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How To Manage APIs For Customer Engagement

by Randy Heffner, April 18, 2014

KEY TAKEAWAYS

APIs Enable Customer Engagement And Business Flexibility Needed For The Age Of The Customer

Open web and B2B APIs allow an organization to better serve its customers, expand its market presence, increase sales, and generate new revenue streams. They do this by opening up flexible access to enterprise data, product catalogs, business processes, or other assets to innovation by business partners and developers across the Internet.

For API Enablement, Industry Discussion Focuses Too Narrowly On API Management Products

As API value grows, so grows market attention to API management products. But vendor and buyer attention tends to be too narrowly focused on this one product category. Successful APIs also need rock-solid production operations and good coordination between many stakeholders during the process of API design and creation.

Management Of APIs Must Cover User-Provider Relationships, Runtime Operations, And API Life Cycles

API management products center on the relationships between API users and API providers. For top-quality API operations, runtime service management products pinpoint issues across the multiple elements of API implementations. Life-cycle management ensures that API delivery processes and checkpoints are well understood and consistently performed.

Business Objectives And Service-Based Maturity Guide Evolution Of Infrastructure For Managing APIs

Organizational priorities determine whether and when to acquire products for the three management disciplines for APIs. When API failure will cause large business impact, runtime management is critical. With large external API user communities, API management becomes very important. Process discipline is a prerequisite for life-cycle management.

How To Manage APIs For Customer Engagement

APIs Need More Than API Management

by Randy Heffner
with Christopher Mines, Eve Maler, and David Murphy

WHY READ THIS REPORT

Application programming interfaces (APIs) are central to any organization's software strategy to win, retain, and serve customers. As a result, development leaders are scrutinizing API management tools to help create and maintain these essential software resources. As important as API management products are, they address at most one-third of what's needed for successful API-based customer engagement. In addition, APIs need strong life cycles and runtime management: To deliver the right APIs with a high quality of service, AD&D leaders institute a well-managed API delivery life cycle and comprehensive production monitoring and management. This report describes why API management products are important but not sufficient for the task and provides strategy guidance concerning why, when, and how to build comprehensive management into your platform for API delivery.

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Notes & Resources

Forrester leveraged its experience across hundreds of client conversations and its long history of advising enterprises on service-based strategies as well as ongoing conversations with industry experts to craft client guidance on what's needed for comprehensive management of APIs.

Related Research Documents

The Forrester Wave™: API Management Platforms, Q1 2013
February 5, 2013

The Forrester Wave™: SOA Service Life-Cycle Management, Q1 2012
January 6, 2012

The Forrester Wave™: Standalone SOA Management Solutions, Q4 2011
December 2, 2011

APIS ARE CENTRAL TO THE FUTURE OF CUSTOMER ENGAGEMENT

The age of the customer places immense pressure on business competitiveness — and thus on application development and delivery (AD&D) organizations to become more fluid, adaptive, and agile.[1] Why? Smartphones and mobile applications have shifted enormous power to consumers and customers — and more channels of engagement are on their way (e.g., wearables, connected products, location beacons).[2] Social interactions (e.g., ratings of products and sellers, Pinterest, Twitter, Facebook) amplify the opinions of customers and influencers and extend their ability to affect others' buying decisions. Delighted customers return for repeat business and tell their friends; dissatisfied customers tell everyone.[3]

Whether organizations win or lose customers comes down to the quality of digital customer experiences they provide. They might provide these experiences directly (e.g., website, mobile app) or indirectly through APIs — software interfaces invoked across the Internet — that open up their data and processes, enabling partners and suppliers to participate in a broader ecosystem of customer engagement. Enterprises typically use multiple categories of APIs to open up their digital resources to customers, partners, and channels.[4]

Open Web APIs Foster Customer Engagement Innovation

Open web APIs (sometimes called public APIs) allow an organization to better serve customers, expand market presence, increase sales, generate new revenue streams, or simply foster an open-ended stream of interest in and innovation around its business. By opening up access to its data, product catalogs, business processes, or other assets, an organization can tap into the creativity of developers across the Internet and expand its reach to each developer's customers and community.

For example, APIs have enabled Aetna's CarePass portal to expand its reach and build an ecosystem of health and fitness data and functionality, allowing Aetna members *and* nonmembers to consolidate healthcare information and track fitness goals. Through the API-enabled CarePass ecosystem, individuals can synchronize data across 25 mobile apps (Aetna owns some of these but not most), access nutrition facts and other data that Aetna brokers from various data providers, manage medication reminders, and view lab results and doctor appointments. Each non-Aetna mobile app serves as an entry point for people to learn about CarePass and to engage with Aetna for the first time. CarePass' APIs enable added value and convenience for Aetna members, but beyond that, they enable Aetna to leverage the ecosystem for future business by engaging nonmembers now and building a positive rapport with them even before they become customers.

Internal APIs Bring Application Resources Together On Behalf Of Customers

For many organizations, the inflexibility of their existing technology estate and siloed vintage applications hampers their ability to quickly adapt to new competitive opportunities and threats. The growing adoption of software-as-a-service (SaaS) applications creates additional siloed complexities and demands API-based connectivity across the increasingly permeable internal/

external enterprise boundary. This is especially true since many SaaS applications are small targeted solutions that sometimes do only one part of a business activity or transaction. On top of these siloed technology building blocks, internal APIs build a nimbler digital business by providing a coherent layer of business building blocks — unified transactions and queries that insulate customer engagement and business processes from siloed complexity by performing a complete business activity or transaction across multiple SaaS and vintage applications.

For example, the internal APIs of R, a Spanish quad-play telco, dramatically improved customer service efficiency by enabling all customer care functionality to be consolidated into one service center workbench. But more importantly, R's APIs — its business building blocks — allow it to deliver consistent customer outcomes via the call center, set-top boxes, web-based self-service, and in-store sales and service.[5]

B2B And Product APIs Create More Hooks For Partners And Customers

Business-to-business (B2B) APIs extend the richness of customer engagement to partners and suppliers across an organization's value chain, and product APIs extend customer engagement across the ecosystems in which an organization's products live. Telefónica O2 Ireland leveraged its internal APIs to extend its billing competency to create new revenue streams and customer convenience, such as allowing its customers to bill toll-road charges to their mobile phones. ING Vysya Bank's APIs changed its competitive dynamics by switching the focus of sales discussions from its interest rates to CIO-to-CIO conversations about API-based business efficiency and effectiveness.[6] Ford Motor's OpenXC APIs open up an ecosystem for direct product integration with its automobiles.

API MANAGEMENT PRODUCTS ARE NECESSARY BUT NOT SUFFICIENT

As APIs proliferate in both type and number, discussion about the value of APIs accelerates, as does attention to API management products — such as those from the Leaders in the most recent Forrester Wave™: Layer 7 Technologies (a CA Technologies company) and WSO2.[7] Forrester will be publishing an updated Forrester Wave on API management solutions in fall 2014. Some organizations are finding API management to be useful for internal APIs as well external APIs. API management products are critical for open web APIs and quite valuable for B2B APIs because 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 — the developers who write solutions that leverage the 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. API management products provide developer portal frameworks with prebuilt capabilities for all three requirements.

- **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. Whether it's the use of 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 rate limits on how many API calls an API user can make, API management products enforce usage parameters as agreed to between API provider and user.

- **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., through charges 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.

In addition, API management products provide message transformation capabilities and may provide ancillary feature-function such as API design tools, servers on which to deploy and run code that implements new services or integrates with existing services, tools for running hackathons to foster creativity among API users, and more. On the other hand, despite API management products' strong potential value for successful API delivery, comprehensive management of APIs requires more than API management because:

- **APIs also need rock-solid production monitoring and management.** Despite having "management" in the product category name, API management products do next to nothing for runtime monitoring and management of APIs. At most, they might monitor APIs at a surface level, for example, reporting on the elapsed time between API request and response. But if something goes wrong in between request and response, most API management products have no clue what happened or why.

- **There must be some underlying service to expose as an API.** API management products tend to assume a service already exists, ready to be API-enabled. Thus, while they provide API security and basic transformation between protocols and data formats, most products don't help with creating a service when none exists. They also don't help with designing a portfolio of related APIs or managing the interactions between multiple teams necessary to validate designs, create and test services, and ensure that services are bullet-proof for performance, scalability, availability, failover, and security.

SUCCESSFUL APIS ALSO REQUIRE LIFE-CYCLE AND RUNTIME MANAGEMENT

If API management isn't enough, what else does an organization need? Forrester identifies three central aspects of a comprehensive approach to managing APIs (see Figure 1):

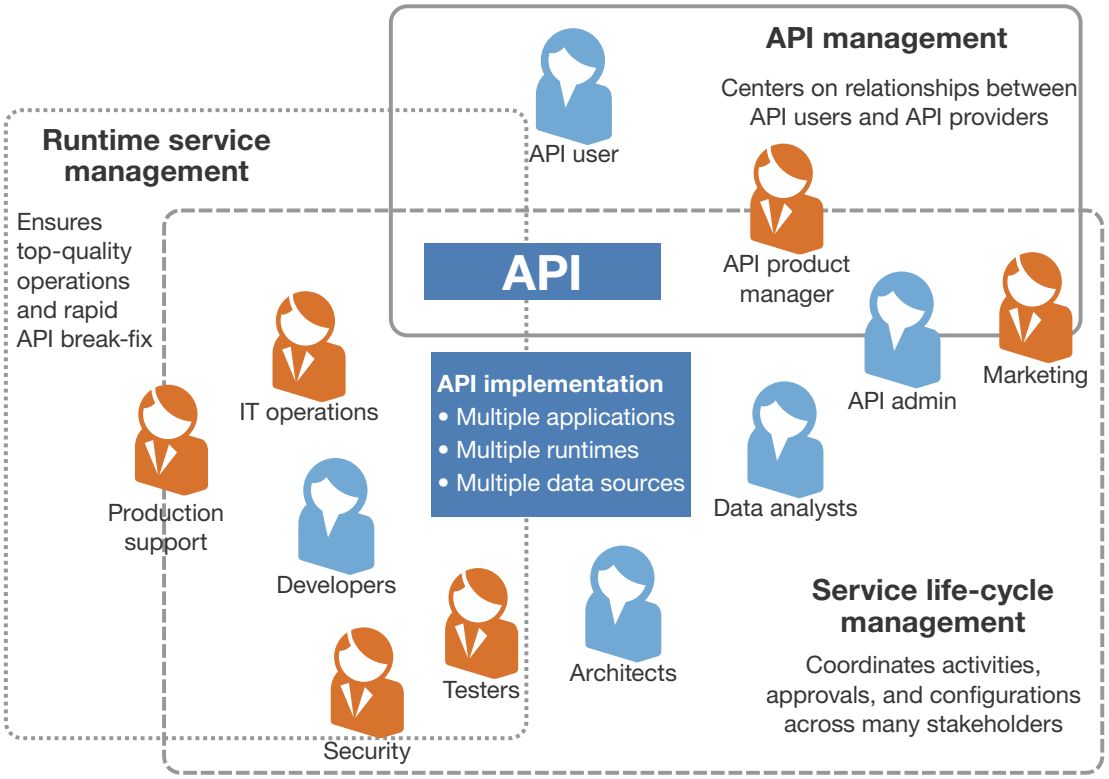
- **API management covers relationships between API providers and API users.** As a central part of an API initiative, managing the relationship between API providers and their target API user audience(s) is indeed important. This is where API management products shine.

- **Life-cycle management ensures smooth relationships among internal API stakeholders.** Across the life cycle of conceiving, designing, building, delivering, testing, and running APIs, an organization's stakeholders may include marketers, product managers, developers, architects, data analysts, production support, IT operations staff, and more. A well-managed API life cycle ensures that the many process touchpoints between these stakeholders run smoothly. Service life-cycle management (SLM) products built for service-oriented architecture (SOA) have helped many organizations run effective life cycles, but it is organizational discipline and maturity that leads to successful life cycles, not SLM products in and of themselves.

- **Runtime management fosters API user satisfaction and efficient API break-fix.** The most valuable API is useless — or worse — when it's not running. Even if it is running, slow response times can create dissatisfaction and impair an organization's reputation among its API user community — and among the organization's customers that are served through API users' applications. The best SOA management products and application performance management (APM) products provide deep visibility into complex implementations behind an API, enabling early warning of potential service-level degradation and, more importantly, pinpointing which of the multiple runtime elements behind the API is the root cause of an issue. The result? APIs perform better for users, and the organization's developers can fix problems more quickly when they occur.

Besides these three key elements for managing APIs, a complete enterprise API platform will include other elements that are not centered on management disciplines. These may include service design and development tools, service testing tools, business logic platforms (e.g., off-the-shelf applications [whether on-premises or SaaS], custom legacy applications, new code running on an application server), application gateways (some API management products embed a full gateway; others have a limited gateway), enterprise service buses (ESBs), integration servers, data virtualization, and more.[8]

Figure 1 Comprehensive Management Of APIs Combines Three Distinct Management Domains



115845 Source: Forrester Research, Inc.

SLM Is First A Process Discipline And Then A Product Category

Forrester talks with many for whom the phrase "life-cycle management" conjures up images of heavyweight processes and heavy-handed governance, when all it really *should* mean is that processes, roles, responsibilities, and checkpoints — of whatever weight — are well understood and consistently performed. Who wouldn't want that? On the other hand, as a product category, SOA SLM has had a checkered past, in that:

- **SOA SLM is successful for organizations with process discipline . . .** Across vertical industries as diverse as telcos, financial services, healthcare, travel services, defense, education, retail, and more, Forrester has talked to organizations that are very satisfied with the results they've achieved with SOA SLM products. By and large, however, they either had good life-cycle discipline and maturity going in or made a concerted effort to develop such discipline as part of their SLM deployment.

- **. . . but many with no process discipline failed in trying to implement SOA SLM.** By contrast, when Forrester talks to users that are dissatisfied with SOA SLM, it is invariably the case that they expected the product to create discipline that they never had and had never seriously tried to develop. Thus, the processes these organizations populate into SOA SLM are untested, overly optimistic, and don't work. In the end, not only do they fail to benefit from SLM, but also people typically blame the product for the failure rather than the true cause: lack of organizational maturity and process competence.

Across multiple stakeholders, SLM products — such as those from SOA Software and Software AG, the Leaders in the most recent Forrester Wave — can smoothly coordinate key steps in the API life cycle, such as the decision to make or modify a given API, agreement on an API's interface design (a critical foundation for API user satisfaction), and validation of security and performance.[9] SLM can foster close monitoring and management of delivery process durations and delays. Through integration with other products, SLM can manage the artifacts that make up an API's implementation and can even foster push-button deployment to production servers (cloud or on-premises).

Success with SLM starts before the product is bought, with process discipline. Process discipline begins with examining one's API life cycle and identifying the decisions and activities that are most important to ensure overall success with one's API initiative. Next is deciding, as an organization, that these process steps will be monitored and measured to ensure that they happen and to provide a foundation for continuous improvement. Process tracking may be done informally — and this is often the best way to start. But as an organization develops process discipline, SLM products can help make the API life cycle stronger through automation, feedback loops, and better management of API artifacts and assets.[10]

Runtime Management Connects The Dots Across Many Runtime Elements Of APIs

If an API is not running properly, it can quickly create dissatisfaction and angst among API users. All that API users know is that responses to API calls are coming back slowly — or not at all. In the same way, this is all that API management products know, since they touch only API requests and responses. But this is not enough visibility for an API provider to be able to find the root cause of a problem because:

- **Many runtime elements can affect an API's performance and availability.** After an incoming API request first touches an API provider's infrastructure, many different applications and infrastructure components may affect whether and when the API user receives a response. Although it will vary according to the needs and functionality of any given API, this may include an API management product or application gateway, a web server, multiple application servers (e.g., Tomcat, Node.js, .NET), an ESB or integration server, multiple on-premises or SaaS applications, a data virtualization product, a database server, and more. A slowdown or failure with any of these can cause problems for API users.

- **Individual elements may be running fine, even though the API as a whole is not.** It is possible for there to be a problem with the API but for isolated monitoring to show no problems with any of the individual servers and piece parts of an API's implementation. Perhaps the connection between two elements is broken. Maybe every element is running slowly but still within its specified response time threshold, yet the sum total of all of the slow responses places the API's response time outside of its specified threshold. What's needed is to go beyond piecemeal monitoring to achieve a holistic view across all of the piece parts.

- **Pinpointing the root cause reduces time to repair and cost of repair.** With a holistic view that shows connections, availability, and response times across an API's full implementation, it becomes possible to pinpoint which of the piece parts is the root cause of a slowdown or failure. This allows the production support team, as described by a telecom firm that Forrester spoke with, to call three break-fix staff in the middle of the night, rather than 20, and for the problem to be identified and fixed in a couple of hours, rather than 6 to 8 hours.

- **Early warning of developing problems prevents outages in the first place.** Beyond faster and more efficient break-fix, the deeper visibility of service management tooling enables developing problems to be identified and fixed before anything breaks. And more importantly, fixes occur before API users — or public API monitoring services like API metrics — notice that anything is wrong.

Historically, SOA management products have been the best source for runtime service management functionality, with the consistent Forrester Wave Leader being Aurea's Actional (previously owned by Progress Software) and its OEMed version from Software AG (webMethods Insight).[11] Because they are designed around service request flows, service policies, and patterns and technologies for service implementation (e.g., REST, SOAP), SOA management products remain a strong choice for runtime management with API services. As an alternative, application performance management (APM) products with built-in business transaction monitoring/management (BTM) features are also a strong possibility.[12]

RECOMMENDATIONS

USE BUSINESS OBJECTIVES TO DRIVE PRIORITIES FOR MANAGING APIS

Although comprehensive management of APIs consists of managing user-provider relationships, runtime operations, and the API life cycle, an individual organization may find it appropriate to evolve toward this one step at a time. Business objectives for APIs — combined with an organization's maturity in regard to service-based development and infrastructure — are the key drivers of one's incremental path. Key considerations include:

- **To build large ecosystems around your organization, use API management to woo API users.** Open web APIs are the category that most requires an API management product, since one is typically trying to build compelling mindshare and a broad ecosystem. This means that one must quickly reach large numbers of API users, build a community among them, and foster community-based support. Large B2B communities will also drive a higher priority for API management, but for small B2B communities, less formal support approaches may be enough.

  API management may well help with internal APIs, but there is a similar danger here as with SOA SLM: Don't think that tossing some new technology into the mix will suddenly get your developers to use APIs when, where, and how they are supposed to. Organizational maturity and discipline is every bit as important to a successful internal API initiative as it has always been for SOA.

- **To deliver rock-solid mission-critical processes, prioritize runtime service management.** If slowdown or failure of one's APIs will have critical business impact, runtime service management will be of high priority. If not, then implementation complexity drives priority. With simple API implementations, it's easy, relatively speaking, to identify where things are going wrong, and runtime management will be of lesser value and lower priority. On the other hand, most enterprises have many application silos — and more being added in the form of SaaS-based point solutions — and this complexity often finds its way into API implementations. Whether because of siloed applications or other reasons for multiple runtime elements, the higher the importance of rock-solid API operations is and the more moving parts there are behind one's APIs, the higher the value of and priority for runtime management become.

- **To foster time-to-market, build rapid disciplined processes and automate them with SLM.** For organizations that do not have process maturity and discipline, the answer to whether to buy SLM is easy: Don't — it will only waste money. First, get API delivery processes set and get a strong start on fixing the discipline problem, and then the value and applicability for SLM will be clearer.

  For those that have good processes and organizational maturity, the question becomes: How many roles and staff members does one's API initiative touch? For small focused teams with targeted sets of APIs, few internal API users and stakeholders, and little need for API design collaboration outside of the team, SLM will have low value and priority. However, most enterprises will have larger multifaceted API initiatives, and the value of SLM will be high. But API management and runtime management will tend to have higher priority when external APIs — and thus external stakeholders — are involved.

ENDNOTES

[1] Empowered customers are disrupting every industry; competitive barriers like manufacturing strength, distribution power, and information mastery no longer create competitive advantage. In this age of the customer, the only sustainable competitive advantage is knowledge of and engagement with customers. The successful companies will be customer-obsessed, like Amazon.com, Macy's, and salesforce.com. See the October 10, 2013, "Competitive Strategy In The Age Of The Customer" report.

[2] Today's rush to reach customers on their smartphones and tablets is just the beginning of an explosion of software-fueled digital touchpoints. Smartphones, tablets, eReaders, games, smart TV, goggles . . . there's no end in sight. Each touchpoint represents a distinct opportunity to engage, service, and support customers but cannot be an island. Customers expect a unified, consistent experience across the several touchpoints they use when engaging your firm. See the August 22, 2012, "Unify The Digital Experience Across Touchpoints" report.

[3] Years of Forrester data confirm the strong relationship between the quality of a firm's customer experience (CX) and loyalty. We built three simple models to estimate the impact customer experience has on three loyalty measures: willingness to consider the company for another purchase, likelihood to switch business, and likelihood to recommend. See the June 10, 2013, "The Business Impact Of Customer Experience, 2013" report.

[4] When designed well, APIs for the open Web create a wide range of business opportunity. The problem that AD&D professionals must solve — what does "well-designed" mean? — applies not only to open web APIs but also to B2B APIs, internal APIs, and product APIs. The answer starts with clear consideration of each API's business context and intent and then moves on to API functionality, technology, and future agility. See the June 11, 2013, "Establish Your API Design Strategy" report.

[5] Beyond service consistency, R's unified APIs foster controlled, monitored, continuously improved provision processes based on analytics derived from BPM and new channels for customer engagement, such as enabling tablet-based sales teams to meet and sell to prospects on the street. See the December 19, 2013, "Digital Business Design Improves Efficiency And Insight" report.

[6] By putting business design at the center of their integration strategies and API designs, O2 Ireland and ING Vysya Bank have opened up new markets and changed competitive dynamics. See the December 19, 2013, "Digital Business Design Sharpens Organizations' Competitive Posture" report.

[7] In Forrester's 15-criteria evaluation of API management platform vendors, Layer 7 and WSO2 — and their solutions — rose to the top, followed by Intel, Mashery, IBM, Vordel, and 3scale. None of the vendors we examined fielded a complete solution across all the subsystems, security models, service integrations, and form factors required, but that's not surprising in an emerging market. In fact, newly emerging standards and evolution of modern application architectures will keep this market in flux for the foreseeable future. See the February 5, 2013, "The Forrester Wave™: API Management Platforms, Q1 2013" report.

[8] APIs and SOA both need — and can share — strong service platforms. See the May 14, 2008, "Defining Your SOA Platform Strategy" report and see the May 16, 2008, "How To Build Your SOA Platform" report.

[9] In Forrester's 55-criteria evaluation of SOA SLM vendors, we found that Software AG and SOA Software lead the pack. Software AG has a strong strategy and consistently good functionality, with particular strength in its core repository. SOA Software has the strongest functionality and average scores on strategy;

its particular strengths are in its core repository, policy management, support for life-cycle management processes, and integration features. IBM, Oracle, HP, and WSO2 are Strong Performers with individual areas of relative strength. See the January 6, 2012, "The Forrester Wave™: SOA Service Life-Cycle Management, Q1 2012" report.

[10] Effective strategies for SOA and APIs require maturity on multiple fronts. Forrester's model of eight central maturity areas — ranging from portfolio management and design strategies to development life cycles and funding — provides a foundation for technology leaders to evolve their organizations' SOA and API strategies toward greater business agility and value for money. See the September 5, 2013, "Drive Business Agility And Value By Increasing Your API And SOA Maturity" report.

[11] In Forrester's 51-criteria evaluation of standalone SOA management solution vendors, we found that Progress Software leads the pack with its broad and deep functionality across the board. IBM and SOA Software are strong in core SOA management and trust enablement; SOA Software is also strong in policy management. Managed Methods is good in core management and trust enablement and is the clear low-cost provider. WSO2 and Tibco Software scored lower on core SOA management than the others. See the December 2, 2011, "The Forrester Wave™: Standalone SOA Management Solutions, Q4 2011" report.

[12] The Forrester model for APM encompasses both BTM and older views of APM into a converged solution where these technologies complement each other. Furthermore, traditional system management approaches are also included in the model: Performance issues are unfortunately not limited to specific technologies, and any component that plays a part in the delivery of a business service is a priori a suspect. See the December 7, 2011, "Market Overview: Application Performance Management, Q4 2011" report.

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