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The API Management Solutions Market Heats Up

New Players Enter And Established Suppliers Advance A Fast-Evolving Market

by Randy Heffner
September 22, 2015

Why Read This Report

APIs have strategic value for business, and API management solutions are a crucial part of any organization's API approach. The market is moving quickly; six important new vendors have entered the space in the last year: Microsoft, Oracle, SAP, Software AG, Torry Harris Business Solutions, and WaveMaker. Established vendors — 3scale, Akana, Apigee, Axway, CA Technologies, IBM, Mashery, MuleSoft, TIBCO, WSO2 — are advancing their solutions, although at very different rates. To help application development and delivery (AD&D) pros set their future direction for API management, this report describes this landscape, each vendor's main strengths and weaknesses, and their future plans.

Key Takeaways

Six New Vendors Are Carving Out Their Place In The Market For API Management Solutions
Since our Q3 2014 Wave evaluation, six significant vendors have entered the API management market: Microsoft, Oracle, SAP, Software AG, Torry Harris Business Solutions (a systems integrator), and WaveMaker. Each is building a market position based on specific strengths in technology and customer appeal.

Four Established Vendors Are Significantly Advancing Their Current Offerings
Akana (formerly SOA Software) introduced a lower-cost SaaS tier and an analytics platform. Axway's new API user role of organization administrator moves toward unified B2B relationship management. IBM made more improvements than others, including enhancements to its analytics and portal. WSO2 increased enterprise credibility with B2B support and enhanced analytics.

Other Vendors Are Making Moderate Or Minor Advances In Their Current Offerings
Apigee, CA Technologies, MuleSoft, and TIBCO made moderate forward movement. For example, Apigee added WebSocket support, CA added revenue-based API plans, and MuleSoft improved its analytics. TIBCO is buying Mashery and making it the core of TIBCO's solution. 3scale and Mashery made minor forward movement.

The API Management Solutions Market Heats Up

New Players Enter And Established Suppliers Advance A Fast-Evolving Market

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with Christopher Mines, Derek Nahabedian, and Tyler Thurston
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Table Of Contents

Notes & Resources

This report is based on product briefings and detailed data collection from both new vendors entering the API management market and established vendors that were included in our Forrester Wave™ evaluation of Q3 2014.

Related Research Documents

The API Management Buyer's Guide, Q3 2014

Applying The Forrester Wave™: API Management Solutions, Q3 2014

The Forrester Wave™: API Management Solutions, Q3 2014

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

The Market For API Management Solutions Is Getting Crowded

APIs have strategic value for the future of business.[1] This is true whether an organization pursues internal APIs, open web APIs, B2B APIs, product APIs, or any combination of them.[2] An API management solution is an important part of an API platform, and Forrester expects the market for API management solutions to grow 70% in 2015.[3] High demand is driving a high rate of change in the vendor landscape, but not all vendors are advancing at the same pace. In this report, we provide AD&D pros with a bottom-line look at new vendors that have entered the market and how the existing vendors are moving their solutions forward since our last Forrester Wave evaluation on API management solutions (see Figure 1).[4]

FIGURE 1 The Landscape Has Developed Quickly Since The Q3 2014 Forrester Wave On API Management

Vendor	New or established vendor	Solution summary	Forrester's predicted velocity for future solution development
3scale	Established	Strong API plan configuration, full-featured billing and payments, and a good portal. Provides a good base for targeted, revenue-bearing API initiatives.	Slow
Akana (formerly SOA Software)	Established	Consistently rich and deep functionality across all core functions. Particularly well-suited for broad-based enterprise-level API initiatives.	Fast
Apigee	Established	Comprehensive solution with leading analytics and extra features for API billing, API hosting, mobile, and IoT. Great for external API strategies and device manufacturers.	Moderate
Axway	Established	Strong security gateway, transformation, and B2B integration. Has the best features and strategy for partner APIs.	Fast
CA Technologies	Established	Strong security gateway, transformation, and mobile security integration. Great for highly secure and mobile APIs.	Moderate
IBM	Established	Strong gateway, simple model for life-cycle management, key enterprise features, and integration with IBM Bluemix. Very good solution overall; great for IBM customers.	Fast
Mashery	Established	TIBCO plans to buy Mashery and make it the core of TIBCO's solution. TIBCO will get strong API product manager features to add to TIBCO's very strong analytics and its gateway.	Moderate (once the TIBCO deal goes through)
Microsoft	New	Feature set is broad and clean, yet in places thin. Best for focused API initiatives, especially for Azure customers.	Moderate

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 1 The Landscape Has Developed Quickly Since The Q3 2014 Forrester Wave On API Management (Cont.)

Vendor	New or established vendor	Solution summary	Forrester's predicted velocity for future solution development
MuleSoft	Established	Strong in API design, with ties to cloud integration and an enterprise service bus foundation. Great for buyers with a combined strategy for integration and API management.	Moderate
Oracle	New	Just getting started with API management. Best for Oracle customers with internal API scenarios.	Fast
SAP	New	OEM/resell of Apigee, extended with SAP-specific features and look-and-feel. Great option for SAP-centric shops.	Moderate
Software AG	New	Deep, rich functionality, particularly for integration and life-cycle management. Good for enterprise API initiatives.	Fast
TIBCO	Established	Plans are pending to buy Mashery and use it as the core of TIBCO's solution. The resulting solution will have very strong analytics, good API product manager features, and good ties to TIBCO's integration base.	Moderate
Torry Harris Business Solutions	New	Systems integrator with a good base for API management, which the vendor treats as a version-managed product.	Fast
WaveMaker	New	Limited initial solution with good B2B features. Best for targeted Java-based API initiatives on WaveMaker Cloud.	Moderate
WSO2	Established	Flexible, low-cost, open source-based platform with many opportunities for extension. Great for customized API management scenarios.	Fast

In A Crowded Market, Niche Spaces Enable New Vendors To Gain A Foothold

With the diversity of business scenarios for applying APIs, there is plenty of market space for a number of vendors with different product strategies and target markets. The major market trends are:

› **There's plenty of room for a variety of vendor strategies and solutions.** To gain a foothold in an increasingly crowded vendor landscape, API management vendors leverage the fact that, for many buyers, particular characteristics of their API strategy can swing buying decisions toward a particular vendor. Common swing points include solution cost, strategic vendor relationships, cloud platforms, integration platforms, governance capabilities, and API categories that are central to a buyer's API strategy (i.e., among the internal, open web, B2B, and product API categories).

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

September 22, 2015

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

› **API management is not merging with mobile platforms or other market spaces.** Because APIs are useful nearly everywhere, features and functions of API management show up in many places — most notably mobile platforms, integration tools, and platform-as-a-service (PaaS) offerings. In such cases, targeted features help manage access to APIs created using the platform, but they can't meet the needs of a broad-based API strategy.

› **Not everything that is called "API management" actually is.** The label "API management" is creating much buzz in the market, and it is commonly applied to products that provide only a small part of the requisite functionality, such as Amazon API Gateway.[5]

Though vendors can use a niche to gain a foothold, organizations that buy based on an initial niche requirement may paint themselves into a corner.

Buyers May Start With A Niche Need, But Should Consider Broader API Strategy Needs

In sorting through API management vendor landscape changes to make or update their vendor selections, buyers should start with a clear understanding of the scope, focus, and boundaries of their API strategy and API management buying needs. Though vendors can use a niche to gain a foothold, organizations that buy based on an initial niche requirement may paint themselves into a corner. Organizations evaluating API management solutions should understand that:

› **Buyers' starting points easily result in a too narrow look at API management.** When buyers own their organization's mobile strategy, they think of API management from a mobile perspective. If they own application integration strategy, they think of it from an internal API perspective. If they own digital strategy, they focus on API portals for open web developers. These and other narrowly focused buying points of view are acceptable only when an organization intentionally segments its API strategy into silos, otherwise they result in API platform disconnects. For example, it may be difficult to manage diverse groups of API users accessing the same APIs. Thus, buyers should examine whether and how an API management solution can meet all of their organization's API needs.

› **If a niche aligns with broader API strategy needs, a focused buy is appropriate.** On the other hand, if an initial niche focus aligns with a siloed longer-term API strategy need, initial success feeds longer-term success. For example, if an organization manages its open web API strategy quite independently from its other API initiatives, a niche API management selection works well. If each line of business drives its own independent technology strategy, it works well for each to make its own API management selection.

› **If a niche is just an API starting point, it's a poor guide for API management selection.** For many organizations, mobile is a major initial driver of API strategy. But mobile projects are often driven by small, targeted teams with particular requirements. If the mobile team drives

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

API management selection, it can easily miss a cadre of other technical, process, integration, and governance requirements that will come as the organization expands its API focus to B2B initiatives, broader internal API-based business flexibility, and open web API developer communities. As the "seven habits" adage goes: "Begin with the end in mind."[6]

Each New Vendor Has A Specific Angle Into The Market

Since our Wave analysis in Q3 2014, six significant vendors have entered the API management market: Microsoft, Oracle, SAP, Software AG, Torry Harris Business Solutions, and WaveMaker. Each has a specific angle from which to build a position in the market. Microsoft's solution is closely tied to its Azure cloud platform. Oracle is building on its integration platform. SAP is bringing API-based connections into its enterprise solution landscape. Software AG's solution is deeply infused with enterprise service governance. Torry Harris leads with its consulting services for digital transformation. WaveMaker's solution is integrated with its PaaS offering.

Two other systems integrators (SIs) are worthy of brief mention. Accenture has a minority equity investment in Apigee and uses it within various software and managed service offerings, but its consulting services focus on API strategy, API governance, and digital enablement rather than Apigee implementation per se. HP has a defined API management implementation offering that it targets at telecommunications clients, however, HP declined to participate in this market update.

> Since our Wave analysis in Q3 2014, six significant vendors have entered the API management market.

Microsoft Provides A Good Foundation For Focused API Initiatives

Microsoft Azure API Management provides a broad, though in places thin, set of features (see Figure 2). Its solution will serve well for API initiatives that have a relatively narrow focus and a defined API user audience. In its administrator portal, it provides well-organized functions for portal customization, defining APIs, defining API products, attaching policies to APIs and products, and managing API users and groups. Within each of these areas, it has limitations compared to the competition, but the solution's breadth of features allows it to function as a complete solution. Its deep integration as part of the Azure platform makes it particularly interesting for Azure customers, and its low-cost profile will make it interesting for others as well.

Going forward, we expect Microsoft to develop its solution at a moderate pace, focusing on broad requirements best suited for internal APIs, open Web APIs, and Azure-based solutions.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 2 Microsoft Provides A Good Foundation For Focused API Initiatives

Areas of strength in feature-function	• Integration with the Microsoft Azure cloud platform. • Clean features for portal customization, including navigation and custom pages. • Straightforward API definition and association with policies and API plans. • Support for Swagger, WADL, CORS, and JSON Web Tokens. • Flexible rate-limit policy, including conditional expressions. • Strong focus on support for managing policy definitions via external source control systems. • Email notifications and templates.
Notable weaknesses in feature-function	• Limited SOAP support. • User management is targeted at individual developers only, not for B2B partners. • Limited role-based controls for UI access. • OAuth2 support is limited. • Cannot define multiple access tiers for an API product. • No life-cycle management.
Major points of vendor strategy	• Future product enhancement priorities include portal customization, enhanced rate-limiting, custom C# policy, full SOAP support, external source code control for all API management definitions, and devops integration with Github. • SaaS-only deployment today, with future plans to add hybrid topology. • Low cost, particularly for non-production developer edition.
Major points of market presence	• Microsoft's global presence. • Azure API Management operates in 15 regions across North America, South America, Europe, and APAC.

Oracle Is Just Getting Started With API Management

As its first step into the API management solution space, Oracle API Manager adds a developer portal on top of Oracle Service Bus (see Figure 3). In its initial version, Oracle API Manager is intended to support API use by a known API developer audience (e.g., internal developers), and it is best suited for existing customers of Oracle Service Bus. It supports publishing APIs and tracking the applications that use them. Oracle is placing a specific priority on maturing the solution, so look for significant functional additions to the solution over the months ahead.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 3 Oracle Is Just Getting Started With API Management

Areas of strength in feature-function	• Tight integration with Oracle Service Bus, which will benefit existing Oracle customers. • Basic API documentation displays. • Applications can subscribe to multiple APIs at one time.
Notable weaknesses in feature-function	• Limited portal customization and feature set. • No developer self-registration. • No approvals for API subscription requests. • API Manager's admin portal is limited to reviewing API usage and current subscriptions. Oracle Service Bus's technical UIs (including its console and its Oracle JDeveloper interface) are the only means of defining APIs.
Major points of vendor strategy	• High priority on maturing the solution. • Integration with Oracle's cloud directions for integration and Oracle SOA Suite. • Vision that API management is central to hybrid integration, IoT, B2B, and digital business.
Major points of market presence	• Oracle's global presence.

SAP Builds On Apigee To Provide A Compelling Offering For SAP Customers

SAP's OEM/reseller agreement with Apigee delivers API management in two forms: 1) via the SAP Hana Cloud Platform, in which SAP customizes several aspects of Apigee's solution, and 2) via customer-managed deployment, in which SAP (for now) supports an unmodified version of Apigee's solution. Thus, to examine SAP's solution, Forrester seeks to identify how SAP's customized cloud version differs from Apigee. Not surprisingly, SAP's major focus is to integrate key parts of its technology base to craft a solution of high value for its current customers (see Figure 4). This it has done well, starting with its portal and SAP Fiori look-and-feel, and then reaching back into its applications through SAP's gateway.

If the mobile team drives API management selection, it can easily miss a cadre of other technical, process, integration, and governance requirements.

Going forward, we expect SAP to track closely with Apigee's core API management solution (as opposed to the Apigee Link solution for IoT and other aspects of Apigee's product line), while integrating with more and more of SAP's platform over time.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 4 The Cloud Edition Of SAP API Management Deepens Integration With SAP

Areas of strength in feature-function	• As an OEM of Apigee, SAP's cloud-based solution builds on Apigee strengths. • UI adopts SAP Fiori's look-and-feel, which will benefit SAP customers. • Out-of-the-box integration with certain SAP applications and infrastructure (this will expand in the future.) • SAP's content management enhances documentation and forum features. • Import and export for OData API definitions. • Integrated SAP Hana Predictive Analytics (enterprise edition only; standard and premium editions use Apigee's analytics.)
Notable weaknesses in feature-function	• Rate-limiting lacks certain features like Apigee's rolling calendar window. • Policy authoring lacks Apigee's rollback features.
Major points of vendor strategy	• Modernization of legacy SAP integration interfaces (BAPI, RFC, IDocs), with an ongoing strategic focus on OData. • IoT integration. • Enhancement of cloud and customer-managed editions to provide better integration to SAP applications and tools, particularly through SAP Hana, SAP Gateway, and billing via SAP hybris Billing. • As Apigee releases new versions of its solution, SAP states that its intent is to release a new version of its own solution that incorporates those changes within four weeks.
Major points of market presence	• SAP's global presence. • The solution currently runs in SAP's Germany data center (more data centers will be added in the future.)

Software AG's Solution Provides A Broad Foundation For Enterprise API Governance

Software AG's API management solution is built upon and deeply integrated with the vendor's service life-cycle management solution, CentraSite. This is particularly beneficial for enterprise governance of APIs and service-oriented architecture (SOA) services. In addition, the API gateway part of the solution, which is filled primarily by webMethods Mediator, is built upon Software AG's enterprise service bus (ESB), which provides a strong foundation for rich transformation and integration. An API management buyer looking for a simple, targeted solution may find Software AG's solution to be overkill, but its richness will serve well for buyers with multiple API usage scenarios and diverse development teams (see Figure 5).

Going forward, we expect Software AG to move its solution forward at a rapid pace, leaning heavily toward features and functions important to broad-based and well-governed enterprise API strategies.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS   September 22, 2015

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

FIGURE 5 Software AG's Solution Provides A Broad Foundation For Enterprise API Governance

Areas of strength in feature-function	• Well-organized features for customization of portal appearance, including API groups and activity feeds for each API user. • A community feature for associating API users and APIs (useful for B2B and LOB scenarios). • Multiple options for filtering API visibility. • Option to require multiple approvers for API users and API access. • Can host multiple distinct API portals from one installation. • API users can schedule periodic usage reports. • API user login via LDAP and social identity. • Deep and rich policy features. • Support for OAuth2 (but with limited scope definition). • SOAP support. • Integrated, configurable life-cycle management for APIs and policies. • Automatic creation of documentation. • Reporting features cover both portal and API activity.
Notable weaknesses in feature-function	• No support for API plans and products. • Swagger 2.0 and RAML support is import only. • Solution is comprised of four elements (CentraSite, API Portal, webMethods Mediator, Enterprise Gateway), which adds complexity to UI and product configuration. • Only the API portal is available via SaaS, not the entire solution. • Moderate to low-cost entry point.
Major points of vendor strategy	• Future product enhancement priorities include direct social publishing of APIs, enhanced analytics, automatic version routing, integration with B2B trading partner management, full Swagger and RAML support, OData, API plans, impact analysis, deeper collaboration features, microservices, OS-level containers, B2B integration, and full SaaS deployment. • Develop API management as a full part of Software AG PaaS and integration PaaS offerings, with B2B support and hybrid deployment options.
Major points of market presence	• Software AG's global presence. • Notable base of customers for the core element of the solution (CentraSite).

Torry Harris Business Solutions Provides A Good Base For Custom API Management

As a systems integrator, Torry Harris has completed many SOA and API implementation projects for clients. From this experience, the firm has productized an API platform it calls API-o-Blocks. The API Connect portion of API-o-Blocks provides an API management solution consisting of an API gateway, a portal, and an authentication/authorization server. SIs often bring toolkits to client engagements and then highly customize them, but Torry Harris treats API-o-Blocks as a version-managed product. This provides clients with the option to have Torry Harris implement the solution as a product, so that they will be able to receive ongoing product upgrades. Although its functionality is not as deep and rich as some competitors, it has a good feature set and provides a strong foundation for Torry Harris to implement API management as part of a client's digital business initiative (see Figure 6).

Going forward, we expect Torry Harris to rapidly develop its solution, leveraging its consulting projects to drive priorities for enhancement.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 6 Torry Harris Business Solutions Provides A Good Base For Custom API Management

Areas of strength in feature-function	• SDK generation. • Custom attributes for API users. • API user groups and API user admin role, both of which facilitate B2B and LOB scenarios and managing API visibility. • Policy authoring features such as a policy library and an inspection function to examine all policies in effect for a given API call. • Support for Swagger, RAML, WebSockets, and WSDL. • Version-linked API definitions and documentation. • Flexible structure and business user role for defining and associating APIs, API products, usage plans/tiers, and API fees. • Pluggable architecture for identity management, API import, and other functions.
Notable weaknesses in feature-function	• No custom roles. • Limited API access policy options. • Limited SOAP standards support. • Basic transformation features only. • Limited notification features. • No drill-down analytics.
Major points of vendor strategy	• Torry Harris' consulting has a major focus on digital enablement, integration, APIs-SOA, and related governance concerns. • The solution is available with Torry Harris consulting projects, but managed like a product with versions and upgrades. • Future product enhancement priorities include fraud detection, enhanced rate-limiting, JMS, IoT, security certifications, visual UI for policy and transformation pipeline, visual UI for API plans, advanced pricing models, billing integration, analysis tools for stability of backend services. • SaaS, customer-managed, and managed hosting deployment options. • The solution is part of Torry Harris' broader platform for APIs, API-o-Blocks. • Vendor's vision touches on digital business transformation and API ecosystems.
Major points of market presence	• Headquarters in the US, with presence in Europe, Singapore, and India. • As a systems integrator itself, Torry Harris does not solicit other integrators for implementation of its API management solution.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

September 22, 2015

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

WaveMaker's Solution Is Limited, But Will Grow To Serve Targeted API Initiatives

The two central elements of WaveMaker's API management solution — WaveMaker API Portal and WaveMaker Gateway — are part of a broader platform for Java-based application development and delivery, including a PaaS environment for running APIs (see Figure 7). The strongest parts of the solution are its policy templating feature and its structure for grouping APIs into API packages, and then grouping packages into API plans. It also has a good start on B2B scenarios through its feature to allow partner administrators to add their own developer accounts. Beyond these, the solution's features quickly get thin. As the solution matures, its close association with WaveMaker Cloud will allow it to serve well for targeted API initiatives that combine API creation and hosting with API management.

Going forward, we expect WaveMaker to move at a moderate pace, focused on rounding out its broader PaaS environment and enhancing API management features at the same time.

FIGURE 7 WaveMaker's Solution Is Limited, But Will Grow To Serve Targeted API Initiatives

Areas of strength in feature-function	• Supports B2B APIs by allowing a primary API user (e.g., at a B2B partner) to add secondary API users who can use subscribed APIs. • Swagger support. • Policy versioning and rollback support. • Policy templates to facilitate policy authoring. • API plans and packages provide flexible structure for defining API access rights and policies.
Notable weaknesses in feature-function	• Portal has limited collaboration features. • No API visibility filtering by on-boarding status. • API provider staff and API user identities are maintained only in an internal identity store. • Limited API access security policy. • Rate limits are per gateway instance, not across a distributed set of gateway instances. • No built-in analytics. • No built-in caching.
Major points of vendor strategy	• Future product enhancement priorities include service testing virtualization, SOAP support (currently gateway-level only), SDK generation, RAML, notifications, identity management integration, OpenID Connect, deeper transformation features, and analytics. • Deployment options including SaaS, customer-managed, and managed hosting. • Aggressive SaaS or customer-managed pricing of $10,000/year for 500 API endpoints with unlimited usage. • Sister Java-based PaaS offering (WaveMaker Cloud).
Major points of market presence	• WaveMaker is a subsidiary of India-based Pramati Technologies. • Sales and support presence in US, UK, India.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

September 22, 2015

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

Established Vendors Are Moving Forward At Very Different Speeds

Each of the ten vendors included in our Q3 2014 Wave evaluation are moving their solutions forward at very different speeds (see Figure 8).[7] IBM made the most significant forward progress. Mashery made the least progress, perhaps because it has been on the auction block, considering that TIBCO just announced plans to buy Mashery. In our analysis below, we assign each vendor to one of three groups based on the degree of forward movement in their current offering:

Each of the ten vendors included in our Q3 2014 Wave are moving their solutions forward at very different speeds.

› **Fastest improvement of current offering.** Akana, Axway, IBM, and WSO2.

› **Moderate rate of improvement in current offering.** Apigee, CA, MuleSoft, and TIBCO.

› **Slow improvement of current offering.** 3scale and Mashery.

Any market update analysis will catch vendors at different points in their product release cycles. Yet, as a general pattern, the vendors that made the most significant forward progress also had the most ambitious lists of future enhancement plans.

FIGURE 8 The Vendors In The Q3 2014 Wave On API Management Are Moving At Very Different Rates

Vendor	Wave position ➤	Degree of improvement to feature-function
3scale	Contender	➤ Minor improvement
Akana	Leader	➤ Significant improvement
Apigee	Leader	➤ Moderate improvement
Axway	Strong Performer	➤ Significant improvement
CA Technologies	Leader	➤ Moderate improvement
IBM	Strong Performer	➤ Significant improvement
Mashery	Strong Performer	➤ Minor (acquisition by TIBCO is pending)
MuleSoft	Strong Performer	➤ Moderate improvement
TIBCO	Strong Performer	➤ Moderate (Mashery will be the new solution core)
WSO2	Strong Performer	➤ Significant improvement

Akana, Axway, IBM, And WSO2 Are Rapidly Advancing Their Current Offerings

Four vendors had significant forward movement in the current offering features of their API management solutions.

› **Akana extends enterprise-level breadth with analytics and portal improvements.** As a Leader in our Q3 2014 Wave, Akana (formerly SOA Software) is building on an already strong and broad solution. Most notably, Akana has introduced a lower-cost SaaS tier and released an analytics platform as a sister product to its API management solution. In addition, it has made improvements in portal flexibility, DevOps integration, SaaS integration, and support for several API-related specifications (see Figure 9).

Going forward, we expect Akana to continue rapid development of its solution. The firm is investigating areas for future enhancement including conversion among description languages (e.g., RAML, Swagger, WADL, WSDL), documentation generation, optimized microservices support, integration with more identity management vendors (e.g., ForgeRock), simplified API package definition, execution performance for custom policy scripts, web Sockets, further DevOps integration, graphical mapping of input/output data, and billing integration.

› **Axway moves toward unified B2B management and deepens technical capabilities.** Axway has added and enhanced several product features. As a significant move toward unified B2B relationship management, it added an API user role of organization administrator, which allows a partner to manage its own developers and the applications on which they collaborate. Expanded OAuth support includes access token revocation and API try-it integration. Several other enhancements deepen Axway's technical features for SOAP support, attack protection, SaaS integration, and identity management (see Figure 10).

Going forward, we expect Axway to continue rapid development of its solution. The firm is investigating areas for future enhancement, including unified partner onboarding and management (i.e., across APIs, managed file transfer [MFT], and other B2B connections), autogeneration of software development kits (SDKs), social identities for the developer portal (via OpenID Connect), deeper web application firewall (WAF)-like features, tiered API plans, enhanced policy authoring, enhanced API authoring, DevOps integration, graphical mapping of input/output data, additional SaaS application support, expanded deployment topologies, integration with mobile and IoT platforms, and life-cycle enhancements.

› **IBM is moving faster than others to enhance its solution's capabilities.** Among the vendors in the Q3 2014 Wave evaluation, IBM has made the broadest and deepest improvements to its solution. Most notably, IBM greatly improved the solution's analytics and portal, including the addition of a simplified model for life-cycle management. Other enhancements include Swagger and CORS support, a trouble ticketing feature, richer user roles and UI access controls, policy

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

authoring improvements, and JavaScript custom policies. Also, IBM removed a key limitation that added cost for advanced SaaS users: IBM now provides a mechanism for deploying custom policies to SaaS gateways without users having to buy separate gateway licenses (see Figure 11).

Going forward, we expect IBM to continue to have among the most rapid paces for development of its solution. The firm is investigating areas for future enhancement, including publishing to API directories, social identities for the developer portal, deeper identity management integration, support for OpenID Connect and JSON Web Tokens, SOAP try-it, additional rate-limiting options and actions, webhook integration point for multistage approvals, features for communication with API users, and a federated API catalog.

› **WSO2's enhancements increase enterprise credibility of its solution.** WSO2 made a number of enhancements across its solution. Most notably for large enterprise deployments are group subscriptions for B2B scenarios, better identity management, custom policy improvements, built-in version management, and enhanced analytics. A variety of other improvements will help with advanced rate-limiting needs, portal styling, and API user management (see Figure 12).

Going forward, we expect WSO2 to continue rapid development of its solution. The firm is investigating areas for future enhancement including API directory integration, SDK generation, expansion of the API store concept to include non-API assets, multistep approvals, deeper identity management integration, over-limit request queuing, IoT support, enhanced life-cycle management, UI improvements, MQTT, CoAP, and additional analytics (e.g., for DevOps integration and fraud detection).

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 9 Akana Improved Its Portal, Its API Spec Support, And Added A New SaaS Tier

Position in Q3 2014 Wave	Leader
Degree of improvement to feature-function	Significant
Major areas of feature-function improvement	• Additional portal navigation options and tagging for control of API visibility. • Ability to expose a portal via multiple URIs, each with its own theme. • New embeddable API test client. • Forum moderation. • Support for OpenID Connect and JSON Web Tokens. • Policy life cycle and versioning, including rollback and effective dating. • Swagger support and additional HTTP verbs. • AMQP and deeper messaging support. • Integration with Jenkins and TeamCity. • Prebuilt cloud integration with multiple SaaS applications. • API user provisioning workflow and data collection. • Integrated Hazelcast for enhanced caching. • Enhanced PCI certification.
Strategy and market presence movements	• Sister product for API analytics. • Broader vision for digital business transformation, IoT, and microservices. • Lower-cost SaaS tier and updated pricing model for customer-managed deployments. • Strong customer growth. • Five new certified systems integrator partners.

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 10 Axway Moves Toward Unified B2B Management And Deepens Technical Capabilities

Position in Q3 2014 Wave	Strong Performer
Degree of improvement to feature-function	Significant
Major areas of feature-function improvement	• Ability to create an organization administrator (e.g., at a B2B partner) who can manage API user identities and their access to API user applications within the developer portal. • Try-it enhancements including SOAP support and the ability to exercise the OAuth access token request flow. • Definition of SOAP APIs via the API management UI (versus only the gateway UI). • Ability to manage API provider staff identities in a separate repository. • Additional OAuth management features (e.g., revocation of access tokens). • Additional attack protection via Apache ModSecurity. • Gateway-level support for OpenID Connect. • Sample policies for selected SaaS applications. • Custom attributes for API users, organizations, and applications. • Additional built-in notifications. • FIPS-140-2 certification and NSA Suite B compliance.
Strategy and market presence movements	• Broader strategy focus on digital transformation. • Expanded participation in industry API forums. • Significant customer growth • New focus on partner programs and marketing.

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 11 IBM Has Moved Faster Than Others To Enhance Its Solution's Capabilities

Position in Q3 2014 Wave	Strong Performer
Degree of improvement to feature-function	Significant
Major areas of feature-function improvement	• Added a CMS-based (Drupal) portal as an optional foundation for IBM's portal, which adds blogging, discussion forums, tagging, and greater portal customization (extra cost in SaaS edition, no extra cost for customer-managed deployment). • Added a trouble ticket feature. • Filtering of API visibility by onboarding status. • License terms and conditions, set at API- or API-plan level. • Custom roles for API provider staff, including roles that are specific to an environment (e.g., development, QA, production). • Added SSO for API user staff and a view-only role for API users (helps B2B partners distinguish between administrators and developers). • Better granularity of UI access control. • Support for Swagger 2.0, CORS, additional HTTP verbs, and multiple API response formats. • Policy improvements including refined rate-limit controls, policy versioning and approvals, effective dating, and the ability to deploy custom policy to a SaaS gateway. • Introduced a simplified model for API life cycles and managing state transitions within a life cycle. • Custom policies written in JavaScript, which increases capabilities for complex transformations. • Greatly improved analytics, with drill-down features. • Rogue app suspension.
Strategy and market presence movements	• Established a Github community for customers to share API management policy templates and custom policies. • New deployment options including integrated deployment inside IBM's Bluemix 1 platform (which also allows for interesting API community scenarios) and private cloud. • Strong customer growth. • A formal certification program.

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 12 WSO2's Enhancements Increase Enterprise Credibility Of Its Solution

Position in Q3 2014 Wave	Strong Performer
Degree of improvement to feature-function	Significant
Major areas of feature-function improvement	• New theme feature for portal styling. • Integration with SmartBear's ReadyAPI testing tool. • Added a feature for group subscriptions to facilitate B2B scenarios. • Added greater access to multitenant features. • Security improvements including social identity, external identity repositories, pluggable OAuth server, and proprietary SSO tokens to secure API access. • Support for Swagger 2.0, CORS, and APIs.json. • Enhanced rate limiting via integration with WSO2 Complex Event Processing. • Custom policy enhancements via WSO2 "sequences" in the gateway. • Temporary blocking of an API user's access. • Improved support for SOAP APIs. • Added version history for API definitions, including the ability to revert to a previous version. • Enhanced analytics by feeding more data to the analytics engine. • Custom attributes for API users. • Improved APIs for portal customization.
Strategy and market presence movements	• Added a SaaS option for API management, further driving WSO2's position as an inexpensive option. • Added a corollary offering for deeper predictive analytics (WSO2 Data Analytics Server). • Expanded strategic focus on IoT scenarios. • Vertical sector focus on telcos. • Strong customer growth. • Added WSO2 presence in South America.

Apigee, CA, MuleSoft, And TIBCO Are Making Moderate Advances In Current Offering

Four vendors had moderate forward movement in the current offering features of their API management solutions.

› **Apigee extends key features and broadens its go-to-market strategy.** Apigee is a Leader in Forrester's Q3 2014 Wave evaluation, so it is building on an already strong solution. Its new web Sockets support addresses emerging customer engagement scenarios, and it has added key portal features such as additional content filtering and the ability for developers to form ad hoc organization associations. Its new API Studio tool supports designing and testing APIs. Apigee expanded is go-to-market strategy by introducing a corollary IoT offering, Apigee Link (aimed at device manufacturers), and adding a new lower-cost SaaS entry point (see Figure 13).

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

Going forward, we expect two types of development from Apigee. First, the firm will continue to expand its ancillary offerings around API management, such as Apigee Link and API Health. Second, we expect a moderate pace of development to its core solution. The firm is investigating areas for future enhancement including widgets embeddable on a customer's website, private messaging on developer forums, JSON Web Token support, policy authoring improvements, API health monitoring (currently in beta), additional deployment topologies, additional analytics for API-based revenue, bot detection, and microservices.

› **CA Technologies extends its solution with a SaaS option and support for billing.** CA's new SaaS deployment option expands delivery options, but its portal has a different architecture and (currently) fewer features than CA's customer-managed portal. Buyers must evaluate it carefully before jumping in, because CA plans to retain both portal architectures. In its customer-managed offering, CA's solution now supports revenue-based API plans (with integration to Recurly for billing), RAML API definitions, creation of APIs from relational databases, and better SOAP support (see Figure 14).

Going forward, we expect CA to continue a moderate pace of development of its solution. The firm is investigating areas for future enhancement including strong OAuth scope management, analytics (via partnering with GoodData), expanded ESB integration, enhanced API creation from data sources, and hybrid deployment topology.

› **MuleSoft addresses enterprise scenarios by managing APIs across LOBs.** MuleSoft's enhancements provide additional richness to address key needs of larger enterprise API management deployments. To provide greater flexibility in coordinating across lines of business, MuleSoft enhanced its custom role definitions and added a business group feature. To facilitate changes to APIs, MuleSoft added built-in API version features and distributed deployment of gateway policy. Better APIs into analytics and other items round out the list (see Figure 15).

Going forward, we expect MuleSoft to continue a moderate pace of development of its solution. The firm is investigating areas for future enhancement including widgets that are embeddable in websites other than the developer portal and improvements to alerts and notifications.

› **TIBCO solidifies its solution — and then announces plans to buy Mashery.** In the very late days of authoring for this report, TIBCO announced plans to buy Mashery and adopt it as the core of TIBCO's API management solution.[8] We expect the deal to go through in the next few weeks. Until then, new customers should hold on buying from TIBCO.

Whether or not the deal goes through, we expect TIBCO to continue with areas for future enhancement including antivirus scanning, message injection protections, Swagger 2.0 support, SOAP try-it feature, graphical mapping of input/output data, and exposing more gateway configuration options directly within the solution's administrator portal.

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

Mashery will supersede TIBCO's current developer and administrator portals, but on the slight chance that the deal does not go through, we provide here our analysis prior to TIBCO's announcement: The firm cleaned up and extended multiple features to solidify its solution. Portal enhancements enable better management of onboarding and API access requests. Multiple API processing improvements allow better handling of sensitive data, better transformations, easier API definition, and better back-end integration, as well as EU Safe Harbor support (see Figure 16).

FIGURE 13 Apigee Extends Key Features And Broadens Its Go-To-Market Strategy

Position in Q3 2014 Wave	Leader
Degree of improvement to feature-function	Moderate
Major areas of feature-function improvement	• PayPal integration. • Ability for developers to create organizations, to which they can add other developers and share a base of apps and keys. • Additional level of portal content filtering by onboarding status. • WebSocket support. • Swagger 2.0 support, including the ability to validate requests/responses using Swagger definitions. • Added Apigee API Studio as an online tool for designing, testing, and sharing APIs.
Strategy and market presence movements	• Added Apigee Link as an API offering for device manufacturers to certify applications that use their APIs. • Added CIO Upload as a digital economy education program for executives. • Expanded delivery of Apigee's I Love APIs event. • Added a lower-cost SaaS entry point. • Added South America and Middle East to Apigee's global footprint. • New systems integrator partners. • Added a formal certification program and certified two implementation partners.

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 14 CA Technologies Extends Its Solution With A SaaS Option And Support For Billing

Position in Q3 2014 Wave	Leader
Degree of improvement to feature-function	Moderate
Major areas of feature-function improvement	• Added RAML support and a RAML try-it feature (which operates via a RAML-WADL conversion). • SAML-based SSO for API provider staff. • Autogeneration of APIs from JDBC data sources. • Enhanced publishing and support for SOAP APIs, including testing integration via a SoapUI tool plug-in. • Better versioning of API documentation as new API definitions are imported. • Added API revenue features including monthly charges and one-time setup fees, together with out-of-the-box integration with Recurly. • New reports for API revenue and uptake. • Mobile security features including integration with Samsung Knox.
Strategy and market presence movements	Added a SaaS deployment option — however, this option has a different portal architecture and currently lacks advanced features.

FIGURE 15 MuleSoft Addresses Enterprise Scenarios With Features For Managing APIs Across LOBs

Position in Q3 2014 Wave	Strong Performer
Degree of improvement to feature-function	Moderate
Major areas of feature-function improvement	• Feature to define business groups, which allows delegated administration across API provider departments and LOBs. • Integration with ForgeRock's identity management, which enables ForgeRock customers to use social identity for the developer portal (also possible through PingFederate). • Enhancements to custom role definitions. • Auto deployment of policy across distributed gateway instances. • Additional HTTP verbs. • Built-in versioning for API definitions. • Enhanced APIs for analytics.
Strategy and market presence movements	• Added deployment option for fully customer-managed implementation. • Sister product for B2B integration, which operates as an integral part of its platform for integration and API management. • New focus on API-led connectivity as an approach to integration. • Strong customer growth. • Enhanced certification program.

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

FIGURE 16 TIBCO Solidifies Its Solution — And Then Announces Plans To Buy Mashery

Position in Q3 2014 Wave	Strong Performer
Degree of improvement to feature-function	Moderate, however the solution will be discontinued (TIBCO will continue to support existing customers, but has yet to say how it will help them move to the new Mashery-based solution).
Major areas of feature-function improvement	• Enhanced approvals for sign-ups and API access requests, with dashboards to view approval status. • API visibility filtering by onboarding status, role, and organization. • Integration with PingIdentity's OAuth server. • Gateway-level policy for masking data before logging and Java-based custom policy. • Enhanced routing to back-end services. • Schema-aware JSON-XML transformations. • Improved UI for authoring of APIs and associating policies with APIs. • Improved integration with TIBCO's ActiveMatrix BusinessWorks integration product. • APIs into TIBCO's API management solution now cover 100% of product functionality. • EU Safe Harbor support.
Strategy and market presence movements	With TIBCO's acquisition, Mashery will become the core of the solution. TIBCO will replace Mashery's gateway with its own and integrate its Spotfire analytics into the new solution.

3scale And Mashery Are Slowly Improving Their Current Offerings

Two vendors had minor forward movement in the current offering features of their API management solutions.

› **3scale stays in place as a good low-cost option for API management.** 3scale elected to not participate in our market update, and Forrester's independent look at its solution's movement shows that it has not changed substantially. Most notably, 3scale extended existing features, like payments and Swagger support, and it added infrastructure-as-a-service integration with Heroku and Amazon Web Services. Also, its new partnerships with Ret Hat and SnapLogic extend its market presence (see Figure 17). Going forward, we expect 3scale to continue a slower pace of development of its solution.

› **Mashery stays mostly status quo — then gets bought by TIBCO.** Overall, Mashery's solution made small forward movements. Most interesting is a new executive dashboard feature, which provides a quick view of API program status (see Figure 18). The slow movement is explained by the fact that Intel was looking for a buyer for Mashery, which it found in TIBCO. The good news for existing customers is that TIBCO will use Mashery as the core of its new solution, and we expect

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

TIBCO to mix its excellent Spotfire analytics into the solution. That said, there is some risk that customers may have a bump in the road as TIBCO substitutes its gateway for Mashery's, but we expect that TIBCO will be able to do this with minimal customer disruption.

FIGURE 17 3scale Added A New Payment Option And Better Infrastructure-As-A-Service Integration

Position in Q3 2014 Wave	Contender
Degree of improvement to feature-function	Minor
Major areas of feature-function improvement	• New payment option (Stripe). • Swagger 2.0 support. • Integration with Heroku and AWS for deployment of 3scale's API gateway. • Plug-in for SmartBear's ReadyAPI testing tool.
Strategy and market presence movements	New partnerships with Ret Hat (for API development on JBoss) and SnapLogic (for cloud integration).

FIGURE 18 Mashery Stayed Most Status Quo — Then Gets Bought By TIBCO

Position in Q3 2014 Wave	Strong Performer
Degree of improvement to feature-function	Minor, but we expect TIBCO to pick up the pace of solution development once the deal goes through and the dust settles.
Major areas of feature-function improvement	• Integration with SmartBear's ReadyAPI testing tool. • SAML-based SSO for API provider staff. • New executive dashboard feature.
Strategy and market presence movements	Intel found in TIBCO a buyer for Mashery. Going forward, TIBCO will use Mashery as the core of its solution.

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

Recommendations

Ensure Your API Management Vendor Aligns With Your API Strategy

Product functionality and the vendor's strategy are both important in choosing an API management solution — or any other technology — and between the two, functionality often takes the upper hand. With API management, AD&D pros must take special care to consider their API future rather than buying based only on today's need. Multiple factors increase the importance of having a strategic match between your vendor and your API strategy, specifically:

› **With broad applicability of APIs, your vendor must meet all needs — or a selected set.** An API strategy can operate at the enterprise level, wherein the goal is that any API should be accessible to any API user. In this case, one API management solution is best, and it must meet a broad set of requirements. Alternatively, an API strategy can be segmented across independent domains (e.g., LOBs, API categories), in which case multiple API management solutions may apply, each with a set of features to meet its target scenario.

› **The diversity of API scenarios leads to diversity in API management solutions.** Whether it's mobile, B2B, open developer engagement, process efficiency, or any of numerous others, APIs are applicable to many different scenarios. This provides great opportunity for vendors to specialize. Akana and Software AG have rich life-cycle management built into the blood of their solutions. Oracle and SAP have unique opportunities to connect to their enterprise applications. Some have strong PaaS offerings to connect API management to. Some have strong integration solutions. Some focus on revenue-bearing APIs as their central need.

› **In a rapidly moving market, solutions will converge some, but still have wide variation.** As the market matures, the solutions will pick up features from each other, leveling the field to a degree, especially for features like API documentation, support for key standards, revenue-based APIs, and discussion forums. But other vendor strategies that connect to API management — like life-cycle management, enterprise applications, integration platforms, and PaaS platforms — are persistent differences that will never be equalized across all API management solutions. These types of differences will continue to characterize selected API management solutions, and it is important to ensure that your chosen vendor will support the scope of your API strategy.

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The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

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Endnotes

[1] Mobile apps and customer engagement are major drivers for APIs, but there is a more strategic and pervasive reality that should infuse an organization's API strategy and thinking: Done right, APIs can open new angles into business strategy. APIs allow an enterprise to go beyond its traditional offerings to pursue new markets and customers by creating new products and services from its assets, data, or processes. See the "How APIs Reframe Business Strategy" Forrester report.

[2] APIs have the power to unlock new revenue streams, transform how you design and deliver change, and extend your value proposition via dynamic ecosystems of value. But digital business design is a highly technical domain awash with jargon and misconceptions and one in which the underlying technology capabilities fundamentally drive and constrain business model design. Neither eBusiness nor technology management teams can build a successful API strategy in isolation — collaboration is key. See the "Brief: Four Ways APIs Are Changing Your Business" Forrester report.

[3] API management solutions have emerged to help organizations implement, secure, and manage their growing use of APIs. Forrester analyzed the key factors contributing to growth in the US API management solutions market, which we expect to triple in annual spending by the end of the decade. See the "Sizing The Market For API Management Solutions" Forrester report.

[4] In Forrester's 40-criteria evaluation of 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. See the "The Forrester Wave™: API Management Solutions, Q3 2014" Forrester report, see the "The API Management Buyer's Guide, Q3 2014" Forrester report, and see the "Applying The Forrester Wave™: API Management Solutions, Q3 2014" Forrester report.

FOR APPLICATION DEVELOPMENT & DELIVERY PROFESSIONALS

The API Management Solutions Market Heats Up
New Players Enter And Established Suppliers Advance A Fast-Evolving Market

September 22, 2015

[5] The newly released Amazon API Gateway, although quite limited in its feature set, is important in its validation of layered security for APIs. But, it is not an API management solution. See the "Brief: Amazon API Gateway Is Limited But Useful" Forrester report.

[6] For more information, see Stephen Covey's book. Source: Stephen R.Covey, The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change, Free Press, 2004.

[7] The eleventh vendor in our prior Wave evaluation, Informatica, exited the API management solutions market.

[8] Source: "TIBCO Software To Acquire Api Management Leader Mashery," TIBCO press release, August 25, 2015 (http://www.tibco.com/company/news/releases/2015/tibco-software-to-acquire-api-management-leader-mashery).

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