Magic Quadrant for Full Life Cycle API Management

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We all use APIs every day. The demands of digital transformation, and the related need for platforms and ecosystems, make it essential to manage APIs throughout their life cycle. We identify the pros and cons of a wide range of API management vendors and offerings, to help you make the right choice.

Market Definition/Description

This document was revised on 1 May 2018. The document you are viewing is the corrected version. For more information, see the Corrections (http://www.gartner.com/technology/about/policies/current_corrections.jsp) page on gartner.com.

This research many not reflect current market conditions after 31 July 2019.

Full life cycle application programming interface (API) management is about the planning, design, implementation, testing, publication, operation, consumption, maintenance, versioning and retirement of APIs. It involves use of a developers' portal to target, market to and govern communities of developers who embed the APIs, as well as runtime management, estimation of API value and analytics.

> **It is impossible to provide the platform for any digital strategy, build ecosystems and run an effective API program, without full life cycle API management.**

Running API programs and getting value from the "API economy" remain fundamentally important (see "The API Economy: Turning Your Business Into a Platform (or Your Platform Into a Business)"). But digital transformations and the need to start a platform business on which to build an ecosystem of partners have stolen the limelight. It is now clear to most CIOs that platform and ecosystem are two sides of the same coin, and that APIs form the touchpoints between them. Business use of APIs, the role of APIs as enablers of digital transformations, and APIs' ability to open up new business channels are now matters of clear interest to CIOs. Obviously, running an API program is not the only way you can run a digital transformation, or

build a platform and an ecosystem, but publishing APIs is certainly a great start (see "From APIs to Ecosystems: API Economy Best Practices for Building a Digital Platform"). For some savvy companies, the idea of the platform comes first, and they then start incrementally delivering APIs as experiments to explore how the platform will work, in co-creation mode with partners in the ecosystem.

Consequently, API programs have become more business-oriented, focusing on very few APIs at any one time, targeted at delivering parts of a digital transformation, or simply testing transformation ideas through hackathons. In some cases, they are responses to particular industry regulations, such as the Second Payment Services Directive (PSD2) for European banks. But whatever reasons drive them, they require very quick execution. Additionally, the growing importance of artificial intelligence (AI), and the packaging of AI algorithms in APIs, together with the evolving notion of API consumers (extending to smart objects, as in the Internet of Things [IoT]), will influence future application portfolios. APIs are no longer just another piece of technology — they make digital society and digital business work. Consequently, API management buying centers will continue to shift rapidly from IT departments to business units or single government agencies.

In the past, APIs were primarily developed and consumed within a single organization, often the same development group. Shared understanding of the domain and the functionality ensured that APIs met the needs of their consumers. Today, though, the advent of the API economy means that organizations are using APIs to open up new business channels, new partner integrations and even new markets. Consequently, the consumers of an API are now often outside the organization offering it. This highlights the need for both the endpoint protection and the developer support offered by full life cycle API management.

> **The basic principle of the API economy is that APIs can be new products that a company offers to open up new business channels, or to sell more of its traditional products.**

Understanding which APIs to offer to which developers, internal or external, can be challenging, as can the task of securing the necessary corporate data and functions (see "How to Build an Effective API Security Strategy"). Evens so, hundreds of APIs are published every month, and thousands are tested by all sorts of developers every day. APIs are present in every part of our digital world. Whenever we use a smartphone app to check email, send messages or share photos, for example, we are using APIs. Every time we click a link to get directions, book a dinner reservation or buy concert tickets, we are using APIs. And each time our digital business platform connects with our partners, or new affiliates sign up to sell our products on their platform, it is using APIs. It should be easy to appreciate, therefore, both that APIs are woven into the very fabric

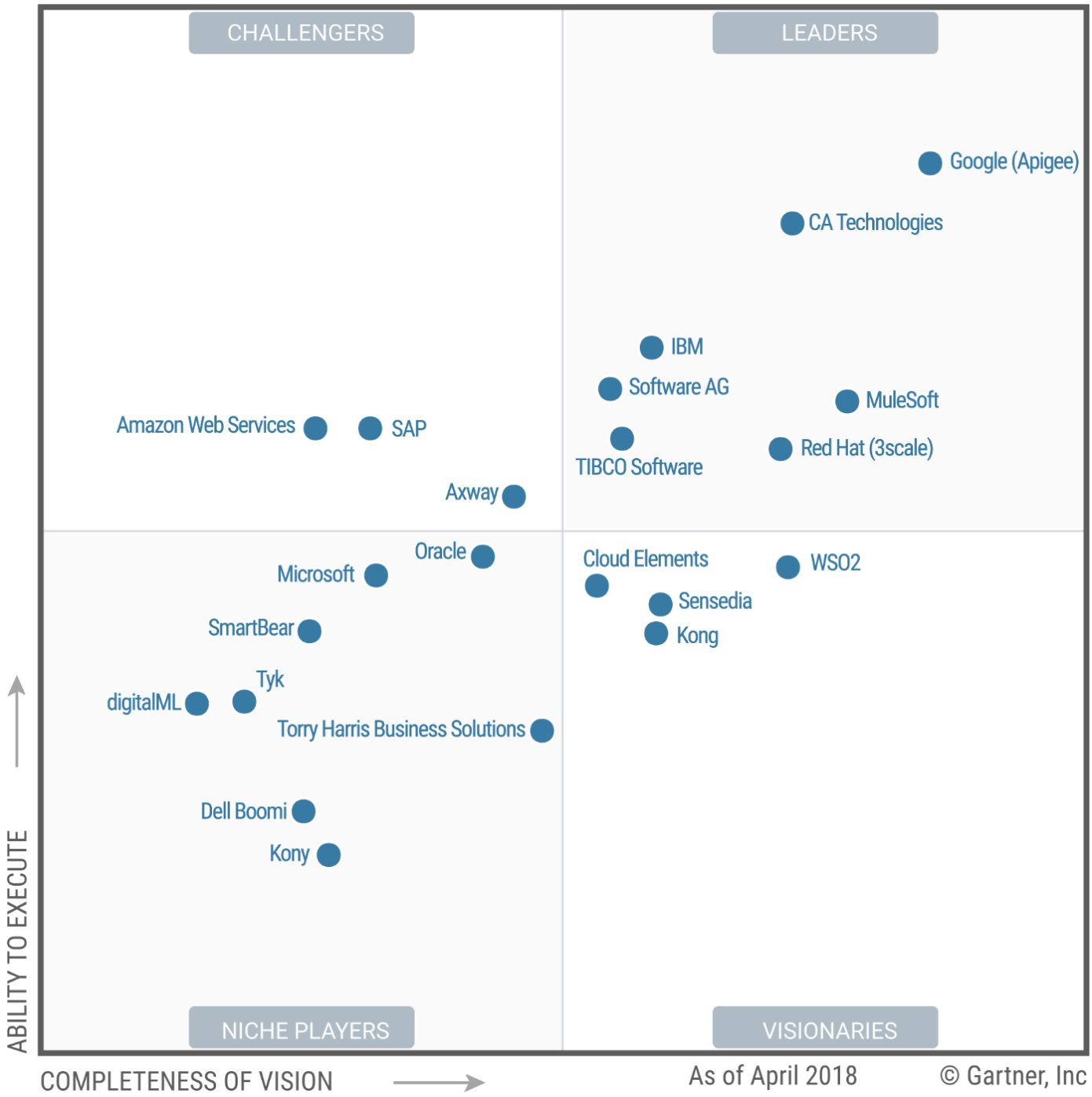
of digital business and that the already-widespread usage of APIs will increase massively in the future (see "Forecast: Enterprise Application Software, Worldwide, 2016-2022, 1Q18 Update").

Several business models are associated with the publishing of APIs (see "Choosing the Right API Pricing (and Funding) Model"). Companies gain different types of value from publishing APIs or running hackathons — value that goes beyond enhancing their image by appearing innovative (see "Use Ongoing Hackathons to Accelerate Digital Transformation"). In some cases, especially when the product can be delivered electronically (for example, TV access to yesterday's final of a sporting event), companies can directly charge for the use of APIs. However, the most common model in the API economy today is indirect, whereby a company provides free access to its APIs. Companies might do this in return for quicker, more efficient execution of a business process, such as the ordering of goods in a supply chain. Or they might do so to increase sales of a traditional product — travel companies, for instance, get more bookings if they publish APIs linking to their reservation systems.

The main theme of Gartner's 2017 Symposium/ITxpo was the need to scale digital business. APIs make this possible, because they support self-service and a one-to-many relationship between provider and consumers. From origins in the media and high-tech sectors in 2009, APIs have since spread into financial services, government, healthcare and retail. For the past two years, a critical mass of companies and government institutions has been publishing APIs in developers' portals to fuel B2C innovation, enable use of mobile apps and benefit from more direct B2B interactions with business partners. Publishing of APIs will continue to fuel the API economy — and the best is still to come.

Magic Quadrant

Figure 1. Magic Quadrant for Full Life Cycle API Management



Source: Gartner (April 2018)

Vendor Strengths and Cautions

Amazon Web Services

Amazon Web Services (AWS) offers the Amazon API Gateway, which was launched in 2015 as a fully managed service to enable developers to publish, maintain, monitor and secure APIs at any scale. The API Gateway team is now part of an expanded serverless organization. AWS is an obvious cloud leader, still growing fast, and API management functionality is reasonably important in its product line: Its API Gateway offering is driven by the growing serverless agenda. The gateway is aimed firmly at developers building serverless applications in AWS and using the gateway to invoke functions.

The Amazon API Gateway is cloud-only. AWS provides an open-source reference implementation for a serverless developer portal that integrates with the Amazon API Gateway. The gateway is

frequently used in conjunction with other serverless AWS products, such as AWS Lambda, Amazon Cognito (for identity management) and Amazon Kinesis (an event-streaming service).

Amazon API Gateway is currently available in 16 AWS regions around the world. Gartner believes that most of its customers are in the U.S. and Europe.

Strengths

- Amazon API Gateway is low-cost (you pay as you use, and if you don't use, you don't pay), efficient and performs at any scale. Via a wizard, the Amazon API Gateway presents itself as a natural, immediate follow-on for users of AWS Lambda or other AWS platform as a service (PaaS) offerings.
- Users report high levels of satisfaction with how the Amazon API Gateway meets their needs, their overall experience with it, and the way it is serviced and locally supported.
- As a straightforward follow-on from AWS Lambda, Amazon API Gateway is fairly well known to API management user communities and system integrators, despite merely modest investments by AWS in its international marketing and sales operations.

Cautions

- The Amazon API Gateway offers only a small subset of the API management functionality available in a mature market that includes vendors with offerings introduced long before 2015. AWS needs to extend its set of operational policies and introduce a ready-to-use developer portal.
- AWS's offering is largely driven by its serverless agenda and the predominance of developers' priorities relating to it. It is unlikely to evolve around the main drivers of digital transformations, in contrast to most other offerings in this market.
- Amazon API Gateway is still evolving. Consequently, users must be willing to trade its low cost for a preliminary product structure — shown, for example, by the lack of SLAs specific to API management and of structured innovation practices (beyond the obvious needs of developers using it).

Axway

Axway has a long history in the fields of integration and B2B software and services. Its API management offering, AMPLIFY API Management, is part of the AMPLIFY platform, which also offers mobile back-end services, a B2B gateway and managed file transfer (MFT). AMPLIFY API Management is available in an AWS public cloud, as a managed service (also on Amazon AWS) and on-premises.

As well as an API gateway and an API developer portal, AMPLIFY API Management includes the API Builder tool. This enables rapid API creation in front of data sources and, through a partnership with Cloud Elements, API access to a broad range of commonly used cloud apps and

services. An embedded analytics capability identifies abnormal situations and enables the customization of metrics and dashboards. The AMPLIFY API Central Service, introduced in 2017 and built on the AMPLIFY cloud platform, is a public cloud service that enables management of a central catalog of APIs and deployment of microgateways (based on NGINX, an open-source web platform).

Axway's main markets are in Europe and North America.

Strengths

- Axway is a diversified vendor, with an extensive product line and effective sales strategies for many geographical locations.
- As well as providing products for API management, Axway offers its customers digital strategy workshops and strategy guidance.
- Axway's partnership with Cloud Elements enables it to offer new cloud adapters. These are especially useful for organizations that want to manage outbound connections to third-party APIs from cloud/SaaS providers.

Cautions

- As our survey of reference customers confirms, Axway has been slow to innovate, and this shortcoming impairs its vision. However, the new API Central Service, now being launched, shows promise by introducing microgateways and more cloud-readiness.
- Axway's API management reference customers report dissatisfaction with the company's support for automation and its gateway's predominantly monolithic architecture. The new API Central Service does, however, offer a more distributed alternative.
- Axway's AMPLIFY API Management offering is powerful and feature-rich, but to harness this power its customers need to surmount a long learning curve and invest in internal resources, unless they use the managed-service option.

CA Technologies

CA Technologies sells a proven, fully featured and mature offering for API management. CA API Management, the company's flagship offering, includes Live API Creator, API Gateway, Mobile API Gateway, API Developer Portal and Microgateway. It offers its product line for cloud-only deployment (API Management SaaS), fully on-premises deployment and hybrid deployment. In the past 18 months, CA has extended its recent API design offering, Live API Creator, which enables users to build APIs for internal applications, mobile development projects, data-as-a-service exposure, IoT enablement and partner application integrations. It has also made three acquisitions in the area of API testing, and embarked on a microgateway strategy.

CA positions API Management as a way to unlock the value of data and empower developers to grow a business. For CA, APIs are the building blocks of digital transformation.

CA sells worldwide, but the bulk of its customers are in North America and Europe.

Strengths

- Following the recent addition of CA Microgateway, CA now has a comprehensive and powerful offering. It has solid security features and good coverage of basic and advanced functionality for the full life cycle of API management.
- CA has a strong product strategy and a geographically distributed sales force with a track record of reliable execution across several regions.
- CA's offering is highly visible and generally well-known, thanks to years of effective and carefully targeted marketing, a recognized and vocal API Academy, and a range of public events through which it demonstrates thought leadership.

Cautions

- CA and its API Management product line are sometimes slow to address upcoming, fast-moving requirements, particularly for the execution of digital transformations and strategies for startups.
- CA's API Developer Portal is still in the early stages of development, compared to the developers' portals of other Leaders. Also, CA has been slow to introduce a cloud strategy. These cautions apply particularly to digital transformations.
- CA-wide marketing messages about the "Modern Software Factory" can overwhelm more focused messaging about the application economy. If CA had clearer, more API-specific marketing messages, existing users and prospective customers would understand more clearly how CA API Management supports the role of APIs in the applications they will need in future.

Cloud Elements

Founded in 2012, Cloud Elements is unique in this Magic Quadrant because it focuses not only on managing API delivery, but also on aggregating API consumption. For API providers and particularly SaaS providers, the Cloud Elements API Platform enables an organization's existing APIs to be registered as "elements" that present a unified API to partners and customers. The API Platform may include a customizable API developer portal to assist onboarding. For API consumers, Cloud Elements allows APIs from different providers (such as several SaaS CRM providers) to be aggregated into Virtual Data Resources and API Hubs. This simplifies API consumption and provides a central point for management.

The Cloud Elements API Platform, which as well as providing API management serves as an integration platform, is available only in the cloud (using AWS) and is priced on a subscription basis. Professional services are provided for on-site API workshops.

Partnerships are particularly important to Cloud Elements. It provides its connectors to other API management vendors. It has, for example, a strategic partnership with Axway to deliver 20 new

API connectors for the Axway AMPLIFY platform, and with IBM for its App Connect product.

Although most Cloud Elements customers are in the U.S., its solution is available worldwide.

Strengths

- Cloud Elements' pricing model for API management is disruptive, as it is not priced on the basis of API traffic. Instead, its pricing is based on factors such as the number of "elements" (abstracted APIs) used. This makes Cloud Elements an attractive choice for high-traffic API scenarios.
- The Cloud Elements API Platform is entirely cloud-based, with no software to download and deploy. This enables quick time-to-value.
- Cloud Elements has a large catalog of prebuilt, API-based connectors to cloud and on-premises applications and services. This gives it an advantage over competitors that provide only "building blocks" for customers to manually configure API connections to cloud services.

Cautions

- Cloud Elements focuses on very specific use cases, namely those involving management of API consumption, aggregation and integration, rather than general-purpose API management. This means that it lacks advanced API management features, such as sophisticated security policies and API monetization.
- Cloud Elements provides API workshops to assist its clients, but the focus is on using its platform for integration, rather than for generating digital business or identifying API monetization opportunities. This limits Cloud Elements' effectiveness as a partner for digital transformations.
- As a relatively small company that does not focus primarily on API management and that has a limited geographic reach, Cloud Elements is not among the better-known vendors in this market.

Dell Boomi

Dell Boomi is a business unit within Dell that provides API management as part of a multipurpose PaaS called AtomSphere. In addition to integration API design and management, Boomi offers application and data integration (integration platform as a service [iPaaS]), a master data hub, B2B management, and workflow app development (following the acquisition of ManyWho in 2017). Within this common platform, Dell Boomi provides cloud-based design, deployment and management of APIs, including SOAP, REST and Open Data Protocol (OData) endpoints. The runtime environment may be cloud-based, or it may run on-premises in a lightweight Java-based agent called an "atom."

Dell Boomi API Management is licensed on a subscription basis. Most customers are looking to modernize existing integration and services implementations by using Service Enablement to

convert an integration process into a SOAP web service. Dell Boomi API Management can then be used to publish, secure and throttle these SOAP web services as APIs. A Message Queuing Telemetry Transport (MQTT) protocol connector is available for IoT use cases.

Dell Boomi's API management offering is sold worldwide, through direct sales presence or local partners.

Strengths

- By combining API management, MDM, workflow automation and iPaaS in one offering, Dell Boomi enables customers to take advantage of a wide range of functions in a unified platform.
- Dell Boomi API Management is certified for use directly on the Dell Edge Gateway family of products. This, along with support for MQTT and the Advanced Messaging Queuing Protocol (AMQP), makes for a strong IoT capability.
- Dell Boomi continues to expand an already strong network of partners, which includes more than 4,500 Boomi-certified professionals at over 360 global partner organizations.

Cautions

- Dell Boomi offers only standard capabilities for pure API management, with a focus on security and traffic throttling. It has not progressed significantly in terms of adding features since the last Magic Quadrant. In particular, its solution lacks a well-designed external developer portal.
- Since its API management capability is provided within an integration solution, rather than on a stand-alone basis, Dell Boomi has low visibility in the market for full life cycle API management. Many potential customers may therefore overlook it.
- By focusing purely on the integration aspects of API management, Dell Boomi is lacking in terms of support for organizations planning an overall API strategy, which includes identifying and tracking a digital transformation and its business outcomes.

digitalML

Based in London and New York, digitalML has a background in XML enterprise repositories. It markets the ignite platform, focused on the planning and design stages of the API management life cycle. In 2017, it added a runtime management capability built on top of Kong's open-source API gateway. This functionality provides deploy and run capabilities, including API traffic management, security and load-balancing. Other API gateways may be used in addition to, or in place of, ignite's runtime option.

To facilitate planning, digitalML has created a series of workshops that walk customers through the process of API planning, registering existing artifacts and creating "output templates" that can be delivered as APIs in different forms. This includes identifying APIs (including third-party ones) to group and manage together in order to perform a business task, and that can be treated as products.

For API design, the ignite Specification Workbench provides a broad set of functions for designing APIs based on information models. Ignite provides a central repository of API definitions, including REST APIs and older SOAP web services, XML schema definitions and a COBOL copybook. Versioning and retirement of API definitions is supported. API testing is provided through ignite Connect+, which focuses on API contract testing and checking SLA adherence.

Traditional digitalML customers are very large organizations (with more than $10 billion in revenue) based in the U.S., but digitalML is now targeting large organizations globally. The ignite platform is available on-premises or as SaaS (running on AWS).

Strengths

- DigitalML provides value particularly during the crucial early planning stages of API programs. It does so by facilitating workshops that help organizations focus on APIs that deliver the highest business value.
- There is an active team of architects at digitalML who can advise on service design and who have wide international experience of complex projects, particularly in large organizations.
- Governance of APIs is a strength of digitalML, which is particularly good at managing changes to API definitions and underlying information models. This helps avoid a "free for all" situation in which changes are not visible or managed.

Cautions

- DigitalML is a relatively small organization, with a product whose implementation benefits from professional services. Customers should evaluate the potential risks this poses in terms of scalability and execution.
- Runtime capabilities, such as traffic throttling and API protection, are based on open-source offerings like Kong. DigitalML offers a developers' portal mainly suited to internal API programs. If customers require a customizable public developer portal, with a richer functionality set, they may want to source this separately.
- DigitalML's product is not intended to be purchased and used without help. Instead, customers typically rely on digitalML's workshops and professional services to get their API programs started.

Google (Apigee)

Google's acquisition of Apigee in September 2016 had a positive impact on Apigee's product line and customers. Apigee continued with its strategy, aided by additional research and development (R&D) resources, and was placed in Google's wider cloud offering. Google's sales channels have proved beneficial to Apigee, especially in the U.S. Most of Apigee's management team, including its former CEO, who continues to run the Apigee unit, have stayed in Google, which is a positive sign.

The core Apigee API management platform, Apigee Edge, is available both on-premises and in the cloud. Apigee Sense (a cloud-only layer of API security that identifies and alerts administrators to suspicious API usage patterns) and a monetization capability add to the offering. Apigee was quick to address the need for internal API gateway use cases with its Edge Microgateway offering. Similarly, Google has been quick to support the Istio open-source service mesh, which Apigee has announced as a key part of its roadmap. The features of Apigee's offering extend to IoT APIs, predictive and standard analytics, Fast Healthcare Interoperability Resources (FHIR)-based healthcare APIs and open-banking APIs.

Apigee markets its offering as a cross-cloud API platform and as a platform for digital business. Most of Apigee's clients are in the U.S. and Europe.

Strengths

- Google gives Apigee increased viability and a wealth of technology with which to multiply the value of its offering. In addition, Google has used Apigee to sharpen its enterprise focus, and continues to exploit this acquisition effectively.
- Apigee's vocal marketing emphasizes its thought leadership, and makes it well-known to prospective API management customers. It also provides a platform from which customers can direct their own APIs to appropriate developer groups and communicate their success stories.
- Apigee focuses credibly on enabling digital business transformations, with dedicated content from the Apigee Institute, a self-assessment tool (Apigee Compass) and Google's extensive and innovative API platform (for machine learning and AI, for example).

Cautions

- For Apigee, being part of a much bigger entity may result in increasing product complexity, wider priorities and dependencies on other Google offerings. These changes could slow its execution in this market.
- Traditionally, megavendors have lacked focus on API management and not competed well against specialists in this market. Apigee has benefited from the megavendors' lack of focus, but this pattern is unlikely to continue for long, for several reasons. Competition is growing, with AWS and Microsoft having now qualified for this Magic Quadrant; vendors from adjacent markets are recognizing the importance API management; and specialist providers are being acquired and their technologies incorporated into larger offerings.
- A number of open-source API management platforms have grown and matured rapidly since the publication of the last Magic Quadrant. They represent viable alternatives to established offerings, such as Apigee's.

IBM

IBM's introduced its first offering for this market, IBM API Management, in 2012. This product focused on API management and required the use of IBM DataPower for API gateway capabilities. In September 2015, IBM acquired StrongLoop, a provider of API creation capabilities using Node.js. In February 2016, IBM introduced API Connect, which integrates StrongLoop, IBM API Management, gateway technologies from StrongLoop and IBM's DataPower Gateway into a single offering.

IBM API Connect is available at three levels: Essentials, which is free for developers; Professional, for small and midsize businesses, which is priced according to API call volume; and Enterprise, which is for higher call volumes and has the flexibility to shift from on-premises to cloud deployment. IBM API Connect still includes two API gateway options: the Micro Gateway, based on Node.js (through IBM's acquisition of StrongLoop) and the Enterprise Gateway (the virtual software edition of the established SOA-era DataPower Gateway). The developer portal is based on the open-source Drupal content management system.

API Connect is available both on-premises and as cloud SaaS. It is sold worldwide.

Strengths

- IBM enjoys an established and powerful position in this market, with solid customer bases in several industries. It has worldwide support capabilities and diversified geographical strategies.
- The functional capabilities of IBM's offering for full life cycle API management have widened consistently in recent years. IBM now offers comprehensive coverage for full life cycle API management.
- IBM has offices in 170 countries, which can market and sell API Connect. The offering is supported in 11 languages (IBM's Tier 1 languages).

Cautions

- Since the previous Magic Quadrant, functional enhancements to the Enterprise API Gateway (formerly known as DataPower), although now available within the IBM Cloud (formerly known as Bluemix), have been following strongly established market trends, and later than competing offers. Not much innovation has taken place, and the offering is showing its age.
- Although IBM has been a leading proponent of digital transformation, API Connect does not yet provide flexible and extended API value-rating features for clients wanting to quantify API value beyond API usage. Also, Stripe, IBM's partner for API monetization, has only partial coverage of geographies and business practices outside North America.
- IBM's understanding of the API management market, and its marketing strategy, are not as sharp and incisive as they were for the last Magic Quadrant, and remain very product-based. In today's market, users have digital transformations to undertake and ecosystems to build. Marketing messages focused on product offerings are likely to fail to resonate with customers' top priorities (such as building an ecosystem).

Kong

Kong, formerly Mashape, was founded in 2010. It launched its API Marketplace in 2012 with the goal of becoming the world's largest API hub. In 2015, the company started shipping an open-core API gateway, also called Kong. Open core is a business model for the monetization of commercially produced open-source software that involves offering a "core" or feature-limited version of a software product as free and open-source software, while also offering "commercial" versions or add-ons. In late 2016, Mashape divested itself of the API Marketplace in order to focus completely on developing the API gateway and complementary platforms, and in 2017 it changed its name to Kong.

Kong offers an open-core API gateway for REST APIs with an extensible plug-in architecture to enable developers to add functionality to the Kong gateway. In addition, Kong offers Gelato, a developers' portal, and Galileo, for API analytics. Kong has a differentiating focus on use cases involving microservices and serverless functions. Kong refers to those use cases as the "'new microservice and microfunction-driven world."

Kong's solution is available both on-premises and in the cloud. About 60 enterprise customers are using it, and it has 40,000 open-source production instances. Kong mainly targets customers in North America, Western Europe, Japan, Australia and Singapore.

Strengths

- Kong's API management platform is attractively lean. It should appeal to users with basic requirements who want to get an initial platform that they can then enrich as they go, either with Kong- or community-provided plug-ins, or with developments of their own.
- Kong's gateways can be deployed in a variety of configurations. This enables them to meet the requirements of traditional API management scenarios and act as microgateways in microservices architectures.
- Kong's product strategy is comprehensive and heading in the right direction. For example, it covers new types of analytics (with an enhanced offering called Vitals), advanced social features in the developers' portal, more sophisticated caching, and integration with Apache Kafka for events processing.

Cautions

- Kong is one of only a few remaining independent API management platforms, and uses investor funding to fuel its growth. It therefore makes an attractive target for acquisition by a larger company.
- Kong's offering is very young and only just beginning to be proven in enterprise use cases. Its offering is mainly targeted at fast-moving, microservice-rich projects. It does not cater to advanced API management priorities, which typically arise quickly beyond the first year of an API program.

- Kong focuses on the API management technology platform, and the developers using it in the ecosystem. Users looking to execute digital strategies will find Kong useful for enabling their platforms, but will need much more — including professional services — to get an ecosystem and digital transformations going.

Kony

Kony's initial KonyOne software, released in 2009, was aimed at front-end enterprise mobile app developers, but included the ability to develop APIs. In 2014, the company launched Kony Cloud (a PaaS), which separated its product line into a front-end tool for design and development (Kony Visualizer) and back-end middleware (Kony MobileFabric). Kony has since invested in API management capabilities — it is a newcomer to this Magic Quadrant — and Kony AppPlatform services (which include database as a service, Node.js services and IoT services).

Kony has renamed MobileFabric as Kony Fabric to indicate its evolution beyond a mobile application development platform (MADP) into part of a hybrid integration platform (HIP). Kony Fabric is the company's main platform for API design and testing. Kony does not offer an API gateway. Instead, APIs are published from the Kony Fabric Console to one or more connected runtime environments, each of which has a separate console for runtime activities and gateway-like features such as operational policies, usage reporting and analytics.

Kony's go-to-market messaging focuses on omnichannel app development, especially for digital banking. Its offerings are sold worldwide and have customers worldwide.

Strengths

- Kony's AppPlatform offers one of the most powerful cross-platform integrated development environments (IDEs) to support high-productivity and professional development approaches. In addition, Kony Fabric back-end services have evolved into a general-purpose application platform as a service (aPaaS) solution.
- Kony facilitates implementation of a multichannel architecture for native mobile, web and watch UIs. It plans to enhance its platform in the second half of 2018 to support omnichannel experiences by using conversational interfaces, chatbots and immersive technologies, all of which require a solid API platform approach.
- Kony offers effective functionality for the early stages of full life cycle API management (planning, designing, implementing and, to some extent, testing), especially via its Visualizer tool. These capabilities enable MADP or aPaaS customers to avoid the need for a separate API management purchase, initially at least.

Cautions

- Despite credibly extending its capabilities into aPaaS and API management, Kony remains mainly a MADP provider. Its product strategy, marketing materials and sales practices still focus on its MADP, and on the value derivable from its full stack platform.

- Kony is the largest independent MADP vendor, having received significant venture capital investment during the past decade. As a result, customers may have concerns about Kony's long-term independence as a stand-alone entity and its long-term commitment to the API management market — they may wonder whether it will be acquired by a larger company.
- In sharp contrast to the effective functionality that Kony offers for the early stages of full life cycle API management, it offers less functionality for the later stages. Moreover, the concept of runtimes does not scale as well as a typical API gateway to large API programs.

Microsoft

Microsoft's Azure API Management was originally created by Apiphany, which Microsoft acquired in 2013 and then integrated into the Azure platform. Azure API Management became generally available in September 2014. As a result of continued sales momentum in the past year, Microsoft met the inclusion criteria for this Magic Quadrant.

Azure API Management is a cloud-only offering. The service enables organizations to publish APIs securely, reliably and at scale. It is designed to increase API consumption by internal teams, partners and developers. The administrator portal enables customers to provision user roles, create usage plans and quotas, apply policies for transforming payloads and throttling, and use analytics, monitoring and alerting. Azure API Management is offered in three main tiers: Developer, Standard and Premium (which permits multiregion deployment). A Basic tier, aimed at entry-level production use cases, also became available on 1 December 2017.

Azure API Management is available in 27 public cloud regions in the Americas, Europe, Asia and Australia, six U.S. Government and Department of Defense regions, and two regions in mainland China. Most Azure API Management customers are in the U.S. and Europe.

Strengths

- Microsoft Azure API Management is low-cost (you pay as you use, and if you don't use, you don't pay), widely available across the world and supported in nine languages. It is an immediate option for any organization using Azure cloud services, and it is well integrated with the Azure platform.
- Azure API Management administration features are part of the Azure portal. The design concepts behind the offering, which flow through to all services using it, are based on extensive design, usability and accessibility testing. This makes Azure API Management easy to use and to start an API program with.
- Being part of the Azure cloud service family, Azure API Management benefits from immediate exposure to a wide user base. It is fairly well known to API management user communities, despite merely modest investment by Microsoft in its international marketing and sales.

Cautions

- Azure API Management includes 40 commonly used operational policies and a developers' portal, but lacks capabilities for later API life cycle stages — for example, many advanced deploy and run features and API retirement predeprecation support. As the offering became generally available as long ago as 2014, Gartner has concerns about Microsoft's commitment of resources to it, and about the offering's long-term viability in a rapidly evolving API management market.

- Azure API Management supports virtual network connectivity for access to on-premises resources, but does not have a customer-managed deployment option that could be hosted on-premises or outside Azure. This option remains a roadmap item.

- Azure API Management is an Azure cloud service and will remain focused on developers' and IT professionals' priorities to build, deploy and manage applications through Microsoft's global cloud. It is unlikely to evolve according to the main business drivers of digital transformations, in contrast to most other offerings in this market.

MuleSoft

MuleSoft started by offering the popular open-source Mule integration platform. Recognizing that API design, implementation and management exist on a continuum, MuleSoft then combined its integration capabilities with API management capabilities and launched the Anypoint Platform in 2013. MuleSoft has continued to expand the capability and reach of the Anypoint Platform through organic product development and targeted acquisitions.

On 20 March 2018, Salesforce entered into a definitive agreement to acquire MuleSoft. However, as this acquisition had not closed at the time of writing, the evaluation of MuleSoft in this Magic Quadrant is based solely on its capabilities as a stand-alone company. The acquisition is expected to be completed in the second quarter of Salesforce's fiscal year 2019, which ends on 31 July 2018.

The Anypoint Platform enables users to design, build and manage APIs and integrations (on-premises and in the cloud) with a single product. It also contains API analytics management and API monetization features, and a set of packaged IoT protocol connectors. It can be run on-premises, in the cloud, and in hybrid configurations.

"Connect anything, change everything" is MuleSoft's slogan for the Anypoint Platform. MuleSoft sells its platform both directly and through a partner ecosystem. It has customers worldwide.

Strengths

- MuleSoft has shown effective marketing and thought leadership in the API management market, as well as related integration markets. Its strategy for growth has earned it customers across the world in several industries and a corresponding increase in revenue since the last Magic Quadrant.

- MuleSoft provides a combination of API management and technologies to enable hybrid integration. These are linked because APIs are widely used for integration and orchestration of

application and data logic. MuleSoft's offering is therefore attractive to customers who are looking for a full set of HIP capabilities in one product.

- MuleSoft users benefit from powerful customer care practices. These include Catalyst, a packaged set of end-to-end offerings that combines customer success, training and other services; ProgrammableWeb, which features the API University; and the Champions Program, which encourages developer growth.

Cautions

- MuleSoft's offering combines integration and API management, which makes it an attractive solution for companies requiring both. However, it may be more than is needed for companies that already have an integration platform (especially given the platform's cost). MuleSoft is addressing this point with a forthcoming stand-alone API management offering.
- MuleSoft's engagement with organizations is mostly bottom-up, through API developers, or as part of integration projects. It lacks the business-level API planning for API programs that is required for today's sprawling digital transformations.
- It is often wrongly assumed that MuleSoft's offerings are fully open-source, whereas, although many of its API-related components are, the API gateway and developers' portal are not. There is, however, ample choice of fully featured open-source offerings, which have been emerging for some time and are fully viable.

Oracle

Oracle has a long history in the application infrastructure market, spanning cloud and on-premises deployments. Its API management offering, Oracle API Platform Cloud Service, is available either as a cloud solution running on the public Oracle Cloud, or in a hybrid architecture using cloud management of on-premises gateways. The gateway component is based on the Oracle Communications Services Gatekeeper product. Previous Oracle API management offerings were based on the Oracle Enterprise Repository product, and, before that, an OEM version of the Vordel (now Axway) API gateway.

In 2017, Oracle acquired Apiary, which was a close partner of Oracle and was evaluated in the prior Magic Quadrant. This Magic Quadrant evaluates the now-combined offering. Following the acquisition of Apiary, Oracle now offers a SaaS-based API designer, which helps teams collaborate on API design.

Oracle's offering is available worldwide.

Strengths

- The acquisition of Apiary gives Oracle a flexible mock server with powerful support for API design, rapid prototyping, and collaboration between API providers and API consumers.

- Oracle is a major force in application infrastructure, and has a long track record. API management capabilities are clearly strategic to its offering, which is increasingly included in larger application infrastructure deals. The API management offering has improved significantly since the last Magic Quadrant, in terms of both Ability to Execute and Completeness of Vision.
- Oracle's pricing is attractive, as it starts low and scales with API traffic. Organizations can get started with Oracle's solution without a large upfront cost, thanks to a truly cloud-based approach.

Cautions

- Oracle offers no entirely on-premises offering, so it is unsuitable for organizations that do not want to have any cloud dependencies. The Apiary Design Portal is cloud-only, and the management service runs on the public Oracle Cloud (or Oracle Cloud Machine for a hybrid cloud architecture).
- Oracle's surveyed reference customers expressed some dissatisfaction with its installation and initial setup procedures. This contributed to a low score (relative to other vendors in this Magic Quadrant) for overall service and support.
- Given its relative newness to this market, and its aggressive product strategy, Oracle has initially focused on core security features. More business-focused features, such as more extensive API monetization and business performance metrics, are still on its roadmap.

Red Hat (3scale)

Red Hat is a successful open-source software vendor that addresses a broad range of OSs, infrastructure as a service (IaaS), virtualization, container and middleware/PaaS offerings, and sells management tools to control them. In June 2016, Red Hat announced its acquisition of 3scale, a focused and mature API management vendor founded in 2007. 3scale offered a distributed architecture (partly open-source) with on-premises agents and policy management in the cloud — which was different from the on-premises gateway or cloud intermediary model of most other API management vendors.

Red Hat 3scale API Management is positioned as part of Red Hat's Agile Integration offering. Users can share, secure, distribute, control and monetize their APIs on an infrastructure platform built with performance, customer control and future growth in mind. With the release of Red Hat 3scale API Management 2, users can place any 3scale components on-premises, in the cloud, or on any hybrid combination. At the time of writing, Red Hat 3scale API Management was not fully open-source.

Red Hat 3scale API Management is marketed worldwide and has customers worldwide.

Strengths

- Red Hat has a strong presence in the application infrastructure market. It has now integrated a powerful API management platform with several application infrastructure offerings, including Red Hat Fuse (an integration platform), AMQ (messaging), OpenShift (a container offering) and Red Hat SSO (a single sign-on solution).
- Since the last Magic Quadrant, Red Hat has increased 3scale's viability, and given it a consulting organization and proven worldwide support structure. Conversely, 3scale has given Red Hat a functional API management platform and sharp market understanding. The acquisition has proven successful, so far.
- The company has a comprehensive and targeted product strategy for Red Hat 3scale API Management. In addition, Red Hat provides support for the NGINX Open Source version (which Red Hat 3scale API Management is based on) via its Linux Software Collections program.

Cautions

- While integrating itself into Red Hat, and focusing on the on-premises deployment option, 3Scale was too busy to bring forward advanced API management functionality. However, its product vision is solid, and the bulk of the integration work is complete, so we expect core product evolution to take a higher priority in future.
- As new, fully viable and functionally comparable open-source API management offerings, such as those of Kong and Tyk, are gaining traction and maturing, Red Hat needs to prioritize introduction of a fully open-source version of Red Hat 3scale API Management.
- 3scale was very responsive to market trends, which compensated for its lack of formal innovation processes. As innovation in this market is essential, customers must check that it remains responsive, now that it is part of a much larger entity.

SAP

SAP has a long history in the application infrastructure market, in which it sells middleware and integration tools and platforms. Its API management offering is SAP Cloud Platform API Management. SAP delivers this as part of the SAP Cloud Platform, a broad PaaS that also includes integration, portal, mobile app development and data management capabilities. It is a multicloud offering that supports AWS, Microsoft Azure and Google Cloud Platform. SAP uses an OEM version of the Google (Apigee) Edge API gateway as the runtime component within its cloud and hybrid API management offerings. SAP has built its own full life cycle API management capabilities around this gateway, including analytics and an out-of-the-box developer portal. SAP also resells the Apigee offering for purely on-premises deployments.

Products in SAP's wider product line (such as S/4HANA, Concur and Ariba), as well as partners in the ecosystem, publish their APIs through the SAP API Business Hub. These can then be managed through SAP Cloud Platform API Management, along with other APIs. For API monetization, there is an API-based integration with SAP Hybris (which can provide billing for API usage) and SAP Hybris Revenue Cloud (for revenue management). For analytics, this includes

integration through OData APIs with SAP HANA (for data aggregation) and SAP Analytics Cloud (such as for customer journey analysis).

In 2017, SAP added API management support for customers developing services or microservices using tools such as Cloud Foundry and Mendix on the SAP Cloud Platform. This support includes a service broker, available in SAP's Cloud Foundry marketplace, which can be deployed to bring services developed in Cloud Foundry under SAP Cloud Platform API Management's control.

SAP markets its API management offering worldwide, as part of the SAP Cloud Platform, and diversifies it through its digital strategy across a number of industries.

Strengths

- SAP has a sound understanding of the role that APIs play in its customers' digital transformations. This has made its API management offering strategic to its entire product line.
- Many integrations are provided with wider SAP platforms, analytics, billing, identity services and SAP Cloud Platform Integration (iPaaS). A broad set of APIs for on-premises- and SaaS-based SAP products is available.
- SAP provides a set of policy templates for download from the SAP API Business Hub (a central catalog of SAP and partner APIs). This points customers to best practices and helps them start using the solution quickly.

Cautions

- SAP offers API management technology as part of a larger digital transformation platform (the SAP Cloud Platform). Although SAP Cloud Platform API Management can be used on a stand-alone basis, customers will benefit most by using it in combination with other SAP offerings.
- Reference customers scored SAP Cloud Platform API Management below average for overall customer satisfaction, and especially for pricing and contract flexibility. It is worth mentioning that SAP recently announced a consumption-based pricing model.
- Although SAP provides many integrations between SAP Cloud Platform API Management and its wider product line, reference customers reported operational challenges associated with those integrations.

Sensedia

Sensedia is a subsidiary of CI&T, a large Brazil-based system integrator. Sensedia's solution is the Sensedia API Platform, which is delivered primarily through associated Brazil-based professional services (consulting and system integration). The technology stack underpinning Sensedia's solution is based on a combination of many open-source projects, including Apache Camel, Kibana and Drupal.

The Sensedia API Platform is available both on-premises and in the cloud (AWS, Microsoft Azure or Google Cloud). Cloud deployments greatly outnumber on-premises deployments. In addition, Sensedia has a significant number of services-only customers, to which it provides strategy consulting, integration guidance and developer outreach services.

In addition to API management products and professional services, Sensedia offers API marketing services for, among other things, running hackathons and providing developer community management on behalf of customers who use Sensedia's API developer portal.

Sensedia also markets a banking API solution that uses the Sensedia API Platform. In addition, it offers solutions for insurance, e-commerce and payments. This reflects its customer base, which includes financial services companies in Brazil.

Strengths

- Sensedia's "API Playbook" methodology facilitates API prioritization in a Lean Canvas-like manner, based on a wide range of factors, including business value. This enables organizations to quickly pursue a coherent API strategy. Our survey revealed that reference customers find this valuable.
- Sensedia provides prebuilt API definitions for banking and other financial services API use cases. Customers can adapt these, rather than having to start from scratch.
- Sensedia recently added support for GraphQL and a new microgateway. This shows market responsiveness and innovation.

Cautions

- Sensedia has limited geographical reach beyond its home territory of Brazil.
- Sensedia's solution stack has been put together with many "moving parts" from open-source components. For a young platform (such as Sensedia's), this approach can lead to support challenges. However, Sensedia has integrated its solution stack into a unified product, and its customers have not reported any significant support issues.
- Sensedia offers a relatively standard set of features. Customizations and extensions typically require consultancy engagements, which are carried out by Sensedia's own professional services arm but may also use resources from CI&T, which has a team focused on services for the Sensedia API management solution.

SmartBear

SmartBear focuses on the planning and design, implementation and testing, and versioning and retirement steps of the API life cycle. It is a founding member of the OpenAPI Initiative (OAI), to which it donated the original Swagger Specification for API design in 2015. It is also the company behind the popular Swagger and SoapUI tools. The creator of SoapUI and SmartBear Advisor, Ole Lensmar, is currently the OAI's chairman.

SmartBear's SwaggerHub provides a team environment that enables API designers and developers to work together. It also validates APIs against style guides to ensure APIs are consistent across an organization. SmartBear's ReadyAPI is a suite of API testing tools that includes SoapUI Pro for functional testing (including some API security testing), LoadUI Pro for performance testing, and ServiceV Pro for API and database virtualization. SmartBear's AlertSite product monitors applications, APIs and websites — and can automatically generate API monitors using SoapUI scripts and OpenAPI definitions.

SmartBear's products are available on-premises and as SaaS (running on AWS), in both cases via a subscription model. They are available worldwide.

Strengths

- SmartBear has a well-rounded set of capabilities for designing, developing, testing and monitoring APIs. It supports open standards and its offerings are scalable for large organizations that want a consistent, well-designed portfolio of APIs.
- As some enterprises already have API gateways, SmartBear does not require customers to add another to their architecture. This approach avoids "proxy overload."
- Owing to its open-source model, SmartBear has a very large user base, which has produced a large community for support and enhancements. SmartBear's OpenAPI Specification expertise gives it an advantage, and its long-term commitment to open-source technology makes it popular with developers.

Cautions

- Although good at the technical aspects of API design, SmartBear does not focus on the business aspects of API planning. It is therefore typically not seen as a strategic partner for digital transformations.
- SmartBear's strategy of partnering with API management vendors in order to integrate with their API gateways may pose a challenge in the long term. This is because some API management vendors may be reluctant to participate, especially those that also offer API testing or API design. Some SmartBear customers that need a full life cycle solution may therefore need to undertake their own integration with the gateway of their choice.
- Reference customers expressed some dissatisfaction with running SwaggerHub on-site. They reported problems with administration and integration, and said that it lags behind the SaaS version in terms of functionality. SmartBear is in the process of addressing these issues.

Software AG

Software AG provides full life cycle API management within the webMethods API Management Platform. Launched in 2014, Software AG's webMethods API Portal is a stand-alone API developer portal. It was followed in 2016 by webMethods API Gateway, which consolidated two older API gateway offerings.

API management is part of Software AG's overall Digital Business Platform offering. This platform also offers hybrid integration capabilities, including B2B, cloud and application integration, business process management, messaging and managed file transfer. It also offers integration with Software AG's Terracotta DB technology, an in-memory data grid, used for high-traffic API use cases in which data is served from memory to the API layer.

Software AG has headquarters in Germany and the U.S., and a relatively strong presence in other markets, such as Australia and Japan (though much less so in Asia). Its API management offering is sold worldwide. It is available both on-premises and as a cloud-based service called webMethods API Cloud, which is hosted on AWS in the U.S. and Europe.

Strengths

- Customers who use Software AG's API management solution in conjunction with its broader product set can take advantage of a well-integrated application infrastructure portfolio, which includes streaming analytics and in-memory computing applications, for example.
- Customers' satisfaction with Software AG has increased since the last Magic Quadrant, due to usability improvements and consolidation of the company's API gateways. Customers report that Software AG's API management solution is relatively straightforward to get up and running.
- Software AG is particularly strong in terms of B2B/private APIs. These are less visible than public APIs but provide significant value for organizations in industry sectors such as manufacturing, banking, insurance and energy.

Cautions

- The lack of visible marketing specific to API management, and the close relationship of the API management solution to other products, mean that Software AG usually sells API management as part of a wide digital business platform.
- Our survey found that Software AG's reference customers are less happy with the cost and pricing of its solution than are the reference customers of other vendors with competing offerings.
- Retirement of APIs, whether because they are old and little-used versions or because they have no business impact (or an adverse one), is becoming increasingly frequent, and is never a simple task. Software AG's support for this complicated process is only partial.

TIBCO Software

TIBCO Software is a well-established vendor of middleware, integration, visual/stream analytics and application infrastructure. At the end of 2014, TIBCO was acquired by Vista Equity Partners, and in August 2015, TIBCO acquired the Mashery unit from Intel. Historically, Mashery had always been at the forefront of API management, mainly with its cloud-centric offering.

TIBCO Mashery is available in three cloud editions, differentiated by price point and feature set. An on-premises product, Mashery Local, is also available, but its administration is cloud-based. TIBCO also continues to sell its original, pre-Mashery API management offering, under the name TIBCO API Exchange Gateway, which is marketed for advanced security and integration projects. Since the last Magic Quadrant, TIBCO has introduced two related offerings: Flogo (for IoT integration) and Mashling (an event-driven microgateway); both are open-source and supported by TIBCO.

TIBCO goes to market with targeted "'connected intelligence'" messaging. It markets and sells its offerings worldwide.

Strengths

- TIBCO is an established international middleware suite and analytics vendor, with many cross-selling opportunities across several product lines.
- Solid R&D and support groups have always been behind Mashery offerings, so the current TIBCO Mashery product line offers broad and easy-to-use API management functionality throughout the API life cycle. TIBCO's product strategy is thoughtful, comprehensive and effective.
- TIBCO has been building a global presence for more than 20 years, and now has sales offices in over 30 countries. Mashery was an almost entirely North American outfit when acquired by TIBCO, but Mashery products are now increasingly sold internationally.

Cautions

- TIBCO focuses on selling to global enterprises with revenue of $500 million or more. Most of them are getting their digital strategies up and running, and from its inception Mashery had a focus on the business side of APIs. However, TIBCO as a whole is not used to selling to the business roles that drive those strategies, having historically focused on technology excellence.
- Except for the developers' portal, TIBCO Mashery is available only in English, and supported only in English. As API programs and digital transformations are becoming worldwide phenomena, this is a major impediment to the execution of TIBCO's international strategy.
- Since the publication of the last Magic Quadrant, TIBCO has mainly innovated by introducing new offerings around the core Mashery product (Flogo and Mashling, for example). As nontechnology buyers take over, TIBCO's innovation will need to focus on their needs if it is to maximize the success of API programs and keep pace with the market. It will need, for example, to increase the number and industry presence of API evangelists and enhance its professional services.

Torry Harris Business Solutions

Torry Harris Business Solutions (THBS), founded in 1998, focuses on providing high-end technical services, predominantly in SOA, APIs, and integration, digital transformation and digital enablement solutions. THBS provides these services to enterprise clients in various industries through a combination of offshore and on-site delivery.

Its API management offering, API-o-Blocks, is a framework of products, processes and services built on open-source components. Its SaaS offering runs on AWS. API-o-Blocks includes an API gateway called API Connect (but can also use other API gateways) and a mobile back-end services component called Omni BaaS. THBS has a well-defined program of digital strategy workshops addressing CxO roles, to help customers design an effective API strategy.

Although founded in the U.S., THBS's staff are mostly located in India. It mainly markets its products in Europe, the Middle East and Africa, India and Latin America.

Strengths

- When API-o-Blocks is purchased in conjunction with a professional services engagement, THBS's pricing is low.
- THBS sells to large organizations mainly in the telecom, financial services and energy sectors. It addresses these sectors with individualized starter packs across the technology and business areas it covers.
- THBS acts as a partner to its customers in digital transformation projects. In particular, it performs effective customer journey mapping, which helps to expand the number of business models it supports.

Cautions

- THBS differs from the other vendors in this Magic Quadrant in that it generates revenue primarily as a consulting company, using a variety of open-source products in its projects. Apart from Sensedia, all the other vendors in this Magic Quadrant are direct providers of their own technology and/or managed services in the cloud. This means THBS's consulting engagements will largely dictate the roadmap for, and development of, products used in its API management solution.
- THBS's product enhancements and lines of innovation are almost entirely dictated by its customers. As a result, its Ability to Execute during the past 18 months has not kept pace with that of the Leaders.
- THBS is not very visible in the market. Its offerings are barely marketed and it has a relatively small customer base for API management. That should not stop end users from considering its offering, however.

Tyk

Tyk started out as an open-source project, founded in 2014 by Martin Buhr (now Tyk's CEO) with the aim of developing an API gateway to handle high-load, high-performance, auto-scaling, containerized microservice patterns. As a company, Tyk launched commercially in April 2016 with no external funding and a transparent business model in which monetization of large-enterprise customers pays for continuous improvement of the open-source gateway.

Tyk offers an API management platform with an API gateway, API analytics, a developer portal and an API management dashboard. Tyk does not provide a separate microgateway product, as its standard gateway can be used instead. The offering was built from the ground up (not using NGINX or node.js), the only dependencies being MongoDB and Redis (both open-source and free to use at scale).

Tyk's target audience is very simple: whoever uses REST, which, in practice, means developers.

Tyk has offices in London, U.K. and Singapore. It has clients throughout the world, with an even spread of coverage across the U.S., EMEA and Asia/Pacific.

Strengths

- Tyk's pricing model is very attractive. The first installation of the full enterprise product is given away, and supported for free on-premises, to smaller organizations; then extra installations in the same company are for purchase. In the cloud, a freemium model applies initially, followed by metered traffic thresholds. Support is available 24/7 at very affordable prices.
- Tyk has been profitable since launch. Its revenue-first approach avoids the involvement of venture capitalists and enables Tyk to remain independent. In less than two years, Tyk has secured active installations in some of the world's largest banks, and in healthcare and media companies.
- Tyk has a simple open-source API management offering that is extensible through plug-ins. It is an attractive proposition for users with basic requirements who want an initial platform to enrich as they progress.

Cautions

- Tyk is one of only a few independent API management platforms still in business, has few dependencies, and has grown well since its inception. It will soon make an attractive target for acquisition by a larger vendor.
- Tyk's offering is very young and largely unproven within enterprises. It provides more than basic full life cycle API management functionality, especially for the deploy and run phase, but overlooks users' advanced priorities — like API monetization and support for the API product manager — beyond an API program's first year.
- Tyk approaches this market from a strictly technological angle — it is an engineering business built for engineers. Users looking to execute digital strategies will find Tyk useful in enabling

their platforms, but will need much more to get an ecosystem and digital transformation started. They will need professional services, for example.

WSO2

WSO2 provides an open-source integration solution that includes identity management and security, API management and analytics. Its API management offering is WSO2 API Manager. WSO2 API Cloud is the public cloud version, which runs on AWS and Microsoft Azure in the U.S., Europe and Australia. Currently, however, most customers use WSO2 API Manager on-premises.

All of WSO2's products share the same underlying Carbon framework. This means that its API Gateway shares capabilities with the WSO2 enterprise service bus (ESB), including protocol support for MQTT, AMQP, WebSocket and others. WSO2's API developer portal is modeled on the concept of an API store, using a general-purpose framework that customers can also use to build app stores, connector stores and API marketplaces. A separate product, WSO2 Identity Server, provides support for single sign-on and identity federation, although the WSO2 API Manager itself supports OAuth 2.0 and other relevant standards and can be used with other identity infrastructure.

WSO2's API management product is available for free download. Companies that want support and access to maintenance and security updates for their production systems pay for product support subscriptions. For on-premises deployments, subscription pricing is based on the number of Java Virtual Machines deployed in production and preproduction environments. Cloud pricing is based on API call volume, and a managed service option is available.

WSO2's products are available worldwide.

Strengths

- WSO2's open-source model offers a competitive advantage. It appeals to technically savvy customers who value the ability to customize the solution, are looking for competitive pricing on-premises or in the cloud, and are used to open-source ways.
- Integration and API management is provided, plus an identity server, on a common platform. This means that customers do not have to deploy different vendors' solutions for each purpose (if they do not already have them).
- WSO2 is particularly suitable for organizations building an API marketplace, as it provides an API marketplace solution that uses WSO2 API Manager and has been used by a variety of clients to create public marketplaces.

Cautions

- As a technology-focused company, WSO2 provides little help for customers in terms of API strategy planning or preparing for the business outcomes of APIs. Customers create their own digital strategies, with WSO2 performing the role of technology provider.

- With an extensive integration offering and a significant number of "moving parts" and customization points, WSO2 tends to appeal to more technically minded customers. Reference customers scored it low for ease of deployment.
- WSO2 has limited marketing reach and awareness in the API market. While recognized as a competitor, its technology-focused approach frequently makes prospective buyers overlook WSO2 as a potential strategic partner.

Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant may change over time. A vendor's appearance in a Magic Quadrant one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. It may be a reflection of a change in the market and, therefore, changed evaluation criteria, or of a change of focus by that vendor.

Added

There are five newcomers to this Magic Quadrant, a number that reflects the growing hunger for API management solutions:

- **Amazon Web Services,** which, thanks to continued sales momentum in the past year, met the minimum revenue requirements.
- **Kony,** which has expanded out of MADPs and made its API management capabilities more explicit.
- **Microsoft,** which, thanks to continued sales momentum in the past year, met the minimum revenue requirements.
- **SmartBear,** which has increased its sales, and extended its coverage in this market.
- **Tyk,** the latest open-source provider, which is maturing.

Dropped

- **Akana,** which was acquired by Rogue Wave in November 2016, and based on Gartner's estimates did not grow by at least 20% in the past year.

Note also that Apiary's capabilities now come under Oracle, which acquired them in January 2017; Apigee now appears as Google (Apigee); and Mashape has changed its name to Kong.

Inclusion and Exclusion Criteria

For a vendor to be considered for inclusion in the 2018 Magic Quadrant for full life cycle API management it must satisfy *all* of the following criteria. It must:

- Market any subset of full life cycle API management capability, as defined under "Product/Service" below, both in the cloud and on-premises, or in the cloud only. Offerings may be part of a more comprehensive platform, such as a PaaS, a HIP or a platform to support digital business. Vendors offering on-premises-only solutions did not qualify for this Magic Quadrant.

- Have been marketing offerings (via general availability or beta) as of January 2017. The cut-off date for products to be evaluated as generally available for this Magic Quadrant was September 2017. Products scheduled to be available after September 2017 were evaluated as part of vendors' roadmaps.

- Have a comprehensive, general-purpose (that is, not specific to one industry) offering for full life cycle API management that covers at least two API life cycle stages (these being planning, design, implementation, testing, deploy and run, versioning and retirement). This offering should either be available directly from the vendor or via publicly announced partner agreements. Vendors not offering a developers' portal — either with a direct offering or via a publicly announced partner agreement — were excluded from this Magic Quadrant.

- Generate revenue of at least $12 million (or its equivalent in another currency) per year from full life cycle API management. Vendors pursuing a subscription-based, open-source business model should have revenue of at least $3 million (or its equivalent in another currency) a year from full life cycle API management. These figures include revenue from software, iPaaS, cloud managed services, support and professional/consulting services relating to the full life cycle API management offering. The figure for open source is lower to reflect a different business model (based on cloud subscriptions and/or support fees, instead of license and/or cloud fees).

- Have grown in terms of full life cycle API management revenue or total number of full life cycle API management customers by at least 20% in the last year.

Honorable Mentions

- Econocom Bizmatica, Nevatech, OpenLegacy, SEEBURGER and Varnish Software. These vendors did not qualify for inclusion in this Magic Quadrant because, based on Gartner's estimates, their offerings did not satisfy the minimum revenue criterion.

- Informatica, which did not qualify for inclusion in this Magic Quadrant because it does not offer a developers' portal.

Evaluation Criteria

Ability to Execute

Please refer to the general Evaluation Criteria Definitions at the end of this document.

Below, for additional clarity, are details of some aspects specific to full life cycle API management.

Product/Service

For full life cycle API management, we consider providers' capabilities in five different categories, which correspond to stages in an API's life cycle:

- Planning and initial design
- Implementation and testing
- Deploy and run (basic)
- Deploy and run (advanced)
- Versioning and retirement

Planning and Initial Design

This subcriterion rates providers' ability to help their clients plan and design the right APIs for their business purposes, frequently to enable the execution of digital strategies.

A common mistake of SOA projects was to build services based on the generic requirements of future applications — it is very clear today that the "if you build it, they will come" approach for APIs will not work. APIs should be designed to meet the concrete needs of real API consumers, and to be used immediately. However, anticipating the needs of digital business applications, or meeting them as quickly as possible, is a very challenging undertaking.

Frequently, full life cycle API management providers offer workshops and tools for business managers, innovation managers or application managers (and the like). These help business managers determine how to engage with the API economy, start a technology platform for digital business, identify which APIs to publish, and come up with APIs that will be essential for building an ecosystem of developers.

One major factor in the selection of an API management platform is the thought leadership of a vendor, as shown by:

- An intention to engage in platform business (see "Winning in the Platform Game, Part 3: Build the Platform Business Operating Model").
- API management offerings known to have delivered value in mature projects for other companies.

For this reason, some providers employ "API evangelists" who very publicly display their knowledge in this area by facilitating webinars, holding conference sessions, helping with planning hackathons and holding client workshops for API planning. API evangelists also play a fundamental role in clarifying the rules of the API economy (and how a company can be a part of

that economy), which now extends to building a business ecosystem (see "From APIs to Ecosystems: API Economy Best Practices for Building a Digital Platform").

Other factors involved in designing APIs are external ones, such as standards and government regulations. There are very few standards for APIs across industries, but, for example, banks are being driven to publish APIs in order to satisfy PSD2 in the European Union. API management providers with industry expertise can help organizations plan and design APIs for such requirements, even if no "standard" layer of APIs has been agreed across a region or industry.

If the APIs are to be used externally, a fundamental part of API planning is the upfront assessment of the business model for the API (see "Choosing the Right API Pricing (and Funding) Model"). Is it to attract new customers, to build a platform and an ecosystem of developers on top, to add value to the relationship with existing customers (perhaps to stave off competition), or to facilitate partnerships? API management vendors with API strategy and digital business experts can benefit customers by establishing a clear business model for an API, thereby preventing later confusion. API contract design tools really help here.

Implementation and Testing

APIs do not just appear from nothing. They are often designed to meet the requirements of one or more specific digital project or mobile app, and should account for different consumers and personas. One of the most common questions asked by Gartner clients during API inquiry calls is: "How do I know which APIs to publish?" The answer clearly rests with the needs of the API consumer (for Gartner's consumer-centric API design approach, see "A Guidance Framework for Designing a Great API"). Once it becomes clear which data and functionality an API should give access to, the API needs to be fully implemented as soon as possible (beyond the initial stubs that some toolkits offer). This generally involves a mixture of the following approaches:

- Using design tools to create API definitions — in an "API first" approach — which can be later mapped to other systems.
- Designing the interface first, using an interface specification format and tools to create an API stub that enables testing and development. This is then followed by development of the underlying service, which may use some or all of the approaches in the following bullet points.
- Using high-productivity and widely available tools to build simple services exposed via API that have create, read, update, delete (CRUD) operations over an existing system (such as a database or ERP system).
- Reworking pre-existing internal APIs or interfaces exposed by an iPaaS, iSaaS or other (possibly hybrid) integration platform, or by a pre-existing ESB.
- Using IoT API toolkits, which offer direct API creation in order to access data and manage "things."
- Composing existing lower-granularity SOA services or microservices, and frequently adding business logic on top.

- Embedding or combining external APIs (public or partner APIs, including cloud or SaaS APIs).
- Programming new implementation code from scratch.

Providers often package into their full life cycle API management offerings the functionality to ease identity management or speed the implementation of APIs serving mobile apps. This may extend to portions of what are sometimes called mobile back-end services, which are evaluated as part of this subcriterion.

When implementing an API, an API provider typically wants to enforce specific design policies. There is a wide variety of design policies and, in general, the bigger the API provider, the more design policies apply. Here are some examples of design policies:

- Enforcement of standards or protocols that a specific API must comply with before being published.
- Definition of a specific application domain that a specific development group can implement APIs on (or from).
- Adherence to specific API templates, or patterns or models provided as input from the design time. An example is a "style guide" for APIs to adhere to within an organization, as defined by an API product manager" (see "Create the Role of API Product Manager as Part of Treating APIs as Products").

And then, of course, once an API has been implemented, it needs to be tested in its expected (and frequently unexpected) usages (see "A Guidance Framework for Testing Web APIs"). A fairly frequent rule for successful public APIs (success typically being measured by the range, number and diversity of consumers) is that the API is used for purposes it was never designed for. Very frequently, wide usage of an API needs to be encouraged, because it enables creation of new value. But the API needs to be thoroughly tested in order to operate properly in its different usage scenarios. With the growth of the API economy and the nascent needs of digital strategies, effective API testing is of paramount importance, both at design time and at runtime when the API has been deployed. That is why this subcriterion also rates generic functionality for API testing.

This subcriterion also rates the ease and speed with which the desired API is implemented and tested. It does so by examining how easily and effectively the API testing works in conjunction with API design functionality (whether offered directly by the vendor or via partners' solutions), and the operation of the API at runtime.

Deploy and Run (Basic)

This subcriterion rates providers' capabilities in basic API management, which is mainly about the packaging, operation, runtime and maintenance of APIs. It is generally divided into two functional areas:

- Policies around operational management, security, format translation and the collection of metrics associated with the usage of the API. A policy defines, implements, monitors, enforces and manages desired behaviors and exceptions around the usage of a specific API. Examples relate to caching, throttling, load balancing, capacity planning, integrity, confidentiality, authentication and authorization (OAuth and more), threat prevention and protection, data transformation (depending on the consumer), data and functionality visibility, quality of service, compliance with SLAs, and many other things.

- Discovery, developer access provisioning, testing and collaboration (in the developers' portal). Developers' portals also include general reference documentation (such as code samples, sandboxes, client libraries, software development kits, test kits, references to hackathons, and API/app contests). Ease of use and the ability to support self-service — for the developers who will realize apps that consume the APIs — is of fundamental importance: the developers' portal is a company's "digital face."

Deploy and Run (Advanced)

This subcriterion rates capabilities that go well beyond basic API management. Some of the following can be options for the mature offerings of API management providers:

- Support for API providers to build ecosystems on platforms, including active promotion of API usage, solutions built with the APIs and collaboration, sometimes via an API marketplace. Frequently this support is achieved by setting up hackathons and running API/app contests that target, through social platforms or other means, the developer communities that might be interested in the API. A social platform may also be provided for developers to collaborate on APIs, and to share ideas about the usage of APIs. This is the first step toward a digital marketplace, and a major enabler for companies that want to benefit from the API economy.

- Advanced analytics to support the assessment of the business value of a specific API. Another frequent question from Gartner clients in API inquiries is "How do I know if the API is of value?" Generally, the value lies in the eyes of the API consumer and in the business benefits that the API enables, directly or indirectly.

- Support for a variety of API monetization options (see "Choosing the Right API Pricing (and Funding) Model"), well beyond simple usage statistics for APIs. The benefits and value of an API can be measured in many ways, because in the API economy APIs generally have several types of value associated with them that can change rapidly over time. The granularity and bands of usage plans may also change over time, based on API consumers' behavior.

- Being at least part of a technology platform for digital business (see "Building a Digital Business Technology Platform"), and "kick-starting" ecosystems and enabling the execution of digital strategies.

- Availability of, and effective features set in, a microgateway (open source or not), coupled with management and distributed governance of distributed services and microservices.

- Ease of connection and integration with devices in the IoT, either through an IoT toolkit (which could be offered by a partner) or support for specific IoT protocols (such as MQTT).
- Support for asynchronous and event-driven APIs and, in general, functionality to manage the loading and analysis of event streams (generated by IoT devices, for example).
- Reverse gateway functionality. APIs frequently call out to other web APIs that are offered by different companies. Alternatively, an organization may make use of external APIs — a reverse gateway would enable API providers to monitor the usage of and dependencies on external APIs (see "Managing the Consumption of Third-Party APIs").
- Advanced security features — offered directly or through partners — aimed at preventing malicious attacks on an API platform and protecting against fraudulent activities such as competitive data mining, form spamming and sustained bot activity.
- Flexibility, extensibility and ease of use of the developers' portal.
- Specific features set aimed at easing and enhancing the work of the API product manager.
- Availability of a potentially limited offering that prospective customers could use for free for a limited period to clarify their API management platform needs.

Versioning and Retirement

Mature API programs already have to deal with several versions of the same API. This issue is becoming more important as companies realize how impractical it is to keep many versions of the same API in production at the same time.

Applications and apps that use APIs change frequently, and in digital business will come and go very dynamically (see "Which New and Old Applications Will Enable Digital Business?"). As APIs are typically consumed in several different scenarios, some will evolve to such an extent that a new version is demanded, some will no longer be used, and a few will require no change at all.

Creating new versions of APIs while supporting old ones should always be thoroughly thought through, as it will become increasingly hard to sustain. Avoiding versioning in the first place would prevent a lot of downstream problems (see "A Guidance Framework for Creating Usable REST API Specifications"). If API providers allow versioning to get out of control, the only choice is to retire old versions of the APIs by pushing applications and apps off them and onto new versions. In many scenarios this will prove very difficult and will require a variety of "hard" and "soft" approaches. As support for API providers and consumers is crucial in this regard, this subcriterion assesses how wide and effective that support is.

Additionally, companies frequently realize that APIs they have published in the past no longer meet their business goals, or have unintended, adverse effects, and therefore retire them. If a soon-to-be-retired API does not have many consumers, the decision to retire it will have manageable consequences downstream. Sometimes, however, an API is retired because it does not produce value for the provider — but does for the consuming applications and its users, who

can be many. This situation is difficult to manage. Technology can help by, for example, determining from the developers' portal which and how many developers have actually realized an app consuming the API, and informing them when the API will be retired or deprecated. Also, the gateway can give an idea of the effective usage of an app by looking at the usage of the associated API. But managing these cases is largely a complex organizational endeavor, involving many negotiations that only humans can carry out, especially when no alternative API is offered. A modern API management platform can, however, support and facilitate API retirement in many ways, and companies are increasingly hungry for this type of functionality.

Overall Viability

Once API programs mature, API providers will incur relatively high costs to switch full life cycle API management vendors. Also, the degree of change that occurs in API consumers' requirements (and the potential impact of those changes) can be significant. For these reasons, we consider a vendor's relative size (in terms of customers and revenue), financial stability and management commitment to this market. Because of the breadth of full life cycle API management functionality, some vendors partner with other providers to complete their offerings. Some other vendors partner to multiply sales opportunities. These partnerships and their perceived effectiveness are of interest when evaluating a vendor's viability. We also consider the size and quality of a vendor's active user community, relative to its target market, and the availability of professional and consulting services.

Sales Execution and Pricing

We track revenue growth, including the number of clients a vendor has, the number and business impact of the projects it has implemented, and how and whether professional and consulting services have eased implementations. We also evaluate whether pricing models — on-premises and in the cloud — are expressed with clarity and predictability. A vendor's ability to handle large and complex deals comes into play here, too.

Market Responsiveness and Track Record

The dynamic nature of API programs, the furious pace of change that the execution of digital transformations will increasingly demand, and how quickly a vendor responds, adapts and takes advantage of them, are key factors. We also look for evidence that the provider responds well to rapidly evolving conditions in the full life cycle API management market (for example, by integrating AI algorithms, addressing new IoT requirements or serving as a platform for digital business).

Marketing Execution

We assess the degree to which the full life cycle API management vendor has captured mind share, demonstrated thought leadership and gained a solid reputation in this evolving and growing market. We also evaluate how often the vendor appears on shortlists for full life cycle API management projects. Effectiveness in marketing and partnership programs is evaluated, too.

Customer Experience

We track the specificity and quality of support (domestic and international), contracts and SLAs for the availability of full life cycle API management functionality in the cloud. API management issues are roughly the same worldwide, and across industries, but the types of policy organizations choose to address first vary considerably by culture, geography and project. Specific attention is given to the customer experience outside the home market of the full life cycle API management vendor.

Operations

This is another area in which the availability of professional and consulting services for the effective deployment of full life cycle API management, and the provision of related tactical or strategic advice, are crucial. We consider the vendor's security and privacy certifications; the scope (in terms, for example, of people and data centers) and reliability of its hosted governance service platforms (for cloud offerings); and the scalability and adaptability of its software platforms (for on-premises deployment), including metrics for efficiency, speed of change, implementation of new features and scale.

The weightings in Table 1 are unchanged from the previous Magic Quadrant.

Table 1: Ability to Execute Evaluation Criteria

Evaluation Criteria ↓	Weighting ↓
Product or Service	High
Overall Viability	High
Sales Execution/Pricing	Medium
Market Responsiveness/Record	Medium
Marketing Execution	High
Customer Experience	High
Operations	Medium

Source: Gartner (April 2018)

Completeness of Vision

Please refer to the Evaluation Criteria Definitions at the end of this document.

Below, for additional clarity, are details of some aspects specific to full life cycle API management.

Market Understanding

End users need to run API programs effectively, more frequently as part of digital transformations, build platforms and develop ecosystems on top of them, and manage the API security issues that will arise. Vendors are evaluated according to the degree with which they show understanding of these needs, and anticipate or drive new ones. We also assess how effectively a vendor partners with other technology and service providers (for example, API security and bot protection providers) to enhance its full life cycle API management platform. Additionally, we evaluate how well a vendor understands on-premises and cloud (private and public) requirements for small, midsize and large projects in various industries, and in different geographies. In short, we assess how well a vendor understands the full life cycle API management market, and how powerfully its vision will drive this market forward.

Marketing Strategy

We look for evidence that a vendor clearly articulates its value propositions (for example, being a digital platform), and how its offering (together with any partners' offerings) creates new business value for clients (for example, in a digital transformation). In this evolving market, a vendor must understand and monitor its competitors, differentiate itself, and exploit an effective marketing channel to reach its target audience (segmentation of target market and clear identification of buying centers are fundamental).

Sales Strategy

We look for evidence that a vendor uses the right balance of direct and indirect sales vehicles. We also assess whether it targets the right mix of small or midsize businesses and large prospects for its target markets, geographies and industries. Even more than for Marketing Strategy, we look for clear identification of a target market (innovation centers or companies in a specific industry with time-critical digital efforts). We also look for evidence of a sound business plan and an effective strategy that uses presales, evangelists, and professional and consulting services (with related templates, blueprints and best practices), where appropriate.

Offering (Product) Strategy

We ask specifically for a vendor's offering plans and roadmaps, and we assess how complete and effective the full life cycle API management offering is likely to be in years to come. We also examine the offering's overall architecture, whether based on technology or managed services, to assess how future-proof it is and how easily it can be integrated with users' current infrastructure. When the vendor uses third-party functionality from partners to extend its offering (for example, to cover other API life cycle stages), we assess a number of things: how effective and seamless the extension is for the user; how solid and helpful support practices are likely to be; how viable the partner is; and whether inclusion of this functionality as part of the vendor's direct offering would make more sense, from a vision perspective.

Business Model

We examine how a vendor targets or maintains profitability through its pricing models and sales strategy, and how the models work in the cloud, on-premises and for partner sales. Because of the breadth of full life cycle API management functionality, some vendors must partner to

complete their offerings. These partnerships, their effectiveness and their viability, from a user perspective, are central to evaluating a vendor's business model. We assess the breadth of the vendor's professional and consulting services, how it recognizes revenue and capitalizes on investments in R&D, and its growth strategy (including mergers and acquisitions) across geographies. We also examine the API monetization opportunities that the vendor's platform enables for its clients.

Vertical/Industry Strategy

We look at the industries a vendor focuses on, the industry-specific solutions (if any) it offers, and how successful or differentiating these solutions are (or are likely to be). The rules by which an API program is run are frequently industry-specific, even if core API policy requirements do not change much across industries. We assess industry-specific blueprints and starter kits, if there are any.

Innovation

In the full life cycle API management market, innovation is not a desirable option. It is a necessity for survival. Innovation targets the three cornerstones of the API economy: API providers, developers and users of the application constructs that consume APIs (see "The API Economy: Turning Your Business Into a Platform (or Your Platform Into a Business)"). We assess how effectively and systematically innovative ideas are filtered and funneled through product development. We also look at a vendor's track record of anticipating or leading new trends in the market.

Geographic Strategy

We look for evidence that a vendor is engaging with the most fertile locations for its capabilities, and whether further opportunities might exist in geographies not explicitly addressed now. Our evaluation assesses the vendor's nondomestic project fulfillment capacity, support centers, sales offices, partner networks, and ability to support complex international requirements and features (such as regional-specific compliance with local laws and regulations).

The weighting for Marketing Strategy in Table 2 has increased since the last Magic Quadrant. The weighting for Business Model has reduced.

Table 2: Completeness of Vision Evaluation Criteria

Evaluation Criteria ↓	Weighting ↓
Market Understanding	High
Marketing Strategy	High
Sales Strategy	Medium
Offering (Product) Strategy	High

Evaluation Criteria ↓	Weighting ↓
Business Model	Medium
Vertical/Industry Strategy	Low
Innovation	High
Geographic Strategy	High

Source: Gartner (April 2018)

Quadrant Descriptions

A Magic Quadrant represents Gartner's judgment of vendors' Ability to Execute and Completeness of Vision in a market — in this case, the full life cycle API management market. The Ability to Execute criteria reflect the staying power and record of execution of vendors in this market. The Completeness of Vision criteria reflect vendors' abilities to understand the market's trends, to lead and influence them, and to follow them with agility and consistency.

In 2016, vendors' collective Completeness of Vision improved significantly, effectively shifting the 2017 Magic Quadrant to the left. This year's Magic Quadrant reflects a general improvement in vendors' Ability to Execute, the collective increase being boosted by Google's acquisition of Apigee. Consequently, the Magic Quadrant has effectively moved up significantly, in the process appearing to lower the positions of many vendors on the Ability to Execute axis.

Additionally, this year's Magic Quadrant exhibits a strange phenomenon: Vendors' scores for Ability to Execute and Completeness of Vision tend to be roughly the same, within the range of values captured by the graphic. In other words, a vendor scoring a certain value for Ability to Execute tends to score roughly the same for Completeness of Vision. Consequently, most of the vendors now cluster around an imaginary diagonal running from bottom left to top right. Partly as a result, this Magic Quadrant mainly contains Leaders and Niche Players, and the Challengers and Visionaries are generally close to the center of the graphic. This situation also reflects the number of acquisitions that have swept through this market, API management being of wide applicability to a variety of large vendors' offerings — their cloud services, for example. The arrival of five new entrants also contributes to the "mainly Leaders and Niche Players" picture.

A word of caution. By its nature, a vendor assessment process tends to favor comprehensive offerings and powerful sales and marketing strategies. A tightly focused product, even if exceptional, typically will not score as well as a comprehensive offering supported by strong sales and marketing strategies. This, in turn, frequently favors the larger vendors, because their extra resources enable them to allocate substantial sales and marketing investments to support their API management products, and to offer more comprehensive collections of functionality.

Our conversations with clients indicate that that they frequently focus on the Leaders when starting a vendor selection process. This is not the best approach. The variety of use cases for APIs (see the associated "Critical Capabilities for Full Life Cycle API Management") means that the best vendor for a particular type of company, industry, project or geography is very often found within the Magic Quadrant, but not among the Leaders. This is especially the case outside the U.S. Clients often wrongly fear that non-Leaders are just not good enough. But the breadth of functionality in API management platforms means that it takes considerable investment and a sharp focus on this market just to appear in this Magic Quadrant (even among the Honorable Mentions). We therefore recommend that clients start their selection process by considering a subset of the vendors mentioned in this Magic Quadrant, one that includes non-Leaders. It is, furthermore, potentially worthwhile considering vendors not mentioned in this Magic Quadrant, if they could be particularly effective locally, or are already well-established in your company. Clients can then narrow the field further as their evaluation becomes more focused on their specific requirements.

Leaders

Leaders are vendors that execute strongly and that lead and influence the market. Recent entrants to this market that have a limited record of execution are less likely to be Leaders. The same applies to strongly executing vendors that are overly cautious about innovation and risk.

The most distinctive attribute of Leaders is that they are able to address the widest variety of API use cases: internal (application-to-application), B2B, B2C, on-premises and in the cloud, and everything from traditional, next-generation SOA "Mode 1" projects to the most dynamic, agile and digital-driven "Mode 2" undertakings. For further details, see the associated "Critical Capabilities for Full Life Cycle API Management."

The advent of sweeping digital transformation and the platform/ecosystem business model have put API programs on CIOs' agendas. They also require the attention of higher management (see "Articulating the Business Value of APIs"). API programs frequently start small with innovative ideas, and might involve a few hackathons before they take off, but then they need to execute really fast. Leaders have made sure their offerings can help their clients thrive in this dynamic environment.

In this Magic Quadrant, there are many Leaders. There are three ways of becoming one:

- By powerfully marketing and enriching a mature API management platform — the obvious way.
- By acquiring Leaders or Visionaries, integrating them into a wider application infrastructure offering and keeping up the pace of API management innovation
- By addressing digital transformation and their integration challenges head on, and adding fully functional API management

Leaders understand the market trends that will benefit them and their clients' business strategies, frequently in the form of digital transformations. Leaders see the business potential of API

programs, communicate this potential to business units, and help their clients realize it.

There are no fully open-source Leaders in this market. But this situation is only temporary, as we expect many open-source providers to improve their positions.

Challengers

Challengers generally execute well for the types of work for which they offer functionality, but they have a blurred or incomplete view of the market's direction, sometimes due to a lack of both innovation and sales focus on API management. This year, there are only three Challengers, some of which fit this general description better than others.

The future of these providers is directly dependent on how aggressive and proactive they are in addressing their current shortcomings. As they must innovate to fulfill requirements for digital transformation, it is likely that they will become Leaders. Otherwise, they may become Niche Players or Visionaries, or drop out of the Magic Quadrant altogether. Of course, they may also remain Challengers, but this market's strong dynamics and fast evolution over the past 18 months indicate that even maintaining their current position will require these vendors to evolve themselves.

Visionaries

Visionaries approach this market with a fresh view from an innovative angle. Although they typically offer an incomplete set of functionality, they have the power and mind share to grow their capabilities, often in a different way from established Leaders.

Two of the Visionaries from the previous Magic Quadrant have bolstered their positions. Also two former Niche Players have become Visionaries through stronger innovation and improved marketing and sales capabilities.

Niche Players

Niche Players focus on a particular segment of the market. It is typically defined by a life cycle stage (for example, design) or other characteristics, such as industry, client size (and spending power), geographic area, advanced functionality (in terms of performance or security, for example) or being fully open source.

Unsurprisingly, especially given the relatively large number of Niche Players in this Magic Quadrant (eight out of 22 vendors), some of the Niche Players fit this description better than others. Some have made significant improvements to their offerings, and some have not.

In their specific niche, these vendors' offerings might be more functional than those of Leaders. In others, an improved position on the Magic Quadrant might just be a sign that the vendor is maturing, or that its offering is being extended.

Niche Players' Ability to Execute is limited to their focus areas. It is, therefore, partial and assessed accordingly. Their ability to innovate and, to a greater extent, survive in this market is

affected by their narrow focus. Improving their marketing strategy and fostering innovation is their safest route to becoming Challengers.

Context

API programs and initiatives do not necessarily need a full set of functionality from the start. However, new functional requirements, such as for security and identity management, will emerge rapidly and will need to be addressed quickly. Therefore, we recommend that organizations that run API programs consider offerings with the potential to address their needs well beyond the first project or two. They will find it much easier, quicker and less expensive to acquire an API management platform with more functionality than they currently need than to extend or replace it as new requirements arise. Replacing an API management platform involves rehosting all the policies (some of which might not be standard in all platforms) and republishing the APIs in a different developers' portal. This is generally uncomplicated during the first few months of usage, but becomes more complicated as the API program matures and the policies become more sophisticated.

An API management platform should not limit its users to one way of consuming APIs, such as via mobile apps. Full life cycle API management solutions have evolved to support IoT scenarios and protocols (including complex connected-car scenarios); personal assistants (such as Siri and Cortana); wearable devices; B2B APIs (frequently used for new B2B interactions, instead of established protocols like EDI); and APIs consumed by rich web applications.

Depending on your company's priorities and digital strategies, the developers who embed the APIs you publish could be inside or outside your IT department, or even outside your company. Therefore, to derive the most value from an API program, you need a developers' portal — even if you publish in a public API marketplace. In executing digital transformations, the developers' experience is as important as the users' experience.

Innovation is out there, but in order to get fresh ideas, you need to publish the right APIs and aim to create new business value, which is ultimately what digital business is about. Several companies run hackathons to uncover fresh opportunities (see "Hackathon Handbook for Banking CIOs" and "Use Ongoing Hackathons to Accelerate Digital Transformation"). These generally involve APIs from diverse sources in different industries.

One of the most far-ranging and fascinating rules of API programs is that once the API has been published, developers will use it for things you never imagined. This is both a blessing, because it will attract fresh innovation, and a curse, because you must protect yourself from malicious usage of the API.

Frequently, clients don't know where to start an API program. We recommend getting involved in digital transformation projects: their requests, which will be fast and furious, will clearly tell you which APIs you need in order to enable them. Focus on the value of the application constructs that might be built on top of the APIs.

Market Overview

A market comprises end users looking for solutions to the same problem, and providers who aim to supply those solutions in the form of products and services. Our view is that companies will need all the functionality described in the "Product/Service" section (above) for their API programs in the next few years.

Acquisitions continue in this market, with Apiary going to Oracle, Akana to Rogue Wave and lately MuleSoft to Salesforce. Further acquisitions of midsize, growing and reasonably established players will not be possible for a while, though, because no acquisition targets matching that description are left. Instead, the market now has larger, more mature and decisively more expensive players (some with considerable technological "baggage"), and much smaller, immature, sharply focused vendors that serve niche requirements. Large players that are looking to acquire in this market will not find much to attract them, in the short term. However, we expect to see smaller, more focused acquisitions to plug holes in existing offerings (for example, in API security) and to remain innovative and ultimately, therefore, competitive.

Gartner has published extensively on this market: See, for example, the data published in "Forecast: Enterprise Application Software, Worldwide, 2016-2022, 1Q18 Update" and discussed in "Forecast Analysis: Enterprise Application Software, Worldwide, 1Q18 Update." Market trends are discussed in "Market Trends: Digital Platforms Will Drive Full Life Cycle API Management Growth" and "Emerging Technology Analysis: Full Life Cycle API Management."

This is a healthy, growing market. We estimate that it came to $961.2 million dollars in 2017 and expect it to top $1 billion in 2018. This will make it particularly attractive to investors, especially as it is still growing by double-digit percentages. We forecast a 2016-to-2021 compound annual growth rate of 14.9%. Most of the current growth comes from cloud solutions, for which revenue is delayed. We expect the overall market's growth to slow, possibly to single-digit percentages, but not before 2020. Double-digit growth might continue for longer, however, given the rise of pressing API program requirements in the financial services sector (spurred by PSD2 in the EU) and the data privacy regulations that banks must comply with in most countries. These will result in further strong demand for fully on-premises solutions, which might extend double-digit growth.

At present, full life cycle API management capability is still generally sold on its own. On-premises solutions are far from disappearing, but API management is increasingly sold as part of more comprehensive cloud service platforms, as the entrance of large cloud players like Amazon, Google and Microsoft shows. Increasingly, API management is finding a place in "as a service" variants (such as IaaS and PaaS), its first coupling with iPaaS being to form a HIP and meet the needs of complex API designs. This integration trend will increase in the short term, as digital transformations will expose even deeper requirements for integration (see "How to Implement a Truly Hybrid Integration Platform"). Also, offerings generically presented as "platforms for digital business," based on technology and system integration services, are proliferating, and regularly feature API management. Bear in mind that, as on-premises API management is far from going away, all these combinations go well beyond cloud service platforms. Clients ask us "Where is API management going?" — to which all of the above answers apply.

The "Market Definition/Description" section (above) provides further details of the trends that are shaking this market. Two points above all should be stressed, however, about a market that now features a full set of megavendors: The need for APIs and API management will only grow, and today's turbulence is just the start of a powerful storm that will buffet IT departments in the coming year. Interesting times lie ahead.

Evaluation Criteria Definitions

Ability to Execute

Product/Service: Core goods and services offered by the vendor for the defined market. This includes current product/service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

Overall Viability: Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit will continue investing in the product, will continue offering the product and will advance the state of the art within the organization's portfolio of products.

Sales Execution/Pricing: The vendor's capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel.

Market Responsiveness/Record: Ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the vendor's history of responsiveness.

Marketing Execution: The clarity, quality, creativity and efficacy of programs designed to deliver the organization's message to influence the market, promote the brand and business, increase awareness of the products, and establish a positive identification with the product/brand and organization in the minds of buyers. This "mind share" can be driven by a combination of publicity, promotional initiatives, thought leadership, word of mouth and sales activities.

Customer Experience: Relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programs (and the quality thereof), availability of user groups, service-level agreements and so on.

Operations: The ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Completeness of Vision

Market Understanding: Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen

to and understand buyers' wants and needs, and can shape or enhance those with their added vision.

Marketing Strategy: A clear, differentiated set of messages consistently communicated throughout the organization and externalized through the website, advertising, customer programs and positioning statements.

Sales Strategy: The strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service, and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy: The vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature sets as they map to current and future requirements.

Business Model: The soundness and logic of the vendor's underlying business proposition.

Vertical/Industry Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

Innovation: Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.

Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries as appropriate for that geography and market.