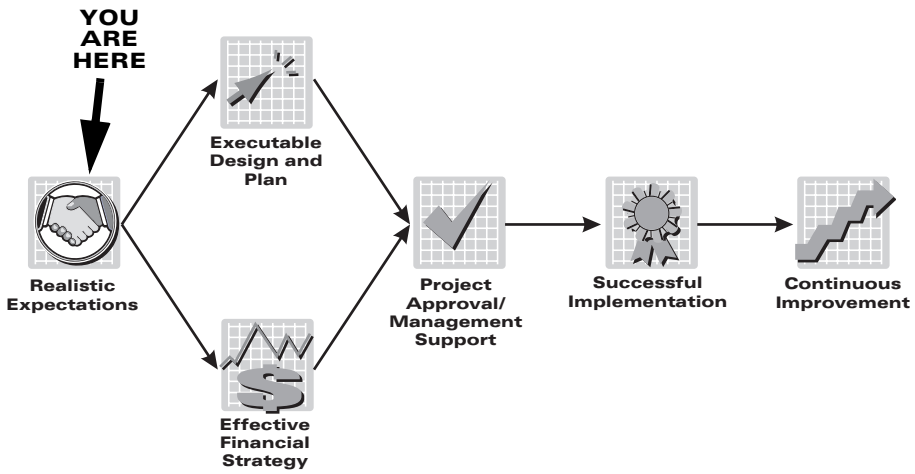
Chapter

1

"Lights Out"—Exposed

Planning and executing a successful automation project begins by developing realistic expectations for the purpose and scope of the initiative:



A few years ago, I spent several months re-architecting the data center operations of a nine-plus billion dollar cash receipt company in Hong Kong. I was contracted to study their mission-critical computing environment, to develop a new architecture, and to prepare the transition plan from a legacy to client/server platform that needed to operate at a

"lights out" automation standard. My assignment was driven by a comprehensive initiative (already underway) to rewrite their mission-critical applications on a client/server platform.

The "lights out" objectives were explicit: reduce head count and ultimately the overall cost of the data center. The challenge was a little scary for me. Although the customer's objectives were succinct, obviously, no one involved had a clear or common understanding of what "lights out" actually meant. To fulfill my contract successfully and satisfy my customer, I had to develop, articulate, and establish the appropriate level of expectation surrounding their "lights out" automation fantasy. To do so, I used the exercises that are described in this chapter.

I completed my mission in Hong Kong and delivered a new architecture for their data center infrastructure and a related plan to make the transition. This data center operation was sizeable. Implementation required the transition of 96 mini-mainframes to new client/server applications and platform over a two- to three-year period. About two years later, on a visit to Hong Kong, the CIO pointed to the architecture and plan manuals that were still sitting on the top of his desk and proudly reported that over 75% of the plan, technical and process, had been implemented. Given the magnitude of the initiative, their progress was a resounding success. I strongly believe that this positive message and outcome was (in addition to good planning and project management) a direct result of the expectations set early in the project using the exercises described in this chapter.

As you read this chapter and apply the ideas and exercises to your environment and challenges, expect to fully qualify and answer the following key questions:

- "What areas of my operation can I realistically expect to automate given my budget, company culture, and related resources?"
- "Once I've identified the areas in my operation I can expect to automate, what level of automation can I realistically expect to achieve?"

The term "lights out" has been used in the IT industry for many years in different contexts. Lights out operation in a data center environment may be defined as:

> *The automation of manual activities to limit requirements for human intervention and consistently deliver desired results.*

The automation of data center operations to a lights out standard requires the identification of specific requirements and decisions concerning the desirable level of automation. What processes are good candidates for automation? What realistic results may be obtained? How will the changes affect operations, budgets, and staffing? Can the cost of automation be justified?

This chapter contains key considerations for data center managers and architects who are analyzing opportunities for automation. These considerations include (a) the infrastructure components that are candidates for automation, (b) the level of complexity involved in automation, and (c) the realistic objectives for automation of each component. An assessment of these considerations will lead to a high-level list of components that may be suitable for automation in a particular data center environment.

Identifying the Components and Complexity of Lights Out Operations

All the infrastructure components in your data center may be suitable for automation. Table 1-1 contains a list of components, brief definitions of each, and the factors that affect the complexities involved in automating them. In this context, the term "complexity" is a measure of the staffing requirements and coordination, the number of technical requirements, the time needed to evaluate alternative solutions, the technical implementation, maintenance of the implementation, and associated costs. Engage your staff in the evaluation and decision concerning the complexity level of each component. Use Table 1-1 to lead a discussion that results in a complexity level assignment for each of the components in your data center.

Table 1–1 Data Center Components for Automation Consideration

Component	Definition	Auto-Complexity Level (Low/Medium/High)
Technical Architecture		
Performance Monitoring and Capacity Planning	Global view of network and system resource utilization, which identifies potential performance problems and provides sufficient computing resources to support current and future business requirements	Medium to High—*Many tools are available to address the automation requirements. The complexity level increases with multiple platform considerations.*
Disk Capacity Management	Process to effectively manage disk usage	Low to Medium—*Many tools are available. Easy to manage through homegrown scripts and processes. Complexity increases as the automation requirements are integrated into an enterprise management initiative.*
Storage Management	Backup/restore, catalogue, and storage process to effectively manage disk and tape archival requirements	Medium to High—*Many tools exist today to address the automation requirements. The complexity level increases with multiple platform considerations.*
Event Monitoring	Process to monitor an event on a system, a network, a database, an application (e.g., a fault, a threshold), which then alerts a centralized management function	Medium to High—*This process is often confused with performance and capacity requirements. Tools will accommodate well defined requirements. Again, the complexity level increases with multiple platform considerations.*
Network Management	Process to monitor the network, to perform trouble-shooting and to manage network configuration and growth	Medium to High—*Many tools exist today to address the automation requirements. Complexity is added when fragmented network groups (i.e., separate domains) manage the enterprise.*

Table 1–1 Data Center Components for Automation Consideration *(continued)*

Component	Definition	Auto-Complexity Level (Low/Medium/High)
Access (Security) Management	Process to address user security for application, database, and transaction-level access	High—*Requires centralization of all access administration processes for mission-critical applications. Enterprise tools are custom installations*
Job Scheduling	Process to schedule jobs, perform job-restart, and check job dependency in a distributed environment	Low to Medium—*Batch scheduling tools, even in the UNIX environment, are well established and mature. The complexity level increases with multiple platform considerations.*
Version Release	Process to change and maintain the release of objects, e.g., System Software and Application Software, between the test and the production environments	Medium to High—*Many tools exist today to address these requirements. The complexity level increases with multiple platform considerations.*
Software Distribution	Process to update and maintain distributed software	Low to High—*Platform specific tools are available to address these requirements. To establish one automated process/system to manage software distribution over multiple platforms is nearly impossible. Automation requires a separate process for each platform.*
Process Architecture		
Production Acceptance	Process that identifies the operational requirements to implement and manage new and changing applications	Low to Medium—*This is an administrative process. However, document management systems can be created within the existent environment to standardize and automate inputs, outputs, and information. Forms and routing can be addressed by Intranet type installations.*

Table 1–1 Data Center Components for Automation Consideration *(continued)*

Component	Definition	Auto-Complexity Level (Low/Medium/High)
Problem Management	A centralized process to manage and resolve user network, application, and system problems	Medium to High—*Standard help desk tools can address rudimentary requirements with minimal customization. Complexity and cost increase when requirements necessitate the custom installation of commercial products. Complexity escalates further when other automated monitoring tools are integrated into the problem management system.*
Change Management	A process that coordinates all changes that affect the production environment	Low to Medium—*This is an administrative process; however, document management systems can be created within the existent environment to standardize and automate inputs, outputs, and information. Forms and routing can be addressed by Intranet type installations.*
Asset Management	Process to query, discover, track, and store enterprise computing resources, including hardware, operating systems, and applications	High—*Asset management is composed of numerous elements. Some elements are suitable for the development of data management systems in the existent environment to standardize and automate inputs, outputs, and information.*
Disaster Recovery	Process to enable recovery in the event a disaster should render mission-critical systems inoperable	High—*The disaster recovery process is supported by high-availability technology. The disaster recovery plan includes the identification and standardization of procedures and decision-making criteria; certain elements of the plan may be automated.*

Automation—The Reality Check

The high-level analysis of components that are suitable for automation requires consideration of both complexity and obtainable results. Table 1-2 repeats the list of data center components, followed by unrealistic expectations (Column Two) and real, obtainable results (Column Three). The "obtainable results" column is designed to provide a baseline expectation that may be adjusted according to the resources available for investment in each automation project. Again, involve your staff in developing a high-level list of expectations for the automation of each of these components. You may eliminate some of the components from consideration as a result.

Table 1–2 Automation Components—Reality Check

Component	Unrealistic Model	Obtainable Results
Technical Architecture		
Performance Monitoring and Capacity Planning	Automatically capture resource utilization (system, disk, network bandwidth, cpu, i/o, database transaction) real-time Automatically locate the bottleneck or problems Automatically resolve or tune with no human intervention	Automatically capture resource utilization Automatically escalate and notify support personnel when threshold exceeds pre-defined limits and provide information or hints for further analysis Manual process and procedures to address troubleshooting
Disk Management	Automatically capture disk space thresholds Automatically add hard disk space to the system Automatically detect hard disk failures Automatically replace failures	Automatically capture disk space thresholds Automatically add hard disk space to the system Automatically detect hard disk failures Manually replace failures

Table 1–2 Automation Components—Reality Check *(continued)*

Component	Unrealistic Model	Obtainable Results
Storage Management	Backups automatically start at scheduled time on system labeled tapes. Automatically restores data files for users. Robotic tape loading and archiving with built-in cataloging. Automatically organizes tapes for third-party vendor pick-up and delivery. Automatically stores archives off-site. Automatically contacts third-party vendor for return of tapes.	Backups automatically start at scheduled time on system labeled tapes. Automatically restores data files for users. Robotic tape loading and archiving with built-in cataloging. Manual organization of tapes for third-party vendor pick-up and delivery. Manual process to store archives off-site. Manual contact third-party vendor for return of tapes.
Event Monitoring	Automated system to monitor the environment (network, database, application, etc.). System automatically reacts and resolves problem using an information database.	Automated system to monitor the environment. System automatically reacts to problem by notifying support personnel without human intervention. Human intervention and/or expertise to resolve problem.
Network Management	Automatically configures hardware on the network. Automatically determines upgrade requirements, e.g., model, size, etc. Automatically installs, configures, or tunes for optimal performance.	Automatically provides monitoring data to feed the event monitoring process and output. Provides utilities for troubleshooting, capacity planning, and network configuration management.

Table 1–2 Automation Components—Reality Check *(continued)*

Component	Unrealistic Model	Obtainable Results
Access (Security) Management	An integrated online application to:	Application that standardizes and automates inputs, outputs, and information to process requests and approval routing, providing auditability, for user access to the system, database, and transaction levels.
	Automatically handle requests, approvals, technical administration and auditing for user access processing to the network, system, database, application, and transaction levels.	Technical administration is centralized but still manual.
	Automatically detect, configure, and authorize access privileges for new applications introduced to the network, system, and database.	Manually detect, configure and authorize access privileges for new applications introduced to the network, system, and database.
	Automatic detection and reporting for security breach of network, system, database, and transaction levels.	Automatic detection and reporting for security breach of network, system, database, and transaction levels.
Job Scheduling	Automatically detect new application batch processes and schedules.	Manually detect new application batch processes and schedules.
	Automatically schedule jobs to run at the most optimal time.	Implement a manually configured schedule of jobs.
	Automatically check for dependencies.	Automatically check for dependencies.
	Automatically restart if failed processes.	Automatically restart if failed processes.
Version Release	Automatically detect configuration of new applications.	Manually detect configuration of new applications.
	Automatically track the configuration and "package" of objects to be changed.	Automatically track the configuration and "package" of objects to be changed.
	Automatically log and report changes.	Automatically log and report changes.
	Automatically grant appropriate authority to new applications.	Automatically grant appropriate authority to new applications.
	Automatically back out from a change if deemed unsuccessful.	Automatically back out from a release or change.

Table 1–2 Automation Components—Reality Check *(continued)*

Component	Unrealistic Model	Obtainable Results
Software Distribution	Automatically distribute software products from the server to the desktop. Automatically detect, track, and resolve license requirements, software releases, and client architecture.	Centralized administration for bug fixes, patches, upgrades. Reduced manual requirements for systems administration.
Process Architecture		
Production Acceptance	Automatically gather and meet operational requirements for new applications.	Implement document management system to standardize and automate inputs, outputs, and information.
Problem Management	Automatically detect problems anywhere in the enterprise. Automatically react to and resolve problems with no human intervention.	Implement system to log, track, escalate with, and report problems and their resolution. Manually react to and resolve problems.
Change Management	Automatically receive requests for change and determine potential impacts. Automatically gain approval and technical support. Automatically publishes change control notification. Automatically verifies status of changes and publishes.	Implement document management system to standardize and automate inputs, outputs, and information.
Asset Management	Automatically enter, track, and audit assets and end- of-life processes.	Implement system to standardize inputs, outputs, and information.
Disaster Recovery	When disaster strikes, all applications automatically shift to recovery site and continue to process with no interruption.	Good contingency plan providing recovery of mission-critical applications within the time frame specified in the plan.

Now that you have completed these exercises, you have a list of the components that are good candidates for automation in your data cen-

ter. You have a sense of the complexity of the work required to automate those components. And you have realistic expectations about the level of automation you can achieve.

These realistic expectations have been developed for each component, but you still need to answer the question: What is the primary benefit we hope to gain from an automation initiative? How will I know that the project has been successful? The answer to these questions should be framed in a purpose statement for the initiative. This statement will become your key message as you refine the scope and requirements and inform management that you are researching an automation project. That you position the purpose of the project carefully is critical, since you will live with the expectations you set. Development of the purpose statement is another opportunity to engage your staff. Here is a sample purpose statement:

The purpose of the project is to automate the technical and process architectures so as to deliver more efficient processing, a reduction in the growth of staffing resources, and more effective operations management.

The Two-Second Validation

However, before you go through the rigor of design and project planning for each of these components, you have one more filter to apply. This filter is simply a—thirty-thousand-foot—intuitive assessment of the feasibility of the automation projects. It's what I call "the two-second validation."

Although the assessment is largely intuitive, I have identified some questions to consider. The reason this is an intuitive process is that the data is largely situational and therefore varies from company to company and time to time. To validate the feasibility of any given initiative, ask yourself the following questions:

- Is there an executive-level directive to cut costs and headcount?
- Does the culture support technology investment to reduce operating expenses?
- Do you have funding in your budget for system management tools or any other type of automation?

- Could other budgeted items be postponed to free up funds for the automation project(s)?
- Do you have any positive momentum to build from?

If you think through your particular situation and review your list of components and likely candidates for automation, you will be able to apply the intuitive, two-second validation. This is a good time to sit down with your IT executive and get his or her input. Review your components list and expectations and the draft purpose statement. The purpose statement helps you define the opportunity. By engaging your executive now, you will set expectations early and get a flavor for the objections that she/he may raise later. Now you have support and input from your staff and boss, a qualified list of components, and a draft purpose statement to carry forward into the technical and financial planning steps described in upcoming chapters.