Master B2B Ecosystem Integration With a Blended EDI and API Approach

Analyst(s): Mark O'Neill, Elizabeth Golluscio

APIs and API management complement, rather than replace, traditional B2B technologies such as EDI and MFT. Application leaders should leverage their legacy B2B skills while taking advantage of new API capabilities to optimize their business ecosystem for digital business.

Impacts

Application leaders must understand how the following affect their organizations:

- APIs enable real-time B2B collaboration, which must be reconciled with existing batch-based electronic data interchange (EDI).

- B2B onboarding has often been a source of frustration, but APIs provide a potential solution.

- New B2B experiences via mobile, social and the Internet of Things (IoT) are now possible through APIs.

Recommendations

Application leaders responsible for B2B application services as part of an integration modernization strategy should:

- Add APIs into your B2B strategy, but ensure that real-time and batch transactions are coordinated, to avoid confusion.

- Choose a managed file transfer (MFT), B2B gateway or integration brokerage vendor that provides APIs to aid onboarding.

- Engage developers, both inside your organizations and external partners, to use B2B APIs to develop ecosystem applications using mobile, social and the IoT.

Strategic Planning Assumption

By 2020, more than 25% of B2B interactions will be performed through real-time APIs versus legacy approaches, although legacy approaches will continue to perform the majority of B2B interactions.

Analysis

Digital business is more adaptation than transformation. Organizations with existing investments in EDI to exchange structured documents with trading partners, can adapt to support real-time patterns, as well as mobile and IoT, through the added support of APIs. Modern web APIs, particularly REST-based APIs, provide a new channel with a lower barrier to entry than traditional EDI in terms of both cost and integration time. APIs enable B2B ecosystems to expand to include trading partners that may not have signed up for EDI because of cost or complexity, as well as enabling self-service integration by the trading partners themselves. For application leaders tasked with modernizing integration strategies and infrastructure, APIs add real-time capabilities to B2B ecosystems, such as the ability to query the real-time status of an order or shipment. In addition to all of this, APIs enable more collaborative processes across the business ecosystem because, while EDI is usually implemented in a hub-and-spoke fashion, APIs are usually implemented in a peer-to-peer fashion.

APIs are not, however, a panacea for B2B. Whereas EDI involves the use of rich, standardized message formats such as X12 and Electronic Data Interchange for Administration, Commerce and Transportation (EDIFACT), industry-vertical standards for APIs are generally lacking. Organizations — typically channel masters or brand owners and generally the larger, more economically influential constituent in a multiparty relationship — using APIs for B2B typically create their own API definitions, driven by a combination of ecosystem requirements (outside-in) and the API provider's own internal data models (inside-out). Because these drivers differ between organizations, the API definitions defined by two organizations in the same industry vertical may be — and in fact are, typically — completely different. APIs also are not as suited to the delivery of large files, especially when compared with EDI and MFT products, both of which are often used for batch processing of similar transactions (for example, for daily payment advice transactions for financial institutions).

EDI-based B2B integration has been perceived as strategic for improving the cost, speed and reliability of B2B e-commerce, and instrumental for improving supplier relationship management. However, it has not historically been seen as strategic to business transformation. But the addition of APIs to engage the "API economy" is a key part of the strategic task of building a digital platform (see "From APIs to Ecosystems: API Economy Best Practices for Building a Digital Platform"). Application leaders should harness the benefits of APIs in a blended approach that weaves APIs into their existing strategy.

Figure 1. Impacts and Top Recommendations for B2B APIs

<table>
<tr><th>Impacts</th><th>Top Recommendations</th></tr>
<tr><td>APIs enable real-time B2B collaboration, which must be reconciled with existing batch-based electronic data interchange.</td><td>▪ Add APIs into your B2B strategy, but ensure that real-time and batch transactions are coordinated, to avoid confusion.</td></tr>
<tr><td>B2B onboarding has often been a source of frustration, but APIs provide a potential solution.</td><td>▪ Choose a MFT, B2B gateway or integration brokerage vendor that provides APIs to aid onboarding.</td></tr>
<tr><td>New B2B experiences via mobile, social, and the Internet of Things (IoT) are now possible through APIs.</td><td>▪ Engage developers, both inside your organizations and external partners, to use B2B APIs to develop ecosystem applications using mobile, social and the IoT.</td></tr>
</table>

© 2017 Gartner, Inc.

Source: Gartner (September 2017)

Impacts and Recommendations

APIs enable real-time B2B interfaces, which must be reconciled with existing batch-based EDI

Gartner analyst Benoit Lheureux coined the phrase "B2B is cumulative." What this means is that each new innovation in B2B, whether it is the EDI value-added network (VAN), MFT (as used in AS2) or integration brokerage (see "Market Guide for Integration Brokerage"), simply adds a new channel. APIs conform to "Lheureux's Law," but with an important caveat. This is because APIs enable not one but two new channels: a new data channel and a new programmatic control channel. Web APIs, starting with SOAP/XML (as used in AS4) and now REST/JSON, add a new data channel, which is suited to real-time B2B scenarios such as querying the status of an order or shipment. At the same time, the programmatic nature of web APIs means that B2B processes can be integrated

more easily with other processes, such as automating the onboarding of a trading partner within the same overall integration flow as performing a credit check on that trading partner and notifying the channel master.

The characteristics of APIs, when compared to traditional B2B technologies, are shown in Table 1

Table 1. APIs Compared to Traditional B2B Technologies

	APIs	Traditional B2B technologies (MFT, EDI)
Business driver	Expanding ecosystems beyond an existing trading partner network using traditional sets of transactions.	Proven, well-understood, and for adding value via improved operational efficiencies to an existing trading partner network.
Target user	Developers	Operations staff
Communication style	Typically in real time	Typically mailbox or batch
Protocol style	Typically stateless and "fire and forget"	Includes delivery acknowledgment messages, confirmation of shipment, etc.
Standards availability	Lacking industry-vertical standards	Widespread and mature industry standards
Typical payload	JSON (for REST) or XML (for AS4) for standard interoperability	Fixed width EDIFACT or X12 for standard interoperability and transaction formats.
Network style	Typically peer-to-peer	Typically hub and spoke
Deployment models	On-premises or cloud (e.g., iPaaS)	On-premises or managed service (and not as often, but increasingly, also cloud)
Rate of change/life cycle	Frequent changes, requiring life cycle management	Slow to change

EDIFACT = Electronic Data Interchange for Administration, Commerce and Transportation; iPaaS = integration Platform as a service

Source: Gartner (September 2017)

Stove-piped web applications, provided to trading partners to manually upload files and view order status as part of so-called "web EDI," can also take advantage of APIs. B2B trading partners can now use APIs to build their own web interfaces, or incorporate B2B processes into other interfaces, such as Salesforce. This means that it is no longer the full responsibility of the B2B provider to create client interfaces; instead, they can provide APIs and, using an API developer portal, encourage trading partners to consume them in their own systems. Full life cycle API management products can be used to provide such an API developer portal (see "Magic Quadrant for Full Life Cycle API Management").

The overall impact of APIs for B2B is shown in Figure 2.

Figure 2. APIs Enable New B2B Channels
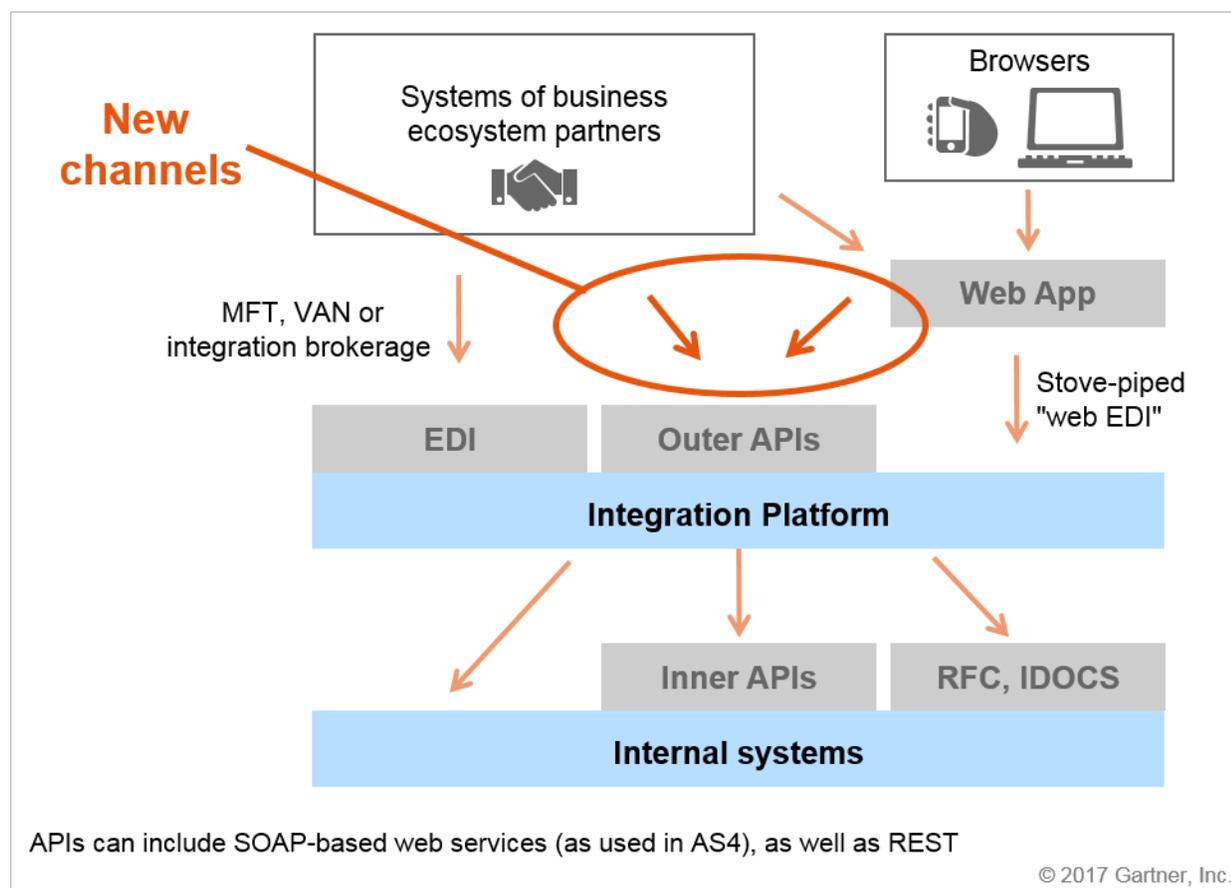
MFT = managed file transfer; VAN = value-added network; EDI = electronic data interchange

Source: Gartner (September 2017)

As shown in Figure 2, the "mediated APIs" pattern applies to APIs used in B2B. Mediated APIs leverage an integration platform between inner and outer APIs, allowing security, monitoring and transformation to be applied (see "Use Mediated APIs to Connect Your Legacy and Packaged Systems With Modern Applications").

APIs enable the embedding of B2B functionality within other services, such as collaboration tools. For example, APIs allow file transfers through MFT to be programmatically triggered from Microsoft SharePoint, or when a file is placed in a content collaboration platform such as Box or Dropbox.
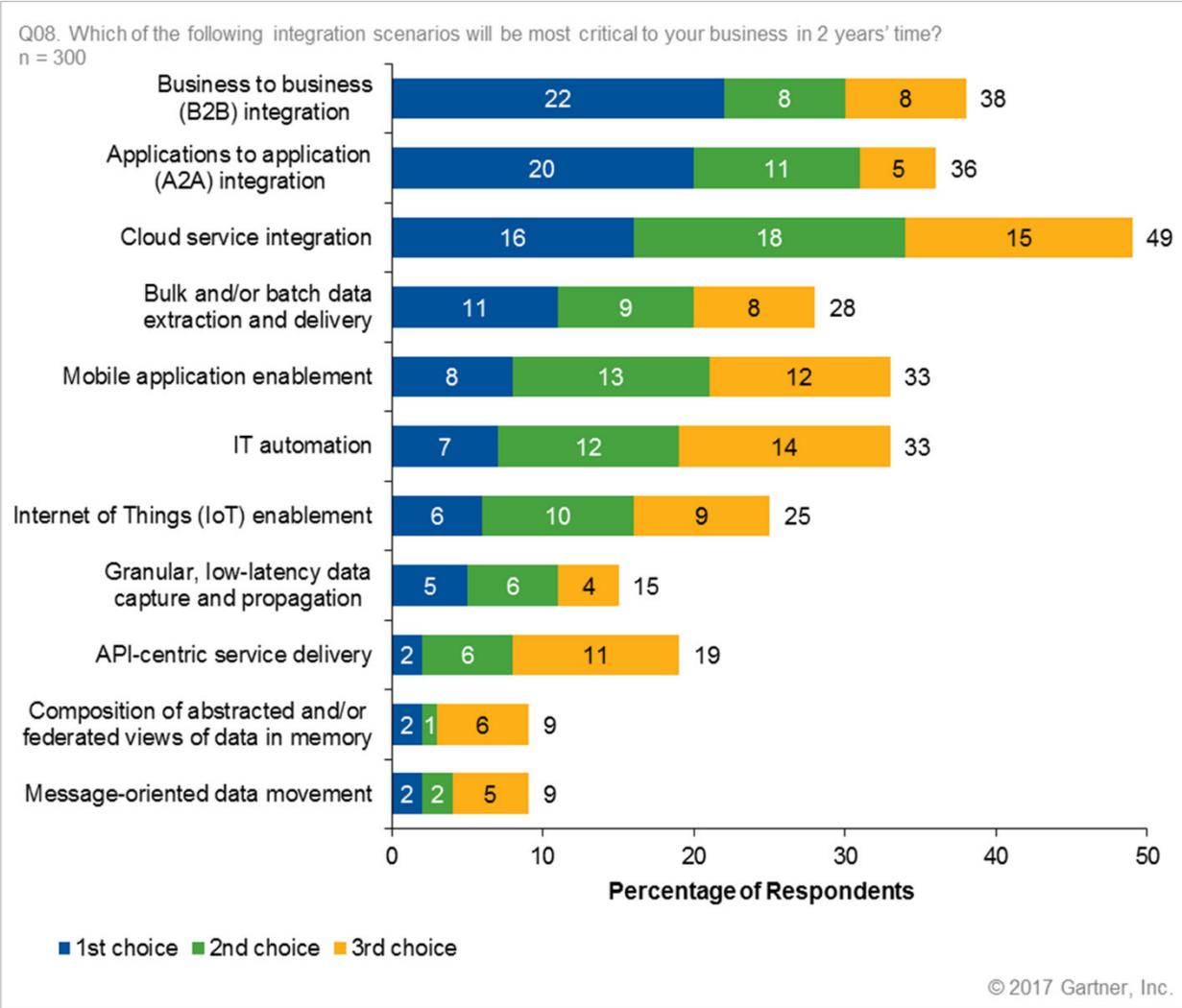
What products can be used to implement B2B APIs?

A number of different integration technologies can be used to deliver B2B APIs, including iPaaS, B2B gateways or API gateways. These products may be used individually (the traditional approach) or together in a more modern configuration as part of a hybrid integration platform (HIP). A HIP is a capability framework that combines on-premises and cloud-based integration and governance

capabilities to support a wide range of integration use cases. Although a HIP may be implemented by assembling a variety of technology building blocks from one or more providers, it is managed as a cohesive, federated and integrated whole (see "Innovation Insight for Hybrid Integration Platforms").

In the 2016 Integration Pulse Survey, Gartner asked application leaders what integration scenario will be most critical in 2018. B2B integration was the first choice (see Figure 3).

Figure 3. Critical Integration Scenarios for 2018

Q08. Which of the following integration scenarios will be most critical to your business in 2 years' time?
n = 300

	1st choice	2nd choice	3rd choice	Total
Business to business (B2B) integration	22	8	8	38
Applications to application (A2A) integration	20	11	5	36
Cloud service integration	16	18	15	49
Bulk and/or batch data extraction and delivery	11	9	8	28
Mobile application enablement	8	13	12	33
IT automation	7	12	14	33
Internet of Things (IoT) enablement	6	10	9	25
Granular, low-latency data capture and propagation	5	6	4	15
API-centric service delivery	2	6	11	19
Composition of abstracted and/or federated views of data in memory	2	1	6	9
Message-oriented data movement	2	2	5	9

Percentage of Respondents

■ 1st choice ■ 2nd choice ■ 3rd choice

© 2017 Gartner, Inc.

Source: Gartner (September 2017)

Figure 3 also shows that API-centric service delivery is important to application leaders. However, APIs are now key to all types of integration, including B2B (see "How Pervasive Integration Enables Your API Initiatives (and Vice Versa)"). Vendors are recognizing this by providing combined product sets to deliver B2B APIs alongside traditional B2B. For example, Axway, IBM, Seeburger and Software AG all provide both B2B gateway and API management software. Others, such as Dell

Boomi, provide API management plus iPaaS with EDI support. Multiple different vendor products may be used together within a HIP to enable B2B APIs (see "Market Guide for HIP-Enabling Technologies").

When using multiple, distinct products together to enable B2B APIs, it is important to ensure that requests through multiple channels are managed together. For example, if a trading partner attempts to send an order via MFT but fails and sends it through an API Gateway instead, what happens? When working with a B2B vendor that now provides APIs, or is using B2B APIs as part of a HIP, ensure that mixed-channel scenarios have been properly addressed.

Understanding the target user

A B2B API strategy begins with clearly identifying the target user of your B2B APIs. Some B2B APIs may be used directly between partners in a "lights-out" manner through direct integration between systems. These APIs may be most suited to a SOAP/XML implementation. However, other B2B APIs may be used indirectly by end users of mobile apps or rich web applications in the business ecosystem. These APIs may be most-suited to REST and JSON. In each case, therefore, it is important to understand the target user, and tailor APIs according to their needs. This can be achieved by treating APIs as products, responding to user needs and managing an API roadmap (see "Create the Role of API Product Manager as Part of Treating APIs as Products").

Existing expertise in B2B can be applied to APIs. Whether this expertise is internal or outsourced, it may be used to identify opportunities to experiment with new ecosystem integration approaches. For example, existing EDI message exchange patterns may be recreated using APIs so that ecosystem partners can achieve the same overall functionality, but without the need to sign up to an EDI VAN or install proprietary client software.

Recommendations:

- Add APIs into your B2B strategy to add real-time access, but ensure that real-time and batch transactions are coordinated.

- Leverage legacy B2B experience to ensure your API approaches are aligned and coexist effectively.

- Clearly identify the target of your EDI message flow or API; start with which consumers you know today to iterate on the approaches and ensure a smooth customer/developer experience.

B2B onboarding has often been a source of frustration, but APIs provide a potential solution

In Gartner's client inquiries, one of the most common complaints regarding B2B software concerns the difficulty of onboarding partners. B2B onboarding involves the process of adding trading partners to the B2B network, including installing and configuring client software, agreeing document types, and performing data mapping. Onboarding is often complex and expensive, with each onboarding activity becoming a project or task of its own.

APIs provide a number of key benefits for B2B onboarding:

- **Embedding:** Partner onboarding tasks can be driven and monitored from within SaaS services such as Salesforce and ServiceNow.

- **Pushing customization work to the trading partner:** Integration work for onboarding can be passed from the B2B provider to the client, who can use APIs to tailor its integration to its own systems, rather than relying on the hub to do this work or waiting for the hub to create a custom connector. Note that this burden is more likely to be accepted when there is a financial incentive; for example, suppliers are more willing to take on this burden for the privilege of selling into your channel. Conversely, if you lack this leverage, your partner may not be willing.

- **Automation:** APIs enable the automation and orchestration of key developer onboarding tasks, including via scripts within DevOps tools, such as Chef and Ansible.

To achieve the benefits of APIs for B2B onboarding, it is vital that APIs are documented and presented in a self-service developer portal. Developers can then use this portal to understand the APIs, and see sample requests and responses. An example of such a public portal is the API developer portal from Cleo, an MFT/B2B gateway vendor.[1] Other vendors providing B2B gateway software, such as Axway, include documented APIs, which can be used by their clients.[2]

An integration brokerage can also be used to build a B2B ecosystem, which includes trading partner onboarding. Integration brokerages typically provide fee-based onboarding (for indicative onboarding pricing, see "B2B/EDI Integration: Choosing between In-House or Outsourced Delivery"). Some integration brokerages also provide prebuilt onboarding APIs (for example, Covisint, now part of OpenText, provides APIs for tasks such as trading partner administrator).[3] For more details on integration brokerage products, see "Market Guide for Integration Brokerage."

Another option for enabling B2B onboarding through APIs is to use an iPaaS. iPaaS services include the ability to create APIs, as well as the ability to link systems together using APIs. They can, therefore, be used as a platform to deliver B2B APIs that include onboarding. Some iPaaS offerings (such as Dell Boomi) support EDI as well as APIs, so they can be a good foundation for organizations that want to implement a hybrid combination of EDI and APIs for B2B (see "Magic Quadrant for Enterprise Integration Platform as a Service"). However, the decision to use iPaaS involves more upfront integration work, even when using the prebuilt connectors or mapping tools that are provided.

B2B APIs in the integration competency center

Ensure B2B integration is part of your organization's integration competency center (ICC). Beyond the ICC, also ensure that B2B integration through APIs is part of a gradual move toward "pervasive integration" and provided in a self-service manner (see "Use the Integration Maturity Model to Assess and Improve Your Integration Competency").

APIs also, by definition, require code to be written in order to consume them. If your goal is to enable simple B2B scenarios, then the "web EDI" approach of allowing browser uploads of files or keying of orders may be sufficient. The goal should be self-service integration to enable integration

without treating the ICC as a bottleneck. Vendors such as Adeptia enable self-service integration for B2B by providing web interfaces to visually set up company-to-company data file transfers, which may be based on events (for example, a file dropped into Dropbox triggers a file transfer; see "Market Guide for B2B Gateway Software").

Recommendations:

- Choose an MFT, B2B gateway or integration brokerage vendor that provides APIs to aid onboarding.

- Use APIs to "push work to the client" when a trading partner requires customization of its B2B connection, and when you have the leverage in the relationship to allow this.

- Add responsibility for B2B APIs to your ICC.

New B2B experiences via mobile, social, and the IoT are now possible through APIs

B2B APIs are an important way for organizations to embrace the API economy (see "The API Economy: Turning Your Business Into a Platform (or Your Platform Into a Business)"). This is achieved through co-innovation with ecosystem partners to extend core services with third-party services via APIs. For example, the Octo Telematics' insurance platform opens APIs to engage B2B partners and enable IoT innovation.

There is also the possibility of using B2B APIs as a new revenue stream in their own right. This is achieved through API monetization. An example of a monetized API is the D&B Direct API from Dun and Bradstreet, which is called by businesses to automatically obtain risk scores on prospective clients and partners (for more information on the D&B Direct case study, and on API monetization in general, see "Choosing the Right API Pricing (and Funding) Model"). Recognize, however, that today most B2B APIs are in the service of a larger business outcome, such as supply chain enablement, and not purchased directly. Therefore, if your organization plans to monetize on B2B APIs in the future, then ensure that your chosen API management solution supports this capability.

If you build it, will they come?

One of the lessons learned from the API economy is that "If you build it, they may not come" (see item four in "Top 10 Things CIOs Need to Know About APIs and the API Economy"). This refers to the fact that, without upfront consideration of use cases and without active promotion, an API may simply not be used. Do not let this be the fate of your B2B APIs. Ensure that the use cases for your APIs are planned upfront, bring your B2B and API developers together in cross-functional teams, and encourage cross-training, as well as ideation, for partner engagement and hackathons for new, ecosystem-led business opportunities. If some trading partners have resisted signing up for an EDI connection, ask if they would consider using APIs to connect instead, and for which use cases. This information then allows effective B2B APIs to be designed and planned. Consider assigning an API product manager to coordinate this work (see "Create the Role of API Product Manager as Part of Treating APIs as Products").

Where are the API standards?

A frequent inquiry question from Gartner clients is "where are the API standards for my industry vertical?" For most industries, the answer is that the industry standards are nonexistent. Even in an industry such as healthcare, where Fast Healthcare Interoperability Resources (FHIR) exists as a nascent standard, it is not widely used. Recognize that B2B API standards are currently lacking, so your organization may be required to design APIs based on your B2B requirements. Do not underestimate the scope of this work. EDI standards include, for example, the definition of delivery acknowledgment messages, which may be required in your industry for APIs, since APIs are largely stateless and "fire and forget." (However, note that newer event-driven API styles, such as webhooks, can provide B2B partners with the ability to subscribe to events such as shipment delivery notifications; see "The Impact of Event-Driven IT on API Management"). Engage partners in your ecosystem to collaboratively work on API definitions for B2B within your particular context. The goal should be ease of use and maintainability for both the publisher and the consumer of the API.

REST or SOAP?

One of the most important decisions for API design is the choice of REST or SOAP. REST and JSON are generally preferred because they are more suited to mobile and web, as well as being lightweight when compared to SOAP and XML. For example, a freight forwarder may provide an API so that clients' employees can look up the location of a shipment, returning data from a sensor. Because these APIs are often consumed by mobile or web, they are most likely to be defined as REST APIs.

In B2B, however, SOAP and XML are still quite commonly used. To communicate complex documents, such as product catalogs, between trading partners, APIs may take the form of SOAP web services such as AS4. SOAP is also suited to large messages (compared to REST) and has a well-defined (though complex) security model.

API marketplaces

An API marketplace is a platform that allows API providers to publish APIs and bring them to market. Customers, generally developers, use an API marketplace to discover, access, test and (in some cases) purchase access to APIs to use in their own applications. API marketplaces differ from standard API developer portals by having the capability to aggregate multiple API providers, as well as by typically also supporting subscriptions, billing and user management (see "Hype Cycle for Business Ecosystems, 2017").

An API marketplace can act as an incentive for third-party developers to create solutions using your B2B APIs. Such a marketplace provides a route to market for these solutions because existing and new B2B trading partners may then find useful applications in the marketplace (see "Digital Marketplaces for a Platform World"). In addition, the marketplace itself may also become a source of revenue, since the marketplace provider typically takes a cut of the proceeds from solutions sourced through the marketplace.

Recommendations:

- Engage developers, both inside your organizations and external partners, to use B2B APIs to develop ecosystem applications using mobile, social and the IoT.

- Identify opportunities to have traditional B2B and API developers problem solve together.

- Consider creating a digital marketplace to promote partner solutions that use your B2B APIs.

Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Magic Quadrant for Full Life Cycle API Management"

"Create the Role of API Product Manager as Part of Treating APIs as Products"

"Market Guide for B2B Gateway Software"

"Top 10 Things CIOs Need to Know About APIs and the API Economy"

"Use the Integration Maturity Model to Assess and Improve Your Integration Competency"

"Market Guide for HIP-Enabling Technologies"

"Choosing the Right API Pricing (and Funding) Model"

Evidence

[1] "Welcome to Cleo Developer." Cleo.

[2] "Onboarding APIs." Axway.

[3] "Build Solutions for the Connected World." Covisint.

Additional research for this note was sourced from Gartner client inquiries and vendor briefings.

GARTNER HEADQUARTERS

Corporate Headquarters
56 Top Gallant Road
Stamford, CT 06902-7700
USA
+1 203 964 0096

Regional Headquarters
AUSTRALIA
BRAZIL
JAPAN
UNITED KINGDOM

For a complete list of worldwide locations,
visit http://www.gartner.com/technology/about.jsp