

The strategic role of APIs with EDI in modern B2B collaboration

An IBM whitepaper

1 Overview

“Pivot” has been the watchword since 2020. With it comes implications of a 180-degree shift – moving in a completely different direction and leaving the familiar, which has served us well, behind. Seemingly overnight:

- Stores morphed into fulfillment centers and customers picked up curbside or opted for delivery
- The classroom experience was replaced with online learning
- Office jobs turned into hours of online meetings and chat check-ins
- Virtual wine tastings, concerts and dinners were among our new forms of entertainment

Supply chains were also affected. Some companies experienced a massive surge in demand, while others experienced severe downturns. [B2B infrastructure](#) operating behind the scenes had to adapt to quickly changing workloads and agility became the key to resilience.

The industry is moving towards a hybrid model that includes legacy infrastructure and business formats working side by side with more modern transactional approaches. Obviously EDI will remain essential for batch processing of mission-critical transactions like financial documents and periodic updates. Yet, for net-new B2B use cases and time critical transactions, companies need more flexible trading approaches with partners. Approaches that blend usage of both EDI and APIs will lower the barrier to entry into the network, allow all participants to be up and running faster, and help with supply chain resiliency. We call this the **hybrid B2B collaboration approach**, which is essential to allow your enterprise to modernize and nurture new business opportunities while preserving existing trading partner relationships.

To continue to enable seamless B2B transactions and integration with partners and customers to keep supply chains moving forward, it's clear that pivoting isn't the answer; augmenting is. Augmenting the power of EDI integration with API capabilities within the same system helps to mitigate risk and capture new opportunities. Over a period of decades, EDI has facilitated frictionless commerce, helped [eliminate manual paper processes](#), and delivered significant, persistent, and broad [supply chain efficiencies through automation](#). APIs have emerged as a complementary way to further extend B2B transactions and this hybrid approach is ideally suited to drive additional business value in certain situations. Creating a separate isolated system just to manage B2B APIs creates gaps in the overall business process and value.

APIs figure prominently in almost every IT modernization project, a perpetual journey for every enterprise. Using APIs to connect directly to a transactional system, like an ERP system, makes the data transfer path simpler since the intermediary file transfer server and associated processes are eliminated. API-driven transactions also require fewer resources (storage, memory, compute) to manage the exchange of data, can be secured using a variety of encryption and authentication mechanisms, are simpler to set up and manage, and are faster to execute in real time.

2 Use cases

The following are common industry use cases that illustrate the importance of APIs in supply chain-oriented business transactions.

2.1 Networked applications and services

More and more use cases are now requiring a deeper level integration with internal services and solutions. For example, directly integrating a company's ERP system with the B2B network using APIs not only effectively increases the speed of the transaction, it also further simplifies processes. This is achieved by removing the need for automated extract, transform and load (ETL) solutions and workflows for knowing how to process deposited files in the file system. Simplifying these processes tends to lower costs, failure rates and mean time to recovery when incidents do occur.



2.2 Status update

Another common use case seen across various companies is the need to pass status information within their B2B and B2C communities. This type of “status update” information could be:

- Status of an order submission, change or cancellation
- Inventory availability status, real-time pre-check prior to advancing a transaction
- Status of a shipment including items such as location, document status (import/export, customs, port, etc.)
- Status information of a payment or credit

With this approach, a normal “status update” piece of data would need to include conversion of data to and from a “standard” document format to a JSON format for the API call. Typical B2B communications utilize EDI, or EDI-like, formatted documents so a function of the network would be to convert advance shipment notice (ASN) EDI documents to JSON for API consumption.

For example, a large manufacturing company used [IBM Sterling B2B Integrator](#) to develop new lines of business requiring real-time responses. Their customers can use any internet device to check inventory of a product and respond with a business decision to purchase. Using B2B Integrator to connect with other internal systems, they can quickly look up items in a code list, instantly check stock and then invoke B2B Integrator via business process orchestration.

This flexibility has changed the way this IBM client conducts business. So much so that by 2030, their expectation is that APIs will be the primary communication method between their customers, suppliers and trading partners.

2.3 Logistics

The need for real-time or near real-time processing is an emerging requirement in various industries and is especially true in logistics between shippers and freight carriers. With very tight service level agreements (SLAs), it is critical for carriers to be able to respond to submitted load tenders from the shippers in a timely manner before the shipper moves on to the next carrier. Here, APIs can play an integral role to ensure entities can respond with load tender responses as well as shipping statuses well within their SLA timeframes.

The emergence of shipping marketplaces also means that manual monitoring of these sites with API capability can greatly improve a shipper’s potential revenue stream with the ability to identify and claim opportunities at a much faster rate.

Finally, APIs can play a role in real-time rate quoting, bookings and broker processing work, augmenting EDI systems with a modern, more rapid interaction to address these time-sensitive customer and partner requests.

2.4 Marketplace integration

A common use case for retailers is automating some of the interactions with marketplaces that they sell through. Take Walmart’s or Amazon’s marketplaces as examples, where there are a number of integration paths a retailer can take. Smaller retailers (with small volumes or number of items) will mostly utilize the web and mobile applications that the marketplaces provide to upload items for sale, update product information and availability, and gather sales data and other information. Larger retailers with more IT resources will most likely elect to integrate with the marketplaces directly using APIs, both for inventory management and fulfillment.

APIs are rising in prominence. Amazon, for example, has utilized web service APIs in addition to traditional EDI for integration for over 10 years. However, more recently the company has declared that their API integration platform is strategic, and all sellers whether big or small, will need to adopt that approach moving forward. The breadth of the APIs available is extensive and covers inventory, orders, fulfillment and shipping. The challenge is how to bridge between more EDI-based, batch-oriented data flows in traditional B2B platforms and these marketplace APIs.

2.5 Automotive ASNs

A common use case from the automotive industry involves larger entities looking to receive their shipment notices from their suppliers leveraging an API. ASNs are one of the more time-sensitive documents in the B2B flow. Providing a new transactional path using APIs for ASN and possibly EDI for everything else can have advantages. This approach is an attractive solution compared to normal EDI flows that in some cases may still be processed in batch with some inherent delay.

However, the challenge that some suppliers have is the ability to change their transaction interface method to accommodate this emerging API requirement. This could be due to the investment in software and infrastructure or lack of experience with APIs. Having a way to solve for this requirement without forcing suppliers to make wholesale infrastructure changes will be key to making APIs successful and making supply chains more resilient.

3 APIs in IBM Sterling

Among clients of IBM Sterling B2B Collaboration solutions, API usage continues to advance, and developing an “API first” strategy is imperative. However, APIs take many forms, and it is important to be clear what the expectations are for APIs in B2B networking.

In the context of B2B transaction processing, it is assumed that APIs are implemented using the HTTPS protocol, the same protocol used for the World Wide Web, sharing many of its benefits of simplicity, statelessness, client-side cacheability and error handling. Many will also assume that APIs will be RESTful, where REST stands for [REpresentational State Transfer](#), which imposes additional behaviors such as only supporting JSON or XML payloads and having a prescriptive URL schema (pattern).

Both [IBM Sterling B2B Integrator](#) (enterprise software) as well as [IBM Sterling B2B Integration SaaS](#) (cloud solution), support HTTPS-based APIs. While not necessarily having all of the additional characteristics of RESTful APIs, the Sterling HTTPS support approach allows IBM clients to define the URL schema and payload of any arbitrary data type that meets the needs of the business.

In almost all cases, the straight HTTPS support in the IBM Sterling B2B Collaboration suite is all that is required. However, you will see later how Sterling HTTPS support can be combined with IBM API Connect and IBM App Connect to provide even richer API capabilities and system interconnectivity options.

3.1 IBM Sterling B2B Integrator

IBM Sterling B2B Integrator's [HTTP Server Adapter](#) allows for the user to submit (HTTPS POST or PUT) data to or retrieve (HTTPS GET) data from the B2B network. B2B Integrator allows you to associate specific business processes or web applications to these API calls, to properly process the data and either return the data or forward the data on to the recipient, depending on operation. Any developer or systems integrator can integrate B2B Integrator with other systems or process automation using this approach.

Later in Implementing APIs, you will see how IBM API Connect can be used as an API management solution to better protect the B2B Integrator HTTPS service, and provide more authentication and authorization options. You will also see how IBM App Connect can provide additional capabilities around building a prescriptive REST API on top of B2B Integrator HTTPS as well as connect B2B Integrator with other systems, such as ERP systems.

Together with B2B Integrator, IBM API Connect and IBM App Connect can create API-driven B2B Integrator business processes as a service. This allows your business to explore new and better ways to forge integrations between your partners, suppliers, applications and devices, while building on the strong EDI backbone that supports auditability, visibility and governance of your B2B interactions.

3.2 IBM Sterling B2B Integration SaaS

IBM Sterling B2B Integration SaaS (formerly SCBN) already supports a wide array of file transfer protocols for transacting data through the network, in addition to the HTTPS protocol. Just like IBM Sterling B2B Integrator, IBM Sterling B2Bi SaaS also supports submitting data using HTTPS POST, as well as retrieving data using HTTPS GET in transacting with other trading partners.

As described in some of the earlier business use cases, having the ability to deliver a hybrid type of solution where you use APIs on one side of the transaction and some other protocol on the other is a key to success as usage of APIs is a progressive evolution. This allows

customers and suppliers alike to move their API strategy forward at their own pace while not excluding any relationships.

Full REST APIs are also being added to the SCBN protocol mix, along with [published API layouts for IBM Sterling B2B Integration SaaS transactional flows](#). These layouts cover a wide variety of commonly used transaction types that flow through IBM Sterling B2B Integration SaaS today. The JSON layouts are based on the [OAGIS](#) standard and overlay very well with the document types IBM Sterling B2B Integration SaaS routinely processes.

The API Gateway for IBM Sterling B2B Integration SaaS allows for the validation and routing of these APIs. This Gateway will be configurable by IBM clients or alternatively business partners or by the IBM expert services team. This provides clients with both a lightweight HTTPS flexible API option as well as a prescriptive, fully REST-enabled API option.

3.3 Other API options

Thus far, this API discussion has been about supporting transactional data flows between systems and trading partners. The IBM Sterling B2B Collaboration suite also supports a series of internal APIs for operational use cases.

One of the main goals of these APIs is to automate repetitive and time-consuming tasks such as customer, user and trading partner lifecycle management. Automation reduces the chances of human error, and eliminates the chance of data discrepancy. Another use case is to extract data from the network for further analysis or for auditing purposes. Together, these internal APIs allow enterprises to integrate their B2B network services with other business and operational process flows.

4 Implementing APIs

APIs are designed to be readily and easily used with a variety of programming languages and automation tools, much more easily and flexibly than traditional file transfer protocols. Just about any HTTP-enabled tool can invoke an API and process the results. So, the natural first inclination on how to leverage APIs is to use them directly.

4.1 API client

A variety of tools are available. Callers can use a range starting with the simple Linux curl command with shell scripting, to API automation tools like Postman, to programming languages like Java, Perl or Python. IT professionals can easily link B2B transaction flows and related visibility data with other business process flows, analytics tools or alert frameworks.

Programming straight to the APIs is a great and simple way to own an integration with B2B workloads. It works best when the relationship between the caller and the called API is tightly controlled, scoped to only the client involved and singleton in nature. That pattern doesn't scale well, however.

4.2 API management for hosted APIs

As soon as more parties are interested in the same APIs or the same patterns, or APIs are promoted from being private to public, then for better supportability, reusability and security, it becomes necessary to incorporate API management (APIm) to secure and govern the use of the APIs. Integration platforms as a service (iPaaS) can also be used to build highly reusable integration patterns with the APIs. IBM has the [IBM API Connect](#) and [IBM App Connect](#) solutions, respectively, to address these needs.

IBM Sterling B2B Integrator is very similar to an iPaaS solution that is part of a broader suite of Sterling B2B Collaboration applications, specializing in the transfer of business data between parties as part of a business transaction system. If you are already using B2B Integrator for translation, integration or file movement, you can augment it with IBM API Connect to build an API-based business transaction solution.

Any time an API is used in a broad context, especially when that API is applied to a common, shared service like a B2B transactional system widely used by a variety of consumers, that API needs to be protected. That is the job of the API management system, such as IBM API Connect.

IBM API Connect can be set up to front the API, authorize who may use it, restrict how it can be used, log or audit who called what, and otherwise protect it against misuse. Using API Connect to centrally manage many different APIs can be useful when they are mapped to a common REST API pattern, or URL schema, so that all APIs look the same to the consumer. In fact, all IBM Sterling public-hosted product APIs are protected by an internally hosted version of IBM API Connect.

API management systems do basically three things:

Map the back-end API to a front-end API

An API schema is basically how the API looks, which includes the universal resource locator (URL) pattern to address it, the same thing you see in your browser's address bar when you visit a web page. A single API Connect gateway can be used to map any number of backend systems' APIs, which will all look and behave differently, to a single common schema and authentication mechanism. This makes it easier for an enterprise to use any of the APIs regardless of their source and make them all appear part of the same solution.

Manage APIs

API Connect comes with a rich set of features to monitor API usage, meter the usage for billing purposes, and package APIs into bundles that can be provisioned as "applications" to groups of users.

Secure APIs

API Connect allows you to configure any number of security mechanisms to protect access to the APIs, even if the back-end system doesn't support those mechanisms. For example, this makes it simple to have a single authentication approach for all APIs, and map the approach to corporate single sign-on infrastructures. It also allows for centralized management of who should have access to which APIs and under what conditions.

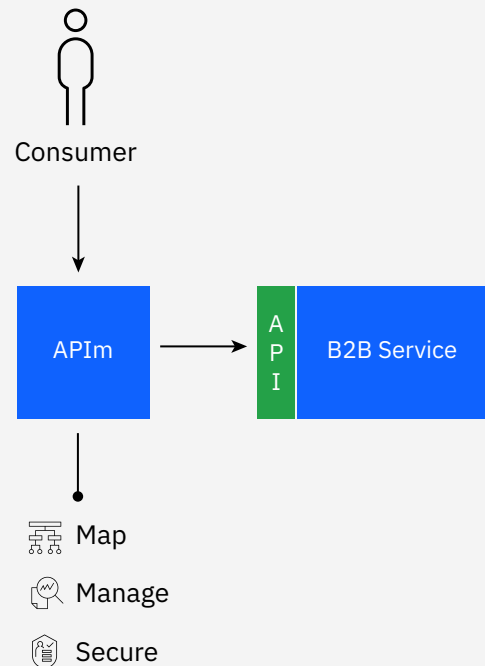


Figure 1. API management system

4.3 Integration Platforms as a Service

Unlike API Management solutions, iPaaS solutions like IBM App Connect and [IBM webMethods Hybrid Integration](#) are API producers. They specialize in creating interfaces where none exist. For example, using App Connect, one can easily create a REST API against a relational database.

Similarly to API Connect, App Connect can also build a new API against one or more existing APIs. The difference is that App Connect can deal with a wide diversity of data types and map data in one format from existing APIs to a totally new format. It can also act as an API client, calling remote service APIs for either sending or pulling data. An example of this would be for App Connect to call an ERP back-end system, parse the results, and send them to another system using a different API.

App Connect uses connectors to integrate with the APIs (and other non-API interfaces, like message buses) of other applications and services. App Connect has an [extensive catalog of predefined connectors](#) to make it simple to get connected to industry leading business solutions. Flows are then created between the connectors, which define the logic around how the connectors are to be used to fetch data and then manipulate that data before being returned to the caller. Flows can be scheduled to run on a regular basis, or can be event driven, meaning they are invoked by a remote system calling an API to kick off the flow, or by listening for a message on a message bus.

iPaaS platforms typically do not offer complex protection or management of the use of newly produced APIs, which is why solutions like App Connect and API Connect are often combined.

4.4 B2B Integrator or App Connect?

As mentioned before, B2B Integrator and App Connect perform very similar functions. So, how do you know when to use which one?

App Connect is a general solution for data extraction, transformation and loading (ETL) functions. It has very limited specialization in any particular field, such as B2B collaboration networks, but it does have a large catalog of pre-built connectors to industry leading business solutions and data platforms.

B2B Integrator, on the other hand, has an extensive catalog of B2B data sharing functions that are purpose-built for the manipulation of supply chain business transaction data. It also supports several

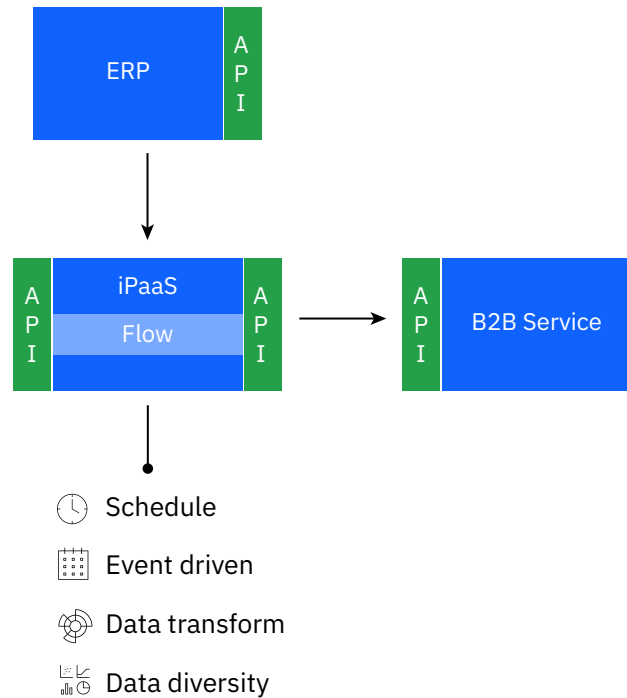


Figure 2. Integration Platform as a Service

legacy file transfer protocols that dominate supply chain networks that may not be supported by App Connect (or other iPaaS solutions). Additionally, a large set of IBM business partners have built an extensive catalog of assets on and around the IBM Sterling B2B Collaboration product suite that extend its value.

So, if you already have access to IBM Sterling B2B Collaboration software, or are looking to create an API front end to a legacy file transfer protocol-based network, or need to perform extensive B2B business data manipulation, B2B Integrator is probably your best choice. Otherwise, use App Connect.

4.5 A competitive field

The API management and iPaaS field has a wide range of highly competitive products, including IBM's offerings. When considering how to better leverage B2B collaboration solutions in more modern, API-driven ways, it is not uncommon for IBM clients to have already invested in some API management and iPaaS solutions. So, while IBM products more naturally work together, IBM B2B Collaboration solutions can easily be made to work with other iPaaS and API management solutions.

5 Crafting a hybrid strategy for b2b transactions

Here are three things to know as you review your B2B integration strategy for supply chain resiliency with APIs.

1. Adopt a unified platform for API and EDI transactions.

As mentioned before, Gartner predicts that by 2023, over half of B2B transactions will be performed through real-time APIs. That means 50% of all transactions will still be supported by EDI. Across many industries and supply chain networks, a core set of [EDI transaction types](#) has been widely adopted to support mission-critical business processes. Companies need to support both or risk missing out on important opportunities to drive revenue, growth and competitive differentiation.

Fortunately, it is possible to evolve your B2B integration strategy by adding API capabilities to your [existing EDI integration](#), so you don't need to choose or invest in a separate infrastructure to use APIs. A hybrid solution allows you to simultaneously leverage resources that are already in place and performing well, building on them to meet all your business requirements and capitalize on the availability of emerging data sources. A B2B integration backbone that handles EDI natively and can extend to include API connectivity provides an all-in-one approach that is efficient, effective and optimizes collaboration with all your trading partners.

2. Identify opportunities for API modernization.

A [hybrid B2B collaboration approach](#) provides the benefit of using the best B2B technology for the circumstance. For partners that have not signed up for EDI due to costs or complexity, APIs provide an alternative way to transact. And whereas EDI is ideally suited for batch processing of mission-critical transactions like financial documents, APIs work well when you need to connect directly to transactional systems or enable real-time data exchange. For example, freight carriers require real-time shipment status and load-tender responses to be competitive. Seconds can make a difference, particularly in shipping marketplaces where the fastest click wins the business.

At the same time, as new government mandates and industry initiatives emerge, EDI formats have evolved in concert to support new [standards for mission-critical transactions](#). In these instances, secure, reliable B2B data exchange can only be addressed with EDI transaction types and other B2B protocols and formats. Integration into backend systems is an example of a mix and match scenario.

Different backend systems have different integration requirements, so companies need options for both EDI and API integration.

3. Prioritize agility when choosing a B2B integration platform.

Since early 2020, we've seen more businesses than ever win and lose based on their ability to respond in a timely manner to changing business, market and partner requirements. A unified platform for API and EDI transactions unlocks the agility you need.

Gain the flexibility to onboard new partners or quickly respond to a new requirement from an existing trading partner. Depending on your partner's resources and needs, APIs provide a simpler, faster way for new partners to connect. However, self-service onboarding processes also make EDI data exchanges easier and faster to setup. To further reduce the complexity of EDI that requires scarce specialty skills to master, a managed-service offering backed by decades of EDI expertise can get data into the proper format for you, along with meeting all your API needs.

With API and EDI unified in one platform, you can view all your customer, partner or supplier transactions through a single dashboard. You can filter out categories like failed documents and drill down for technical details. The addition of natural language search and conversation capabilities allow users to ask questions, like showing the status of a purchase order number, and getting all related documents. Any user can find the status of a transaction and respond to customer inquiries fast – without involving IT.

B2B integration strategies can be complex and doubling-up investments or compromising performance can introduce unnecessary risk. A unified hybrid solution that combines the power of EDI and API eliminates complexity and builds supply chain resiliency – for you and your trading partners.

6 Getting started

Watch the webinar

[EDI and APIs - How do they work together?](#)

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