MuleSoft®

B2B/EDI: Modern supply chain management

Table of contents

Executive summary

Key challenges

› Companies fighting to compete in today's hyper-competitive world face challenges from demanding customers and ever more complex supply chains.

› Organizations must find ways to drive shorter new product introduction cycles while contending with a more complex supplier ecosystem.

› The challenges of maintaining B2B/EDI interactions with suppliers and trading partners put constraints on an organizations' ability to compete.

Recommendations

› Leverage API-led connectivity approaches and establish an application network to drive a 'two-speed' approach that supports innovation, even in the face of legacy B2B/ EDI technologies.

› Consider wrapping existing B2B/EDI gateways with RESTful APIs—insulating your trading partners from the pain of collaboration through EDI.

› For existing B2B/EDI interfaces, consider leveraging a microservices-based approach and reusing processing logic between trading partners — such as using common message validation or message enrichment processing logic — to avoid duplication of effort and decrease the time it takes to onboard new partners.

Introduction

Digital disruption has had a profound effect on every industry, but the changes are perhaps most striking in industries like manufacturing, transportation and logistics, and [retail]. It seems counterintuitive — as those industries are concerned with the production, distribution, and selling of physical goods — but due to technology trends like the ubiquity of mobile, improvements in human-machine interaction, and the rise of smart sensors, customers are becoming increasingly demanding and want what they want immediately, if not sooner. In fact, in a recent survey of 653 global brands, customers' expectations of what brands need to do to retain their loyalty rose by 18%.[1] To meet these increased expectations, companies need to deliver new products and experiences, adjust to changes in the marketplace quickly, make business processes smooth and invisible to the end-consumer and, most importantly, be agile. Customers simply won't tolerate delays because of a supply chain issue, and low switching costs mean that customers can simply switch to another vendor.

That this level of competition is the new normal is clear. What's less clear is how to create the agility, operational excellence, and constant innovation necessary to succeed, while retaining legacy systems and messaging protocols. Most businesses depend on the central IT organization to deliver what is needed for enterprise digital transformation, but the needs are so great that IT is losing the capacity to deliver solutions to the business on time.

1   Lukovitz, Karlene. Brand Keys CLEI 2016: "Consumers raise engagement and loyalty bar once again." MediaPost.
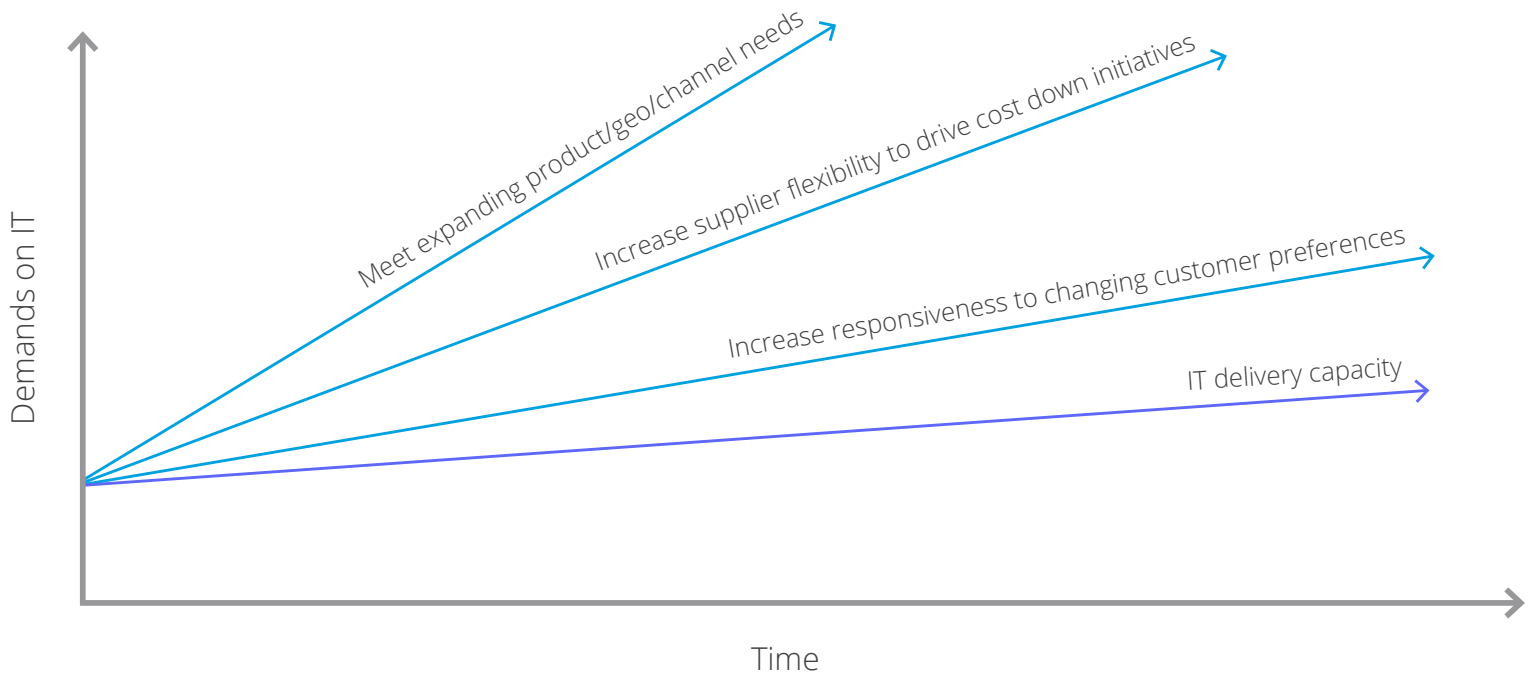
As you can see in the above diagram, given the pressure on IT budgets, IT delivery capacity remains constant, while the need to drive digital transformation for important business — such as expanding products and channels, increasing supplier flexibility, and increasing responsiveness to changing customer preferences — are driving demands on those resources.

For the retail, manufacturing, and transportation and logistics industries, these problems are compounded by EDI messaging standards. As the number of trading partners has expanded, and B2B/EDI message 'standards' continue to diverge, organizations must spend an increasing percentage of their delivery capacity on perceived "keep the lights on" B2B/EDI messaging, rather than on the digital transformation initiatives that are the catalyst for future growth.

Digital transformation and the agile supply chain

In working with leading retail, manufacturing, and logistics firms, we see three consistent business outcomes that these organizations are driving towards:

> **Launching products to the market more quickly.** Every company wants to be more responsive to customer needs and drive more rapid New Product Introductions (NPI) and time to market.

> **Increasing agility to more rapidly respond to changing production and supply chain needs.** Whether it's a change in raw material costs requiring a rapid change in suppliers or a change in customer demand for specific products, it is crucial to be able to quickly change your production approach to match demand.

> **Delivering operational excellence.** Given increasingly tighter margins, it becomes a strategic imperative for businesses to manage non-production costs in a more efficient manner—i.e. streamlining business operations.

In support of these business outcomes, we see a set of corresponding supply chain technology, and specifically, B2B/EDI-related challenges:

> **Decreasing partner on-boarding time (partner setup, message mapping, business logic).** Normally, when businesses start working with partners, B2B/EDI partner setup, trading profile management, and message processing are core to the onboarding process. That onboarding can take a significant amount of time — often weeks to months—and in the case where such work is outsourced to a VAN provider, can be a black box. In a world where speed is a

competitive differentiator, shaving time off the partner onboarding process is extremely important.

› **Decreasing the time needed to make changes to partner configurations.** Change is constant. Business scenarios and customer demands may change. The suppliers businesses rely on today may not be there tomorrow, but the customer still wants goods and services quickly. Changing the partner configuration needs to be easy for IT to do.

› **Decreasing risk and/or cost by replacing a legacy or custom point-to-point B2B/EDI solution.** EDI technology is 20-30 years old, so the EDI solutions that are in place at most companies today are 20-30 years old as well. They're either custom solutions that have had extensions built over layer-by-layer, or they are legacy systems with value that the original vendor is no longer supporting or, certainly, no longer actively investing in.

Is EDI holding your company back?

EDI, is, in some ways, is the epitome of 1980s technology. As the successor of the fax machine in B2B communication, it has become a global standard for transmitting business processes and transactions in numerous industries. However, as facsimiles printed on wax paper are incongruous with today's 140-character delimited social media posts, so EDI is to today's always-on, global business landscape. Over time, EDI message standards have become frayed, such that the vision of a consistent, industry-wide message standard providing economies of scale and scope in B2B interactions, has become significantly diluted. EDI messages are verbose and reflect a previous age where B2B/EDI transactions were traditionally processed in batches, rather than the real-time, transparent processing that today's trading landscape demands. B2B systems that transmit EDI messages are integrated into a point-to-point system, rather than a platform, increasing fragility and complexity—creating more demands on central IT to maintain.

API-led connectivity and EDI

When EDI first came into use, supply chains were simpler, with a limited number of suppliers. Now, thanks to globalization and specialized manufacturing, there might be hundreds of suppliers in a supply chain. And, as prices change, businesses move overseas, and market conditions evolve, these suppliers change as well. Businesses want control and visibility over their processes, even as they grow more complex because they are so integral to business strategy and success. Yet, while EDI messaging approaches may not be fully fit for purpose for today's competitive landscape, given its adoption and organizations' investment in it, EDI isn't going away anytime soon. To succeed, companies must find a way to marry new architectural approaches to B2B/EDI challenges that insulate the legacy technologies from the new and abstract its limitations. MuleSoft's work with leaders in retail, manufacturing, and transportation and logistics suggests that it is possible to innovate and differentiate, despite the constraints that B2B/EDI can impose. These organizations are applying API and microservices approaches to drive a 'two-speed' innovation approach that supports innovation, even in the face of legacy B2B/EDI technologies. We see two distinct patterns:

REST-ful API 'experience layer': For many organizations, B2B/EDI does not need to be the primary means of interacting with external trading partners. New and emerging distributors, such as resellers and suppliers, may not have the strict requirement to interact via B2B/EDI interfaces. In fact, they may prefer to engage through more modern techniques, such as providing purchase order instructions through a RESTful API, rather than an X12 850 purchase order message. In these cases, organizations can drive significant increases agility by wrapping existing B2B/EDI gateways with RESTful APIs and insulating trading partners from the pain of collaborating through B2B/EDI.

Reusable APIs 'process layer': Where organizations must continue to leverage B2B/EDI messages, there is still innovation possible in terms of how those messages are created and processed. For existing B2B/EDI interfaces, organizations can use a microservices-based approach to reuse processing logic between trading partners (e.g. common message validation or message enrichment processing logic to avoid duplication of effort and decrease the time it takes to onboard new partners).

These approaches reflect a broader API-led connectivity approach. API-led connectivity is a multi-layered approach that scales IT capacity through its emphasis on modular components, decentralized authority over application development, and reusable assets. It is a fundamental shift in the IT operating model and promotes decentralized access to data and capabilities while retaining security. API-led connectivity calls for a distinct 'connectivity building block' with three components:

> **Interface:** Presentation of data in a governed and secured form via an API.

> **Orchestration:** Application of logic to that data, such as transformation and enrichment.

> **Connectivity:** Access to source data, whether from physical systems or from external services.

"One of the greatest benefits of the MuleSoft-powered platform is that it allows us to not only lower the customer's cost of access, but it allows us to lower our cost to serve. Cost is one of the biggest reasons why the mid-market is so underserved by many people in our industry; it was difficult to serve that segment effectively and profitably. Anypoint Platform allows Redwood Logistics to dramatically lower our cost to serve."

ERIC REMPEL CIO, REDWOOD LOGISTICS

API-led connectivity architecture
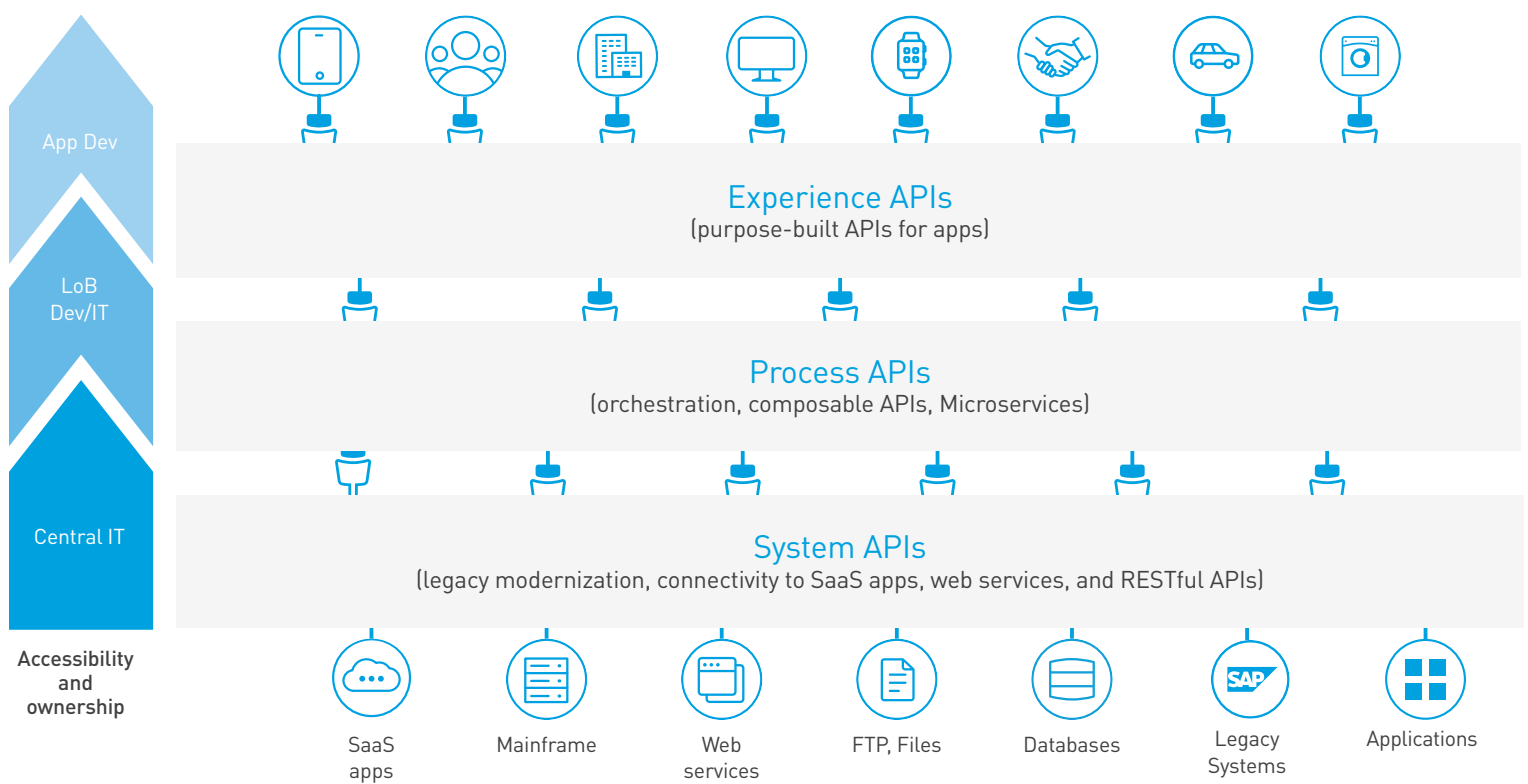
System Layer: Underlying all IT architectures are core systems of record (e.g. ERP system, key customer and billing systems, proprietary databases, etc). Often, these systems are not easily accessible due to connectivity concerns. As such, APIs conceal that complexity from the user. System APIs provide a means of accessing underlying systems of record and exposing that data, often in a canonical format, while providing downstream insulation from any interface changes or rationalization of those systems. These APIs will also change more infrequently and will be governed by central IT, given the importance of the underlying systems.

Process Layer: The business processes that interact with and shape this data should be encapsulated independently of the source systems from which data originates, as well as from the channels through which that data is delivered. For example, in a purchase order process, there is some logic that is common across products, geographies, and retail channels that can and should be distilled into a single service that can then be called by other services. These APIs perform specific functions and

provide access to non-central data and may be built by either central IT or line of business IT.

Experience Layer: Data is now consumed across a broad set of channels, each of which want access to the same data, but in a variety of different formats. For example, a retail branch POS system, eCommerce site, and mobile shopping application may all want to access the same customer information fields, but each will require that information in very different formats. Experience APIs reconfigure data so that it is most easily consumed by its intended audience—all from a common data source, as opposed to setting up separate point-to-point integrations for each channel.

In the EDI context, an API-led connectivity approach provides both flexibility to serve different partners, but tight control over core ERP systems:

> **System API layer:** Different System APIs to wrap key systems of record.

> **Process API layer:** Different Process APIs by business process, whether it is executing a purchase order, checking inventory levels, and more.

> **Experience API layer:** Different Experience APIs by channel, perhaps an eCommerce platform, a SaaS application, or a data interface.

As an example in the retail industry, here is a diagram of how API-led connectivity can co-exist with EDI. In this example, we show the following APIs:

> **System API layer:** This layer provides consistent, managed, and secure access to backend systems by abstracting and unlocking data from core systems like a legacy backend database, SAP, and Salesforce to create product APIs, order APIs, and partner APIs.

> **Process API layer:** This layer takes the core assets and combines them with business logic to create a higher level

of value. By aggregating data extracted from the Product, Orders, and Partner APIs, the Sales Order, Invoice, and Shipping Notice APIs are created. These APIs process the purchase order, check inventory levels, and create the appropriate acknowledgment notices necessary for partners.

> **Experience API layer:** This layer is designed specifically for consumption by a specific end-user app or device that will be exposed to the partners. Anypoint Partner Manager creates a partner profile that can be templatized and reused from Partner 1 to Partner 2 if the new partner requires similar B2B/EDI formats e.g. EDI 850 via AS2. This will ultimately be exposed to partners via a web channel or portal to allow for B2B transaction statuses to be viewed and the associated payloads to be viewed or downloaded.
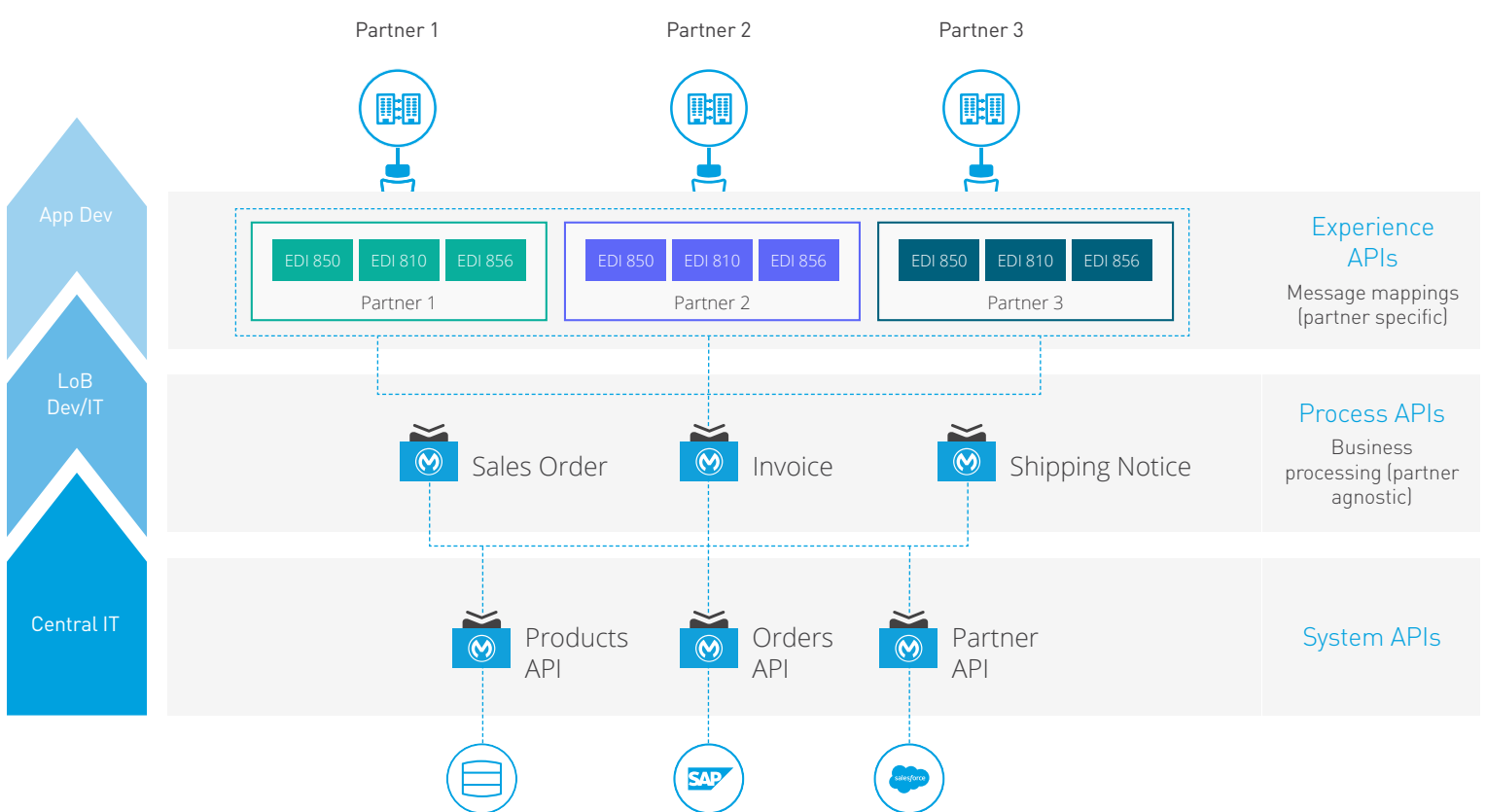
The architectural benefits of this approach including creating a decoupled architecture that abstracts away complexity, and having a more agile response to change. All of your channels are able to reuse the same process logic, so as you onboard new partners, you only need to manage the logic of receiving

messages and the purchase order processing logic is already baked in—thus allowing you to move quicker.

This retailer could take this approach one step further; they could apply the API-led connectivity approach at the experience API layer too. In this scenario, trading partners can submit purchase orders via a partner API and create the required EDI 850 message to process the purchase order document. In this way, they can onboard partners more quickly because they do not have to deal with the intricacies of EDI for franchises that may not have an EDI gateway or for new retail channels like kiosks that do not 'speak' EDI.

Achieving operational excellence with B2B/EDI

A manufacturer of telecommunications equipment was using an older messaging standard, RosettaNet, and had to impose this burden on their trading partners. The consequence was that it took partners up to a year to onboard. It is difficult to do business when you're waiting for a year to onboard a partner. In other words, that is a full year of time sitting idle and not achieving value out of the partnership. In addition, when a new partner was added, the business wanted the flexibility of not having to wait for IT to onboard the partner or change the file format; they wanted a particular business unit to be able to respond in an agile and flexible manner. They wanted to have more control over the process. This customer has found that there is a lot of partner turnover and wanted to shorten partner onboarding time to increase productivity. This company is using our approach to B2B integration, API-led connectivity, by creating and reusing APIs internally to connect to the RosettaNet messaging protocol. In the second iteration of the release, they will expose those APIs so that partners leveraging APIs can simply use them instead of the old RosettaNet EDI standard. This decreases onboarding time and the need for specialist coding to integrate the systems. The idea is to have both an internal API layer, which is being built now, and then they can implement a "public" API strategy so partners can use modern development practices.

The benefits of B2B communication, API-led connectivity, and the application network

An API-led connectivity approach to handling EDI messages has several benefits. A microservices approach to processing EDI documents, as well as reuse of business logic for processing exchanges between business processes, creates good business outcomes for the entire IT architecture, not just B2B communication. The idea is to create smaller, agile units for business, processes, and technology, and to make those units reusable and available to the entire business, while still maintaining stability and control. This is a new vision of enterprise IT: an application network. An application network allows organizations to internally build communities and developments around certain capabilities.

Engaging customers in new ways with B2B/EDI

One retailer in North America has a business model of brick-and-mortar stores that show goods that you can rent instead of purchase. You pay a monthly fee to lease sofas, TVs, desks, etc. They realized that revenue growth potential is limited by the number of brick-and-mortar stores they have, so they entered into a number of different partnerships with other retailers to install digital kiosks or booths in those retailers' stores. This allows partner retailers to also benefit from the company's services through the digital kiosk. The North American retailer, as a result, is able to build an end-to-end supply chain process from customers buying things in the kiosks, to actual purchase orders being generated on the backend. This is an example of a business being extended by B2B/EDI functionality and engaging their customers in new and interesting ways.

It allows all technology groups in the business to self-serve the technology and data sources they need and for central IT to work with other groups inside the organization to enable that

self-service. Central IT no longer delivers the projects themselves, it enables other groups to use and become successful with the assets. This is a culture shift that allows IT to scale alongside the growth of technology needs inside the organization, as demonstrated in the diagram above.

Application networks emerge from the ground up, encouraging and rewarding the creation of composable microservices and reusable assets and templates. Once you have your API strategy in place, the first corner of your application network is built out. Then, other groups or parts of your organization are also doing the same thing. Every time they deliver a project they might add one or two or maybe three new resources to the application network. These assets can then be discovered and consumed by a broader set of people inside the organization.

Suddenly, IT, instead of delivering projects, is actually directing projects. They are ensuring quality and reusability; they are thinking about important things like security. They can actually focus on some of the more important aspects versus running on the hamster wheel delivering the next Salesforce or SAP integration. It also means system experts and EDI gurus are no longer needed for every single project. All of that is automated through reusable assets and business logic, and teams can focus on innovation, operational excellence, and creating a great experience for stakeholders.

API-led connectivity with MuleSoft's Anypoint Platform

MuleSoft's Anypoint Platform™ is the only solution that allows enterprises to truly deliver on their digital transformation by realizing API-led connectivity. In particular, Anypoint Platform is the only solution that enables end-to-end connectivity across API, service orchestration, and application integration needs with a single unified platform. This allows developers to rapidly connect, orchestrate, and enable any internal or external endpoint. The result is between 2x to 5x faster time to launch new initiatives, connect systems, and unlock data across the enterprise, as well as a 30% reduction in integration costs.

Furthermore, unlike alternatives, MuleSoft's Anypoint Platform can be rapidly deployed on-premises, in the cloud, or in a hybrid environment. Since MuleSoft's solutions are easy to use and understand, any developer can quickly become productive without lengthy training in vendor-specific technology — resulting in 10% higher employee productivity and 70% higher productivity for app development teams.

Finally, MuleSoft's experience in partnering with our customers to drive digital transformation initiatives allows our customer success teams to bring expertise in change management, organizational design, and IT development best practices to complement our technology offerings and truly partner to drive success.

Anypoint Platform is the world's leading integration solution. MuleSoft is the only integration provider to be named a Leader across two Gartner Magic Quadrants: the Gartner Magic Quadrant for Enterprise Integration Platform as a Service (iPaaS) and the Gartner Magic Quadrant for Full Life Cycle API Management.

Conclusion

EDI is a standard messaging protocol, but one which can hamper innovation and agility due to its unwieldy nature. But given the right enterprise architecture, it can be an important ingredient in creating positive business outcomes. Our approach to abstracting away the complexity of EDI through API-led connectivity has been shown to lower operating costs, open up new channels, and streamline business processes — making digital transformation a reality for businesses in transportation logistics, retail, and manufacturing.

Contact us to find out how API-led connectivity can enact digital transformation in your business.

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**

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