of the contract. Transition planning is especially important if maintenance, support, and ongoing operations will be the responsibility of jurisdictional information technology resources. Whatever method is chosen, a transition plan should be developed early in the program to ensure operations continue to run smoothly once the new system is fully implemented. Remember, transition planning does not begin at the time of transition.

## Transition Planning

To be effective in transitioning the system from the project team to the ongoing support team, preparation should begin as early as possible. Transition planning should establish the deployment date, transition date, length of transition, transition end date, and when operations and maintenance support begins.

The transition period occurs after deployment and during the period when stabilization of the system is complete. The stabilization period can last for weeks or months depending on the size of the project. Flexibility should be built in the schedule to allow for an extended or reduced timeframe based on issues identified post-deployment. After the system is stabilized, transitional operations should be initiated and the system and staff ready for daily operations and support.


Early in the project, an agency should weigh the pros and cons of available approaches and decide how to handle long-term maintenance and support.

After the transition begins, evaluating progress of transitional operations becomes essential. If transition efforts end too soon, the agency will lose valuable knowledge and experience, which can only be gained through trial and error or extensive research. Follow the established governance model for any business or system issues identified during the transition period.

## Code Releases

Defects and enhancements will be identified during the pre–go-live, cutover, and stabilization periods. Both a standardized release schedule and an emergency schedule should be developed for quick fixes of defects based on criteria set forth in the service-level agreement (SLA). The SLA should identify the period of warranty support for both the application and the infrastructure and should identify when daily operations and support begin. Recognize that there may still be warranties in place even though the move to daily operations and system support is complete. Establish a communication protocol to notify business

users and appropriate stakeholders about code and maintenance releases.

A permanent quality assurance (QA) and user acceptance testing (UAT) team is needed to perform tasks associated with the future system or software upgrades and enhancements. Do not underestimate the level of effort such activities will require. The software development lifecycle and testing processes established during the program should be followed throughout the life of the system.

## Project Evaluation Report

A project evaluation report provides a status of the project, supports communication plan messaging, and informs the decision-making process for project closeout. Identify successes that can be quickly measured and immediately published, including "go live," "all offices are now taking customers," "no major defects," and so on.

Compare baseline business operational metrics from pre–go live with new system metrics. Part of the comparison should include consideration of items that may impact the initial metrics of new system processes, including learning new procedures, time to become familiar with the system, and improvement when users and customers are comfortable with the new system. The agency should expect to see a temporary increase in wait times until staff become comfortable with the new system and processes.

Consider how to address productivity recovery expectations and business process improvements — in other words, how the new system processes and its users are performing compared with the old system and processes. Implementing a business process improvement team can be invaluable for improving user and customer experiences and identifying changes to improve system usability. Create a schedule to evaluate and communicate metrics to stakeholders to support the return-on-investment strategy.

## Logistical Operations

During operation support, begin transitioning resources allocated to the program to their previous, new, or changed roles. Identify resources that can return to operations, a timeline for doing so, and a notification process for management and stakeholders. If program facilities are no longer needed, decide when to cancel the lease or contract or repurpose the space. Review security measures for facilities, systems, data, user access, and so on and determine what is no longer needed.

## Post-implementation and Ongoing Training

Training of existing employees took place during the pre-deployment phase. Additional training needs should be addressed during the transition period. Identify how remedial training will be scheduled and administered post-deployment. Training should include business modules, tests for understanding, and example scenarios or records the user can use in a test environment for hands-on training. Do not forget training needs for those who will provide operations and support, regardless of whether the support is administered by a vendor or in-house. Changes in information technology (IT) resources dedicated to the system will occur. Training for dedicated IT resources improves the quality of work and time needed to understand the system. If transitioning from a vendor to third-party or in-house support, develop criteria and deliverables to ensure appropriate knowledge transfer occurs.

A training or refresher training schedule should be developed and supported by a dedicated training team. A learning management system (LMS) can be tailored by topic or user and can provide tracking of completed mandatory training. Consider the types of information to include in training materials or LMS, including:

- business requirements
- policies
- procedural manuals
- administrative rules
- release notifications

## Ongoing Operations

Ongoing operations begin before new system deployment. The maintenance and support plan should outline how defects, enhancements, change requests, system and hardware maintenance, warranties, and other contractual obligations will be addressed. If applicable, the maintenance and support plan should be included in the RFP and contract to enable execution at the close of the transition period.

The maintenance and support plan should clearly identify all business and vendor operations and roles and responsibilities of resources dedicated to ongoing operations. Remember to update the governance model for any role changes (e.g., project sponsor replaced with executive management for approvals).

## Long-Term Planning

Agencies should remember to plan for the entire life of the system, which includes establishing processes to achieve long-term goals for defect resolution, system enhancements, and changes. Software licensing timeframes may have changed and should be addressed. Considerations should be given for infrastructure support of hardware and equipment that reaches end of life or is no longer supported. An annual or biennial strategic plan for such operations is recommended.

Remember that systems outlive their usefulness and ultimately need to be replaced. Consideration should be given for decommissioning the new system and planning for the ongoing tasks to keep systems current.

## Maintenance and Support Strategy

The agency's maintenance and support strategy should be included in the RFP to ensure the system is supported and remains operational with limited downtime or reduced functionality. Maintenance and support will not be fully implemented until predefined stabilization occurs and the transition to operations is complete.

SLAs are needed with the entity (internal or external) providing maintenance and support services. The document should specify downtime allowances, requirements for root cause analysis, response times, and corrective action plans with timelines, including service credits, liquidated damages, or equivalents.

To make the transition to maintenance and support as seamless as possible, the following considerations should be made early to allow for smooth implementation after the close of transitional operations.

- Determine whether in-house support, vendor support, third-party support, or a hybrid will be used.
- Consider maintenance and support as part of the total cost of ownership for the system, especially for licenses, end-of-life infrastructure, and peripherals.
- If a vendor or third-party support is used, research whether a software assurance package is an option for future software upgrades.
- Include a warranty period for software and hardware because it can reduce unforeseen expenditures related to out-of-the-box items that do not work or defects not identified during QA and UAT.
- If available, consider service packs that can be used in lieu of or with a software assurance package.

## Continuous Business Improvement and Modernization

Deployment of a new system is only the first step to improving business processes and customer experiences. The modernization of the system and business processes are ongoing efforts. Technology introduces new ideas every day, and part of ongoing operations should include looking to the future. At the

start of the project, develop a three-, five-, and ten-year strategic plan. Start by identifying user and customer needs, potential law changes, and other external impacts. This helps to ensure ongoing operations stay ahead of technology changes and prevents business improvement from being delayed as a result of unexpected or new requirements.

A comprehensive approach is necessary to align the strategic plan with fully vetted new ideas and requirements so as not to have a negative impact to ongoing operations. The approach should:

- include budget forecasting for ongoing modernization and future process improvements
- include performance management and metrics
- consider other lines of business and how to leverage system upgrades to address business efficiencies
- keep processes current and be prepared for the future project(s), whether large or small

## Data and Document Management

Data and document management is key throughout the project. It is easy to forget that the process needs to continue when the modernization program ends and transition begins. The agency should make a concerted effort throughout the life of the system to prevent the loss of both data and documents. Data and documents created and used by a vendor(s) should be moved to the agency before the transition period ends and ongoing operations begin. It is best to define a process at the beginning of the program that can easily continue and be supported by the business.

Data management should include:

- establishment of a governance model for data and data stewardship
- creation of and compliance with record and data retention requirements
- consideration to purging historical data and identification of timelines for purging
- consideration of laws, public information, and impact to infrastructure when determining data management requirements
- exploration of new potential revenue sources from the sale of data

Document management should include:

- identification of a tool(s) and processes to maintain a variety of documents, including system overviews, business requirements, requirements traceability matrix, project schedules, status reports, software requirements specifications, use cases or user stories, design and development documents, QA, user acceptance documents, and deployment documentation, among others
- creation of and compliance with record retention requirements
- consideration to purging archived documents and timelines for purging
- consideration of laws, public information, and impact(s) to infrastructure in determining document management requirements

## Decommission Legacy System(s)

Legacy systems may need to remain available for a period of time after the new system or application is deployed. Do not rush to decommission a system or application immediately after deployment because data or transaction retrieval may still be needed. A decommission date should be established as part of the maintenance and support plan to ensure efforts continue post-deployment.

When evaluating the decommissioning of legacy systems or applications, consider costs and

operational impacts. For example, waiting too long to decommission a system can result in continued maintenance and support by IT resources tasked with supporting the new system. Assess the political atmosphere for potential concerns about loss of information or costs associated with supporting two systems, especially if a phased approach is used. When ready to decommission legacy systems and applications, formalize removal of access to legacy systems and any future data or transactional processing.

The communication plan should include a notification process for users, stakeholders, and support personnel well before decommissioning occurs. Ensure staff assigned to complete the task of removing access or archiving or deleting databases or files are aware of timeframes and that such processes align with the notification timelines in the communication plan. Allow a few users to retain access to the legacy system for a set period of time after decommissioning because it allows for issues or concerns not originally identified during the transition period to be verified between the new and legacy systems.

## End-of-Project Audit

When a project is considered complete, an audit by internal or external auditors is expected. External audits may focus on financial activity and technology processes of the project, and internal audits may focus on fraudulent activity, security, and business improvement.

From the beginning, define a process to manage documentation, metrics, and data. Develop standardized terminology and file creation processes and create a document to define the standards. This ensures information is easily retrieved by auditors and business users after the program closeout.

## Summary and Recommendations

Modernization is no longer a finite project, but an iterative process as new technologies evolve. Ensuring the availability of long-term and ongoing support maintains the longevity of the delivered system. Funding, support, and maintenance are ongoing efforts that require the agency's constant attention.

# Chapter 20 Signs of a Troubled Project

You've done all the prework, assessed infrastructure needs, obtained funding, put a top-notch project team together, and are moving forward in what seems like a positive direction. What can go wrong now? Sometimes agencies and vendors can do all the right things, yet a project can fail. What are the key things to look for, and how can you best mitigate a project that shows symptoms of failing? What are the signs to look for? In this chapter, we ask you to take a step away from best practices and take the time to review and examine both what can go wrong as well as suggested solutions for mitigating any issue that may arise.

As a precautionary note, an agency may experience one or more issues and still end up with a successful project. A combination of issues or a single issue can tear a team apart. Not all failed projects have every symptom, and conversely, other projects may have one or more of issues during the project lifecycle and still be successful. There is no magic formula, such as a "three symptoms, you're out." Being attuned to potential warning signs allows you to assess the program for risks and whether or not it's time to enact a mitigation strategy or consider subjecting one or more of the projects to an intensive review.


Pay attention to signs of a potentially troubled project! Assess the issues and take immediate corrective action to get or keep the project on track.

The best advice is don't ignore the warning signs. The issues discussed in this chapter serve as clues that something may be amiss. Be careful to fully assess the issues and don't just treat symptoms. It is best to heed the warning, assess what is really taking place, and elicit support for navigating the project into balance.

## Lack of Sponsorship or Executive Support

If the program does not have the support of both an active and involved executive sponsor and senior management team, the modernization effort will fail. The issue of sponsorship can affect both the agency as well as contractors or vendors. Ownership at the highest level of the organization, not just lip service, is crucial. Without ownership of all outcomes (both good and bad), projects will falter and fall flat.

Because of numerous system modernization project failures, legacy modernization projects do not have great reputations. Therefore, executives may understand the need for the project but may take a back seat hoping for a more desired outcome. Some executives may worry more about their reputation instead of what's right for the project and make decisions that may be detrimental. There is no room for large egos on system modernization projects, especially executives who refuse to admit that problems exist and are more worried about what it means to them personally. Project staff alone cannot navigate the many roads a large-scale project requires, including the multitude of executive decisions required. Both

project staff and vendors need executive support. They should pay close attention to executive sponsors, listen to what they are looking for, and keep them informed at all times. It is a delicate balancing act but one that is critical for success.

The following chart provides recommendations to ensure executive support is provided throughout the project.

| Recommended Strategies |
| --- |
| • As a project manager, schedule one-on-one time with the executive sponsor and openly discuss concerns. |
| • As a project manager, listen attentively to the issues presented by the project team and by executives. |
| • As a project sponsor, listen attentively to the issues presented and determine whether they can be solved. |
| • As a project sponsor, give the project team the correct level of authority to make decisions and quickly resolve questions. Consider allowing autonomy for the project manager either for a specified duration or spending authorization. |
| • As a project sponsor, drive transparency at the highest levels and require it throughout the entire project team for both the jurisdiction and vendor. Determine consequences if transparency doesn't occur for either the jurisdiction or the vendor. |
| • Ask, if the sponsorship is not organizationally aligned, whether someone else in the organization who can serve in this the role and is a willing partner. |
| • Do your homework — read up on project failures specifically related to sponsorship, including experiences within the agency. |
| • Discuss a change in the project structure, including project leadership, to determine whether a personality conflict exists. Be willing to make hard choices if it means the project will fail or succeed based on those decisions. |
| • Document all issues, develop recommendations, and present the information to the executive team. |
| • Read Chapter 4 about governance of the AAMVA System Modernization Best Practices. |
| • Consider whether or not the project should move forward based on the outcomes of discussions. |

## Extensive Resource Changes

In any long-term project, resource changes will be required over time. Some may be due to departures, retirements, job changes, and a multitude of other reasons that can have a detrimental effect on the jurisdiction or the vendor(s). Resource changes are inevitable, and planning for their handling is critical for the continued success of the project. Ensuring continuity for occasional staff changes is necessary as the project progresses. Document both agency and vendor key resources and follow established processes for replacement. Assuming one or two staff changes will have minimal impact is not a wise practice, and the departure of any team member should be handled quickly and according to established procedures.

Ongoing and extensive changes in resources by either the agency or the vendor can warn of bigger problems ahead. A legacy modernization program needs consistent, talented, and dedicated resources to successfully reach the finish line. When significant staffing changes occur for either party, the removal and addition of staff may result in things becoming out of sync. Established plans need to be revisited to ensure the entire team is aligned. Remember, adding additional staff can also impact a project. For example, a vendor may add staff because it is behind schedule. That leaves the agency struggling to keep up if its resource plan did not also change. In addressing resource changes, remember:

- Dedicated staff are critical for both the agency and the vendor, and modifications should be considered part of change procedures.
- If either the vendor or the agency starts to increase staff, the other may not be able to keep current with project plan dates, and both should stick to the original resource plan.

The following are recommendations for addressing extensive resource changes:

**Recommended Strategies**

- If a vendor is present, ensure contract language is clear on key resource changes and include penalties for noncompliance.
- Assess key staffing changes (additions and exiting staff) for the agency and vendor as part of ongoing project updates and status meetings.
- Consider movement of key staff as a formal change and follow standard project (and contract, if applicable) processes for the change.
- Use of an independent verification and validation (IV&V) vendor can assist in identifying staffing concerns for both the agency and the vendor.
- If an agency begins removing key staff, review the governance structure and project sponsorship to ensure there is alignment.
- Replan or re-baseline the project schedules as staff and hours are added or deleted and ensure the impact is understood by both the vendor and the agency.
- Do your homework — read up on project failures specifically related to resourcing issues, including experiences of the agency.
- Discuss a change in the program structure as key staff leave or change. Be willing to make hard choices if it means the project will fail or succeed based on those changes. As staff changes, be willing to reassess the entire project structure if necessary.
- Document all issues and present them appropriately to the executive team.
- Read Procurement and Contract Management (Chapter 8), Project Management (Chapter 9), and People and Facilities (Chapter 15) of this document.
- Consider whether or not the project should move forward based on the outcomes of discussions.

## Missed Dates and Scheduling Adjustments

Many system modernization programs miss deliverables or milestones and modify the schedule at some point during the project lifecycle. One or more missed dates can still result in a successful implementation. So when do missing dates and schedule adjustments become a warning? In reality, the very first missed deliverable or milestone serves as a warning. Answer the following questions when deadlines are missed.

- Do potential staffing issues exist on the part of the vendor or the agency?
- Is the team trying to do too much at one time (not enough resources to support the desired throughput), or are other projects interfering with resource assignments?
- Was the possibility of missed project reports or events clearly communicated ahead of time, or was the missed deadline a surprise?
- Was the project schedule detailed enough, or were tasks missing?
- Were project reports consistent between preceding weeks and months, which would have alerted to potential issues or missed dates?
- Were all parts of the program reporting progress consistently and accurately?
- Were requirements gathering, development efforts, or other areas behind schedule?
- Did the plan or schedule fall short, resulting in the team's being in just-in-time (JIT) mode on every deliverable?
- Is the backlog of issues growing at a faster rate than those being resolved?

Each one of these items could signal a problem bigger than simply a missed deliverable or timeline. A missed deadline is a warning sign that something bigger needs attention. If a missed deadline is not addressed, future deliverables or milestones may be delayed. Don't just sign a change request; instead, determine the reason for the delay and whether it requires additional time to fix or complete or whether the project needs other adjustments to be successful.

The following recommendations address missed deadlines and deliverables:

**Recommended Strategies**

- Complete an assessment of the issues identified with any missed date; don't accept that time will cure the issue.
- Assess agency and vendor project staffing and determine whether either contributed to project delays.
- Use of an IV&V vendor can assist in identifying issues for both the agency and the vendor.
- Consider using a project management office — not the vendor responsible for delivery — to ensure accurate representation of status.
- Replan or /re-baseline the project schedule with new information adding more hours or more staff, not just by adding duration. Truly understand the reason(s) behind any missed date.
- Exercise penalty or liquidated damages (LDs), contained in contracts or service-level agreements if appropriate.
- **Don't let the schedule drive decisions.** Decisions should be based on what is right for the success of the project, not because it needs to be completed to meet the scheduled deadlines. It is important that decision making is sensitive to the project timeline; however, "analysis paralysis" can set in and prevent the project team from moving forward when decisions are not made timely.
- Do your homework — read up on project failures specifically related to failed dates.
- Read Procurement and Contract Management (Chapter 8) of this document.
- Consider whether or not the project should move forward based on the outcomes of discussions.

## Changes in Methodology, Scope, or Other "Contract" Modifications or Issues

Many times when a project is troubled, the agency and the vendor first try to change methodology, staffing, resources, or other approach. Such knee-jerk activities may cause more damage than good. Be wary of changes that start to happen as soon as the project hits a snag. As good as intentions may be, the change itself may signify a troubled project needing more than a slight modification to get back on track.

An increasing number of change requests is typically a symptom of a bigger issue, including the possibility that the project was not scoped accurately. If the project was not properly scoped, delays are inherent, and the project is likely destined for failure.

Another temptation by both the agency and the vendor community is to de-scope to get something delivered. Removing scope can be as simple as moving a function from one phase to another or completely eliminate some functionality. Moving functions to another vendor (e.g., moving work to the credit card vendor or legacy team) is also a method used to reduce scope. Although removing scope is neither desired nor totally detrimental, scope changes occurring well into the project delivery stage typically signifies a larger issue. Removing or moving the responsibility or function will only serve as a temporary fix.

*All scope changes should go through a formal change control process that includes updates to the base contract document.*

Another subtle form of scope movement is not de-scoping per se but moving difficult discussions to the end, such as voids, purge, audit functions, and other more challenging business functions. By moving tough discussions to the end, the team may not realize the solution impacts on earlier designs — which could in turn have large-scale implications for the whole program. If the agency or vendor want to move tough topics to the end of requirements sessions, it will cause trouble later. The old adage of "don't put off till tomorrow what can be done today" rings true for large projects. The tough topics will not get easier to address as time goes by, but instead will become tougher if the initial design does not take all things into consideration.

Another issue to be mindful of is writing the contract to clearly identifying recourse available to the agency if the vendor is unable to meet its obligations. Determine

whether the agency will step in and alleviate the vendor of one or more of its responsibilities. Or, if the reverse happens, does the vendor step in and take on responsibilities of the agency? Always follow the contract and do not allow program changes just for the sake of getting something done.

The following recommendations address changes in methodology, scope, or other contract modifications or issues:

**Recommended Strategies**

- Complete an assessment of the issue(s) and continue to dig deeper until the root cause is determined. The first symptom is rarely the root cause.
- Consult with other jurisdictions that have the same project or vendor to see if any of the challenges being faced by the agency are shared.
- Ensure project and contract documentation are aligned. DO NOT make project changes without ensuring the base contract shows what is taking place.
- Include language in any vendor contract to require software versions to remain current and to provide proof as specified.
- Use of an IV&V vendor can assist in identifying issues for both the agency and the vendor.
- Planning around scope is imperative, and understanding the 80/20 rule is valid. This is not to be mistaken for removal of scope when a plan is in place. It doesn't hurt to revisit the 80/20 rule as long as it's done formally and with purpose.
- If not already part of the team, add a contract compliance officer to assist with managing the contract(s).
- Remember that a new tool may not fix problems the project is having.
- Read Procurement and Contract Management (Chapter 8) and Project Management (Chapter 9) of this document.
- Consider whether or not the project should move forward based on the outcomes of the assessments completed.

## Process or Methodology Issues

Large-scale information technology (IT) projects should follow a formal methodology to be successful; legacy modernization cannot be done by ad hoc procedures. Many times when a project gets into trouble, instead of leaning on established processes for support (preferred), processes tend to gradually fall apart. In some cases, time, or the lack thereof, is the reason given for sloppy or nonadherence to the chosen methodology. In other cases, lack of knowledge on the importance of formal processes is the culprit. Critical components of system modernization programs should include the following:

- formal requirements management processes, including a requirements traceability matrix
- formal testing processes, test plans, sign-offs, user acceptance testing entrance criteria, defect resolution methods, and other testing formalities
- rigorous configuration management plans and processes
- formal project management principles, including schedules or plans and agreements on how and when changes are made

If one or more of the processes is compromised, it's like pulling a brick from a house foundation. It may be okay temporarily, or if lucky, the agency may make it through many years without significant failures. However, there is always a risk that some damage will result. Maybe it won't take the entire project down, but it will start tearing away at the foundation, and fundamentally, you can't predict when or where the problem will occur. Take, for example, configuration management and how much a system relies on proper procedures for repeatable success in executing new code. If processes are skipped once on how something is put into production, the issue may not become apparent until a second or third release. At that point, debugging becomes very difficult and time consuming.

Other issues that may provide clues that your project is headed into trouble include but are not limited to:

- Lack of, or outdated, detailed requirements traceability matrix. Without one, the agency cannot confirm that all requirements have test coverage and where the requirement is located in the source code for later debugging.
- Skipping sign-offs – Sign-offs protect both the vendor and the agency. If there is a reason not to sign, deficiencies should be documented for both parties to understand the issues and get to resolution. It is important to structure sign-offs so they do not prevent progress (e.g., unnecessarily requiring sign-off on testing for part A before commencing testing of part B results in the sign-off becoming an impediment to the project and likely increases risk).
- High defect counts – Troubled projects tend to have high defect counts when remediation is lacking or remediation steps are not followed. Tight processes are needed to measure and hold both the agency and the vendor accountable for identifying and fixing defects. If the project incurs numerous defects, there is probably an underlying issue with either staffing (lack of training or not following coding and configuration standards) or fundamental issues with the code base. A root cause analysis is necessary to get to the bottom of the issue(s).
- Not keeping software current can be a process issue, and contracts should be written to ensure all versions remain current given the duration of legacy modernization efforts.

The following recommendations address process and methodology issues:

**Recommended Strategies**

- Ensure the agency's formal project management methodology and processes are followed.
- Assess project staffing for the agency as well as the vendor. Determine if the quantity or quality of staff contributed to any identified issue.
- Use of an IV&V vendor can assist in identifying issues for both the agency and the vendor. Include requirements in the IV&V contract to have code assessment experts as part of the team, as well as expertise in reviewing all aspects of a large-scale development effort.
- Testing processes are critical for the program and it is important to see a proof of concept for testing and delivery before engaging a vendor.
- Early in the project, the team needs to agree reporting of project status and testing metrics. Too often multiple versions are used to report information, potentially causing the actual status and testing statistics to be unclear. Only one version should be used, and the contents should be clear for all recipients.
- Ensure that business requirements contain adequate details to prevent misinterpretation later in the project. Misinterpretation can lead to disputes between parties as to whether a change or clarification is required.
- Do your homework — read up on project failures specifically related to issues being seen such as high defect rates, failed implementations, and so on, including any from within the agency.
- Read Requirements and Methodology (Chapter 7), Procurement and Contract Management (Chapter 8), Project Management (Chapter (9), and System Design and Development Lifecycle (Chapter 16) of this document.
- Consider whether or not the project should move forward based on the outcomes of discussions.

## Lack of Communication and Collaboration

If project teams are not communicating and collaborating regularly and effectively, there will be issues. Balancing the relationships among multiple parties is a delicate process. Mutual respect, honesty, trust, and candid open discussions of issues and how to solve them should occur. Significant issues can be avoided if all parties approach the situation with candor and a positive attitude. When that does not happen, the project will suffer.

Any system modernization program will have tense moments — it's the nature of the beast. When unprofessional behavior becomes an accepted practice, additional care and insight are required to determine the level of intervention needed to correct the problem. The difficulty in identifying when communication and collaboration jeopardizes the program is the fact that it happens incrementally. The level of severity is not felt until it is too late. Keeping a pulse on how well things are going among team members is imperative in preventing issues.

Remember that issues can be between or among any two or more parties — the agency and the vendor(s), business and IT, IT and the vendor, and so on. Continual communication and collaboration are required among all parties. The more parties involved, the more likely that friction and misunderstanding increases. If there is an issue on the team, take immediate action. Most people issues do not self-correct, and if the agency or vendor has a team member causing friction, remove him or her from the team and reestablish expectations for communication and collaboration.

Within the vendor–agency relationship, both should acknowledge that each has its own reporting structure. A level of trust should be established, and when it is violated because of a lack of information sharing, it becomes an issue. All parties will protect their own interests, but when information required for the project to move forward is not shared, the relationship is damaged.

The following recommendations address communication and collaboration:

**Recommended Strategies**

- Continually assess project staffing for agencies and the vendor(s). Determine if anyone is contributing to failed communications and general lack of respect.
- Team building exercises are essential when building the joint agency–vendor team. This helps to build the foundation of "we ALL succeed, or we ALL fail together." Neither side is solely responsible for the success or failure of the program, so everyone should act as ONE TEAM!
- Communication is one of the single most difficult things that we do. The person speaking has a very clear understanding of what s/he is talking about and assumes those with whom they are communicating are on the same page. The reality, however, may be quite different. Be sure to follow up in writing with simple measurable statements that do not leave room for misinterpretation.
- Use of an Independent IV&V vendor can assist in identifying issues for both the jurisdiction and the vendor. Include requirements in the IV&V contract to have them keep a pulse on the project status from a communications standpoint. Sometimes a third party will see issues before the agency or vendor.
- Have provisions in the contract for key resources for contracted staff, which allows the agency to remove based on performance issues, including failure to create a collaborative work environment.
- Do your homework — read up on project failures specifically related to communication issues, including any from within the agency.
- Read Governance (Chapter 4), Project Management (Chapter 9), Procurement and Contract Management (Chapter 9), and Communications (Chapter 14) of this document.
- Consider whether or not the project should move forward based on the outcomes of discussions.

## Potential Legal Actions

Plan for the worst and hope for the best. Assume a lawsuit is a potential outcome and plan accordingly. Strict adherence to the contract terms, project management methodologies, and governance process protects the agency's interests in a lawsuit if one occurs. Good documentation and a solid filing or maintenance system for project documents will be invaluable in the event legal action is taken.

Remember also that legal action can go beyond paperwork and address behaviors and decisions that may or may have not be documented. The best course for all involved parties is to be honest and forthcoming about both the pros and cons of what took place. It will be in the court's domain to determine liability for the issues presented.

One last piece of advice, is Q-TIP — quit taking it personally! If in legal action, let go of the outcome. In court, sometimes it's not always about right and wrong. Sometimes it's about how the case is presented. Take care of yourself and let your attorneys handle the case because it is in their hands. The processes followed to prepare yourself for a lawsuit will also prepare you for any program audits.

Recommendations to address potential legal actions follow:

**Recommended Strategies**

- Document, document, document! Document all required items from the contract as well as items related to the project lifecycle.
- Document all key decisions.
- Know the contract and all of the required elements and adhere to them.
- Have a contract compliance person assigned to assist with tracking due dates and deliverables.
- Develop standards that detail how program documentation will be filed and stored and assign a responsible party. Include compliance language in the contract.
- Develop checkpoints in the project schedules to review contract filing responsibilities and audit the project files annually at a minimum.
- Review this best practices document in its entirety.
- Consider the use of an IV&V vendor.

## Summary and Recommendations

Being aware of the signs of a troubled project is a first step. Knowing the signs and taking immediate action will help keep the project on track.

# Appendix A Glossary of Terms

**advisory board**

The creation of an advisory board is an important aspect of stakeholder management. An advisory board allows stakeholders the opportunity to provide their input on the project. The members of the advisory board may be internal or external to the organization. In some cases, it is feasible to have both internal and external members serve on the advisory board. The board provides strategic input to the program team and make recommendations to the executive steering committee. Perhaps the biggest challenge for advisory board members is to facilitate communication and cooperation between the organization sponsoring the program and the organization(s) they represent. It is not simply enough to establish the advisory board; those serving on the board who represent a larger organization should timely and effectively communicate the status of the project and other pertinent information to their membership.

**agency, jurisdiction, organization**

These terms are used interchangeably within this document and refer to the entity that provides oversight of the legacy modernization effort.

**cascading sponsorship**

This term is used in organizational change management to ensure that all levels of the organization are engaged, carrying forward messages, and assisting in the adoption of a specified change. A manager should receive communication from their boss or project sponsor and act as a change sponsor with his or her own staff. Such cascading processes should occur until the entire organization is covered.

The point of the model is to warn us about a common confusion of roles. The top executive should resist temptation to become a change agent (make action plans) and focus on being a good vision communicator. The agent should not implement the changes but should instead lead others to do so. If s/he doesn't pass on the vision with enthusiasm and clarity, the communication chain is interrupted, and the executive team will soon wonder why people didn't get the message or adopt the change.

**contract administration**

The program should establish formal vendor management processes to help ensure the vendor adheres to contractual requirements as specified in procurement documents (RFQ, RFP), delivers work according to mutually agreed upon scope, and operates according to expectations. The vendor expectations and requirements are specified within the vendor contract, thereby formally establishing vendor agreement to follow the project processes.

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| **COTS/MOTS** | Commercial off the shelf (COTS) and modified off the shelf (MOTS) are used to describe a software methodology in which a software package either customized or modified to meet a jurisdiction's needs. The typical upside of a COTS/MOTS package is less development time. The typical downside of a COTS/MOTS package is that the system will not — in most cases — match exactly to the agencies wants and needs. |
| **custom** | The term applied to a software development project is built from the ground up. Most legacy systems were built with a custom development methodology, much of it occurring over a matter of years. The upside of a custom-built system is the fact that it is tailored specifically to the needs of the business and well understood by the information technology department if it is the ones constructing the solution. The downside is the effort typically takes longer than a COTS/MOTS solution. |
| **data profiling** | The process of examining data in an existing data source and collecting statistics and information about the data. |
| **data refresh** | Update of data found in the legacy system that can used for analysis and migration. |
| **data rule** | An expression generated out of a data rule definition that evaluates and analyzes conditions found during data profiling and data quality assessment. |
| **delegation** | A common activity in project management is the role of the project manager to identify the roles and responsibilities of the project team early on and to "delegate" activities to accomplish the common goal. The one thing that projects always require is the involvement of people. |
| **80/20 rule** | Also known as the Pareto principle, this rule stipulates that roughly 80% of value comes from 20% of one's effort. In the world of legacy modernization, applying the 80/20 rule is especially helpful when defining scope. Focus on the 80% of your transactions and avoid spending too much time on the 20% unique transactions. |
| **enterprise architecture (EA) governance process** | This process is required to identify, manage, audit, and disseminate information related to the management and use of the EA. The governance process will ensure that all architecture principles, policies, decisions, recommendations, deliverables, contracts, and agreements are correctly used at the appropriate time by the business area projects. EA governance should be used to make decisions about the content and direction of the EA. |

**executive program sponsor**

The executive program sponsor usually serves as the chair of the executive steering committee. S/he serves as the champion of the project, both internal and external to the organization. The sponsor should be an engaged and active participate in the project, maintaining a vested interest in its success. The project management Institute enumerates the following as key responsibilities of the executive project sponsor:

- provide clear direction for the project and how it links with the organization's overall strategy
- secure project resources
- ensure the project is on time, on budget, and in scope
- provide feedback on status reports and ensure they reach necessary stakeholders
- champion the project at the executive level to secure buy-in
- champion the project with external stakeholders

**executive steering committee**

It is imperative the project have the support of all stakeholders, but the executive steering committee should be especially engaged and supportive. Collectively, the committee should remove roadblocks for the project team. As the name implies, the committee consists of executive leadership with a vested interest in the success of the project. The role of the executive steering committee is to:

- provide direction to the program and make decisions on items escalated to the committee
- ensure the project continues to align with the strategic goals of the organization
- approve change requests impacting budget, schedule and scope of the program
- receive and approve assessment reports submitted by any independent verification and validation (IV&V) vendor
- champion the project at the executive level

**extract, transform, load (ETL)**

Used when cleansing data. (See Chapter 11 on Data Migration for details.)

**governance board**

The board has overall responsibility for governance of project management. The roles, responsibilities, and performance criteria for the governance of project management should be clearly defined. Governance boards can also be called an executive steering committee, steering committee, or other name, but their function remains the same. The steering committee or project board is responsible for approving, reviewing progress, and delivering project outcomes. It should have capacity to make decisions, which require commitment of resources and funding outside the original plan. The board provides leadership on culture and values, owns the business case, keeps the project aligned with the organization's strategy and portfolio direction, governs project risk, works with other sponsors, focuses on outcomes, recommends opportunities to optimize cost and benefits, ensures continuity of sponsorship, provides assurance, and provides feedback and lessons learned.

**governance structure**

Project governance structures are established because it is recognized that organizational structures do not provide the necessary framework to deliver a project. Projects require flexibility and speed of decision making, something that the hierarchical relationships within organizations do not enable. Consequently, the project governance framework established for a project should remain separate from the organization structure.

**independent verification and validation (IV&V)**

System modernization projects are usually funded with public funds and should be executed as efficiently as possible. These projects are complex and often involve implementation of new technologies into organizations using legacy systems well past end of life. Many of the risks that can derail such a large program can result in schedule delays, cost overruns, and a decrease in quality for the deliverables produced.

IV&V can help with all of the issues described above if applied effectively. IV&V should be conducted by an outside vendor to validate and verify the activities of the program/project to determine the stated objectives and outcomes will be delivered. The responsibility of the IV&V organization is to review and inspect work performed by the program or project team. In many cases, the IV&V vendor will also test processes and work performed by the program. This means that every deliverable is reviewed and assessed, including all project artifacts (e.g., project charter, program management plan, program schedule). Additional examples of deliverables assessed and examined are:

- requirements documents
- design documents
- system design and configuration
- test cases
- test case results
- software deliverables
- organizational readiness
- communications plan
- project management documentation

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| *(continued)* | The IV&V vendor should operate independently of both program and management teams within the organization. The assessment reports should be unbiased as to the status of the program and evaluation of the deliverables produced. An IV&V vendor should not merely point out deficiencies in the program but should be able to provide recommendations on correcting any issues noted. IV&V should also be able to use the data collected to predict issues before they occur and to help the team avoid pitfalls. |
| **issue** | Issues in projects cover any concern, query, potential request for change, suggestion or off-specification raised during the project. Issues and issue tracking are used in projects to ensure all identified concerns are documented, tracked, and resolved. |
| **jurisdiction** | *See* agency. |
| **landing area** | A separate database where raw extracted information from the legacy system is stored in preparation for data cleansing. |
| **organization** | *See* agency. |
| **portfolio** | *See* program. |
| **program, project, portfolio** | These terms are sometimes used to refer to the effort. A project is an effort with a defined duration. A program usually has a longer duration than a project and by nature normally has more complexity, requiring additional oversight. Because a legacy modernization effort tends to fall into a program definition because of the size, several interrelated projects may be rolled up into the program and be managed as a portfolio. Examples include data migration and change management as separate projects under the legacy modernization program. It is important that all members involved in the modernization program understand that several projects should be completed to ensure the successful completion of the modernization effort. |
| **project** | *See* program. |
| **Project Management Book of Knowledge (PMBOK)** | A global standard for project management practices. It provides fundamental practices to achieve project success. |
| **project management institute (PMI)** | Provides services including development of standards, research, education, publication, networking-opportunities in local chapters, hosting conferences and training seminars, and accreditation in project management. |

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| **project management office (PMO)** | A group or department within a business, agency, or enterprise that defines and maintains standards for project management within the organization. The PMO strives to standardize and introduce economies of repetition in the execution of projects. |
| **requirements repository** | A method of storing requirements, including those approved, under development, and under review. The repository may contain work processing flows/diagrams, data dictionaries, and other items to ensure common understanding of the requirements. The repository should be actively managed and have its own rules and processes governing use, access, retention, and deletion. |
| **requirements traceability matrix (RTM)** | A tool used to determine the completeness of a relationship by correlating all detailed business requirements for a project to the matching parts of test plans or test cases and ultimately to the final design documents. An RTM should be used to verify that project requirements are met and to help in the creation of software requirements documentation, project plan tasks, and various deliverable documents. To ease the creation of traceability matrices, it is advisable to add the relationships to the source documents for both backward traceability and forward traceability. That way, when an item is changed in one document, it is easy to see what needs to be changed in the other. |
| **responsibility assignment (RACI) chart** | A common type of responsibility assignment matrix that uses the Responsible, Accountable, Consult and Inform status to define the involvement of project team members and stakeholders in completing project activities. |
| **risk** | The formal definition of a risk is an event or occurrence that may negatively impact a legacy modernization project. Risks can be mitigated and even prevented. However, a thorough understanding of the risks and advance planning are required. Typically, risks and risk mitigation plans are used together after a risk is identified to help the project team determine next steps should the risk actually take place. |
| **staging area** | A separate database where cleansed data are stored when cleansing rules are run on data stored in the landing area. |
| **stakeholder** | A person, group, or organization that has an interest or concern in the organization. Stakeholders can affect or be affected by the organization's actions, objectives, and polices. In legacy modernization efforts, stakeholders can resist or assist the agency in meeting goals of the effort. Examples of key stakeholders include law enforcement, courts, other agencies within the jurisdiction, suppliers, unions, business users, and basically anyone affected by or who could affect the modernization effort. |

**test entry and exit criteria**

Entry criteria for testing can be defined as specific conditions or ongoing activities that should be present before the testing process can begin. Typical criteria included in test entry includes no high or significant defects, a plan to remediate defects, test training for participants, tools or processes necessary to perform next stage of testing, and other similar items. Exit criteria are often viewed as a single document commemorating the end of a lifecycle phase. Exit criteria are defined as the specific conditions or ongoing activities that should be present before a lifecycle phase can be considered complete. By referencing the entry–exit criteria matrix, clarity of deliverables is expected from each phase. The matrix should contain "date required" and should be modified to meet specific goals and requirements of each test effort based on size and complexity.

# Appendix B Checklist for System Modernization Best Practices

The following pages contain high level best practices for system modernization. For details, please refer to the chapter referenced.

## CHAPTER 1 – BEFORE GETTING STARTED

- ❑ Begin with the end in mind.
- ❑ Define the vision and develop goals in line with the mission of the agency.
- ❑ Complete business process reengineering, data cleansing, and data security efforts before beginning system modernization efforts.
- ❑ Reach out to peer agencies in other jurisdictions early in the process and gather and evaluate as much information on similar projects as possible. Make in-person visits, see their operation, and talk to members of the project team. Explore vendor options.
- ❑ Obtain ownership for the project at the highest level of the organization. This is crucial because without ownership of all outcomes (both good and bad), projects can easily falter or, worse, fail.
- ❑ Remember, the more time spent on planning, the easier the journey.

## CHAPTER 2 – INTERNAL AND EXTERNAL SUPPORT

- ❑ Discuss and make decisions regarding long-term maintenance early in the process.
- ❑ Understand the strengths and weaknesses of information technology and business teams in the decision-making process.
- ❑ Weigh individual risks and benefits to both internal and external support options before committing to an approach.
- ❑ Consider a "blend" of internal and vendor support, allowing the agency to capitalize on the strengths of both internal and vendor support. Success will depend on how well the service-level agreement is written.
- ❑ Weigh the pros and cons of modified-off-the-shelf (MOTs), commercial off-the-shelf (COTS), and custom builds and then decide how the system will be managed over time.
- ❑ Consider maintenance and support as the total cost of ownership for the project.

## CHAPTER 3 – BUSINESS CASE DEVELOPMENT

- ❑ Develop a written business case that clearly articulates the need for modernization by addressing:
- ❑ business drivers supporting business vision and strategic planning objectives
- ❑ policy or legislative drivers supporting jurisdictional priorities, policies, and legislative mandates
- ❑ human resource drivers to retain knowledgeable staff with appropriate skills, depleting resources required to maintain legacy systems, and resource needs for the project
- ❑ technical drivers to eliminate legacy technologies and architecture, reduce data, eliminate functionality redundancies, reduce the number

of technical platforms used, and increase the time and effort needed to implement legislation and policies for the legacy system, in-house, or hosted solution

- ❑ financial drivers to reduce costs, increase revenues, enhance service delivery models, reduce fraud, protect privacy, and reduce maintenance costs on legacy systems
- ❑ items to be fully developed as part of the project plan
- ❑ Establish performance measures or key performance indicators (KPI)s and return on investment (ROI) expectations.
- ❑ Develop a communication plan and include stakeholder management strategies.
- ❑ Engage an independent verification and validation (IV&V) vendor to provide input to the business case, validate foundational assumptions, and/or verify conclusions between the business and IT. Many agencies have found IV&V vendors well worth the cost and effort to engage them.

## CHAPTER 4 – GOVERNANCE

- ❑ Develop a comprehensive governance plan for the life of the system to enable timely decisions and ensure the project stays on track.
- ❑ Involve stakeholders. Get them involved early and keep them involved and informed.
- ❑ Ensure the agency's executive owns the project and its outcomes.
- ❑ Establish a governance board to make decisions to help the project teams succeed.
- ❑ Establish an executive steering committee or similar group to provide guidance and oversight to the project.
- ❑ Garner buy-in from all levels of the organization.
- ❑ Agree on and document a process prior at the start of the modernization effort to deal with unanticipated scenarios.

## CHAPTER 5 – LEGISLATION AND FUNDING

- ❑ Identify champions and detractors, develop appropriate messaging to address potential concerns, and keep them informed regarding program status.
- ❑ Include key support personnel in legislative communications as they can help provide continuity of information across legislative terms.
- ❑ Educate legislators about the need for the effort and explain funding needs. Explain the consequences of remaining on the existing system.
- ❑ Identify funding sources for the project, as well as operational, maintenance, and support costs. Consider nonexpiring dedicated or fee-based funding. Ensure appropriate spending authority is in place.
- ❑ Communicate a specific return on investment and provide information on the agency's prior experience in managing large funds to demonstrate sound fiscal management practices.
- ❑ Consider the need for a contingency fund for future business needs, legislative additions, other changes, and unexpected requests that may arise.
- ❑ Request a moratorium on new statutory changes that may impact the project and institute a code freeze for the current system until the new system is implemented.

## CHAPTER 6 – ENTERPRISE ARCHITECT

- ❑ Engage a dedicated and experience enterprise architect as part of the project team who can also assist with design of the solution.

- ❑ Develop an enterprise architectural plan (EAP) to enable the organization to make effective decisions about technology as modernization efforts proceed. The plan should guide decisions about which technologies will be implemented and the infrastructure needed to provide support.
- ❑ Complete a gap analysis to identify differences in the "as is" environment as compared with the "to be" environment.
- ❑ Ensure network and server capacity planning is accomplished.
- ❑ Conduct analysis of the technology environment to ensure hardware and software are compatible with the "to be" environment.

## CHAPTER 7 – REQUIREMENTS AND METHODOLOGY

- ❑ Provide sufficient time to complete requirements gathering.
- ❑ Establish a requirements repository for storing project documentation. Update it as changes are made.
- ❑ Update project documentation each time a system or business process change is made and do so throughout the lifecycle of the system. Include maintenance and support plans post-implementation. Avoid the temptation to document the solution in lieu of the requirement.
- ❑ Develop and use a requirements traceability matrix (RTM) to gather and record requirements and to support development, testing, training, and system support. The usefulness of an RTM cannot be overstated.
- ❑ Decide the methodology for requirements gathering — agile, waterfall or structured, or hybrid.
- ❑ Document functional, nonfunctional, business, user, system, and stakeholder requirements ensuring they are clear, not subject to misinterpretation, and do not contradict other requirements. Confirm correct implementation through observation and testing.
- ❑ Prioritize "absolutely necessary" requirements from those that are "nice to have" based on the implementation timeline, budget, and agency goals.
- ❑ Consider the level of detail to include when writing business requirements. Different types of requirements may require different levels of detail.
- ❑ Plan for all requirements to be reviewed and approved by a single validation checkpoint.

## CHAPTER 8 – PROCUREMENT AND CONTRACT MANAGEMENT

- ❑ Request and review system modernization materials (e.g., procurements, contracts, project schedules, workplans) from other motor vehicle agencies.
- ❑ Clearly outline procurement deliverables expected from the jurisdiction and from the vendor.
- ❑ Require award to the successful vendor to be a deliverable-based, fixed-price contract.
- ❑ Articulate expectations, establish frank and open communications, and set a clear plan on how contract documentation and sign-offs will occur.
- ❑ Develop a "deliverables expectation" document so both the agency and vendor(s) are clear on expectations and objectives of contract requirements.
- ❑ Ensure all contracts are included in the oversight plan when managing multiple vendors, including an independent verification and validation (IV&V) and development contract.

- ❑ Develop a consistent method for acceptance of contract deliverables.
- ❑ Require the vendor sign a service-level agreement (SLA) that includes penalties, liquidated damages, or service credits that ensures needs of business are met.
- ❑ Pay a percentage of the overall cost upon acceptance of specific deliverables.
- ❑ Ensure the vendor contract contains language that is inclusive from initiation to closure and associated activities for either, regardless of when and why closure is initiated.
- ❑ Ensure, through the lifecycle of any project that uses contracted vendors, that files are maintained adequately and that all contractual obligations are followed.
- ❑ Develop a detailed contingency plan for any problems that may arise. Include next steps should fall back or resetting be required. Create a roll back strategy plan based on predefined criteria.
- ❑ Ensure the project has adequate resources and processes to align efforts to the contract documentation and related activities, such as compliance reports, change management, and other key items that ensure the effort and the contract stay in alignment.

## CHAPTER 9 – PROJECT MANAGEMENT

- ❑ Develop a project management plan (PMP) for each separate project.
- ❑ Develop an overall PMP to integrate key elements from the separate projects.
- ❑ Follow standardized project management processes or phases to ensure the project is properly managed from inception to successful conclusion.
- ❑ Establish or use an existing project management office (PMO) to increase the chance of success for a modernization project.
- ❑ Adopt a sound project management methodology.
- ❑ Engage a dedicated, trained, and certified project manager. A project manager with PMP certification who has experience in systems modernization or large-scale technology projects is preferred.

## CHAPTER 10 – SECURITY

- ❑ Develop a security plan for the life of the system or facilities. Identify the person(s) responsible for security decisions and tasks, how the projects will adhere to outlined federal or jurisdictional security requirements, internal security practices or guidelines, tools to be used, and processes and schedules for vulnerability assessments and audits.
- ❑ Include in the security plan additional security steps that may be necessary to protect data and accesses for vendor staff.
- ❑ Establish security protocols if they do not already exist.
- ❑ Engage a security officer for the lifecycle of the program. Don't underestimate the need for an experienced security officer. Motor vehicle agencies maintain a tremendous amount of PII (personal identifiable information) in which hackers are very interested. Safeguards and monitoring tools are necessary to proactively alert and restrict access to sensitive data.
- ❑ Identify resources and a physical location to house both vendor and agency resources and provide accesses for authorities early in the project.

## CHAPTER 11 – DATA CLEANSING AND MIGRATION

- ❑ Ensure the right team is in place to take on this portion of the project and that team members possess the skill sets required to understand the business data and supporting structures.
- ❑ Hire a dedicated data steward or assign an employee with expertise of data maintained in the system data steward duties.
- ❑ Consider the data cleansing effort as a separate project from the modernization effort.
- ❑ As part of data cleansing activities, use two separate databases (landing and staging).
- ❑ Review current data retention requirements before data cleansing efforts begin. If some retention requirements seem unreasonable, change them if possible.
- ❑ Document decisions on how to cleanse the data. Document what data may change as a result of the cleansing and assign a level of risk to each change.
- ❑ Do not underestimate the manual staff hours needed to identify, amend, and remove data. This will be a long and time-consuming effort for many resources already fully engaged with other responsibilities.
- ❑ Establish an issue or defect tracking repository to provide for better monitoring and for documenting system rules, data anomalies, and approved recommendations.
- ❑ Use data masking to protect sensitive data elements from project team members or external vendors that do not have appropriate security clearance to view and access such data.
- ❑ Data cleansing should be a combined effort between information technology and the business unit to ensure success.
- ❑ Complete multiple mock conversions to ensure complete and accurate data migration occurs. The mock conversions also establish timeframe necessary to accomplish the migration over go live weekend.

## CHAPTER 12 – ORGANIZATIONAL CHANGE MANAGEMENT

- ❑ Hire or appoint a dedicated organizational change management (OCM) manager to increase awareness of the project at all levels of the organization, provide regular communications, and ensure participation and buy-in from both internal and external stakeholders.
- ❑ Develop a comprehensive OCM approach because it is critical to garnering buy-in and to the ultimate success of the program.
- ❑ Consider both IT and the business in OCM activities.
- ❑ Acknowledge and develop a plan to promote change management throughout the lifecycle of the project.
- ❑ Include aspects of OCM in the communications plan. Plan for stakeholder engagement, develop strategies to reduce or eliminate resistance, and create approaches to increase support and buy-in.
- ❑ Consider putting "sensors" or "change agents" throughout the organization to measure understanding by staff and to promote acceptance of change.

## CHAPTER 13 – TRAINING

- ❑ Develop a comprehensive training plan that describes the strategies, activities, and tasks necessary to provide the business unit with the skills necessary to operate the new system successfully.

- ❑ Engage trainers early and require they attend project meetings enabling them to continually update training materials as changes are made to the program.
- ❑ Establish a testing "sandbox environment" for user training opportunities months before project implementation. Such environments can be costly, so be sure proper funding is in place.
- ❑ Conduct an assessment of training and user readiness and include a review of the results of training and any testing conducted.
- ❑ Develop effective training and training materials that are user centric, process oriented, modular, sustainable, efficient, and standardized and that build the understanding, skills, and capabilities employees need to use and maintain the new system.
- ❑ Provide for continuous training for the life of the system.

## CHAPTER 14 – COMMUNICATIONS

- ❑ Develop internal and external communications plans for the duration of the project that are evaluated constantly and modified as needed. Identify the frequency of communications, distribution method, responsible parties, medium to be used, and key high-level messages.
- ❑ Clearly define and share roles of business users, information technology, and vendor staff. Update as roles change and as new members are added to the team.
- ❑ Sign agreements with agencies who interface with the system to ensure a mutual understanding of the effort and resources required by everyone involved.
- ❑ Identify internal and external stakeholders and determine how to best engage them during the project. A needs assessment can help determine the level and timing of interactions with external stakeholders.
- ❑ Consider labor relations or collective bargaining units in planning and communications about the program. If job functions or positions are being eliminated, following labor contractual obligations and bargaining agreements is not only necessary, but it is also a good business practice to engage them early.
- ❑ Identify a dedicated resource to manage communications to internal and external stakeholders throughout the project.
- ❑ Regularly share information with everyone impacted by the project and regularly request feedback.

## CHAPTER 15 – PEOPLE AND FACILITIES

- ❑ Enlist a full-time, dedicated, and experienced project manager.
- ❑ Complete workforce planning to identify the number, type, experience, knowledge, and skills of staff needed to achieve program objectives.
- ❑ Develop a project resource and staffing plan. Address resources and hours required of staff assigned to the project in a project resource plan and address ongoing work while project resources are dedicated to the legacy modernization effort in the staffing resource plan.
- ❑ Obtain agreement from executive sponsors on the need for key project resources.
- ❑ Identify leaders that can carry the project forward to completion and reassign job duties as needed.
- ❑ Co-locate business, information technology (IT), and vendor project teams.
- ❑ Identify a facility or location and determine equipment needs for the project team.

- ❑ Plan for the future state and the impact changes will have to existing business and IT staff. Plan to modify, add, or eliminate positions based on changes that will occur when the modernization project is fully implemented.

### CHAPTER 16 – SOFTWARE DEVELOPMENT LIFECYCLE

- ❑ Use the software development lifecycle (SDLC) approach that best fits the need of the agency and the program to build a quality business solution. After it has been decided, adhere to the methodology.
- ❑ Test the validity of the enterprise architecture of the modernized system by following SDLC activities.
- ❑ Establish a gateway review processes to formalize SDLC activities required when moving from one phase to the next.

### CHAPTER 17 – TESTING

- ❑ Develop a test plan that describes the scope, approach, resources, and schedule of testing activities.
- ❑ Follow established change management processes and revise project documents as appropriate.
- ❑ Allocate an adequate period to ensure quality testing of the system. Avoid the temptation to reduce the testing time to make up project delays.
- ❑ Clearly identify the roles and responsibilities of business and information technology staff for the various types of testing.
- ❑ Ensure that close coordination and communication takes place among developers, business analysts, and testing team to avoid delays and ensure timely testing.
- ❑ Identify testing personnel early in the program to allow for sufficient resource management.
- ❑ Address hardware and the number of environments needed (e.g., DEV, quality assurance, user acceptance testing, and training). Keep environments separate.
- ❑ Consider federal, state, or provincial requirements such as the Americans with Disabilities Act (ADA) when developing requirements.
- ❑ Provide metrics to management that addresses progress, performance, and status of software testing.
- ❑ Identify test exit criteria (go/no go) as part of test script development.
- ❑ Ensure testing has been accomplished on "real" data for security access, data appearance, auditing, and so on.

### CHAPTER 18 – SYSTEM READINESS

- ❑ Identify key elements of system readiness early in the program as extensive planning is required.
- ❑ Develop an implementation plan that provides information on how the new system will be deployed and transitioned to operations. Identify steps required to revert to the legacy system if significant issues are discovered during implementation.
- ❑ Include stakeholders in planning efforts so they understand their part and the effect the new system will have on their operations.
- ❑ Perform load testing often so users can test the system multiple times before go live.
- ❑ Ensure network, server, and database load testing occurs and proves adequate for desired production response time.
- ❑ Complete multiple mock conversions to optimize the outcome and ensure consistency in timing and content.

- ❑ Choose a deployment option — big bang, phased, pilots, parallel processing — that best fits the agency's needs.
- ❑ Develop a detailed list of migration tasks and the individual responsible for each.
- ❑ Develop a detailed contingency plan for any problems that may arise. Include next steps should fall back or resetting be required. Create a roll-back strategy plan based on predefined criteria.
- ❑ Establish a go-live command center and identify a team to staff it during implementation. Determine the timeline the team is expected to be in place.

## CHAPTER 19 – LONG-TERM AND ONGOING OPERATIONAL SUPPORT

- ❑ Create a transition plan early in the process that includes the deployment date, transition date, length of transition, transition end date, and when operations and maintenance support begins.
- ❑ Include a warranty (at least six to eight months) for software fixes and hardware defects.
- ❑ Develop standardized release and emergency schedules for quick-fixes of defects based on criteria contained in the service-level agreement (SLA).
- ❑ Allow a few users to retain access to the legacy system for a set period of time after decommissioning, which allows for issues or concerns not originally identified during the transition period to be verified between the new and legacy systems.
- ❑ Identify how remedial training will be scheduled and administered after deployment.
- ❑ Identify permanent quality assurance (QA) and user acceptance testing (UAT)teams, which will be needed to perform tasks associated with future system or software upgrades and enhancements.
- ❑ Develop a maintenance and support plan that outlines how defects, enhancements, change requests, system and hardware maintenance, warranties, and other contractual obligations will be addressed. Include plans for decommissioning the legacy system.
- ❑ Prepare a project evaluation report to provide a status of the project, support communication plan messaging, and inform the decision-making process for project closeout.
- ❑ Ensure transfer of data, documents, and information from the vendor(s) to the agency.
- ❑ Plan for permanent QA and UAT teams to perform tasks associated with future system or software upgrades and enhancements.
- ❑ Complete long-term planning that establishes processes for defect resolution, system enhancements, and changes.
- ❑ Address any changes to software licensing timeframes and give consideration for infrastructure support of hardware and equipment that reaches end of life or is no longer supported.
- ❑ Report on lessons learned and baseline operational metrics from pre–go live compared with current operations.
- ❑ Prepare for an internal or external project audit.

## CHAPTER 20 – SIGNS OF A TROUBLED PROJECT

- ❑ Don't ignore warning signs of a potentially troubled project. Be careful to fully assess the issues and not just treat the symptoms. Elicit support for navigating the project into balance.

- ❑ Potential signs of trouble include:
  - lack of sponsorship or executive support
  - extensive resource changes
  - missed dates and scheduling adjustments
  - changes in methodology, scope, or other "contract" modifications or issues
  - process or methodology issues
  - lack of communication or collaboration
  - potential legal actions
  - financial challenges by the vendor or its parent company
- ❑ Determine reason(s) for any delays and whether they require more time to fix or whether other adjustments are needed.
- ❑ Follow a formal methodology to be successful. Legacy modernization cannot be done by ad hoc procedures.
- ❑ Ensure there is good communication between the vendor(s) and the agency.
- ❑ Take immediate action when staff issues are identified. Most people issues do not self-correct.
- ❑ Adhere to contract terms, project management methodologies, and governance processes to protect the agency's interests in a lawsuit if one occurs. Be sure to establish, update, and maintain project documentation and a solid filing and maintenance system.
- ❑ Adhere to project's resource allocation plans. If either the jurisdiction or vendor increases staffing, then activities will become misaligned to the plan.

# Appendix C System Modernization Working Group Roster

## CHAIR

**Terrence Samuel**
*Director, Office of Motorist Modernization*
Florida Department of Highway Safety & Motor Vehicles

## VICE-CHAIR

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**Tina Hargis**
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**Rose Jarois**
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**safe drivers**
**safe vehicles**
**secure identities**
**saving lives!**


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