



Unlock the value of legacy systems with MuleSoft

A Guide to Creating a Connected Company with
Anypoint Platform

The Connected Company unlocks legacy systems

The world is moving at lightning speed from legacy enterprise software to SOA, SaaS integration and APIs, compelled by the power of convention over configuration and the promise of agility and operational efficiency. Yet most businesses face a widening divergence between the IT infrastructure demanded by emerging business needs and the infrastructure they've built up over generations.

While businesses may have strategic imperatives to build rich mobile applications, move services to the cloud or simply reduce long-term costs by modernizing existing assets, the information enabling these initiatives—namely data and businesses processes—is tied up in legacy systems. This all-too-familiar scenario is one of the chief impediments to innovation within established businesses. Unresolved, it can stunt growth and ultimately lead to business decline.

“**While businesses may have strategic imperatives to build rich mobile applications, move services to the cloud or simply reduce long-term costs by modernizing existing assets, the information enabling these initiatives—namely data and businesses processes—is tied up in legacy systems.**”

The smart enterprise is meeting this challenge head-on, by connecting legacy systems with today's explosion of applications, data, partners and customers to create a seamless, high-performing organization. This Connected Company is a vanguard of a new economic world order, wielding a new competitive advantage—with help from MuleSoft's Anypoint™ Platform.

Legacy pains in the unconnected company

Generally speaking, legacy systems are technologies, computer systems, or applications that were implemented to solve earlier business challenges. Though the ages of these “older” investments vary broadly, the pains associated with legacy systems commonly appear over time, in the form of inefficiencies. Although they usually aren't as fast, scalable, or flexible as newer solutions, legacy systems are nonetheless maintained, because they've become critical to some aspects of business operations, and can't be easily eliminated or replaced.

What are the pains legacy systems inflict?

- In-house analysts and/or programmers don't fully understand them
- Expertise to monitor and maintain them is close to nil
- Their layers of custom code—improvised over the years—create multiple, fragile dependencies
- Physical access to them is limited
- Implementation and usage is largely undocumented
- Connections to other SaaS or on-premises applications are extremely difficult due to lack of clearly defined / accessible / implemented APIs
- They create an unclear migration path and vendor lock-in

Legacy systems also carry massive maintenance expenses. According to a study by Business Technographics, 75% of North American and European enterprise IT budgets are expended on ongoing operations and maintenance, leaving a mere 25% for new investments. Another study found that nearly half of the US Federal IT budget is spent supporting legacy systems. Many of the expenses associated with these legacy systems derive not from simple maintenance but from new demands on them—which usually go far beyond their original purpose and design.

“**According to a study by Business Technographics, 75% of North American and European enterprise IT budgets are expended on ongoing operations and maintenance, leaving a mere 25% for new investments.**”

As a result, businesses generally face a stark choice: continue with these systems and lose access to the advantages of modern alternatives, or undertake a wholesale “rip-and-replace,” at great expense and risk of disruption.

Before deciding on a strategy for how to deal with legacy systems, it's important for organizations to consider several key questions:

- What is the most essential data in your enterprise?
- What are the most essential business processes in your enterprise?
- What current initiatives do your legacy systems fail to support (e.g., integration with e-commerce, mobile, SaaS, ERP, CRM, APIs, etc.)?
- How would you ideally like your legacy systems to fit into your future infrastructure?

Common approaches to legacy:

There are three common solutions for approaching the challenges posed by legacy systems:

- **Let it be** – In some instances, making fundamental changes to a legacy system may be unwarranted. When a system is both of high quality and high business value, it's best to continue using it as normal.
- **Replace it** – Retire the system and modify business processes so that the legacy system is no longer required. Low-quality, low-business-value systems are best excised wholly from the organization.
- **Modernize it** – This approach may range from simple, noninvasive changes that enable Web functionality to full-bore migration to other languages and platforms. Systems that are of low quality but high business value are typically expensive to maintain and should be modernized.

Of these options, modernization is typically the lowest risk and least intrusive approach for dealing with the pains of legacy systems. However, it also requires the adoption of technologies that facilitate seamless integration.

Legacy modernization

Modernization represents an attractive alternative to replacing legacy systems. There are several approaches to legacy modernization, and selecting the right one for your organization is critical. No component of a modernization effort is more important than the integration platform—which enables organizations to expose legacy systems as services and make them available for use in new, more modern applications.

Much has been written on the topic of how to expose legacy systems under the heading of “Service Oriented Architecture” (SOA). But SOA doesn't fully address the critical need for an intermediary communication layer that exposes and brokers connectivity from legacy systems, formats, and transport protocols to new systems and applications. Such a communication layer is needed, for example, when a legacy system provides only a file-based interface or a data format that's unique to the system. For certain IBM-based legacy products, an IBM Websphere Message Queue—itsself a legacy solution—may be the only defined interface. In contrast, modern applications may be written using SOAP or RESTful web services. Integration platforms provide the necessary transformations among these various systems and applications—without the developer's needing to understand the legacy interface.

There are, of course, potential pitfalls in such modernization approaches. Modernization of legacy software demands careful analysis of different modernization options and strategies that affect the interests of many stakeholders. The process requires making non-trivial and non-obvious tradeoffs. Some integration solutions are so complex and expensive to deploy that it would be more efficient to simply replace the legacy system. Others lack robust connectivity to the often irregular interfaces provided by legacy systems.

The most common trap organizations fall into is selecting an over-engineered solution for legacy modernization. Many vendors propose highly closed proprietary SOA stacks comprised of multiple products, including application servers, enterprise service buses, orchestration engines, management tools, and development tools. More often than not, these solutions are accompanied by large consulting projects. Rather than modernizing a single or small number of legacy systems, these projects entail adopting an entirely new business architecture. Once the project is completed, the company's development team requires substantial retraining on the new architecture. These developers have to throw out their existing tools, processes, and skillsets and be heavily retrained to the new solution—resulting in high upfront costs and multi-year rollouts.

“The most common trap organizations fall into is selecting an over-engineered solution for legacy modernization.”

Additionally, many integration solutions fail to account for the future needs of the business. For example, many have poor or no support for emerging SaaS applications or API initiatives. According to CIO Insight, 43% of IT executives believe a failure to integrate with legacy systems is the biggest barrier to future mobile initiatives. So failure to select a solution that can enable legacy modernization as well as enterprise mobility on a single platform limits future flexibility. When done properly, with the right integration platform and the right design, legacy modernization can offer impressive results with minimal impact on the business processes delivered by the legacy systems.

“When done properly, with the right integration platform and the right design, legacy modernization can offer impressive results with minimal impact on the business processes delivered by the legacy systems.”

To ensure the best selection of integration middleware to support a legacy system modernization project, organizations should consider these key questions:

- Which systems are central to your business infrastructure, today and in the future?
- How do you plan to access your legacy systems? Which interfaces does the system offer (e.g. REST or SOAP)?
- Are there problems interfacing the system to other systems? How will you mitigate these?
- Are you doing any system migrations or is this a stable environment?
- Is there an explicit data model for the system? To what extent is data duplicated in different files? Is the data used by the system up to date and consistent?
- Are there people available who have the skills to maintain the application? Are there only a limited number of people who understand the system?

Connect legacy without disruption

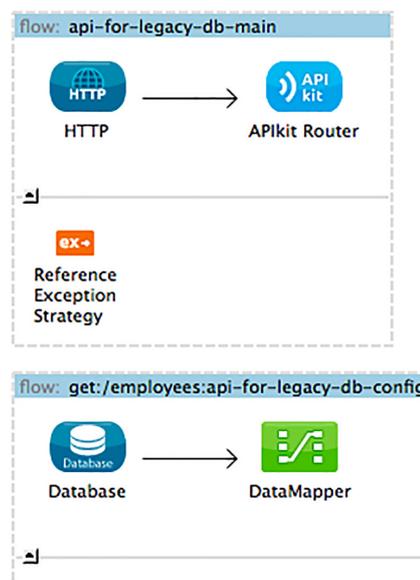
MuleSoft has helped hundreds of companies overcome the challenges of legacy modernization. MuleSoft's solutions expose legacy systems with their legacy data formats and transport protocols in a straightforward way.

An implementation for a legacy modernization use case typically involves the following:

- **Orchestration** – Composing several fine-grained legacy components into a single higher-order composite service. This can be done to achieve appropriate granularity of services and promote reuse and manageability.
- **Data transformation** – Transformation between legacy system formats and standards-based data formats. Examples include transforming between CSV, COBOL copybook, or EDI formats to either SOAP/XML, REST or JSON.
- **Transport protocol negotiation** – Transport protocol negotiation between legacy transports such as file-based applications, FTP, traditional email (SMTP) or proprietary messaging formats and contemporary internet-based HTTP protocols.
- **Mediation** – Providing support for multiple interfaces for the purpose of a) supporting multiple versions of a service for backwards compatibility, or b) allowing for multiple channels to the same underlying component implementation. The second requirement may involve providing multiple interfaces to the same component—one legacy interface (flat file) and one standards-compliant (REST, SOAP/XML) interface.

- **Non-functional consistency** – In legacy modernization projects, this can involve providing a new secure channel (including authentication and authorization) for external consumers of legacy components that were originally designed with only internal consumers in mind.

Let's look at a very simple example of these capabilities in action. In the following example, a REST API exposed using APIKit returns employee information after a 'GET' request is made to the '/employees' API. The API abstracts the user from the legacy implementation, which in this case is a legacy database. This flow shows the data transformation capabilities made possible by Anypoint DataMapper.



This example demonstrates how to leverage an investment in an existing system by taking existing database functionality and exposing it as a web service. This design furthermore promotes loose coupling, since consumers are now interfacing with Anypoint Platform instead of invoking the component directly. In this way, the platform dramatically simplifies the process of onboarding additional requirements regarding transformations, transports, orchestrations, service mediation—and even non-functional requirements based upon the integration principles outlined above.

One of the key benefits of this solution is its simplicity and elegance. MuleSoft's solution doesn't require specialized developer knowledge or costly training programs. Development teams can start to modernize existing applications in a fraction of the time it takes with alternative solutions.

Another of the solution's benefits is its long-term agility. Because it's so accessible, it eases the burdens of hiring IT staff, controlling salaries, and onboarding new employees. The following case study illustrates this point in greater detail.

Customer case study: Fortune 100 Healthcare company

After an acquisition that doubled the size of the organization, this firm's IT team needed to rapidly connect some of the acquired company's legacy applications and databases with existing infrastructure. At the same time, they also needed to make it easier for customers to interact with them over the web and on mobile devices. Complicating matters was a high-throughput use case: the company handles over 2.5 million transactions each day, each of which must be routed between partners with differing data standards and unique ways of exchanging information. In adopting a new integration platform, the development team sought to streamline the technologies the company used for service development, as part of a larger SOA initiative to improve reusability and consistency.

In a head-to-head comparison with a proprietary integration vendor, the Anypoint Platform delivered significantly improved performance across a range of key metrics. The development team also noted the solution's rapid deployment. "We rolled out Anypoint very quickly because it's built on common standards like Java and Spring, which allowed us to use commonly accepted developer standards without learning a proprietary ecosystem."

“ We rolled out Anypoint very quickly because it's built on common standards like Java and Spring, which allowed us to use commonly accepted developer standards without learning a proprietary ecosystem.”

Since Mule is easy to use and understand, any developer can quickly be productive, without lengthy training in vendor-specific technology. The Technical Lead estimates that in the three years following deployment of Mule, the company will save over \$2.7 million in reduced maintenance, staffing and consulting costs. The Anypoint Platform now serves as the backbone for all major integration projects at the company—connecting databases, legacy applications, and services.

Customer case study: National Postal Carrier

Postal services around the world are at a turning point. In the last seven years, this postal carrier has seen a drop of over 30% in letter volume and has reduced mail carriage because of lower demand carrier from six days a week to three. To stave off irrelevancy, this carrier decided to digitize and reinvent their services through APIs. The national postal service knew they needed a solution with rich design tooling that guided them towards best practices every step of the way. They also realized they needed a solution that made it easy to connect APIs with legacy systems, regardless of the technology on which those

systems were built. And because of the scale of their program and its large number of stakeholders, the solution had to be easy to learn and produce APIs that were easy for customers to adopt-all while scaling to support an ever-growing number of consumers.

Leveraging the Anypoint Platform allowed them to quickly design, develop and launch APIs on top of legacy systems and services to monetize their demographics data, enable customers to locate and purchase postal services from mobile devices, and extend their reach through connections to partners.

Unlock legacy systems to gain competitive advantage with Anypoint Platform

Anypoint Platform is the world's leading integration platform. It's especially well suited for legacy modernization, allowing enterprises to get up and running quickly, while providing a framework to meet future integration needs. Whether you're modernizing a mainframe application, a custom application built in-house, or any other legacy system, Anypoint Platform provides a clear and easy path to modernization.

With Anypoint Platform, enterprises can:

- Expose and integrate legacy systems as services, to leverage current IT investments
- Address immediate integration challenges while establishing a backbone for future SaaS and API initiatives
- Maximize developer utilization

Anypoint Platform, enables organizations to rapidly build applications that utilize legacy systems while supporting emerging technologies and business processes. By eliminating the need for expensive legacy system replacements, organizations can unlock the value of their existing investments to gain competitive advantage. Furthermore, unlike alternatives, MuleSoft's Anypoint Platform can be rapidly deployed and is easily understood by developers with little retraining.

By utilizing Anypoint Platform as a communication layer, valuable information that would otherwise be sealed within legacy systems can be exposed to new applications rapidly and effectively. Compared to alternatives such as rip-and-replace, continued isolation, or massive SOA projects, organizations adopting Anypoint Platform achieve faster time to ROI, lower risk, and better employee utilization.

Ready to get started?

MuleSoft has a team of expert consultants conversant in legacy modernization to help you develop your Connected Company roadmap. We have field-tested experience in integrating legacy systems with cloud services and multi-platform applications in addition to our expertise in the design and publishing of modern APIs. For those looking to learn more, these two webinars provide a deeper look into MuleSoft's technology:

Mule 101: Rapidly Connect Anything, Anywhere

What if you could deliver an integration project up to 8 times faster? With the Anypoint Platform from MuleSoft, you can. Join MuleSoft founder Ross Mason and Sr. Product Manager Steven Camina for a demo-driven walkthrough and discussion on how you can integrate faster with Anypoint Platform.

<http://www.mulesoft.com/webinars/esb/mule101rapidlyconnectanythinganywhere>

SOA and legacy modernization

Service-enabling legacy assets and effectively managing and orchestrating services are the first steps toward realizing the promise of the Connected Company. In this webinar, MuleSoft Sr. Product Manager Steven Camina will present strategies and demo solutions for getting the most out of your legacy assets. He'll also outline the steps you can take to build a solid foundation for future APIs.

<http://www.mulesoft.com/webinars/soa/legacy-system-modernization>

About MuleSoft

MuleSoft's mission is to connect the world's applications, data and devices. MuleSoft makes connecting anything easy with Anypoint Platform—the only complete integration platform for SaaS, SOA and APIs. Thousands of organizations in 54 countries—from emerging brands to Global 500 enterprises—use MuleSoft to innovate faster and gain competitive advantage.

For more information:



www.mulesoft.com



info@mulesoft.com



Mule ESB: <http://www.mulesoft.com/download/>

MuleSoft and the MuleSoft logo are trademarks of MuleSoft Inc. in the United States and/ or other countries. All other product and company names and marks mentioned in this document are the property of their respective owners and are mentioned for identification purposes only.

All contents Copyright © 2014, MuleSoft Inc.