

WHITEPAPER

The connected financial institution

Part 1: legacy modernization
industry drivers



Table of contents

About the connected financial institution	3
Introduction	4
Legacy modernization: the platform for change	6
Relying on aging back-office systems	6
The need to improve operational effectiveness	8
The rise of open-source software	10
Common approaches for legacy modernization	12
Do nothing	12
Rip and replace	12
Refresh and extend	13
Case study: P&C insurance company	15
Integration: the key to unlocking legacy systems	18
Ready to get started?	19
About MuleSoft	20

About the connected financial institution

Information Technology (IT) is no longer a mere steward of middle and back-office functions, but a critical business partner to growth. In this three-part whitepaper series, we'll explore the key challenges that financial institutions' IT functions must address: legacy modernization, in which we'll discuss how to bring legacy systems into the 21st century; data management, where we'll reflect on the need to access and aggregate data for regulatory reporting and customer-facing initiatives; and digital transformation, where we'll take a look at how to manage the mobile, omnichannel, and API technologies that bring value to customers. At the core of each of these challenges is the need for a new level of connectivity. To thrive in this era, financial services organizations must seamlessly integrate applications, data, and devices, and it is those organizations that are able to embrace these challenges — those “connected financial institutions” — that will win.

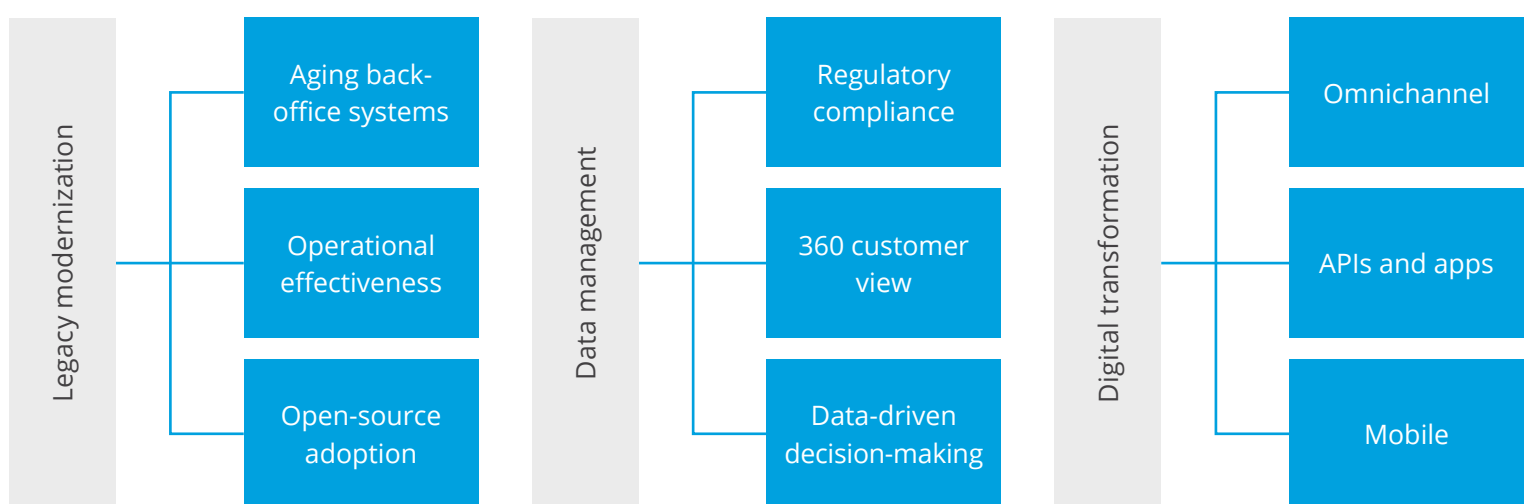


Figure 1: The connected financial institution

Introduction

The centuries-old financial services and insurance industries have been bulwarks of stability and reliability for understandable reasons. The business of storing, distributing, and keeping track of money has a profound effect on customers in a way that few other businesses can match. As a result, change has come slowly.

This is not to say that financial institutions have been afraid of technology. In fact, banks have often been early adopters. For example, in 1955 Bank of America adopted two systems built by the Stanford Research Institute — [Electronic Recording Machine, Accounting \(ERMA\)](#) and magnetic ink character recognition (MICR) — to automate check processing. Stanford notes that these digital systems, thanks to their increased data-processing power, revolutionized the way Bank of America did business. Its branches no longer had to close at 2 p.m. to process the day's transactions.

However, it is fair to say that financial services institutions are reticent to change. The reason is easy to understand: The price of systems failure for a financial institution could be catastrophic both from a regulatory and a customer point of view. The old adage “if it ain't broke, don't fix it” applies here. What's truly extraordinary is that the 60-year-old MICR line is still a critical component, even as check image processing becomes widely adopted.

In recent years, however, the case for change has grown to such proportions that it is compelling organizations to action. Customers are demanding more from their financial services providers as their lives have become ever more complicated and demanding; they want to be able to access their services at any time, at any place. And firms need to provide the services that a mobile-based, cloud-based world can offer, otherwise they'll lose customers to their competitors. In short, it's not

simply enough to “run the bank,” as some in the industry refer to business-as-usual spending. IT departments must support business initiatives to “grow the bank,” delivering new products and services to meet customer demand.

For financial services firms to do this successfully, the IT organization must become an innovation hub, undertaking transformational initiatives such as improving customer experience and enabling innovative digital offerings. IT departments must find a way to connect legacy systems that have worked for decades to the cloud, mobile, and social applications that the modern customer wants and needs. In short, they must successfully overcome the problem of legacy modernization.

In partnering with the world’s leading financial services firms, we believe that there are three core legacy modernization drivers: aging back-office systems, operational effectiveness, and open-source adoption. In this whitepaper, we address how each of these challenges is affecting the financial services industry, survey how organizations are responding, and propose best practices.

Legacy modernization: the platform for change

Relying on aging back-office systems

The IBM mainframe recently celebrated its 50th birthday and remains the processing workhorse at many large financial services firms. These firms depend on mainframes to run back-office systems for such critical functions as deposit accounting, policy administration, loan servicing, and payment processing. These applications are part of the foundational core application stack for running the business and will continue to serve their purpose for many years to come.

However, the financial services industry has not stood still in the 30 years since these systems were introduced. A new set of challenges has emerged that legacy systems are not always well-equipped to meet. The number of products an institution sells has expanded, the delivery channels across which firms must serve its customers have multiplied, and the speed at which they must respond to market changes has increased exponentially. As [Accenture states](#): “The banking industry is staring at a major challenge: how to drive growth, attract new customers, and slice costs while relying on 40-year-old technology systems.”

To take just one example, many banking systems were designed from the ground up to support batch processing. Banks continue to rely on massive nightly batch jobs to post deposit and loan transactions to mainframe servicing systems. In the U.S., the low-value domestic payment system (ACH) processes large volumes of credit and debit transactions in batches. Merchant processors use end-of-day batch posting processes for credit card receipts.

But today's banking customer interacts with his or her bank not only via a teller at a branch, but also online and via mobile, where being able to replicate balances and transactions in real time is critical. This challenge is one that systems designed for daily batch processing are ill-equipped to meet. Upgrading or extending systems to meet these new demands is a critical imperative to enabling growth.

“The back and middle offices of financial services organisations often have systems that are patchy, and in need of an upgrade to fit with the digital, connected world.”

[U.K. Department for International Trade](#)

Although some firms are bravely undertaking core modernization initiatives, legacy systems aren't going away tomorrow. Many banks have no immediate plans to swap out their core banking software; and no insurance company will blithely wave goodbye to its claims-processing system. But as these systems get older, IT architects at these institutions have to find novel ways of maintaining them cost-effectively while rolling out new products and services, all without making the entire structure crash.

The need to improve operational effectiveness

Operational effectiveness is a big challenge for technology professionals in the financial services industry. Industry analysts estimate that IT departments spend 60 to 90% of their budgets managing and maintaining older systems, leaving little left over for new initiatives.

And this is a situation that most businesses simply can't afford. With declining profits and rising expenses, it's not surprising that improving operational effectiveness remains a top priority for the financial services industry. Accenture looked at the aggregate efficiency ratio for North America's top 150 banks and found that despite a continued focus on cost cutting, the efficiency ratio for these banks is [lagging leading global banks](#), with North American banks' efficiency ratios approaching 70% and global bank ratios in the mid-40s. A bank's efficiency ratio is considered a key indicator of management's ability to control expenses.

A core component of the cost base is IT applications and infrastructure maintenance, much of it legacy technology. For the financial services industry, improving operational effectiveness is critical to outperforming, or at least keeping up with, the competition. Sixty-nine percent of survey respondents in Finextra's annual global transaction [banking survey](#) stated the major challenge to growing revenue in transaction banking was operational inefficiencies, disparate systems, and poor STP (straight-through processing). And this isn't just an issue for the banking industry. Celent estimates that more than half of property & casualty (P&C) insurers are planning some level of replacement of their systems in 2014, driven by profitability and operational-efficiency challenges. Celent cites [several reasons](#) driving replacement projects including maintenance expense, lack of flexibility, problems accessing data, and difficulty finding resources to work on older technology.

“Faced with slow growth and tight margins, banks have to address the fact that legacy systems all too often impose high — and increasingly unsustainable — costs of ownership and inflexibility...”

[Accenture](#)

Organizations’ response to inadequate systems has often been to add layers of makeshift functionality to compensate. As these layers have built up over time, what computer programming pioneer Ward Cunningham calls “technical debt” now weighs down IT organizations. [Cunningham says](#), “Every minute spent on not-quite-right code counts as interest on that debt. Entire engineering organizations can be brought to a stand-still under the debt load of an unconsolidated implementation, object-oriented or otherwise.”

It is this technical debt that has left financial institutions spending the majority of their time on maintenance rather than innovation. It is also this technical debt that has slowed the ability of IT organizations to respond to business initiatives, as developers must unpack layer upon layer of makeshift code to make changes, and often spend significantly more time on testing than on development for fear of the potential downstream impact.

The preferred approach to legacy modernization must not only prevent accruing additional technical debt, but must reduce that debt to increase organizational agility. Increasing the efficiency of technology and business operations leads to a reduction in costs, both in money and time, which can be reinvested into developing the innovations that current and potential customers want.

The rise of open-source software

The initial wave of third-party software investments often resulted in perpetual software licenses with large upfront fees and significant annual maintenance expense. Such license structures remove the economic incentive for software vendors to maintain a high level of service, and there is increasing dissatisfaction within the financial services industry regarding poor support, long lead times for bug fixes, and high ongoing costs. Moreover, these legacy systems continue to be “black boxes” that are difficult to inspect and troubleshoot.

Looking for alternatives, financial institutions are increasingly adopting open-source solutions. Access to source code provides an insurance policy against vendor lock-in. Moreover, with the source code under the pressure of public scrutiny, the quality of these applications is often higher than their proprietary rivals. Finally, financial services organizations are increasingly finding that open-source developer communities are often more vibrant, leading to greater innovation.

Key drivers of open-source adoption:

- 80 percent chose open source because of its quality over proprietary alternatives
- 69 percent said open source improved efficiency and lowered costs
- 55 percent responded that open source helped create new products and services

With these benefits in mind, organizations began to implement open-source infrastructure stack components several years ago, driving credibility within the enterprise. Many financial services organizations now have an open-source strategy, and according to Financial News, large banks such as Deutsche Bank, JPMorgan, Bank of America, and HSBC have all participated in open-source projects and are now looking at open-source solutions for an even broader set of applications.

Unfortunately, the choice to use open-source software and tools is often driven by developers or architects downloading open-source software for a single project, siloing knowledge of the technology, and ignoring the technology's potential to become a reusable asset with common patterns and shared resources. These firms have the opportunity to realize an even greater return from their open-source investments by developing best-practice reference architecture to solve problems in a repeatable way across the enterprise.

Common approaches for legacy modernization

The business case then for legacy modernization is clear. But how should technology leaders respond? From our experience working with leading financial services companies, three main approaches are being pursued:

Do nothing

In a surprising number of cases, despite a clear business case and technological need for change, none occurs. In these cases, the inertia for technology change often reflects a broader organizational inertia. At its core, legacy modernization is not only a technology challenge, but also one of leadership and vision. Financial institutions must have a clear strategic vision, alignment between business and technology leaders, and the drive to execute at a tactical level.

Without these factors, the operational needs of the business to “run the bank” will outweigh the strategic imperative to “grow the bank.” Ultimately, the financial institution will find it difficult to compete in a rapidly evolving business and consumer environment.

Rip and replace

If “do nothing” is one extreme to approaching legacy modernization, then “rip and replace” — the replacement of a legacy system with a new system from a different vendor or in-house solution — is at the other extreme. There are certainly potential benefits to this approach with vastly improved functionality and scalability that does away with aging systems and technical debt. But this approach is the most risky, expensive, and complex, and usually takes the longest.

Examples abound of well-publicized core banking replacement projects ending in failure. One is the Irish Bank AIB suing Oracle over a [failed €84 million implementation](#) of its Flexcube banking software. In court documents, the bank claimed that the implementation faced serious technical and project management shortcomings. Another example is ING Bank stopping its Temenos T24 core banking transformation project after three years citing internal reasons. And finally, the Union Bank of California cancelled the implementation of [Infosys' Finacle Solution](#) almost two years after the program was initiated.

These three banks aren't alone. Cognizant estimates that 25% of core banking system transformations fail without any results and 50% fail to achieve the transformation objectives, with costs and implementation times doubling or tripling. With these downsides, the "rip-and-replace" approach isn't often chosen to modernize the mission-critical back-office systems common at financial institutions.

Refresh and extend

Between the two extremes of "do nothing" and "rip and replace" lies an intermediary option of refreshing and extending existing systems. Refresh and extend is an incremental approach that, while acknowledging the limitations of legacy systems, also accepts that they are so core and critical to their institutions' operations, that replacing those systems may not be feasible in the short term. Organizations must increasingly blend what they already have running in production with those newer best-in-class technologies necessary to meet customer needs.

The refresh-and-extend approach to legacy modernization is an attractive alternative to replacing aging systems. It typically is the lowest risk and least intrusive approach for dealing with the pain of aging technology. This scenario also recognizes that "running the bank" and "growing the bank" represent two

parallel technology tracks, each requiring different approaches and philosophies. This is commonly referred as “bi-modal” or “two-speed IT.”

Executing on this approach requires organizations to embrace connectivity as a source of competitive advantage. Here the role of integration is to serve as an “agility layer” that sits between existing legacy assets and newly adopted applications. This agility layer wraps the underlying aging systems, insulating the limitations of what the systems were designed to do, and bridging to newer systems that can effectively support customer consumption of bank-account or insurance-policy data, whether using a cloud, web, or mobile platform.

In implementing this agility layer, it’s critical to learn from previous development efforts. Rather than repeating the mistake of building layers of makeshift code, the agility layer should be built in a loosely coupled manner, separating utility services that provide access to data from orchestration services that hold the processing logic. Moreover, given the time to value pressures that IT organizations face, this approach also allows firms to leverage existing technology assets, whether services or custom libraries.

Loosely coupled services can be just the beginning. Practices such as exposing services as APIs and then using these APIs to govern access to data, irrespective of whether that access is internal or external to the organization, become possible. This approach provides a distinction between consumption and provision of data and is a sea change in how development teams think about exchanging data with internal and external parties. The consumers of data need only understand and interact with the API and do not need to be concerned with how to connect with the underlying data source. Conversely, those charged with maintaining the systems of record need only be concerned with maintaining an interface to the integration layer, rather than the needs of each individual consumer.

“Most prefer to mitigate the risks of legacy modernization by gradually replacing individual applications, or running new and old systems in parallel.”

[Gartner, 2014 Top 10 P&C Report](#)

This approach also sets the stage for future systems replacement. Financial institutions invariably need to take a pragmatic and patient approach that implements change in a staged manner, thus managing risk. The value of the integration layer is to decouple systems. The mobile application accessing policyholder claims information through an API is oblivious to whether that data is being served from a legacy mainframe system or from a new policy-management system. Thus, whether by geography, by business unit, or some other combination, the integration layer provides a means of insulating much of the impact and risk of systems change.

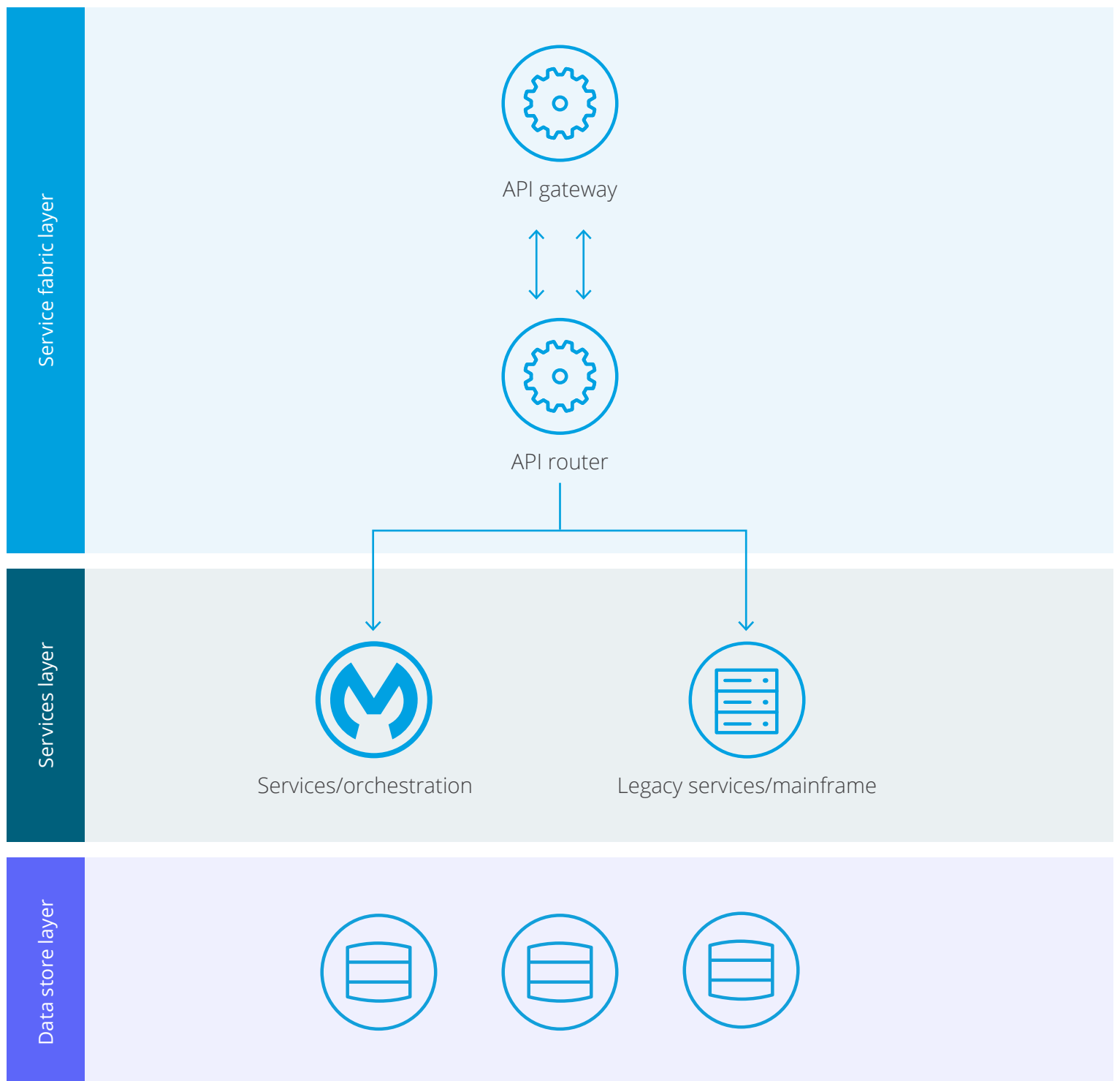
Case study: P&C insurance company

A U.S.-based insurance company wanted to re-architect its 15-year-old customer information system (CIS) that was initially developed with COBOL. It decided to replace the CIS front end with new browser-based screens, improving usability for its customer-facing staff.

This insurance firm saw the initiative as an opportunity to re-envision its IT organization, moving away from building applications and implementing vendor packages using waterfall development methodologies. Developers were organized into small delivery teams that could ramp-up or down as needed and leverage integration tools that fit their needs.

The company decided to implement an integration layer encompassing three core patterns: 1) mainframe web service call, 2) service orchestration to multiple asynchronous calls, and 3) stored procedure calls using JDBC. This approach shows

a clear separation of utility services (accessing the mainframe, stored database procedures) and business-processing logic (service orchestration). This means that one can be changed independently of the other enabling IT to respond more quickly to business demands.



MuleSoft's Anypoint Platform™ was chosen to re-architect the CIS system's application services layer, providing service orchestration and transformation. MuleSoft fit within the firm's core technology stack and had strong support for third-party connectors. Its open-source framework meshed with their developer-first philosophy. Another benefit was that Anypoint Platform's licensing model allowed the client to start small and increase usage based on business value.

The client delivered the project in one year, with core development done in nine months, versus a budget of two years. IT resource ramp-up time dropped to 1 to 2 hours from 40 to 50 hours with proprietary development tools. The highly performant Mule runtime engine now processes five times the number of transactions per hour than the old architecture.

Integration: the key to unlocking legacy systems

As you embark on initiatives to refresh and extend the life of your legacy systems, keep in mind that no component of a modernization effort is more important than the integration solution. Integration is the key to shifting resources and budgets from “running the bank” to “growing the bank.”

In selecting an integration solution, key considerations include:

- The breadth of the integration vision, ranging from application integration to service design and development, and API creation and management.
- Product innovation to reflect evolving integration use cases for legacy modernization, data management, and digital transformation.
- Total cost of ownership in terms not only of hardware and software cost, but also developer-resourcing costs, developer productivity, and time to value.

MuleSoft’s Anypoint Platform is the world’s leading integration platform built on an open-source developer toolchain familiar to millions of developers. Anypoint Platform is especially well suited for legacy modernization, allowing financial services firms to get up and running quickly, while providing a framework to meet future integration needs. Whether you’re modernizing a mainframe application, a custom in-house application, or any other legacy system, Anypoint Platform provides a clear and easy path to modernization.

A framework to meet future integration needs is critical as financial institutions increasingly migrate to “off the shelf” or SaaS packaged applications for non-core administrative functions such as human resources, accounting, or customer relationship management. These systems need to be

integrated with legacy back-office applications and their adoption demonstrates evolving connectivity needs across SOA, SaaS, and API solutions as they converge over time.

MuleSoft's Anypoint Platform provides a unified, lightweight integration platform to rapidly connect, orchestrate, and enable any internal or external endpoint. The result is a 3x to 6x faster time to launch new initiatives, connect systems, and unlock data across the enterprise. Anypoint Platform delivers an exceptional unified user experience in concert with robust technical features and performance.

Furthermore, unlike alternatives, MuleSoft's Anypoint Platform can be rapidly deployed and is easily understood by developers with little retraining. Since MuleSoft's solutions are easy to use and understand, any developer can quickly become productive without lengthy training in vendor-specific technology.

With Anypoint Platform, enterprises can:

- Expose and integrate legacy systems as services while providing an internal API gateway for solutions deployed in private clouds.
- Augment existing integration architecture to provide real-time, on-premises integration of legacy applications with cloud and mobile applications.
- Maximize developer utilization and productivity by eliminating proprietary, heavier tooling with popular open-source standards and tools.

Anypoint Platform is the world's leading integration solution and is trusted by many financial institutions, including 4 out of the top 10 global banks, to help modernize their legacy architectures.

Ready to get started?

MuleSoft has a team of expert consultants conversant in legacy modernization to help you develop your connected financial institution roadmap. [Learn more about MuleSoft's solutions for legacy modernization.](#)

About MuleSoft

MuleSoft, a Salesforce company

MuleSoft's mission is to help organizations change and innovate faster by making it easy to connect the world's applications, [data](#), and [devices](#). With its API-led approach to connectivity, MuleSoft's market-leading Anypoint Platform™ empowers over 1,600 organizations in approximately 60 countries to build application networks. By unlocking data across the enterprise with application networks, organizations can easily deliver new revenue channels, increase operational efficiency, and create differentiated customer experiences.

For more information, visit mulesoft.com

*MuleSoft is a registered trademark of MuleSoft, LLC., a Salesforce company.
All other marks are those of respective owners.*