

API-led Connectivity

Take the next step in the evolution of SOA.



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Executive Summary

IT team leaders are tasked with keeping up with customer and employee expectations by utilizing the latest advancements in technology. But with limited budgets, finite time to dedicate to the process, and so many solutions out there, keeping up with these expectations can be difficult.

Integration solutions have played a major role in allowing organizations to digitally transform and ultimately create exceptional customer experiences. The challenge for IT leaders is to figure out which integration solutions will most efficiently create connectivity to improve operations and exceed consumer expectations.



At a high level, companies currently face four major technological challenges:

- The dynamic digital landscape is in constant flux
- Customers expect personalized and connected experiences across platforms and devices
- Employees demand better digital experiences at work
- Digital and connectivity transitions and implementations are often costly and slow

This whitepaper will cover these transformation challenges that businesses encounter today. We will identify the best ways to structure your digital architecture to drive efficiency, increase productivity, and lower costs – all while remaining flexible and agile enough to add new features and solutions quickly.

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The Transformation Gap

API-LED CONNECTIVITY

While the technological progress of hardware components has slowed dramatically in recent years, businesses worldwide have been increasing their digital transformation and connectivity spend year-over-year.

The projected digital transformation compound annual growth rate (CAGR) is 16.4% – adding up to more than \$10 trillion from 2020 to 2025.

With all the money being poured into this sector, the explosion in services and increased complexity is challenging to navigate.

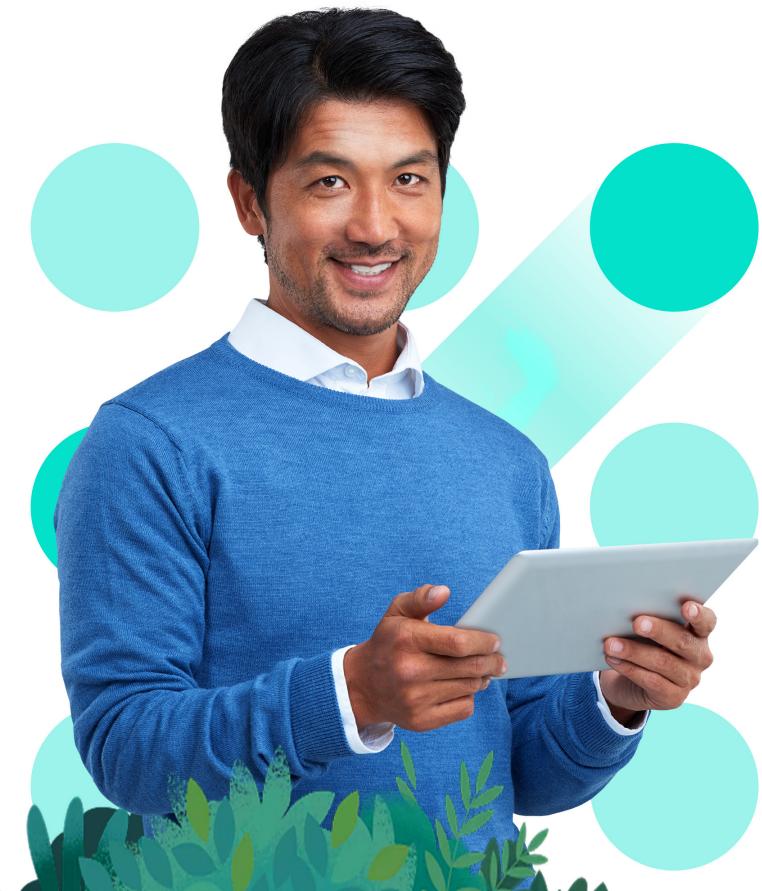
Today, businesses must determine how to bring data from disparate and changing sources to multiple audiences – including customers, suppliers, and employees – securely, efficiently, and at scale. Balancing these factors means that your organization's strategy and approach are key differentiators to success.

Gartner suggests that organizations should take a holistic approach to digital and connectivity transformations. However, they noted that more than half of the companies surveyed were uncertain about their transformation readiness and progress.



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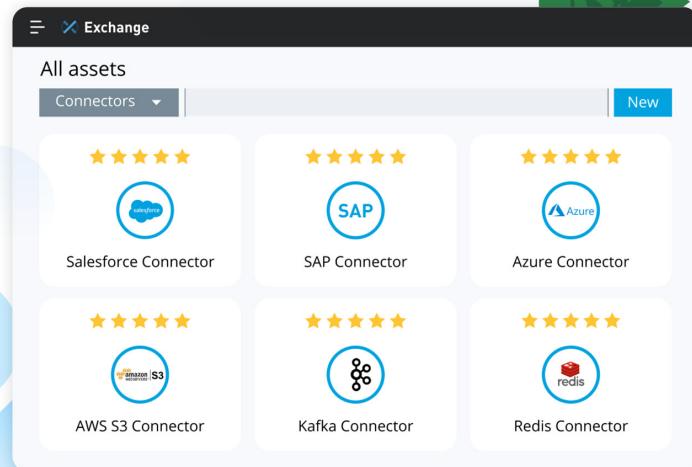


The complexity of adding services ad hoc leads companies to use short-term approaches that value the success of an individual project to the detriment of the enterprise as a whole. This point-to-point strategy creates a patchwork of solutions that cover technology stacks already in place, resulting in a brittle and expensive way to maintain architecture.

Service Oriented Architecture (SOA) approaches emerged in the early 2000s. They began to address these enterprise infrastructure and connectivity problems by breaking services out of the monolith and reducing redundancy.

However, enterprises often failed to integrate SOA successfully due to poor strategic planning; they tended to rely on vendors or single teams when a companywide approach was necessary.

While traditional SOA is no longer a suitable solution today, it laid the groundwork for creating well-defined, easily discoverable, and reusable services.



API-led Connectivity: The Evolution of SOA

An API-led connectivity builds on the central tenets of SOA by re-imagining its implementation to meet today's connectivity needs.

What is an API-led approach?



- Defines methods for connecting and exposing your assets



- Shifts how IT operates, promoting decentralized access to data and capabilities without compromising governance



- Empowers IT to use existing investments to drive transformational change while maintaining visibility and control



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Taking full advantage of this approach requires shifting the IT team mindset away from project delivery to delivering assets as services. This enables lines of business and IT to self-serve, building their own connections, processes, and applications – all while central IT governs access, SLAs, and data quality.

The complexity of providing multiple stakeholders with customized views of the same underlying data source increases exponentially with the number of channels through which that data must be provided. It also reinforces the need for decoupled and independent data between the point

of consumption and the system of record, so applications may use it interchangeably.

These problems lend themselves to a service-oriented approach where application logic is broken down into individual functions that can be reused across multiple channels, making the system more agile.

An API-led connectivity approach yields an application network built from software, data, and devices that are able to be used quickly with minimal effort, which means greater agility and speed.

Anatomy of API-led Connectivity

API-led connectivity is governed by three components:

1 Interface:

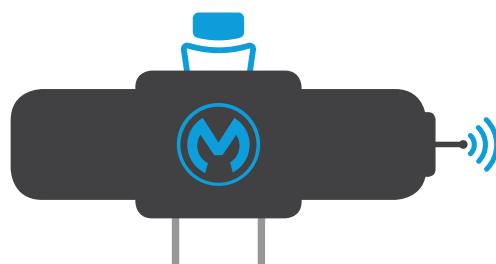
Presentation of data in a governed and secured form

2 Orchestration:

Application of logic to that data, such as transformation and enrichment

3 Connectivity:

Access to secure data from physical systems or external devices



The primary building blocks of the API-led connectivity interface include APIs and microservices.



What is an API? APIs are designed to provide controlled consumption and access to connectivity while playing a role in that connectivity's e-governance, security, and management.

They act as demarcation and abstraction contracts between data consumers and providers – decoupling the two and allowing them to work independently of one another (as long as they continue to be bound by the API contract).

What are microservices? At MuleSoft, we define microservices as an architectural pattern for creating applications.

Reusable microservices also work well to break up and consolidate operations but call for a higher level of governance for successful implementation than APIs.

The interface is an aggregation and orchestration of many APIs – microservices that perform specific functions and provide access to non-central data built by

either central IT or line of business IT. Together, the interface and its orchestration lead to connectivity.

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A Three-Layered Architecture

Large enterprises have complex, interwoven connectivity needs that require multiple API-led connectivity building blocks. Therefore, a framework for ordering and structuring these building blocks is essential.

Agility and flexibility are best achieved through a multi-tier architecture containing three distinct layers:

1 System Layer: Underlying all IT architectures are core systems of record (e.g., ERP, key customer, billing systems, and proprietary databases), these systems are often not easily accessible due to complexity. APIs provide a means of hiding that complexity from the user, and system APIs facilitate access to underlying systems of record and expose that data while providing downstream insulation from any interface changes or rationalization of those systems. These APIs will also change less frequently and will be governed by central IT, given the importance of the underlying systems.

2 Process Layer: These are the underlying business processes that interact with and shape the data that should be strictly encapsulated independent of the data source

systems and its target channels. In a purchase order process, for example, some logic is common across products, geographies, and retail channels that must be distilled into a single service.

3 Experience Layer: This is where data is consumed across a broad set of channels – where each channel requires access to the same data but in various forms. For instance, a retail branch POS system, e-commerce site, and mobile shopping application all require access to the same customer information fields, but each will require that information in different formats. Experience APIs reconfigure data so it is easily consumed by its intended audience from a common data source, rather than setting up fragile and separate point-to-point integrations for each channel.



Each API-led connectivity layer provides context regarding function and ownership.

Layer	Ownership	Frequency of Changes
System Layer	Central IT	6-12 months
Process Layer	Central IT and line of business IT	3-6 months
Experience Layer	Line of business IT and application developers	4-8 weeks; more frequently for more mature companies

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ILLUSTRATIVE ARCHITECTURE:

Mortgage lending transformation — the emergence of an application network and a foundation for reuse.



*Customer-facing channels are consolidated into a single customer experience API in this figure for simplicity.

Key Benefits of API-led Connectivity

IT leaders are constantly seeking ways to enable efficiency and increase productivity across the business – and API-led connectivity is a path to deliver on those imperatives.

Business Benefits

→ IT as an enabler for the business:

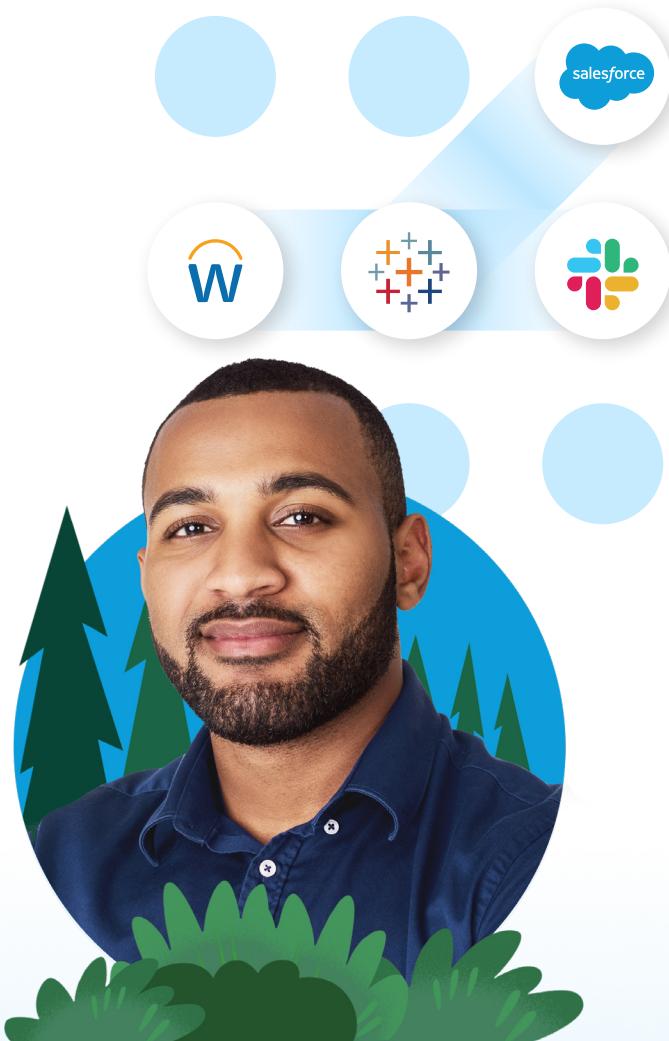
By exposing data assets as services to a broader audience, IT can become an enabler that allows lines of business team members to self-serve.

→ Increased developer productivity through reuse:

API-led connectivity is consistent with a service-oriented approach where logic is included in its constituent parts and reused across different applications. This prevents duplication of effort and allows developers to build on each other's efforts.

→ More predictable change:

IT leaders can better estimate and ensure delivery against code changes by modularizing integration logic and ensuring a logical separation between modules. This architecture negates the nightmare scenario of small database field changes that have significant downstream impacts and avoids extensive regression testing.



IT Benefits

→ **Distributed and tailored approach:**

An API-led connectivity approach recognizes that no one-size-fits-all architecture exists. Instead, it allows connectivity to be addressed in small pieces through the APIs and microservices.

→ **Greater agility through a loose coupling of systems:**

Within an organization's IT architecture, different levels of governance are appropriate. The so-called bimodal integration or two-speed IT approach makes this dichotomy explicit. On the one hand, there is a need to carefully manage and gate changes to core systems of record (e.g., annual schema changes to core ERP systems). On the other, it is crucial to retain the flexibility

to iterate quickly for user-facing edge systems, such as web and mobile applications where continuous innovation and rapid time to market are critical. Separate API tiers allow a different level of governance and control at each layer, making simultaneous loose-tight coupling possible.

→ **Deeper operational visibility:**

Approaching connectivity holistically allows greater operational insight beyond whether an API or a particular interface is working. This approach provides end-to-end insight from receipt of the initial API request call, to the fulfillment of that request based on an underlying database query. At each step, fine-grained analysis is possible, which cannot be easily realized when considering connectivity piecemeal.



API-led Operations in Action

Thousands of companies rely on MuleSoft's innovative approach to exceed customer expectations and improve employee performance and daily operations. Let's take a look at two examples of enterprise-sized organizations that have benefited from implementing MuleSoft's API-led connectivity.

CUSTOMER STORY

Bayer Crop Science

Bayer Crop Science is the agricultural and environmental branch of Bayer Corporation. The company conducts scientific research and innovates solutions to help feed our planet, such as new seeds that help farmers overcome challenges such as pests, diseases, and drought.

The Salesforce instance at Bayer had grown into a large, sprawling ecosystem spanning multiple groups across the globe. Data was held in silo systems that were difficult to access, consequently slowing down product development and other projects. Due to the complexity, it was difficult for Bayer to resolve faults in the system, resulting in project delays that negatively impacted the business.

Bayer created a single view of all customer data via API-led connectivity replacing the P2P integration pipeline, enabling

the company to integrate Salesforce with existing legacy systems and gaining access to data in formerly siloed systems.

MuleSoft provided the framework to modernize Bayer's integration platform to accelerate speed to market, increase scalability, lower ongoing maintenance and support costs, and future-proof the company's integration architecture.

"Previously, it took our teams 5–6 weeks to develop a product, and now it takes just 2 weeks, so we are seeing 200% faster product development, and speed to market has increased by 5x."

Arun Sankarapillai, Senior Director
Product Experience Lead –
Portfolio and Pricing, Bayer



 [Read the story](#)

CUSTOMER STORY

Wells Fargo

As one of the largest banks in the world, Wells Fargo employs roughly 273,000 team members and serves over 70 million customers across 8,500 locations and 13,000 ATMs.

As part of its digital transformation journey to deliver a unified customer experience, they built Wells Fargo Gateway, a Banking-as-a-Service (BaaS) platform that provides key services – such as account servicing, payments, and foreign exchange – through exposing APIs to Wells Fargo's partners and developers.

Through API-led connectivity, services from all partners and applications are seamlessly integrated into the Wells Fargo experience.



Wells Fargo's application network is the backbone to their digital platform, enabling reuse of the same API across multiple channels, allowing more rapid project delivery – increasing the speed of IT project delivery from months to just weeks – and allowing the bank to be more responsive to its customers' needs.

"The FX API, which we are offering to our partners, has been a game-changer ... they can seamlessly integrate their applications or their systems with our platform."

Sid Vyas, CTO – Capital Markets and Investment Banking Technology, Wells Fargo



[Read the story](#)

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Conclusion

As complexity increases, an API-led connectivity approach is the best solution to help your teams easily build and rapidly scale application networks.

Key Takeaways:

- Build an application network by adopting an API-led connectivity approach that packages underlying connectivity and orchestration services as easily discoverable and reusable API building blocks
- Structure these building blocks across distinct systems, processes, and experience layers to achieve greater organizational agility and control
- Drive technology changes holistically across people, processes, and systems



MuleSoft: The API-led Connectivity Platform

MuleSoft's Anypoint Platform™ is a single, unified platform designed to deliver an API-connectivity approach that enables end-to-end connectivity across APIs, service orchestration, and application integration. It is the world's leading integration solution and is trusted by more than 1,600 enterprise customers across every major industry.

- 2x to 5x faster time to launch new initiatives
- Connected systems
- Unlocked data across the enterprise
- 30% reduction in integration costs
- 10% higher employee productivity
- 70% higher productivity for app development teams



Partnering with MuleSoft

MuleSoft also helps partners achieve their goals with [Catalyst™](#). Organizations that partner with MuleSoft have access to expertise guidance in change management, organizational design, and IT development [best practices](#). Regardless of where your organization is in their digital transformation journey, we offer industry-leading consulting,

online tutorials, templates, and other resources to help exceed your customers' expectations. Whether for a single project or a broader digital transformation initiative, MuleSoft Anypoint Platform and Catalyst enable organizations to realize business outcomes faster, and create exceptional customer experiences.

Contact us | Begin your digital transformation journey

→ [Get started](#)

Learn more | See what sets MuleSoft apart from the rest

→ [Meet Anypoint Platform](#)

Watch | Webinar: Anypoint Platform 101: API-led integration basics with MuleSoft

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