The Forrester Wave™: API Management Solutions, Q3 2014

by Randy Heffner, September 29, 2014

KEY TAKEAWAYS

CA Technologies, SOA Software, And Apigee Lead With Broad-Based Solutions

Forrester's research uncovered a market in which CA Technologies, SOA Software, and Apigee lead the pack. IBM, Intel Services, WSO2, MuleSoft, Tibco, and Axway offer strong competitive options. Although the solutions from Informatica and 3scale are not as full-featured as the others, they are important options for API service providers.

API Management Grows In Importance As AD&D Pros Implement A Wide Variety Of API Initiative Types

The API management market is growing to serve a wide diversity of enterprise API initiatives. Via open web, B2B, internal, and/or product APIs, commercial, government, and nonprofit organizations aim to better serve customers, expand mindshare, optimize supply chains, and even create new revenue streams by charging for API use.

Differentiators In The API Management Market Depend On An Organization's API Initiative

API initiatives vary widely, so the features that differentiate among solutions vary across buyers. Open web APIs favor simple REST APIs and rich portals. B2B APIs favor delegated user management and may need good SOAP support. For firms that will charge for APIs, built-in billing is useful. Other API initiatives will have still other priorities.

Access The Forrester Wave Model For Deeper Insight

Use the detailed Forrester Wave model to view every piece of data used to score participating vendors and create a custom vendor shortlist. Access the report online and download the Excel tool using the link in the right-hand column under "Tools & Templates." Alter Forrester's weightings to tailor the Forrester Wave model to your specifications.

The Forrester Wave™: API Management Solutions, Q3 2014

The 11 Providers That Matter Most And How They Stack Up

by Randy Heffner
with Christopher Mines and Eric Wheeler

WHY READ THIS REPORT

In Forrester's 40-criteria evaluation of application programming interface (API) management solutions, we identified the 11 most significant software providers in the category — 3scale, Apigee, Axway, CA Technologies, IBM, Informatica, Intel Services, MuleSoft, SOA Software, Tibco Software, and WSO2 — and researched, analyzed, and evaluated them. This report details our findings about how well each vendor's products fulfill our criteria and where they stand in relation to each other. This analysis, combined with three buying guides that highlight key make-or-break decision factors, will help AD&D professionals select the right partner for their API management needs.

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Notes & Resources

Forrester conducted product evaluations from April to August 2014 across 11 vendor companies and did reference check phone calls with 36 companies that use the vendors' API management solutions.

Related Research Documents

The API Management Buyer's Guide, Q3 2014
September 29, 2014

Applying The Forrester Wave: API Management Solutions, Q3 2014
September 29, 2014

How To Manage APIs For Customer Engagement
April 18, 2014

Establish Your API Design Strategy
June 11, 2013

API MANAGEMENT FACILITATES EXPANSION OF DIGITAL ECOSYSTEMS

APIs are playing an increasingly important role as organizations look for better ways of engaging with customers, optimizing business outcomes, and expanding their digital ecosystems. APIs are central to the US federal government's Digital Government Strategy.[1] Nonprofits like Brooklyn Museum use APIs to build their communities and gain visibility through initiatives like Google Art Project.[2] Commercial organizations with APIs span the breadth of industry sectors and include the likes of E-Trade, Best Buy, Travelocity, AT&T, Pitney Bowes, Con-way, Cisco, American Express, and many, many more.

There are a variety of scenarios in which organizations may become API providers. Some may provide APIs for internal use only as an enabler of business agility and customer engagement. Others may provide B2B APIs to optimize value chain relationships and processes. Still others may open their APIs for access by thousands of developers across the open Web. In many cases, an organization will pursue multiple angles into API strategy.

For any of these scenarios, API management solutions supply three major areas of feature-function.[3] They:

- **Manage the relationship between API users and API providers.** For most API providers, it is important to 1) make it easy for API users — developers, whether internal or external to the API provider's organization, who write applications that leverage an API — to access and understand how to use the API; 2) know who is using an API, typically by having them register for an API key; and 3) ensure that API users have the support necessary to solve any problems they may have, whether that support comes from the API provider or from other API users (e.g., through community discussion forums). API management products provide developer portal frameworks with prebuilt capabilities for these requirements and more.

- **Enforce agreements on API usage and security.** An API key is often only the first element of an API provider's control over API use. API management products enforce usage parameters as agreed to between an API provider and API users in a variety of ways: the use of a secure sockets layer (SSL) or digital signatures for added security; the use of OAuth to allow the API provider's customers to authorize access to their data; or quotas and rate limits for how many API calls an API user can make.

- **Allow API product managers to optimize value to the API provider.** Many API providers borrow from product management ideas and disciplines, managing their APIs as products — whether or not the API is intended to directly bring in revenue (i.e., by charging for API use). For these providers, API management products provide analytical tools to understand how APIs are being used and configuration tools for product managers to directly change access limits and other usage parameters.

While these features form the core of how Forrester defines API management, a variety of ancillary features are useful for many API providers, such as message transformation and integration, analytics, billing (for providers that charge for API access), life-cycle management, mobile-related features, integration with a broader set of API and service platform products, and more.

Multiple Buying Scenarios Drive Diverse Requirements For API Management

Because APIs are a general phenomenon that applies to any type of organization, there are many different business scenarios into which an API management solution may fit.[4] Thus, there is a wide variety of different combinations of features that may be important. To help clients understand and classify their needs, Forrester identifies five major buying scenarios (and numerous other scenarios are reasonable to consider).[5] Any individual API management solution may play well — or not — into any combination of these. An organization might want to pursue one or more of the following initiatives:

- **Build a broad open web community with simple and free REST APIs.** Like Facebook, Twitter, Google, and other big players, many organizations are building open web APIs in hopes of attracting large audiences of independent developers. Often, a key goal is to grow existing revenue streams either indirectly (e.g., by increasing mindshare, as USA Today does through free API-based content syndication) or directly (e.g., by selling through APIs, as Sears does with API-based access into its online store). In this scenario, API strategies tend to focus heavily on simple REST APIs and rich portals for engaging with API users. Analytics are important to help with understanding how APIs are being used and by whom.

- **Support mobile app development with REST APIs.** Because of mobile device limitations and the programming environments typically used with mobile apps, simple REST APIs are an important part of an enterprise mobile strategy. In this scenario, an organization may use API management as the coordination point for creation and consumption of APIs by internal (and external) mobile app developers. Some API management solutions include additional value-added features related to mobile apps, such as authentication, push notifications, and geolocation support, allowing buyers to avoid acquiring a separate product for these functions.

- **Facilitate internal use of SOAP APIs and REST APIs for an enterprise services strategy.** For over a decade, SOAP and REST have both been used with enterprise SOA strategies. However, use of REST APIs has started to grow rapidly. With the industry's focus on APIs, the rise of API management solutions provides another tool that can help organizations with governing their service-based strategies (i.e., the combination of both SOA and APIs). In this scenario, the priority for SOAP support is high, along with life-cycle management, features to support multiple lines of business, and integration with key elements of a common platform of services (e.g., SOA service life-cycle management and SOA runtime management).[6]

- **Act as an API service provider that charges for API access.** Some organizations desire to go one step further than merely growing existing revenue streams; they want to create a new source of revenue with the APIs themselves. Big firms like Dun & Bradstreet may add API access to existing offerings, and there are many small API-based service providers (e.g., for text processing, facial recognition, and much more). In this scenario, the key additional feature needed is direct, turnkey support for billing, including built-in credit card processing. As with mobile app support, this capability may be added with other products, but out-of-the-box support will be important to some buyers. Service provider scenarios tend to use simple REST APIs.

- **Build a B2B community around mission-critical APIs.** Although API market attention centers heavily on open web APIs, Forrester finds that B2B API scenarios are just as important. APIs are a valuable addition to B2B integration strategies that may already include electronic data interchange (EDI), file transfer, and other digital interconnections. For API management, B2B scenarios increase the need for managing partner organizations (which may have many individual developers), security federation (for both portal users and API requests), more complex services with higher needs for security and integrity, and a wider range of messaging styles. Integration with trading partner management systems is a plus, but currently API management solutions are light on this feature.

This Forrester Wave analysis has been crafted to allow API management buyers to customize the criteria weightings in favor of any one of these scenarios — and others too. Our weightings take a balanced view across the core requirements, while excluding certain value-added features that apply to only one or two of the scenarios (e.g., mobile app support, API implementation hosting, billing). Clients may download the detailed Forrester Wave spreadsheet and change the weightings on value-added features, regenerating the Forrester Wave graphic according to their specific requirements. In a separate report, Forrester provides customized versions of the Forrester Wave for three of the above scenarios: API service provider, mobile app support, and enterprise services strategy.[7]

API MANAGEMENT SOLUTIONS EVALUATION OVERVIEW

To assess the state of the API management solutions market and see how the vendors stack up against each other, Forrester evaluated the strengths and weaknesses of the top 11 API management vendors.

Evaluation Criteria

After examining past research, user need assessments, and vendor and expert interviews, we developed a comprehensive set of evaluation criteria. We evaluated vendors against 40 criteria, which we grouped into three high-level buckets:

- **Current offering.** We looked at 26 criteria on core product features and functions, grouped into in six areas: portal for API users, security and policy management, API design and creation, API transformation and integration, API product manager features, and product architecture.[8] In

addition, we included a separate group of five additional criteria relating to added value feature-function that will be of interest to certain buyers, but are not core functionality of an API management solution.

- **Strategy.** We used five criteria to evaluate each vendor's strategy including product strategy, API management vision, industry and customer leadership, and two views of solution cost (representing a minimal deployment and a high-volume deployment).

- **Market presence.** To assess each vendor's success in the market and ability to serve a global base of customers (and their customers' global base of API users), we looked at three primary criteria: installed base, financial position, and geographical presence. We also included an additional criterion for reference accounts so that vendors could provide names of their marquee customers to give buyers an idea of the market they serve.

Evaluated Vendors

Forrester included 11 vendors in the assessment: 3scale, Apigee, Axway, CA Technologies, IBM, Informatica, Intel Services, MuleSoft, SOA Software, Tibco, and WSO2. Each of these vendors has (see Figure 1):

- **An API management solution that was generally available as of May 23, 2014.** We selected this cutoff date so that the solutions vendors demonstrated to Forrester would match the feature set evaluated in the Forrester Wave.

- **A core set of API management functionality.** Although we evaluated the solution against a broader set of criteria, Forrester includes three major features as the minimum functionality required for an API management solution: 1) an out-of-box portal designed for engaging an external community of API users; 2) API security enforcement capabilities including authentication and rate-limiting; and 3) basic API message transformation capabilities.

- **Demonstrated enterprise credibility.** To ensure that each vendor and solution was credible in the eyes of Forrester's enterprise clients, we required that, as of the kickoff date for this Forrester Wave analysis (April 10, 2014), at least three enterprise customers (1,000 or more employees) must have acquired the solution as their primary means of publishing APIs for external use.

A special note is in order regarding Informatica: During the course of this Forrester Wave analysis, Informatica acquired StrikeIron, whose IronCloud offering is one of the API management solutions we evaluated. In the latter stages of the evaluation, Informatica decided to leverage IronCloud to enable creation and deployment of APIs as part of Informatica's cloud and on-premises hybrid integration strategy rather than as an API management solution per se. Should Informatica continue this direction, IronCloud would not be included in future updates to our API management solutions Forrester Wave evaluation.

Figure 1 Evaluated Vendors: Product Information And Selection Criteria

Vendor	Product evaluated	Solution release date
3scale	• 3scale API Management Platform & Infrastructure	March 2014
Apigee	• Apigee Edge 14.05.14	May 2014
	• Apigee Insights 1.0	February 2013
Axway	• Axway API Portal 7.3	May 2014
	• Axway API Gateway 7.3	May 2014
	• Axway API Manager 7.3	May 2014
	• Axway API Gateway Analytics 7.3	May 2014
	• Axway Application Studio 1.0	January 2014
	• Axway Cloud API Service	May 2014
CA Technologies	• CA Layer 7 API Management and Security Suite:	
	o CA Layer 7 API Portal 2.6	March 2014
	o CA Layer 7 Mobile Access Gateway 2.1	March 2014
	o CA Layer 7 Enterprise Service Manager 1.0	November 2009
	Note: CA Layer 7 API Gateway 8.1 provides a subset of Mobile Access Gateway's functionality and may be substituted for it to reduce solution cost	
IBM	• IBM API Management Admin and Developer Portal, version 3.0	May 2014
	• IBM WebSphere DataPower Appliance, firmware version 6.0	June 2013
	Note: IBM's SaaS offering, which is feature-function equivalent, is IBM API Management Service, version 3.0	
Informatica	• IronCloud Spring 2014 API Management	Spring 2014
	• IronCloud Spring 2014 API Management and Hosting	Spring 2014

Figure 1 Evaluated Vendors: Product Information And Selection Criteria (Cont.)

Vendor	Product evaluated	Solution release date
Intel Services	• Intel Mashery API Management SaaS Edition:	
	o Intel Mashery API Management SaaS Traffic Manager	May 2014
	o Intel Mashery API Management Local Traffic Manager 2.2	March 2014
	o Intel Mashery API Gateway — Services Management 6.1.3	April 2014
	Note: Additional editions of the solution include Intel Mashery API Management Data Center Edition and three additional versions of Intel Mashery API Gateway	
MuleSoft	• Anypoint Platform for APIs, which includes API Portal, API Manager, and Mule Studio	January 2014
SOA Software	• Customer-managed edition:	
	o Community Manager 7.0	March 2014
	o API Gateway 7.0	March 2014
	o Lifecycle Manager 6.6	April 2014
	Note: The SaaS offering, which is feature-function equivalent, includes Enterprise API platform-as-a-service and Enterprise API lifecycle-as-a-service	
Tibco	• Tibco API Exchange 2.1	March 2014
	• Tibco API Exchange Spotfire Add-on Bundle:	November 2013
	o Tibco Spotfire Server 6.0 (Nov 2013)	
	o Tibco Spotfire Analyst 6.0 (Nov 2013)	
	o Tibco Spotfire Consumer 6.0	
	Note: Tibco API Exchange Gateway can be deployed on Tibco Silver Fabric for private IaaS.	

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　　　　　　　　September 29, 2014

Figure 1 Evaluated Vendors: Product Information And Selection Criteria (Cont.)

Vendor	Product evaluated	Solution release date
WSO2	• WSO2 API Manager 1.7.0	May 2014
	• WSO2 Business Activity Monitor 2.4.1	May 2014
	• WSO2 Identity Server 5.0	May 2014
	• WSO2 Developer Studio 3.6.0	March 2014
	• WSO2 Governance Registry 4.6.0	October 2013
	• WSO2 Enterprise Service Bus 4.8.0	December 2013
	Note: The planned SaaS version, WSO2 API Cloud, will provide the same core capabilities, but not all features will be enabled by default.	

Vendor selection criteria

Had an API management solution version under general customer availability as of May 23, 2014
The API management solution has, at minimum: • An out-of-box portal designed for engaging an external community of API users • API security enforcement capabilities including authentication and rate-limiting • Basic API message transformation capabilities
As of April 10, 2014, the solution had at least three enterprise customers that acquired the solution as their primary means of publishing APIs for external use (i.e., B2B or public open web APIs)

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Additional Non-Evaluated Vendors

Because the market for API management solutions is developing quickly, there were additional vendors whose solutions were not generally available by our cutoff date or otherwise did not qualify for our Forrester Wave analysis. Buyers may wish to be aware of these vendors as they conduct their solution analysis:

■ **Microsoft.** Microsoft acquired Apiphany and has been integrating the solution into its Microsoft Azure cloud platform. Microsoft Azure API Management is currently in preview release, with general availability planned for the fall of 2014.

- **Software AG.** In its current form, Software AG CentraSite can be adapted to support an external API user audience, but it is not designed out-of-the-box for this scenario. Software AG is in the latter stages of developing webMethods API-Portal, with general availability planned for October 2014. Thus, Software AG will have API/service platform offerings for API development and management, gateway, enterprise service bus, life-cycle management, and runtime management.

- **WaveMaker.** After the Forrester Wave cutoff date, WaveMaker (a subsidiary of Pramati) completed work on a pair of products, WaveMaker Gateway and WaveMaker DevPortal, which together provide an API management solution. An associated product, WaveMaker Studio, has a focus on what the vendor calls "API prefabs" — a fragment of an app prebuilt to ease API consumption.

- **Other small vendors.** Two other vendors, though small, are worthy of mention as possibilities. As an API marketplace, Mashape can serve either as a low-end alternative to an API management solution or an additional channel to market for API providers. Managed Methods was restructuring its solution as of the Forrester Wave cutoff; it has since released a pair of products (API Portal and API Gateway) that may serve as an inexpensive alternative.

EVALUATION ANALYSIS

The evaluation uncovered a market in which (see Figure 2):

- **CA Technologies, SOA Software, and Apigee lead the pack.** CA's long history in the SOA application gateway space has given it broad resources in API security, transformation, and integration, and it has leveraged an early entry into API management to round out its portal and other features. SOA Software has broad coverage across all our feature-function categories and is the only vendor to embed both service life-cycle management and runtime management products within its API management solution. Apigee's standout feature is its analytics and it is well-rounded across other criteria and the only vendor to have full capabilities in three of our added value feature criteria: API hosting, mobile app support, and turnkey billing.

- **IBM, Intel, WSO2, MuleSoft, Tibco, and Axway offer competitive options.** These six vendors are grouped in a relatively tight pack in our evaluation, and each has a way to distinguish its solution. With IBM, it is support for B2B and for SOAP APIs. With Intel, it's API discovery features, REST API support, and SOAP API features. For MuleSoft, it's API design, unique API discovery features, and a close connection with MuleSoft's ESB product. With Tibco, it is analytics and API request transformation features. And with Axway, it's REST API support and a strategy for APIs and one of multiple integration styles with B2B partners.

> ■ **Informatica and 3scale focus on narrower but important buying points.** Informatica and
> 3scale are two of only three vendors with deep built-in features for billing and payments, which
> makes them prime candidates for API providers that want to charge for API usage. Informatica
> adds API and data hosting to its offering, as well as good support for SOAP APIs. 3scale targets
> affordability, and it also has strengths in its portal and product manager features.

This evaluation of the API management market is intended to be a starting point only. We encourage
clients to view detailed product evaluations and adapt criteria weightings to fit their individual
needs through the Forrester Wave Excel-based vendor comparison tool.

Figure 2 Forrester Wave™: API Management Solutions, Q3 '14

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Figure 2 Forrester Wave™: API Management Solutions, Q3 '14 (Cont.)

	Forrester's Weighting	3scale	Apigee	Axway	CA Technologies	IBM	Informatica	Intel Services	MuleSoft	SOA Software	Tibco	WSO2
CURRENT OFFERING	50%	2.23	3.36	3.53	3.76	2.97	1.44	3.42	2.94	4.11	3.09	3.22
Portal for API users	20%	3.10	2.80	3.20	2.95	2.05	1.35	2.90	1.85	4.35	2.15	2.65
Security and policy management	20%	2.00	3.85	3.90	4.45	3.35	1.60	3.65	3.35	4.90	3.20	3.25
API design and creation	20%	1.97	3.47	3.77	3.53	2.84	1.18	2.95	3.61	4.05	2.84	4.12
API transformation and integration	15%	0.35	3.30	4.35	4.35	3.95	0.65	3.70	3.70	3.65	3.95	3.70
API product manager features	15%	3.15	3.45	2.25	3.70	2.70	2.35	4.05	1.80	2.90	3.30	2.15
Product architecture	10%	2.90	3.25	3.70	3.70	3.20	1.65	3.60	3.55	4.65	3.65	3.35
Added-value feature-function	0%	1.20	3.45	1.15	1.50	2.15	2.25	0.55	0.75	2.55	1.50	2.10
STRATEGY	50%	2.05	3.90	2.95	4.05	4.35	3.45	3.40	3.65	3.35	3.40	3.40
Product strategy	40%	3.00	4.00	4.00	5.00	4.00	3.00	4.00	4.00	5.00	4.00	4.00
API management vision	35%	1.00	3.00	1.00	3.00	5.00	5.00	3.00	3.00	1.00	3.00	3.00
Industry and customer leadership	25%	2.00	5.00	4.00	4.00	4.00	2.00	3.00	4.00	4.00	3.00	3.00
Solution cost	0%	4.60	1.60	4.00	3.00	3.80	3.60	1.00	4.00	3.60	4.00	4.40
MARKET PRESENCE	0%	2.80	3.80	3.90	4.10	3.65	2.30	4.20	2.90	3.95	3.90	2.50
Installed base	45%	5.00	4.00	3.00	3.00	2.00	1.00	4.00	2.00	4.00	3.00	2.00
Reference accounts	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial position	20%	1.00	3.00	4.00	5.00	5.00	4.00	5.00	3.00	2.00	4.00	1.00
Geographical presence	35%	1.00	4.00	5.00	5.00	5.00	3.00	4.00	4.00	5.00	5.00	4.00

All scores are based on a scale of 0 (weak) to 5 (strong).

VENDOR PROFILES

Leaders: CA Technologies, SOA Software, and Apigee

- **CA Technologies has strong API security, integration, and mobile app support.** With Layer 7's long history as an SOA application gateway provider, CA's solution has among the best API security, message transformation, and integration features in our evaluation. Among the traditional gateway vendors, Layer 7 was an early mover into the API management space, which has given CA a head start to round out the features of its portal and tooling for API product managers. The gateway's mobile app support is also among the best in our evaluation. The solution provides basic analytic features.

CA's solution is in the middle range on cost. In our reference checks, CA's customers were very satisfied with the vendor. They were very complimentary of the solution's security and rate limiting features, while some expressed a desire for richer CMS features.

- **SOA Software is strong in most areas and leads with life-cycle and API ecosystem support.** SOA Software's solution was the most consistently strong across all of our primary evaluation criteria, and it was the only solution to at least partially fulfill all of the five added-value features we examined. The solution's standout features are life-cycle management, federation to support multiprovider API scenarios, and an integrated core of service management capability. It is among the best in its portal, security, API design and creation, and product architecture.

  SOA Software's solution is in the lower to middle cost range. In our reference checks, SOA Software's customers were very to extremely satisfied with the vendor. They were moderately to extremely satisfied with all areas of the solution, while their most positive sentiments were for the solution's API product manager features, closely followed by its security and rate limiting features. They expressed a desire for better product documentation.

- **Apigee's API hosting, billing, and mobile features round out a comprehensive solution.** Apigee's solution has a strong core of functionality and, although it does not have as many advanced features as some others, it is the only one with full feature sets for three of the added-value functions we examined (billing, hosting, and mobile apps). Thus, considering the added-value features along with the primary criteria, Apigee's solution has the most consistent across-the-board functionality. The solution's analytics are particularly strong, especially considering that Apigee's direction is to make it easier to use API analytics in the solution's policy processing to enable more intelligent APIs and API control. Apigee's partnerships with Accenture and SAP promise to help it maintain a strong market position.

  Apigee's is among the highest cost solutions overall. In our reference checks, Apigee's customers expressed mixed vendor satisfaction, ranging from moderately to extremely satisfied, saying that upgrades may cause challenges. They were very complimentary on all of the solution's features, particularly analytics.

Strong Performers: IBM, Intel Services, WSO2, MuleSoft, Tibco, and Axway

- **IBM has key enterprise features and a strong start on its future API strategy.** IBM's solution, dubbed "version 3," is notably different from IBM's first and second approaches to API management. We believe IBM has hit its stride and will stick with this architecture for a long time to come. The solution is strong on security and integration due to its underlying DataPower gateway. Its portal and API design features are less mature, but with strong spots such as API plan configuration, SOAP API design, and features to facilitate scenarios for B2B and multiple lines of business. Although added value features such as API hosting, billing, mobile, and service platform support are not built-in, IBM has the broadest base of other products it can bring to the table to provide such capabilities.

IBM's solution is low in cost for a minimal deployment, in the middle range for high volume customer-managed deployment, and among the most expensive for high volume SaaS deployment. In our reference checks, IBM's API management customers were very to extremely satisfied with the vendor; all of them were in early stages of implementing version 3. They were very complimentary on the solution's security and API product manager features, particularly noting that API plan configuration was easy to use. They noted that API user portal is currently somewhat basic.

- **Intel Services has strong API product manager features and a well-rounded solution.** With Intel, functionality can vary notably depending on which deployment option a buyer chooses. Our evaluation centered on the SaaS portal with Intel's full-featured customer-managed gateway. The gateway gives the solution strong security and integration features; the portal has strengths in API plan configuration, and it can be configured with report sets that provide good drill-down analytics. Notable features include UI support for SOAP API design and its Mashery API Network, which allows an API user to access more than one provider's APIs with a single login. Until Intel makes further progress integrating the Mashery acquisition, the portal and the full gateway are not highly integrated, and customers that may want to migrate between vendor- and customer-managed deployments must choose their deployment options carefully.

  Intel's is among the highest cost solutions overall. In our reference checks, Intel's customers were moderately to extremely satisfied with the vendor. They were very complimentary on the solution's rate limiting and integration features and mostly positive on its security features, whereas other features received a wide range from somewhat to extremely satisfied. They expressed a mix of concern about Intel's integration of Mashery and an opinion that the integration was starting to get on the right track.

- **WSO2's open source platform provides many opportunities to extend API management.** Aside from being the only fully open source solution, the unique feature for WSO2 is the ability to extend API management features by adding in other categories of software, such as complex event processing, security integration, or business process management. WSO2 charges for enterprise support based on the number of JVMs used in production, so in some cases, these features may be free (i.e., if the added feature's volume of use is low enough that no added JVMs are necessary). WSO2's solution has among the best features for API design and creation, as well as strong transformation and integration.

  WSO2's is among the lowest cost solutions overall. In our reference checks, all of WSO2's customers were extremely satisfied with the vendor. They were very happy with the solution's portal, security, integration, and analytics features, and expressed confidence that WSO2 would do well at filling in any weak points. They noted a desire for stronger API product manager features.

- **MuleSoft's solution has a novel "try it" feature and strong connections to its cloud ESB.** MuleSoft's strategy is built on close connection with its CloudHub integration PaaS and Mule ESB offerings. This gives it strengths in API design and integration. One of these is a unique advanced feature "try it" that MuleSoft calls an API notebook, with which an API user (or provider) can create a sequence of API calls to demonstrate a scenario combining multiple APIs, even from multiple API providers. This, combined with RAML-based API authoring and a built-in mocking service, facilitates collaborative API design processes that involve API users and one or more API providers. MuleSoft's solution is particularly well-suited for buyers that need deep or cloud-based integration capabilities to build APIs on top of existing applications, although its portal and API product manager features are on the weaker side in our evaluation.

  MuleSoft's solution is at the lower end of the cost scale. In our reference checks, MuleSoft's customers were very satisfied with the vendor. They had mixed reviews on the solution's features, ranging from somewhat to extremely satisfied, with no area of the solution being consistently rated high or low.

- **Tibco has excellent analytics and a rich UI for configuring REST and SOAP APIs.** Analytics is the standout feature for Tibco's solution. Tibco Spotfire is built into the solution, and customers can supplement API data with related information from other data sources. Message transformation is also strong, and the solution's API definition UI provides flexibility by breaking API definition into separate stages (although this can get confusing if APIs are not well-organized). The solution is one of the newer ones on the market, so its portal and features for advanced API definitions need to grow in the future.

  Tibco's solution is at the lower end of the cost scale. In our reference checks, Tibco's customers were very satisfied with the vendor. They were all using the solution in a customer-managed deployment, and one of them used only the gateway, not the full API management solution. They were very satisfied with the solution's security and rate-limiting features, and those using the full solution were very satisfied with API product manager features and analytics. They expressed a desire for greater maturity in the API portal and deeper integration with Tibco's other products.

- **Axway has strong security and integration plus a good direction for unified B2B strategies.** Among the strong performers in our evaluation, Axway's solution is the most consistently strong across-the-board. Drawing on the strengths of its long history in the gateway market, Axway's portal, security, API design, transformation, integration, and product architecture are strong; though its API product manager features and analytics are somewhat weak. Leveraging the strengths of its product line, Axway has the best articulated strategy for APIs in the context of broad-based B2B integration strategies that include EDI, file transfer, and other technologies.

Axway's is one of the lower cost solutions. In our reference checks, Axway's customers were very to extremely satisfied with the vendor. They were all using customer-managed deployments. They were very complimentary on the solution's security, rate-limiting, and integration features but expressed a desire for simpler policy configuration.

Contenders: Informatica and 3scale

- **Informatica's history as an API provider makes it a good choice for API service providers.** Before being acquired by Informatica, StrikeIron's strategy was to extend its long success as an API service provider into providing a turnkey offering for other API service providers. Its strengths in billing, API and data hosting, and support for simple REST and SOAP APIs would make it an attractive option for this scenario. Since the acquisition, Informatica has shifted IronCloud toward the creation and deployment of APIs in combination with Informatica's integration PaaS technology.

  Informatica's solution is in the low to middle cost range. In our reference checks, Informatica's IronCloud customers were very to extremely satisfied with the vendor. They were complimentary on all the solution's capabilities, and particularly positive on the solution's portal, security, and rate-limiting features.

- **3scale's broad customer base stems from its affordability and good feature set.** 3scale has built the largest base of paying API management customers among all the vendors in our evaluation. The solution's strengths are its match with the primary API service provider requirements: a good portal, strong features for API plan configuration, full-featured billing and payments, strong rate-limiting, and basic capabilities for most of the rest. With 3scale's architecture, API providers implement and run the API gateway, while 3scale runs the API user portal, administrative UI, and security engine. The gateway can take the form of an HTTP server (typically the open source Nginx) or direct calls to the security engine from API implementation code. This architecture requires a bit more implementation work from 3scale customers, but some like the added control this gives them.

  3scale's is among the lowest cost solutions overall. In our reference checks, 3scale's customers were very satisfied with the vendor. They were very complimentary on the solution's security and rate-limiting features but expressed a desire for better analytics. Although many of 3scale's customers are small organizations, they do have large enterprise customers in both commercial and government sectors.

SUPPLEMENTAL MATERIAL

Online Resource

The online version of Figure 2 is an Excel-based vendor comparison tool that provides detailed product evaluations and customizable rankings.

Data Sources Used In This Forrester Wave

Forrester used a combination of three data sources to assess the strengths and weaknesses of each solution:

- **Vendor surveys.** Forrester surveyed vendors on their capabilities as they relate to the evaluation criteria. Once we analyzed the completed vendor surveys, we conducted vendor calls where necessary to gather details of vendor qualifications.

- **Product demos.** We asked vendors to conduct demonstrations of their product's functionality. We used findings from these product demos to validate details of each vendor's product capabilities.

- **Customer reference calls.** To validate product and vendor qualifications, Forrester also conducted reference calls with at least three of each vendor's current customers.

The Forrester Wave Methodology

We conduct primary research to develop a list of vendors that meet our criteria to be evaluated in this market. From that initial pool of vendors, we then narrow our final list. We choose these vendors based on: 1) product fit; 2) customer success; and 3) Forrester client demand. We eliminate vendors that have limited customer references and products that don't fit the scope of our evaluation.

After examining past research, user need assessments, and vendor and expert interviews, we develop the initial evaluation criteria. To evaluate the vendors and their products against our set of criteria, we gather details of product qualifications through a combination of lab evaluations, questionnaires, demos, and/or discussions with client references. We send evaluations to the vendors for their review, and we adjust the evaluations to provide the most accurate view of vendor offerings and strategies.

We set default weightings to reflect our analysis of the needs of large user companies — and/or other scenarios as outlined in the Forrester Wave document — and then score the vendors based on a clearly defined scale. These default weightings are intended only as a starting point, and we encourage readers to adapt the weightings to fit their individual needs through the Excel-based tool. The final scores generate the graphical depiction of the market based on current offering, strategy, and market presence. Forrester intends to update vendor evaluations regularly as product capabilities and vendor strategies evolve. For more information on the methodology that every Forrester Wave follows, go to http://www.forrester.com/marketing/policies/forrester-wave-methodology.html.

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Integrity Policy

All of Forrester's research, including Forrester Waves, is conducted according to our Integrity Policy. For more information, go to http://www.forrester.com/marketing/policies/integrity-policy.html.

ENDNOTES

[1] See details of the US Digital Government Strategy. Source: "Digital Government: Building a 21st Century Platform to Better Serve the American People," The White House (http://www.whitehouse.gov/sites/default/files/omb/egov/digital-government/digital-government.html).

[2] See details of Brooklyn Museum's API. Source: "Brooklyn Museum Collection API," Brooklyn Museum (http://www.brooklynmuseum.org/opencollection/api/).

[3] The API management product category is one of three major management disciplines that together constitute comprehensive management of APIs. The other two are service life-cycle management and service runtime management. See the April 18, 2014, "How To Manage APIs For Customer Engagement" report.

[4] As background to Forrester's creation of the scenarios in this section, see the June 11, 2013, "Establish Your API Design Strategy" report.

[5] Forrester's scenarios here do not explicitly call out the API category of product APIs. However, these might be represented in any of Forrester's scenarios. Product APIs are an important perspective, especially during the early stages of an API strategy, wherein an organization is striving for creativity about what kinds of APIs it might have. See the June 20, 2014, "Brief: Product APIs Create Distinct Customer Value And Opportunity" report.

[6] Although many voices in the market speak as though SOA implies SOAP and APIs are always REST, this is not true. Both SOAP and REST may be used with both SOA and APIs. Indeed, there is no clear definition of the distinction between SOA and APIs that holds across the market. Forrester makes the distinction that SOA is for creating core business flexibility and APIs are for extending the reach of an agile business to many new contexts. SOA and APIs share a strong core of best practices for maturity, as well as having some unique aspects. See the September 5, 2013, "Drive Business Agility And Value By Increasing Your API And SOA Maturity" report.

[7] For a description of alternate buying scenarios and a customization of the API Management Solutions Forrester Wave, see the September 29, 2014 "Applying The Forrester Wave™: API Management Solutions, Q3 2014" report.

[8] As detailed background that informs the more technical aspects of these criteria, read the four-part report series. See the August 21, 2013, "API Design Part 1: REST Is The Leading But Not Only Option For Your APIs" report.

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