

WHITE PAPER



mclellan creative
RESEARCH

EXECUTIVE GUIDE

Legacy Modernisation:
*An Executive Guide to
Gaining New Returns from
Old Technology Investments*

SEPTEMBER 2010

Research Underwritten by Progress Software

Executive Summary

Many organisations are still partially or fully reliant on IT systems that were first developed more than 40 years ago. In some cases these legacy systems may be running on updated hardware platforms, but still lack modern interfaces to facilitate integration with new business applications, and the problem is compounded by the fact that there is a dwindling number of mainframe skilled staff to administer these systems. As such, organisations can easily view these systems as significant operational or commercial risks that may need to be ‘ripped and replaced’ with more modern alternatives. Unfortunately, attempts to replace such systems have often resulted in high-profile and extremely expensive failures.

This white paper will review the business drivers used to justify most legacy modernisation initiatives. It will consider the real-world challenges such initiatives frequently encounter and identify current best practice in the field. Finally, it will identify how legacy modernization is converging with other IT disciplines to deliver solutions that combine legacy system functionality with state-of-the-art technologies to deliver true business agility in a cost-effective manner with minimized operational and commercial risk.

Introduction

The collapse of the dot.com boom at the turn of the 21st century is viewed by many as the most obvious example of IT-related commercial failure yet seen. The demise of dot.com overshadowed another equally significant failure that was occurring simultaneously as some of the world’s leading corporate giants and public institutions attempted to scrap established legacy systems for more modern alternatives. These legacy-replacement initiatives were high-profile projects with catchy code names, extensive staffing and ambitious objectives. Unfortunately, many were abject failures that never even made it into production. Some of the world’s most respected institutions and brands were forced to back-pedal and abandon months, if not years, of IT development work. In many cases they were forced to write off millions of pounds (hundreds of millions in some cases) and incur further untold losses in terms of time, talent and competitive edge. It happened in every sector—banking, insurance, healthcare, manufacturing, retail, telecommunications, government, logistics, wherever the mainframe proliferated.

The challenge we face today is how to make wise business decisions within the current economic climate and uncertainty that is affecting us all. As budgets are reduced and the demands on your business systems and applications increase, being able to implement changes, cost-effectively to flex any competitive advantage is paramount. Being able to focus on IT optimisation, enhancing and simplifying data integration and application transformation will enable you to implement the changes that matter to the business.

Growing awareness of the challenges associated with mainframe migration has forced the IT sector to re-evaluate its approach to legacy system modernisation. Despite their outdated architectures many legacy systems are still effectively the ‘vital organs’ of the enterprise. Any attempt to transplant them without appropriate care, planning and safeguards threatens the health of the entire business. Alternative legacy modernisation approaches are now emerging that take a more considered and holistic view of the overall modernisation challenge.

Such strategies seek to gain a better upfront understanding of the legacy systems’ precise functional scope, to identify any opportunities for reuse or modernisation, and

The combination of legacy modernisation tools provided by Progress Software has enabled us to avoid costly changes to our existing infrastructure.

*—Leading Insurer,
UK Life, Pensions and
Investment Industry.*

to ensure that any system migration activity is precisely planned so as not to stress the wider business enterprise unduly. These strategies are discussed in greater detail later in this document, but first it is useful to consider the specific challenges posed by legacy systems, as these collectively provide the commercial business drivers for most legacy modernisation activity.

Business Drivers for Legacy System Replacement

A number of business drivers compel organisations to consider replacing their legacy systems.

- **High Cost of Ownership**

Application and hardware maintenance costs tend to be higher on outdated system platforms. Organisations become locked into specific tools, skill sets, vendors and partners. Additionally, mainframe processing capacity is expensive and upgrades for additional capacity can trigger additional charges from independent software vendors who based their licenses on mainframe capacity measured in MIPS. That means less budget and resources are available for new, more strategic initiatives.

- **Complex Integration Challenges**

Disparate enterprise systems present numerous integration and connectivity problems, making it difficult to share information across the enterprise or with external partners. The lack of business visibility due to limited access to real-time operational data can create problems for those responsible for corporate governance and regulatory compliance.

- **Increased Operational Issues**

Cumbersome, outdated user interfaces lead to inefficient business processes as system users are forced to ponderously navigate dozens of 'green screens' or for that matter, dozens of modern, siloed applications with no real single view. Business rules are often buried within such screens, making them difficult to access and change. Users of such systems are thus often required to manage a widening gap between the system's functionality and their actual business requirements. This in turn increases the need for staff training while simultaneously reducing morale as staff begins to resent their outdated system and worry about their personal ability to develop new and pertinent skills. In most cases (and this is not an extreme) the Post-it® note becomes the bridge between what the system does and what it should do, leading to the 'I'll do that later' death spiral.

- **Elevated Risk and Business Continuity Concerns**

Ageing or unsupported systems elevate risk, and maintenance costs, while frequent upgrades force downtime. Additionally, as these systems age, the pool of skilled personnel diminishes. Organisations become locked in to specific vendors for support and maintenance. For the same reasons, back-up and disaster recovery plans are much more difficult. Companies also fail to support 24x7 uptime goals, losing revenue and incurring service-level agreement (SLA) penalties as a result.

The main point to take away from this list of issues—and one of the primary problems addressed in this paper—is that legacy systems can all too often become silos, self-contained system environments that ring-fence valuable data and functionality required by other systems or users across the enterprise, and lack cost-effective methods for modernisation.

An organisation that finds itself with such legacy silos suffers an associated reduction in its ability to respond to new requirements. This inflexibility can alienate customers, incur productivity losses and other related costs, and frustrate employees. It is perhaps unsurprising that organisations facing such challenges are frequently persuaded to consider replacing their legacy systems. Unfortunately, many attempts to achieve this have created somewhat mixed results.

Legacy Replacement: A History of Failure and Success

The Ford Motor Company's adventure with Oracle is often held up as an obvious and significant legacy 'rip and replace' cautionary tale.

Ford wanted to streamline their procurement processes, speed operations and eliminate paper across their organization by launching a new Web-based purchasing project with Oracle. The project, called 'Everest,' consumed almost 350 IT staff and was eventually dubbed 'Neverest' because it failed so miserably. Ford pulled the plug after four years and \$400 million. In test versions, end users were forced to navigate multiple screen layers only to find that they couldn't see all their data. Functionality was missing, inefficiencies were added, and none of the modernisation goals was accomplished. Ford eventually said it would revert back to the original legacy systems that Everest was to replace.

Those organisations that do manage to replace their legacy systems successfully still tend to incur heavy losses that include money, time, retraining, loss of competitive positioning etc. For many organisations such costs are just too daunting and have led them to explore an alternative strategy that focuses on modernisation and enhanced integration rather than replacement.

Washington State University is a good example of this growing trend. When the university began to investigate the possible replacement of its ageing backend administration system, it was quoted conservative migration costs of between \$30 and \$50 million. The timeline? Five years!

Washington State University was sufficiently concerned by these projections that they established a project to investigate possible alternatives to a wholesale migration strategy. They eventually adopted a SQL-based integration strategy that allowed newer systems written in ASP, JSP, .NET and JAVA to issue queries against their legacy student information system. The Washington State University experience, (and others like it), are indicative of an increasingly common trend towards legacy system modernisation rather than legacy system replacement. Such an approach allows organisations to retain valuable IT functionality developed over many years and to extend existing investments by transforming reliable workhorse systems into modern, flexible business applications. This trend is heavily influenced by the rising popularity of enterprise integration initiatives. Such technologies are fundamentally changing the architectural landscape of most enterprise IT functions and are making it easier to blend new and old functionality rapidly, successfully and above all seamlessly.

The legacy modernisation approach does not suit every situation. There will always be certain systems and scenarios where total replacement remains the most viable option. Fortunately, the majority of organisations now have the option of modernising legacy systems with confidence, thus avoiding the risks (and costs) encountered by organizations such as Ford. The next section charts the development of legacy modernization approaches from the early days of 'screen scraping' to present day SOA-based composite application development.

Our financial organisation realized an investment return in only 13 months, well before the original goal of almost four years. In a very short time we can gain the benefits of the investments in the backend systems and completely regenerate those systems to be reused in multiple channels. We are armed and ready for a service-orientated architecture.

*—Application Architect,
Global Financial
Services Organization*

By using Progress we've been able to modernise our application without compromising our technical or business vision.

—Director, Information Systems, Estate Agency Network

Progress products are incredibly flexible. We can have people on our team working on different aspects of the same project, and, when the time is right, we can converge that work together. This accelerates the development process significantly.

—Architect of Systems and Applications Integration, Global Telecommunications Company

The Changing Face of Legacy Modernisation

Organisations have historically employed three approaches to the modernisation of existing legacy systems: enhancing the user interface, accessing data directly using enterprise application integration middleware, and developing new front-end applications for legacy systems.

The earliest attempts to modernise existing legacy systems focussed heavily on changing the application's look and feel. 'Screen-scraping' tools provided developers with the ability to transform and extend ugly and inefficient green-screen interfaces into Windows® or Web-based screens that were effectively indistinguishable from any other modern business application. Such an approach could typically be implemented very quickly and delivered a significantly improved end user experience with more efficient screen sequencing and reduced training costs. Unfortunately, it did little to address the more fundamental legacy system concerns already discussed above. The legacy platforms remained in place; the development effort to maintain the legacy system was unchanged; and the ability to directly access its data from other systems remained elusive. Despite its many advantages, the 'screen-scraping' approach to legacy modernisation was obviously not the definitive solution. A silo, however appealingly decorated, remained fundamentally a silo.

Organisations have also modernised applications at a more fundamental level by accessing their data directly using enterprise application integration (EAI) middleware. Such an approach offered many advantages, especially in situations where the functionality of the legacy system was particularly valuable to the enterprise. At a stroke the old user interface could be bypassed. A new generation of Web and Windows applications could leverage and extend the legacy functionality directly. Development effort on the legacy system could be reduced or in some cases halted as most changes could now be made within newer application development environments. Unfortunately, such an approach also created a new set of challenges related to the architecture of the legacy applications themselves. Most modern applications are designed to separate interfaces, business logic and data in clearly defined layers. Another issue related to the EAI middleware itself. This created a new, expensive and typically proprietary layer across the enterprise that required a new set of skilled developers and administrators. In many early EAI projects the cost of investing in the middleware technology almost negated any discernible business benefit.

Best Practices for Legacy Modernisation

There are now new technologies that can effectively deal with the challenges of mainframe modernisation. With over 20 years of integration and data access experience, Progress Software has amassed the experience and comprehensive integration solution necessary to address the legacy modernisation paradigm and shortcomings of previous approaches. The following key best practices help to ensure a successful legacy modernisation. These best practices enable an organisation to exploit legacy data and systems across the enterprise and increase increases the ability to respond to market changes quicker and more efficiently.

• Employ Standards-based Integration

The rise of standards-based integration, initially with tightly coupled interfaces (ODBC, JDBC and ADO.NET), and more recently with loosely-coupled Web services, and Enterprise Service Bus (ESB) technology, has provided increased



mclellan creative
RESEARCH

flexibility for organizations to integrate legacy data and applications with a wider variety of data integration and SOA initiatives. Similarly, mainframe 'screen-scraping' has evolved to now leverage technology that interfaces with the underlying map definitions, rather than coordinates on the screen. This approach ensures integration integrity and reduces maintenance. Screens can now serve as foundational elements for Web services, singularly or as an aggregation in order to complete a logical business process. It is now easier to access existing legacy functionality via a standards-based service call.

• Provide Enterprise-wide Data Access

The benefits of a 'data access' legacy modernisation strategy are not just limited to increased responsiveness and development agility. Access to data regardless of where it resides within the enterprise allows management staff to precisely monitor and control the important business data that flows around the organisation. This essential information can be used easily by any business intelligence tools. Bottlenecks can be identified and addressed. Resources can be redeployed for greater operational efficiency. Enterprise dashboards can be created to further simplify the task of day to day management and to avoid unnecessary surprises.

• Leverage Composite Application Development Tools

The issue of front-end application development is also being addressed. Instead of creating additional self-contained business applications with associated maintenance overhead, many organisations are choosing to create composite applications that incorporate mainframe data or logic as services that can be called from any new application. These 'services' can consume the legacy data already described and incorporate it into enterprise business applications in a manner that allows business users to retain greater control over the development of their required functionality.

Significant development has been made in transforming legacy modernisation initiatives with 'rich Internet application' development solutions based on Web 2.0 technologies such as Asynchronous JavaScript and XML. This new generation of composite application development tools enables the creation of high-quality user interfaces that provide capabilities directly equivalent to the best Windows screens via a humble Internet browser.

For the first time a business application wrapped in such an interface and delivered via a browser can provide an end user experience that is every bit as ergonomic, efficient and aesthetically pleasing as a traditional commercial application.

• Reduce the Cost of Modernisation Initiatives

Legacy modernisation, whether it is old style, custom coded approaches, or more modern service oriented techniques, places an additional cost burden on an already high mainframe Total Cost of Ownership (TCO). Modernization of mainframe applications and data is essential for integration with other enterprise services, data and processes that drive business value—but it has to be accomplished in a manner that reduces mainframe TCO.

One target has to be the overly complex integration 'spaghetti' that develops over time as organisations interconnect the various databases, applications and

With the right mainframe modernisation tool in place, the mainframe has unrestricted use of our online payment application, essentially enabling the mainframe to act as a client to the overall SOA architecture, able to consume common web services available to all applications supported by the underlying architecture.

—CIO, US Media and Publishing Firm

Technological advancements like SOAs, Web services, ANSI-92 SQL and XML Events address many of the challenges of mainframe integration, but cost still remains a primary customer concern.

—Susan Eustis, President and CEO, WinterGreen Research

interfaces that underpin their business. Multiple, redundant layers of integration connections require additional hardware, management software, and personnel—all adding to costs. An optimal approach would be to use an ESB to provide a real-time, fault tolerant integration layer for connectivity. A natural extension to the ESB for mainframe modernisation is a single mainframe integration platform that supports multiple, parallel integration methods—data access, Web services to business logic and screens, Events from data or transactions, and Web enablement of mainframe screen applications. This approach allows for management across all integration types and to a broad range of mainframe environments. A single mainframe integration platform can reduce complexity, lower costs and eliminate the risk.

Secondly, reducing the cost of modernisation must involve strategies for reducing mainframe MIPS capacity usage, while keeping the workload on the mainframe. Data replication or migrations for the purposes of reducing processing costs leads to issues of data latency and inconsistency. Thankfully, IBM® provided a window for keeping specialized workloads on the mainframe via its specialty engines, co-processor that functions just like a mainframe's General Purpose Processor (GPP), but without capacity charge or speed restriction. When used in combination with new mainframe integration middleware, specialty engines can be used to handle the onerous processing associated with data integration and parsing of mainframe application into Web services utilizing zIIP specialty engines. Leading mainframe modernization middleware can divert up to 99% of the integration related processing that it handles from the GPP to the zIIP specialty engine in a proven, risk free manner.

A third and final issue relates to the development of new front-end applications. Organisations embarking on such development initiatives quickly began to realise that they were in fact creating parallel architectures that were characterised by a growing web of interdependencies with other systems, often custom-coded and requiring careful management. As external pressures intensified, many organisations discovered that such a complex IT landscape severely limited their ability to cope with rapidly changing business requirements. Even minor business changes required a coordinated development response involving several disparate teams. A growing demand for reduced costs and greater business agility collided with an increasingly cumbersome and expensive corporate IT reality.

Conclusion

The layering of a services capability on top of standards-based legacy integration has dramatically changed the rules of legacy modernisation. Elderly IT systems running on disparate platforms can be pruned back to expose core data and programs (business logic or screens) that can then be wrapped, and plugged into one or more applications, and delivered to end users via a state-of-the-art user interface. Such an approach can be applied incrementally to create a body of reusable applications and legacy services that can grow over time.

Short-term requirements and long-term strategic plans can both be accommodated with equal ease. Such an architectural approach to legacy modernisation may not suit every situation, but in most cases it is worthy of serious consideration. Even when legacy system replacement is deemed the only viable option, it is increasingly common to find that the new replacement system is actually a highly modular set of services designed to be plugged directly into such an SOA-based framework.

These enterprise integration strategies have caught the imagination of virtually every major vendor, analyst or IT service organisation and they are here to stay. Unfortunately, it is a deceptively complex paradigm to implement effectively with its own techniques, terminology and best practices. Organisations seeking to implement SOA-based strategies are frequently advised to seek out partners who can provide an appropriate combination of SOA technology, expertise and pragmatic, real-world understanding. Progress Software is just such a partner organisation and has gained considerable experience of the SOA-based legacy modernisation paradigm.

About Progress Software

Progress Software Corporation (NASDAQ: PRGS) is a global software company that enables enterprises to be operationally responsive to changing conditions and customer interactions as they occur. Our goal is to enable our customers to capitalize on new opportunities, drive greater efficiencies, and reduce risk. Progress offers a comprehensive portfolio of best-in-class infrastructure software spanning event-driven visibility and real-time response, open integration, data access and integration, and application development and management—all supporting on-premises and SaaS/ cloud deployments. Progress maximizes the benefits of operational responsiveness while minimizing IT complexity and total cost of ownership.

To learn more about modernising your legacy systems to gain new returns from old technology investments, contact Progress Software at +44 207 7880130 or visit www.progress.com.

About McLellan Creative Research

McLellan Creative Research (MCR) is a leading research company providing market intelligence and insights for the information technology, healthcare and consumer technology markets. MCR helps IT professionals and business executives understand emerging technology trends and solutions, develop creative strategies and make decisions on technology purchases. In addition to research and writing services, MCR also offers worldwide translation and localization services through its partnership with Hewlett-Packard ACG. Founded in 1995, MCR creates research documents for companies ranging from global enterprises to small startups. The company's expertise includes the development of individual research documents, white papers and thought leadership. A division of McLellan Creative, MCR is headquartered in Ashland, Oregon and its team of technology research associates is located throughout the U.S. and in Europe.

For more information about McLellan Creative Research, visit www.mclellancreative.com.