GIGAOM RESEARCH

Sector Roadmap: application-management solutions for distributed and cloud environments

Bernd Harzog

a cloud report

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08/22/2014

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Massive and beneficial changes are occurring when it comes to how applications are built, deployed, and run in the cloud. The benefits of these changes include dramatically increased responsiveness to the business (business agility), increased operational flexibility, and reduced operating costs.

Applications development is fundamentally changing in order to be more responsive to business constituents. The most visible parts of this change are the agile development and devops methodologies, which result in the rapid deployment of new functionality into production and the frequent updating of applications in production.

The environments onto which applications are deployed are also undergoing a fundamental change. Virtualized environments offer increased operational agility, which translates into more responsive IT operations organizations. Cloud computing offers the owners of applications a complete outsourced alternative to internal data center execution environments. IT organizations are in turn responding to public cloud with IT-as-a-service initiatives.

Taken together these changes replace a monolithic, dedicated applications environment that did not change very quickly, with rapidly changing applications running on dynamic, distributed, and cloud based environments. The combination of these changes at the application layer and the changes at the infrastructure layer create new imperatives for users and vendors of application performance management solutions.

Key highlights from this Sector Roadmap^{TM} include:

- For organizations building and supporting rapidly changing applications in production, APM is now an imperative. Application management (APM) solutions should be deployed against every instance of every application that automates any portion of a business critical process.

- Users of APM solutions must learn to evaluate APM solutions differently than in the past. Trusting the legacy vendor of infrastructure management tools to have an acceptable APM solution is no longer either the optimal or an acceptable strategy.

- Vendors must address a range of new requirements, including new languages, ease of deployment, ease of operation in production, the ability to trace transactions across distributed systems, mapping of application topology, and monitoring of actual end user experience.
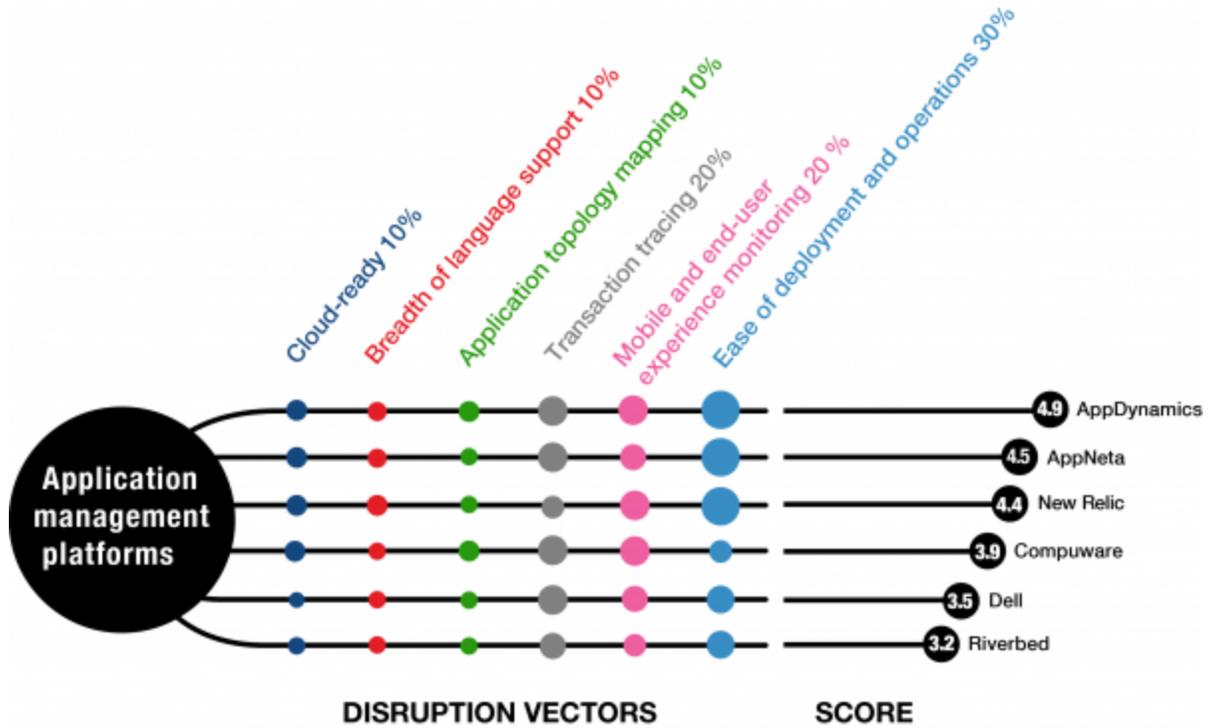
Key:

- Number indicates companies' relative strength across all vectors
- Size of ball indicates companies' relative strength along individual vector

The history of APM

APM got its start in 1998 when Lew Cirne founded Wily Technology, the first vendor that was able to monitor custom Java applications running on J2EE application servers like WebLogic and WebSphere in production. Wily grew into a very successful company and was acquired by CA in 2006. In the same time period, IBM, HP, BMC, and Compuware all made acquisitions of Java application monitoring solutions and the business of monitoring J2EE application servers became a "big company" business with APM often included in enterprise license agreements that covered managements suites that addresses the entire IT estate at enterprises.

Just when everyone thought that APM was an issue destined to be settled with incremental improvements by the large systems management vendors, Bernd Greifendender founded dynaTrace in 2005. Initially based in Linz, Austria, dynaTrace pioneered the concept of tracing individual transactions through mesh networks of Java servers. This innovation arrived just in time to capture the rise of service oriented architectures which was the first of many dynamics that caused large and monolithic applications to be broken apart into highly distributed systems. dynaTrace was acquired by Compuware in 2011.

In 2008 Lew Cirne started his second APM company, New Relic. New Relic brought three innovations to the table. New Relic was the first APM solution to be delivered as a service or via SaaS. This made New Relic into the easiest to deploy APM solution on the market as New Relic hosted the back end for all of its customers. New Relic was also the first vendor to support a language other than Java and .NET, with its support for Ruby. Finally New Relic was the first APM vendor to go to market through cloud vendors, offering its product as an add on to cloud services from Ruby PaaS vendors like Engine Yard and Heroku.

Also in 2008, Jyoti Bansal, the former VP of Development for Wily, founded AppDynamics. AppDynamics brought several innovations to the table including the ability to quickly deploy in production with minimum impacts upon resources, the ability to automatically detect and trace transactions across distributed infrastructures and the offering of the product as both an on-premise solution and a host SaaS solution.

In summary, over the last 10 years, APM has been transformed from a solved problem dominated by slow moving legacy vendors to a rapidly growing market characterized by a host of new challenges and solutions.

New challenges for APM

Existing APM solutions were built around a set of assumptions that are in many cases no longer true today. These solutions assumed that the application would be built or bought and then run inside of the firewalls of the enterprise data center. They assumed that applications would be built in Java or .NET — the dominant environments used by developers for a long time. It was assumed that the average application would only be enhanced one or at most twice a year. As a new wave of innovation began to address both how to build applications and how to deploy them, such assumptions turned out to be no longer valid.

The proliferation of applications

The increasing and unlimited demand for new application functionality along with an ever-growing backlog of unaddressed application development and enhancement requests in enterprises of all sizes has resulted in the need for increased developer team efficiency. Organizations have responded to this issue in various ways: Many have adopted new tools that allow for applications to be built more quickly. Others (either officially or unofficially) have sanctioned or tolerated "user-developed" or "departmental" applications. The bottom line is that when the business area of a company needs application functionality and cannot get it from the central IT development organization due to backlogs and priorities, that department builds it with whatever tools happen to match the skill sets on hand. This has led to an astounding proliferation of applications within enterprises worldwide, with many enterprises reporting that they now have 1,500 to 2,000 applications considered business critical.

Agile development and devops

The unrelenting pressure to deliver more application functionality in less time has given rise to other important trends: Agile development as a development methodology and devops as a methodology for managing applications in production.

Agile development focuses on making one developer responsible for each component of an application system and then having those developers work as a self-coordinating team to deliver new functionality into production on regular and short time intervals (every week, two weeks, or at most a month). Devops is about eliminating the walls between application development and production application support, essentially creating one team that builds the application and supports it in production.

The combination of agile development and devops creates a set of requirements that first-generation APM tools cannot meet. These tools simply have too much administrative

overhead and are too costly to be able to keep up with the pace of change in such environments.

Lower-cost and open-source platforms

The continued improvements in the price and performance of commodity Intel-based servers along with the emergence of lower-cost open-source alternative application platforms like Linux, JBoss Application Server, VMware vFabric, and Apache Tomcat means that it is now much less expensive to have large numbers of "smaller" commodity servers than it is to have a small number of high-end servers that maximize CPU count and memory size. Since enterprises are now spending less on the application server tier, traditional pricing models of the first generation APM vendors under pressure.

Scaled-out (not up) deployment models

Agile development has led to the modularization of applications and the continuous delivery of new functionality into production. The economics of commodity hardware and open-source application platforms have made it inexpensive to scale server farms out, not up. The combination of modularized software and scaled-out deployment models means that we now have rapidly changing application systems that run on hundreds, and in some cases thousands, of scaled-out servers instead of just a few very large and expensive boxes. This creates another requirement that the first generation of APM tools are not designed to address because they cannot deal with application systems comprised of hundreds or thousands of servers. Nor are they priced and sold in a manner that makes their purchase feasible for this type of deployment scenario.

Distributed (cloud) deployment models

Modern deployment environments now consist of distributed data centers, private cloud, hybrid clouds, and public clouds.

The traditional method for deploying APM was to install the management system for the APM solution in the same internal data center as the one where the application was installed. This deployment model was assumed by the early APM vendors, and so they built their communications architecture around the back-end management systems polling the agents in the JVMs.

However, once applications are distributed across different data centers or into clouds such an approach no longer works, since communication networks (open ports) are generally not set up to allow remote polling into distributed data centers or clouds.

This requires modern APM solutions to work no matter where the application is running (and therefore where the agent is installed), and where the back end for the APM is installed. This in turn requires that agents use outbound communications techniques over commonly open ports like 80 and 443 to call into the back end.

The proliferation of tools, platforms, and languages

Whereas first generation APM tools did a great job for Java and .NET applications running on a small number of servers deployed inside of an enterprise's network, that is not the world we live in today.

Today we live in a world of tremendous diversification of platforms, tools, and languages. Not long ago it was a world characterized by HTML, Java, and .NET. We now not only have these languages but others, including Ruby on Rails, PHP, Python, Node-JS (JavaScript on servers), and even emerging languages like Scala and Go. In short, it is clear that the pressure to build new application functionality and rapidly enhance existing applications will not abate and will in fact continue to increase over time, driving the continuous evolution of new tools, platforms and languages that keep pace with this need.

Opaque clouds

Most cloud providers use network and systems monitoring products to monitor the performance of their own infrastructure. However, little of this data is made available to the customer of the cloud. Even if the customer of the cloud uses a cloud-aware APM solution, the root cause analysis for problems can be very difficult to find due to a lack of visibility into the performance of the underlying cloud infrastructure. This puts pressure on APM vendors to delve into the question of how much a transaction's round-trip response time is spent in the cloud infrastructure versus in the application and its application run time. This will be an emerging area of focus for the APM industry, as no vendor does a good job of this today.

Managing elasticity

Many cloud providers offer managed services that automatically provide computing resources as needed to allow for traffic bursts. This is certainly one of the key benefits of cloud computing: capacity when it is needed, automatically. Ensuring the performance of business-critical applications however, remains the responsibility of application owners. The rise of the public cloud has therefore created the need for an APM solution that can work seamlessly in an out-of-the box manner for applications that are distributed across servers running inside of the enterprise network and servers running in various public clouds. The rise of cloud bursting or the ability to dynamically add instances of an application as load increases creates the need for an APM solution that can dynamically

and automatically recognize and start monitoring new instances of applications as they are instantiated, no matter where they are located.

Methodology

For our analysis, we have identified and assessed the relative importance of six Disruption Vectors. These are the key technologies and market forces in which players will strive to gain advantage in the sector. Tech buyers can also use the Disruption Vector analysis to aid them in picking products that best suit their own situation.

The section below features a visualization of the relative importance of each of the key Disruption Vectors that Gigaom Research has identified for APM platforms. We have weighted the Disruption Vectors in terms of their relative importance to one another.

Gigaom Research's analysis process also assigns a 1 to 5 score to each company we looked at closely for each vector. The combination of those scores and the relative weighting and importance of the vectors drives the company index across all vectors. That produces the Sector RoadMap chart in the company-analysis section.

APM disruption vectors

The six criteria listed below constitute our requirements for leading edge APM vendors that are innovating and disrupting the APM industry:

- Ease of deployment and operations

- Mobile and end-user experience monitoring

- Transaction tracing

- Application topology mapping

- Breadth of language support

- Cloud-ready
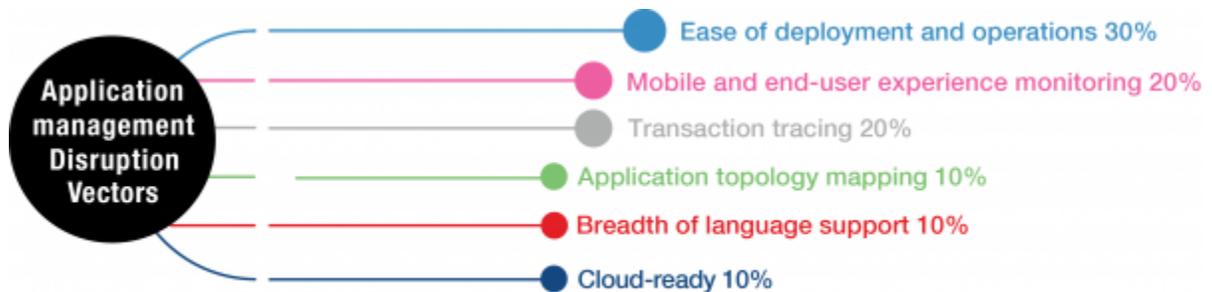
Ease of deployment and operations

APM solutions in dynamic and cloud-based environments need to work out of the box with as close to zero initial configuration as possible, and with no ongoing configuration required as applications either change or are replaced by new ones. The environment is simply too dynamic and potentially distributed for approaches that require heavy configuration and customization to work. This is one of the areas that differentiates legacy APM solutions from modern APM solutions. Legacy APM solutions all required heavy initial and ongoing services from the vendor in order to configure and maintain the solution. Modern APM solutions can be put into production with no configuration and can automatically adjust to the application as it is rapidly evolved through agile and devops techniques.

Mobile and end-user experience monitoring

Historically, IT managers and application support teams would assume responsibility for the application system up to the edge of the environment controlled by the enterprise. What occured in the network between the user and the enterprise and on the user's workstation or device was deemed out of their control.

Two things have changed this view: The first is that for many applications the experience of the actual end user determines the effectiveness of (and therefore in many cases the revenue from) the application. So in order for the application to function correctly the end user of the application needed a good experience. In order to ensure this, measurement of applications performance now needs to extend out to the end user's device.

The second is that smartphones are now the fastest-growing and most widely deployed computing device in the history of the computing industry and are now used by over 50 percent of internet users in the world. For such reasons, APM has had to assume responsibility for the performance of the smartphone applications, the end-to-end response time of mobile transactions, and the complete mobile end user experience.

Transaction tracing

For certain types of very performance-critical applications it is essential that the APM tool has the ability to trace individual transactions from their arrival at the edge of the application system through the tiers of the application system to the database and back. This capability should exist across the diverse set of middleware and operating environments that typically comprise these kinds of applications. This capability is therefore usually traded off against the depth of the diagnostics into the code, as the breadth of platforms that need to be supported for transaction tracing make it impossible to provide code diagnostics for all of these platforms.

Application toplology mapping

Two factors drive the need for automatic discovery of applications and their topology: The first is that new applications can be automatically instantiated by IT as a service initiatives, and monitoring needs to just automatically start working for these applications as they come up. The second is that the topology of the application (what runs where) can undergo automatic and arbitrary changes, and the APM solution just needs to adapt to these changes as they occur.

Breadth of language support

We have gone from an application-development language landscape with two primary languages — Java and .NET — to one that includes Ruby, Python, PHP, and Node-JS. Since the pressure to build more software in less time with less skilled (and therefore less-expensive) developers is inexorable, the innovation on the language front will continue.

There are therefore two aspects to the language support from an APM vendor. The first is whether or not the candidate vendor supports the language(s) used today, or that companies plan to use tomorrow. The second is knowing whether the vendor has a track record of quickly adding support for new languages as they become viable, so that an organization can stay on the leading edge of developer innovation and application development cycle time.

Cloud-ready

We are entering a world where applications can run anywhere and be automatically instantiated from a service catalog with no involvement of IT. This means that APM solutions must either be provisioned along with the application (for example by automatically putting a Java or .NET agent into the application when the application is provisioned), or that APM solutions need to find and identify applications automatically as they appear on the network. APM solutions must also be cloud-ready in the sense that if the agent monitoring an instance of an application is in a public cloud it must be able to "phone home" and traverse firewalls to get back to its management system in the enterprise without requiring a VPN or firewall work.

Additional forces to consider

In-depth code analysis. The ability to trace the execution of code in production and to measure the time spent in individual objects, methods, and database calls is a foundational capability of APM. If the APM product under consideration does not offer this capability for the languages in which applications are developed, then that solution is not an APM solution and should not be considered for an APM use case.

Automatic and dynamic baselining. In a world of many new and changing applications there will be no time to manually set thresholds for anything but a few top-level metrics like response time. Therefore a part of self- or zero-configuration is the ability of the APM solution to set baselines for underlying resource utilization and load metrics and for these baselines to automatically change over time as the usage patterns of the application changes.

Resource utilization cross-correlation. There are two high-level causes of issues with application performance: issues in the application itself and issues in the infrastructure that supports the application. In the case of infrastructure-related issues it is important for the APM solution to collect resource utilization information from the infrastructure and to cross-correlate this information with degradations in response time.

Configuration changing cross-correlation. As in the case directly above, it is very often the case that when a problem in the infrastructure is impacting the performance of applications, the root cause of the problem is an inappropriate change in the configuration of the environment. APM tools should therefore integrate with modern deployment management tools to be able to detect the impact of changes upon performance.

Company analysis

The vendors profiled below are the new vendors disrupting the APM market in response to emerging new market requirements.
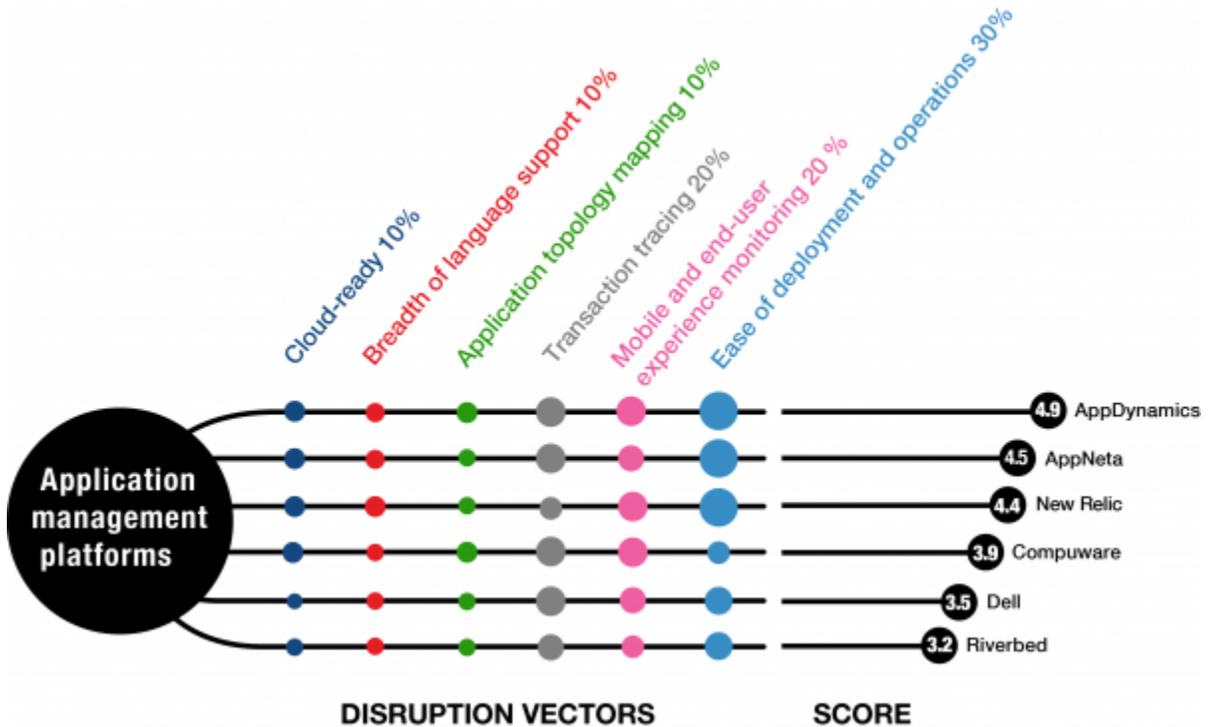
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AppDynamics

AppDynamics was founded on two simple but extremely valuable innovations. First is the ability to put the AppDynamics agents into production with zero configuration and have the solution simply work out of the box. This was in direct contrast to the legacy solutions from IBM, HP, and CA, which required considerable tweaking in order to properly balance the depth of the monitoring with the required resources.

The second innovation is the focus on automatically discovering business transactions, which means that AppDynamics monitors an entire application system and all of its transactions, not just a JVM. The ability to automatically discover new transactions and adapt to changing transactions remains a highly differentiated feature for AppDynamics. The perspective shift from the infrastructure to application enables users to focus on the only thing that matters: the end-user experience.

AppDynamics has expanded the breadth of functionality of its solution by adding monitoring support for not just browser applications but also iOS and Android mobile applications. By adding agents to support PHP, Node.js, and C++ customers get even deeper visibility into the end-user experience, application and infrastructure performance, and database performance to provide complete application intelligence.

AppNeta

AppNeta unifies full-stack application tracing, comprehensive end user monitoring, and 360-degree network performance insight to assure fast problem resolution and superior a end-user experience via both real-user and synthetic transaction monitoring. AppNeta offers SaaS-delivered performance management solutions across private and public clouds, data center and remote sites to arm development teams, apps ops and IT ops with capabilities to continuously assess, monitor, troubleshoot and remediate mission-critical application service delivery from the end user's perspective.

AppNeta has added support for languages other than Java and .NET (including PHP, Ruby, Python, and Node.js), and offers comprehensive tracing of the complete transaction flow across distributed applications through multiple hosts, from the web server through the application server all the way down to the database tiers. AppNeta is also easy to deploy and easy to manage in production due to its light-weight overhead and long data retention periods (high resolution trace data is available and analyzed in near real-time for over 90 days), and is unique in its ability to combine network performance into the perspective of the performance of custom code in production.

New Relic

New Relic targets application development, devops, and IT operations teams that need detailed visibility into the performance of their production applications without having to go through the effort to procure, install, configure, and manage an on-premise monitoring solution.

New Relic supports applications written in Java, .NET, PHP, Ruby-on-Rails, Python, and Node.js in addition to supporting native mobile apps on iOS and Android. It provides robust monitoring of application response time and throughput, from the application code

to the back end server to the browser. New Relic also offers an Apdex Score, which monitors the satisfaction level of customers as perceived by the end-user experience. The company also provides visibility into application transactions because its instrumentation technology offers an understanding of where problems are occurring in the code and the database calls. The ease of implementation is complemented by a simple server and monthly subscription-pricing model.

New Relic's focus is on new web and mobile applications that are frequently built and deployed in the cloud. By virtue of its numerous partnerships with cloud vendors, New Relic is offered as an option in the checkout process for cloud services. This has led to a rapidly growing user base, which includes many SMB customers, and also a rapidly growing segment of large and global enterprise customers, giving New Relic more customers and more installed agents than the rest of the APM industry combined.

Compuware

In 2005, Compuware entered the APM business with the acquisition of Adlex, a network-based application and end-user monitoring solution that strengthened its growing network and systems management portfolio. Then in 2009, Compuware augmented its APM business with the acquisition of Gomez, a platform for generating synthetic transactions against web, non-web, mobile, streaming, and cloud applications, including enterprise applications accessed by employees, ecommerce web sites visited by customers, and applications running on mobile devices.

Most recently, in 2011, Compuware acquired dynaTrace, the APM vendor that invented and brought to market the breakthrough ability to trace transactions across mesh networks of Java and .NET virtual machines. Over time dynaTrace's ability to trace transactions was extended into the browser and the mobile device at the end-user tier, and into enterprise middleware like Tuxedo, IBM Message Queues, and CICS transaction regions.

Today Compuware offers a comprehensive suite of active (synthetic-transaction based) and passive (agent-based and probe-based instrumentation) APM solutions. Compuware continues to introduce support for new application workloads, including recently added support for mobile (iOS8, Swift), big data (NoSQL, Hadoop, MapReduce), new languages (PHP, Nginx, Node.js), and clouds (Microsoft Azure, Amazon AWS, Rackspace, and Red Hat OpenShift).

Dell

Dell Foglight is the APM product that also includes Foglight for Virtualization, Foglight for Storage, and Foglight for Databases. It is important to note that unlike many product families all three of these products are built from the same codebase using the same

development framework, and are tightly integrated with one another should the customer choose to purchase more than one of them.

Foglight APM deeply monitors J2EE and .Net applications servers as well as the real user experience, allowing for visibility into the transaction layer of web-based application systems from the browser through the infrastructure. The real user-experience monitoring is unique in that it captures both performance and content that allows for a visual replay of what the user saw in their browser. Full transaction tracing was added to the product in 2013, and a SaaS delivered version was recently added, as well.

Foglight APM is a particularly good choice if you own your own storage and have your own virtualized data center running VMware's vSphere or Microsoft's Hyper-V, and you are running custom-developed applications written to Java or .NET in the virtualized operating systems in your virtualized data center. The combination of Foglight APM, Foglight for Virtualization, Foglight for Storage, and Foglight for Databases is the only solution on the market that can diagnose application-related performance issues, virtualization-related performance issues, storage-related performance issues, and database-related performance issues in one product.

Riverbed

In 2012, Riverbed acquired OpNet, a vendor of application performance and network performance management solutions. The OpNet APM solution has been rebranded SteelCenter AppInternals. Riverbed SteelCentral AppInternals is comprehensive APM designed for production environments, and provides deep visibility into the performance of complex, multi-tier applications. It provides applications teams with a complete picture of what they need to quickly and collaboratively identify, troubleshoot, and debug application performance issues. It monitors all transactions from the browser to back-end databases by combining code-level transaction tracing and end-user experience monitoring, fine-grained application component monitoring, and big data-driven performance analytics.

AppInternals enables application teams to understand and manage real user experience from the browser click through the web- and application-tiers, to the database, and back for all users and all transactions, around the clock. It does so by using lightweight JavaScript agents that monitor the real user experience from the browser, and through advanced, low-overhead, and always-on transaction tracing to provide always on transaction tracing for deep visibility into application code as it executes.

This generates a complete picture of a transaction's path and its performance across each tier for immediate and historical analysis.

AppInternals monitors custom Java and .NET applications and also enables monitoring of hundreds of third party and custom applications, including popular commercial offerings such as Oracle E-Business, and others.

Other APM solutions

IBM. In Feb 2014, IBM launched a newly redesigned performance-management SaaS offering that provides a new unified platform for APM, code-level deep dive, and infrastructure-performance management with integrated IT operations analytics. This new platform supports modern programming languages like Ruby, Python, node.js, and PHP. It also provides code-level deep dive of .Net and Ruby, in addition to JAVA. It is compatible with agents deployed using older IBM APM products and supports hybrid deployment. IBM's APM solution is also available for the monitoring of IBM PaaS Bluemix-built applications. IBM acquired Cyanea in 2004. The resulting product was IBM Tivoli ITCAM, which was then IBM's Java deep-dive code-monitoring solution. Customers using ITCAM in production should look to move up to the modern solutions from IBM — the SmartCloud APM, for example — for on premise and APM SaaS for cloud consumption.

BMC. In 2011 BMC acquired Coradiant, a vendor of an HTTP monitoring appliance that collected data from physical mirror ports on switches and did deep packet analysis to measure the response time and error rates of HTTP based web applications.

Following the acquisition of Coradiant, BMC replaced a solution that was resold from AppDynamics with an internally developed solution: BMC Application Diagnostics. The two solutions were then delivered in a single console. BMC sells both products in an on-premise and SaaS delivery model.

Application Diagnostics currently supports only Java and .NET applications and does not have the robust feature set to compete with the modern disruptive vendors profiled in this report.

BMC has recently been taken private which has led to new leadership and a new strategy for this space. This strategy emphasizes the need for Application Performance Management for every function including IT Operations in an attempt to break down silos that exist between traditional monitoring and APM.

CA. CA gained its foothold in the APM space with its acquisition of Wily in 2006, which specialized in root-cause analysis and robust diagnostics. Today, CA has expanded this capability by capturing real-user sessions to understand end-user-experience with the apps, and tying that knowledge back to their diagnostics functionality. Additionally, Application Behavior Analytics (ABA) embeds statistical learning that spots unusual

behavior as it emerges, so APM practitioners can more proactively address application performance issues by gaining insight from all the metrics APM collects.

CA APM has traditionally been focused on serving the needs of large-scale Java or .Net enterprise accounts. But as new scripting languages and platforms emerged in an era of mobile apps and cloud services, CA needed to respond to the demands of fast application deployment.

In an effort to refocus the APM product set, CA recently formed an APM business unit, led by James Harvey as General Manager (formerly of Taleo, a SaaS startup acquired by Oracle). Over the past 12 months, CA has increased its breadth of language support, added deep transaction tracing, and focused engineering efforts on ease-of-adoption and usability.

HP. HP Diagnostics is an enterprise focused APM solution currently supporting Java, .NET and Python applications. Although the core product architecture was established in 2005, HP has evolved the product to support dynamic cloud workloads including AWS, Azure and CloudFoundry. HP's traditional strength has been in the enterprise space with built-in enterprise integrations and scalability.

In early 2014, HP launched AppPulse, a new brand for a next generation suite of self-service, SaaS-based APM offerings. The first AppPulse product provides synthetic transaction monitoring, deep application diagnostics and self-learning predictive analytics. AppPulse Mobile entered public beta in June 2014 and offers real user experience monitoring, crash analytics and performance analytics for iOS and Android mobile apps. HP's new offerings are based a modern big data analytics architecture, leveraging HP Vertica Database technology.

HP is therefore unique among the big four legacy vendors as having proven that it can organically develop a new performance management solution targeted at the new requirements of the performance management market, and delivered in a modern SaaS manner.

Key takeaways

APM has been transformed from a legacy management software business to a vibrant market characterized by a host of new challenges and a host of new vendors offering breakthrough new solutions to these challenges. For any organization that is developing and supporting a custom application in production that supports revenue generation or a critical business process the following approach to APM is recommended:

- First generation APM solutions were so difficult and expensive to implement that most organizations chose to only implement them against a very few absolutely critical applications. Modern APM solutions, like those from the disruptive vendors profiled in this report, are much easier to implement and much more affordable.

- Organizations should instrument every application that supports a business critical process with an APM solution, and implement that APM solution on every server, desktop, laptop, and mobile device covered by the applications in question.

- APM is not just for the developers who created the application and for the team that supports the application in production. APM creates the metrics by which the business can understand the relationship between application performance (response time) and business performance (revenue per minute). Therefore the summary performance metrics from an APM solution should be provided to the application owners and business owners whose business objectives are affected by application performance.

- Agile Development, DevOps as a support methodology, distributed and virtualized data centers, and public clouds combine to create an environment characterized by rapidly changing applications running on dynamic, distributed, and cloud based infrastructure. The only way to measure and understand the performance of an application that is distributed across these environments or is being migrated across these environments is to measure its performance with an agent embedded in the application that travels with the application. APM is therefore essential to being able to understand application performance for all modern applications deployed on all modern infrastructures.

- In the not too distant future lies the prospect for infrastructure that automatically adapts to the needs of the applications running on the infrastructure, while guaranteeing that service levels measured in response time and throughput are met. However, it will only be possible to achieve this level of automated service assurance if every instance of every application that matters is instrumented for response time and throughput by an APM solution that can collect these metrics for every application and transaction of interest.

About Bernd Harzog

Bernd Harzog is an Analyst for Gigaom Research and at The Virtualization Practice for Performance and Capacity Management and IT as a Service. At The Virtualization Practice Bernd writes extensively about the new performance management challenges at the infrastructure and application layers, and how emerging vendors are addressing these challenges.

Bernd is also the CEO and founder of APM Experts a company that provides strategic marketing services to vendors in the virtualization performance management, and application performance management markets.

Prior to these two companies, Bernd was the CEO of RTO Software, the VP Products at Netuitive, a General Manager at Xcellenet, and Research Director for Systems Software at Gartner Group. Bernd has an MBA in Marketing from the University of Chicago.

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