



# Mainframe Migration Opportunities: Staff, Skills, and Training

Custom Research Note

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## **Executive Summary**

Today's mainframe migration efforts progress more smoothly and rapidly than they have historically because of better technology but also because of the better utilization of internal and external staff and skills sets.

For organizations considering or actively pursuing mainframe migrations, this research paper provides insights into and recommendations for how to maximize staff and skills sets through internal initiatives and external services. Internally, multiple opportunities exist, such as improving IT management practices and empowering staff to deliver greater business value. On the external services front, the mainframe migration ecosystem continues to grow, with a broad range of service options available to address all aspects of the migration. Finally, this paper offers perspective on some of the key staffing choices that must be made during a mainframe migration effort as part of a larger IT modernization strategy.

## **Contents**

Introduction	3
Mainframe Skills	4
Modern Mainframes	4
Staff, Skills, and Training for Mainframe Migrations	5
Training Methods	6
Vendor Training, Products, and Services	6
The Impact of Application Replacement	8
Focusing on Process Skills (or Not)	10
Project Skills and Training Considerations	10
Summary	12

## Introduction

Robert Frances Group's (RFG) interactions with information technology (IT) and business executives indicate an increase in mainframe migrations as part of an effective IT modernization strategy.

While some organizations have chosen to increase mainframe workloads, many more organizations have successfully migrated individual applications in an effort to reduce cost and increase flexibility. Others have eliminated the mainframe completely. Unfortunately, a percentage of companies do not have an IT modernization strategy, deciding to ignore the question completely and thus failing to capitalize on their investments in people, processes, and technologies.

In recent years, mainframe migrations to distributed platforms have been fortified by numerous training efforts, publications, and technologies plus a growing vendor consortia working toward the common goal of IT modernization through the removal of dependency on mainframes. Savvy companies also are concerned about a possible mainframe skills shortage and are formalizing IT modernization plans in harmony with career development and human capital management.

This paper will provide some background on mainframe skills issues and insights into and recommendations for how to optimize and capitalize on internal and external skills sets and staff in both pre-migration and post-migration efforts—with the understanding that for companies armed with the right knowledge and skills, the probability of a successful IT modernization and mainframe migration is significantly higher.

This paper will discuss skills as they are related to IT modernization, specifically mainframe migration and how an effective IT modernization strategy should not only address a possible skills shortage but also how it should plan for the modernization of legacy applications.

IBM, Microsoft, and RFG seem to agree that developing an IT modernization strategy and rethinking the role of the mainframe are vital to the success of any IT department. Regardless of the IT modernization approach, modernization will affect IT staff and hence must be planned and managed accordingly. Technology change is the most obvious example of how IT staff is affected. Other examples that require planning include the changes to the business and IT operational processes that are needed to support an application of a specific architectural paradigm. That is to say, as architectural paradigms evolve so will processes and skills that surround them.

## Mainframe Skills

Mainframe skills are showing their age as the people who know mainframe technology steadily retire. Plus, most universities (information systems or computer science programs) no longer offer mainframe instruction to train a new generation of skilled workers. Hence, organizations would be wise to consider how a shortage of mainframe talent could affect their business over time. To start, and to aid understanding, let's simply define the term "mainframe skills" into three uncomplicated groups:

1. Applications Developers (e.g., COBOL, JCL, CICS, and IMS)
2. System Operations and System Programmers (e.g., CICS, IMS, and VTAM)
3. System Administrators (e.g., DB2, RACF)

Besides the data stored in databases, COBOL represents the largest digital asset on the mainframe. It is estimated that the marketplace is supported by over 150 billion lines of COBOL, with several billion lines of code added annually. Given this huge code base, COBOL (Applications Development) won't go away anytime soon. COBOL's huge base, platform independence, and easy-to-learn syntax have helped it defy its predicted demise many a time, and it will continue to do so for a while.

Therefore, the mainframe skills issue is related more to less-popular and platform-dependent languages such as IBM Assembler, TPF, JCL, Easytrieve, Natural, and PL/I or systems software and environments such as JES, VTAM, RACF, IMS, and IDMS. Finding mainframe skills (System Operations, System Programming, and System Administration) for these technologies in the future could be more difficult and more expensive, and this challenge must be considered when building an IT modernization strategy and staffing model.

## Modern Mainframes

The mainframe is widely used but future mainframe database administrators, system programmers, and architects will become more difficult to find over time. In an attempt to reverse this problem, IBM has launched the "System z program" as part of the IBM Academic Initiative. But it is unknown whether this step alone can prevent a significant reduction in mainframe talent in the future. Moreover, IBM has been working to reinvent the mainframe and has endowed it with new processing capabilities. These capabilities include specialty processing engines (zIIP and zAAP) designed to run Linux workloads. This new capability may help solve the skills problem for new mainframe applications because plenty of college graduates have skills in Java and Linux technologies, but this strategy does not address existing mainframe workloads. The problem is not new applications but the decades of investments in legacy mainframe applications. Hence, if an organization decides to modernize applications on the mainframe, it faces both the problem of writing new applications in Java plus the problem of finding operations and administration staff for its legacy applications environments and workloads.

One method for mitigating this risk is to migrate applications from the mainframe to a distributed architecture. Doing this provides an opportunity for new workers to be exposed to an organization's legacy applications assets and to transfer vital application knowledge to the next generation while eliminating dependence on legacy mainframe systems. Let us now look at what staff, skills, and training are needed for a successful mainframe migration.

## **Staff, Skills, and Training for Mainframe Migrations**

Successful mainframe migrations have a project portfolio management (PPM) component. Migrating applications from the mainframe is a complex undertaking. To prepare for the migration, careful consideration of the personnel and skills requirements is a priority. If mainframe elimination is the ultimate goal, it is better to create a formal program that addresses the full migration, spawning projects as appropriate to deal with each specific workload. Doing this requires a strong PPM capability that should include assessment, discovery, and project planning, as well as determination of the staff, skills, and training required for the migration.

Good project management skills are vital. As with most projects, it is recommended that efforts be managed through a project management office (PMO), with oversight from the enterprise program management office (EPMO). The EPMO plays a critical role in establishing overall direction and priorities, as well as ongoing governance; and it should understand how the migration affects other project and business initiatives, including overlaps in staffing, skills, and training requirements. This will make the most of staff changes or training needs.

The bigger the migration, the more external services are used to do the work. Research and experience indicate that the level of external services used for mainframe migrations tends to be directly proportional to the size of the migration effort. This includes not only the application size but the operational components that surround a mainframe application and system. Research also suggests that some migrations are undertaken almost exclusively with in-house staff, though this is mostly in cases where the migration effort is small and where packaged applications are replacing the legacy system. Regardless, it is common to find that many internal employees have never performed a platform or application migration, which makes training IT staff and management important. Hence, plan for an internal education component.

Business systems analysis skills are required because the choice to use packaged applications instead of rewriting applications is critically important. Likewise business analysis skills are needed to assess how to eliminate applications that have limited use or value, either by consolidating the functionality to fewer applications or by reducing the number of applications that perform similar functions. Indeed, many replacements are spurred by an application rationalization effort (see PPM) to determine what is being used and whether it can be replaced, merged with other applications, or eliminated.

Experience indicates that there is value in retaining mainframe-skilled staff. Therefore, when transitioning staff from the mainframe environment to a new target environment, conducting a skills audit and training needs analysis (TNA) are best practices. Unfortunately, some mainframe staff will not transition easily and may need to be replaced with new staff or through adjunct services. It is best to plan for this contingency ahead of time.

Thus, adjunct services should be considered. To maximize the value of the migration experience, it is prudent for IT organizations to use vendor services that are available through the growing mainframe migration service provider community. This also applies to up-front activities such as project planning by experienced providers that can identify opportunities for cost savings and greater efficiency and that can help an internal project "start off on the right foot."

As part of getting the right start, requests for information (RFI) and requests for proposal (RFP) are valuable tools for securing vendor services. Regardless of the final sourcing decision, reviewing vendor RFI responses can help customers learn a great deal about the various approaches and skills in use in the marketplace. This information will be useful both for the project planning phase and in determining the overall migration methodology. So, plan for the development of a formal RFI and RFP process, which should include a development, review, and selection process.

In summary, when looking at staff, skills, and training requirements for mainframe migrations, planners should consider how needs overlap with other skills in their organization. Planners

should consider seeking external assistance from experienced vendors to fill skills gaps and to assist with early phases such as assessment, discovery, and project planning. Let us now take a look at relevant training methods.

## Training Methods

Training methods fall into three categories:

1. In-house group training, including online education
2. One-on-one coaching, mentoring, and skills transfer
3. Outside workshops and seminars

The use of vendor workshops and seminars is valuable for jump-starting new skills development no matter the size of the migration effort. In addition, online training videos can provide practical insights regarding migration pitfalls and opportunities. However, these are no substitutes for practical hands-on experience. Moreover, these resources provide a starting point for skills transfer. A wise approach is to send select staff for training who can then return to educate others in the context of the actual migration effort. This is often referred to as “training the trainer.”

## Vendor Training, Products, and Services

Training and educational materials that offer insights into and assistance with mainframe migrations abound in today's marketplace. A combination of anecdotal information, articles, books, videos, and white papers is available to optimize the migration experience. In addition to these resources, several organizations provide a community and central location for vendor information. See Table 1 for some examples.

**Table 1: Training and Educational Materials and Vendors**

Source	Offering	Web site
<b>COBOL Portal</b>	General information	<a href="http://www.cobolportal.com">www.cobolportal.com</a>
<b>Forrester Research</b>	Industry research	<a href="http://www.forrester.com">www.forrester.com</a> (search for “staffing” and “mainframe migration”)
<b>Fujitsu NETCOBOL</b>	Video and other training materials	<a href="http://www.netcobol.com/products/video/video.htm">www.netcobol.com/products/video/video.htm</a>
<b>Gartner Research</b>	Industry research	<a href="http://www.gartner.com">www.gartner.com</a> (search for “staffing” and “mainframe migration”)
<b>Mainframe Migration Alliance</b>	White papers and videos	<a href="http://www.mainframemigration.org">www.mainframemigration.org</a>
<b>Micro Focus International</b>	Training and general information	<a href="http://www.microfocus.com/Resources/Webcasts/FirstFriday.asp">www.microfocus.com/Resources/Webcasts/FirstFriday.asp</a> <a href="http://www.microfocus.com/Resources/Webcasts/ThirdThursday.asp">www.microfocus.com/Resources/Webcasts/ThirdThursday.asp</a>
<b>Microsoft Learning</b>	Training	<a href="http://www.microsoft.com/learning">www.microsoft.com/learning</a>
<b>Microsoft Mainframe Modernization</b>	Training and white papers	<a href="http://www.microsoft.com/windowsserver/mainframe/training.mspx">www.microsoft.com/windowsserver/mainframe/training.mspx</a> <a href="http://www.microsoft.com/windowsserver/mainframe/papers.mspx">www.microsoft.com/windowsserver/mainframe/papers.mspx</a>
<b>Robert Frances Group</b>	Industry research	<a href="http://www.rfgonline.com">www.rfgonline.com</a> (search for “staffing” and “mainframe migration”)
<b>William Ulrich</b>	Book	<i>Legacy Systems: Transformation Strategies</i> <a href="http://www.systemtransformation.com/legacy_book.htm">www.systemtransformation.com/legacy_book.htm</a>
<b>Wilson Price and Wayne Rippin</b>	Book	<i>COBOL and .NET</i> <a href="http://www.cobolportal.com/bookstore">www.cobolportal.com/bookstore</a>

Source: Robert Frances Group

Many service providers can handle all aspects of a mainframe migration, with some having more comprehensive solutions than others. Service providers can be divided into Tier 1 and Tier 2 providers, with Tier 1 service providers offering proven methods for everything from planning to project management to implementation.

Tier 1 service providers, such as Computer Sciences Corporation (CSC), Electronic Data Systems (EDS), Fujitsu Consulting, Hewlett-Packard (HP), IBM Global Services, Infosys Technologies, and Tata Consulting Services, differ in key ways from Tier 2 service providers, such as BluePhoenix Solutions, Cratos Technology Solutions, and so on. These differences include the size of resource pools and the willingness (or lack thereof) to customize efforts for each engagement. Simply stated, Tier 1 service providers have more resources to call upon but their methodology is usually somewhat rigid. Moreover, many Tier 1 vendors are often unwilling to bid on projects that are not sufficiently large.

See Table 2 for a brief list of mainframe migration service providers.

**Table 2: Mainframe Migration Service Providers**

Tier 1 vendors	Offering	Web site
Accenture	Full services	<a href="http://www.accenture.com">www.accenture.com</a>
CSC	Full services	<a href="http://www.csc.com">www.csc.com</a>
EDS	Full services	<a href="http://www.eds.com">www.eds.com</a>
Fujitsu	Full services	<a href="http://www.fujitsu.com">www.fujitsu.com</a>
HP	Full services	<a href="http://www.hp.com">www.hp.com</a>
Infosys	Full services	<a href="http://www.infosys.com">www.infosys.com</a>
Microsoft	Education, assessment and discover, and project planning	<a href="http://www.microsoft.com/mainframe">www.microsoft.com/mainframe</a>
Sun Microsystems	Full services	<a href="http://www.sun.com">www.sun.com</a>
Tata	Full services	<a href="http://www.tata.com">www.tata.com</a>
Sample of Tier 2 vendors	Offering	Web site
BluePhoenix	Application focus	<a href="http://www.bphx.com">www.bphx.com</a>
Cognizant	Full services	<a href="http://www.cognizant.com">www.cognizant.com</a>
Cratos	Limited full services	<a href="http://www.cratos.ca">www.cratos.ca</a>
Getronics	Full services	<a href="http://www.getronics.com">www.getronics.com</a>
Information Concepts	Application focus	<a href="http://www.infoconcepts.com">www.infoconcepts.com</a>
Speedware	Application focus	<a href="http://www.speedware.com">www.speedware.com</a>
Migrationware	Full services	<a href="http://www.migrationware.com">www.migrationware.com</a>
Idea Integration	Full services	<a href="http://www.idea.com/solutions/legacy-solutions">www.idea.com/solutions/legacy-solutions</a>

Source: Robert Frances Group

Tier 2 service providers offer a cooperative approach composed of customizable services based on the methodologies, skills, and tools available in-house. The difference in cost between Tier 1 and Tier 2 service providers is usually large (Tier 2 providers are significantly less expensive if the deal is negotiated properly), but Tier 2 vendors are less able to react to unplanned events and requirements. From a risk management perspective, the size of the migration effort plays a part in determining which tier of service provider to employ. Without question, Tier 1 vendors are the recommended approach if the effort is large and the sourcing external. In either case, however, skills transfer should be built into the effort. Hence, a balance between internal and external skills is important.

When it comes to the transition skills needed for migration, the need for external help usually is clear. Tier 1 vendors are not inclined to offer piecemeal support for such efforts, leaving

either Tier 2 vendors or specialized services or tools (for example, professional services automation vendors) to address them. The requirement for internal staff is clear because the transition requires maintenance of both the old and new systems and because application knowledge and continuity is of paramount importance.

It is important to retain subject matter experts who understand the applications and business processes. The probability of retaining staff to support migrations is low if there is not a clear understanding of their long-term role and of the value proposition of their career development. Key in-house employees require a concrete plan for career development. Identifying these employees must be done early, which begins with both staff skills audits (SSA) and training needs analysis (TNA). These assessments can be completed using internal resources and tools or by employing a service provider such as those listed in Table 2.

As stated earlier, PM and PMM are vital. A number of vendors provide applications and tools to assist with managing budgets, projects, and resources. These solutions track and allocate enterprise resources, including knowledge, people, and time, to ensure that resources are allocated appropriately. While aimed at project management constituents, these tools can be generically applied to facilitate workforce skills and talent management efforts throughout the migration. Table 3 highlights some of these vendors and their project facilitation and resource management offerings.

**Table 3: Vendors Offering Automation Solutions**

Vendors	Solutions	Web site
ADERANT	Novient	<a href="http://www.novient.com">www.novient.com</a>
Business Engine	Business Engine Network (BEN)	<a href="http://www.businessengine.com/index2.asp">www.businessengine.com/index2.asp</a>
CA	Clarity r8	<a href="http://www.ca.com">www.ca.com</a>
Compuware	Changepoint	<a href="http://www.compuware.com">www.compuware.com</a>
Exigen	ServicePort	<a href="http://www.exigen.com">www.exigen.com</a>
HP	Mercury Resource Management	<a href="http://www.hp.com">www.hp.com</a>
Lawson Software	Service Process Optimization (SPO)	<a href="http://www.lawson.com">www.lawson.com</a>
Microsoft	Microsoft Office Project and Visual Studio® Team System	<a href="http://www.microsoft.com">www.microsoft.com</a>
Oracle	PeopleSoft Enterprise Service Automation (ESA)	<a href="http://www.oracle.com">www.oracle.com</a>
Primavera Systems	Primavera Evolve	<a href="http://www.primavera.com">www.primavera.com</a>
Tenrox	Project Workforce Management	<a href="http://www.tenrox.com">www.tenrox.com</a>

Source: Robert Frances Group

## The Impact of Application Replacement

Application replacement is one of many IT modernization methods. Experience indicates that packaged, commercial off-the-shelf (COTS) offerings are now employed more frequently than porting or rewriting in mainframe migrations. As many IT departments have shifted from a build-centric, custom-development model toward a buy-centric, packaged-application model, several organizational challenges have surfaced. This set of issues, categorized as vendor management, risk, security, skills and staffing, and processes, is congruent with those of an application migration. The decision to invest in COTS solutions will be critical in the planning stage, especially when it comes to staffing and skills management.

IT and business executives should view packaged applications as a form of outsourcing because purchasing and using this software is essentially equivalent to assigning most of the functional planning for enhancements and upgrades to the software vendor. Because packaged applications incorporate best practices and leading technologies, they can assist IT departments with reducing application backlog and meeting business unit demands. Moreover, by employing packaged applications, the company is outsourcing application development. As such, the IT department's responsibility to enhance or change the application is greatly reduced and is supplemented by the need for supplier relationship management. (It should be noted that supplier relationship management requires a different set of specialized skills, especially contract negotiation and vendor relationship management.) Beyond this, packaged applications are seldom employed without some customization, which often requires knowledge of and skill in the packaged application extension and enhancement.

IT departments that implement packaged applications also need employees with database administration and data reporting skills. Data integrity is especially important in today's business environment as companies must comply with regulatory mandates, such as the Sarbanes-Oxley Act in the United States. Therefore, the quality of data must be high to ensure that customers see the same data, regardless of the application from which the data is retrieved. In addition to data integrity, data integration will be critical to ensuring that legacy applications can effectively operate with new software products. Firms should ensure that their IT staff can manage and maintain these critical integration points.

Companies with a build-centric model tend to employ several systems analysts and programmers. As the enterprise transforms to a buy-centric model, these roles start to shift. In the build-centric model, systems analysts focus primarily on building and meeting end-user application requirements. But in the buy-centric model, these employees will turn their focus to configuration and release management. Their responsibility will be to change current business processes to meet the best practices incorporated within the chosen application package. This is a critical role in the shift from development to gaining value from the functionality within the application.

Packaged applications often offer self-service administration and support functionality, such as the ability for end users to set up their own passwords. As a result, many firms find that applications groups and "shadow IT" groups assume responsibilities similar to those of the IT department. IT executives should therefore ensure that they have employees with user administration skills who can manage IT access, security, and users across the enterprise. This may require going to a training course in the vendor's software for that function.

Identity management has gained a great deal of attention in response to a need to be accountable for assets, data security, and user information. These areas have been the focal point of audits for compliance with various industry and government regulations. As such, IT executives also must ensure that an approval hierarchy and security policies are in place. Some of this responsibility will move to shadow IT or direct business users, depending on corporate culture, which is not necessarily a bad thing but needs to be considered in planning.

As for programmers, their focus will move from programming applications to configuring the application package. Depending on the package the enterprise selects, programmers can also choose from numerous tools with which to customize the software and still be able to incorporate upgrades from the vendor. Programmers will also be responsible for integrating the new application with incumbent legacy systems and for ensuring that applications are running on supported servers, that databases are supported, and that disaster recovery processes are in place.

The "turnkey" label for packaged applications is often misleading. Between retraining and rapid deployment mandates, the outcome is usually a lengthy process requiring skills that address both the old and new systems. IT executives often need costly third-party integrators to integrate packaged applications with legacy systems. When working with systems integrators, IT executives should ensure roughly a sixty-forty split between consulting

resources and staff to ensure that knowledge of application idiosyncrasies is transferred to internal staff.

In summary, application replacement will affect your staffing, skills, and training needs. This may result in a greater emphasis on skills such as release management, software configuration, security and database administration, reporting, and legacy interface design. Temporary staff augmentation may be required to assist but regardless of whether the company hires contingent staff, outside consultants, or both, these third-party resources should be viewed as temporary. Their goal is to complete the implementation and to work with full-time internal staff to train them on the new software and configuration tools. Hence, knowledge transfer is extremely important for a company eventually to be able to proceed on its own (post-implementation) and continue to provide support and maintenance to its customers.

## **Focusing on Process Skills (or Not)**

Perhaps surprisingly to some, processes are not the focus of migration efforts. Processes represent the work that needs to be done in all IT and business areas (business, infrastructure, and operations processes). However, processes are the building blocks for products and services. Thus, focusing on products and services when evaluating and planning migration efforts is a best practice.

Unfortunately, many companies have yet to establish a product and service portfolio that provides both the mapping to processes and the full range of products and services that must be considered during mainframe migration. Moreover, mainframe-specific processes are often embedded within a portfolio that does not distinguish between platforms, which is problematic. For those companies, processes are necessarily the focus, and a process portfolio should be employed—or built, as the case may be. Overarching efforts such as Control Objectives for Information and related Technology (COBIT), IT Infrastructure Library (ITIL), master data management (MDM), and service-oriented architecture (SOA) should also be employed because these represent pervasive efforts to focus on both processes and products and services. If the results of such efforts have not matured to the point of adding value, the minimum tie-in should be to begin developing the required documentation as part of the migration project.

Operational activities is one area where a process focus is appropriate. Change, release, testing, and quality assurance (QA) processes represent the "rubber meets the road" work that supports production implementations, and these processes can render all earlier efforts futile if not done correctly. ITIL has become the de facto framework for defining operational processes and, from the standpoint of personnel and in-house skills, requires the coordination of multiple IT and business areas. The best way to address process issues is to identify each constituency as a customer or supplier to the process and to ensure that each group negotiates expectations that optimize the migration while preserving local procedural differences.

## **Project Skills and Training Considerations**

Project structures are required for migrations, and these skills can be critical to the successful outcome of a migration. It is also important to understand that migrations are not a typical project, especially given the multiple-pronged nature of mainframe elimination where many applications are being migrated. PPM is important because it focuses on the management of the relationships between a number of projects, including the reporting of each project's (and the overall program's) success.

The skills for PPM are usually housed within the PMO, whether reporting indirectly or directly. Indeed, many organizations are currently struggling to fortify project management processes

and skills along with the unique skills associated with PPM. While it is important to maintain and capitalize on in-house skills for these disciplines, experience indicates that reliance solely on internal staff and skills increases the risk of failure. If a vendor is employed to manage migration projects, its experience (such as building in contingencies for unplanned migration tasks that may arise) helps avoid many of the problems that an employee would encounter when doing the migration for the first time. Thus, it is probably better to look to external providers for project management unless in-house project management (and PPM) processes are mature and other aspects of the migration are being handled mostly in house.

Because the work underway in regulatory compliance projects may be altered by the migration process, it is important to coordinate these during migration. The PMO provides a critical, early role in migrations by tying all current and planned projects together in the context of the PPM, with compliance a preponderant. Increasingly, the ability to manage projects in relation to one another is becoming a critical enabler for all projects. The notion of reuse, which entails utilizing communications, including key milestones, and applying lessons learned from previous projects, is also becoming central to how these projects are coordinated.

There are many dimensions and levels of planning—ranging from strategic to tactical and from business to IT—but the best-laid plans for migration projects must originate from the strategic business plan. This is where the understanding of each application's value and long-term disposition are defined, and the tenets of the business strategy should guide migration decisions. The most important element of planning is the vision of how the data, business processes, applications, and infrastructure will be affected by the migration. This serves as the basis for identifying key tasks and other milestones that ensure efforts are on track.

## Summary

IT systems dependent on aging staff and legacy technology is a serious issue for IT leaders. IT modernization and specifically mainframe migration can mitigate this risk and generate significant benefits for an organization, both in reduced costs and better use of staff resources. However, mainframe migration projects can be complex, especially when they touch multiple areas within the organization. Whether small or large, these efforts are best begun with a formal staff and skills assessment to compile and understand related skills requirements.

Books, online videos, training, and myriad additional resources exist to help with migrations. The experiences of others should be utilized to identify best practices, key issues, and pitfalls, and ways to maximize the migration experience and associated benefits. Experience and training cannot be underestimated; and for organizations that have applied rigorous IT staff management in this context, the result has been better use of internal staff and avoidance of unnecessary services.

Using a new, packaged application in the target environment versus rewriting or porting the old application can have a profoundly simplifying effect on the nature and outcome of the project. Most IT organizations favor packaged applications if they are available and reasonably match business requirements; this choice makes the project easier and less reliant on the skills of application programmers and subject matter experts.

Use of RFI and RFP processes will help in choosing a service provider and assessing provider capabilities. The general rule to follow for outsourcing migrations is to determine the in-house capabilities available to plan, build, and execute the migration, and then to determine the gaps that exist. It is also critical to consider the target state and associated staff and skills requirements. If the gaps are many and large, outsourcing is probably the right decision.

Tier 1 providers will perform the whole effort but will do so using their own tools and techniques. Tier 2 providers are more willing to customize the effort to include in-house staff, tools, and techniques, and these providers usually do a better job of transferring skills throughout the effort. Either way, the ability to migrate workloads successfully from the mainframe must be well planned and should be driven by a clear and concise IT modernization strategy.

Given the nature of IT ecosystems, it is most important to consider the impact of mainframe migrations on other projects, people, and processes. Care should be taken to evaluate the training and information requirements of all IT groups and within all disciplines, most notably the PMO. This project clearinghouse group should receive sufficient training to understand the impact of the migration project on all other projects and the impact of the associated role changes among support staff. These forms of training are often overlooked and can lead to problems midstream. With the wealth of training and related mainframe migration materials available today, good planning will result in major dividends if all such needs are considered beforehand.

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