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Research

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Magic Quadrant for Enterprise Application Servers

Yefim V. Natis, Massimo Pezzini, Kimihiko Iijima

Foundational EAS technology is evolving to meet the challenges of constant innovation in business software. Service-oriented architecture, extreme transaction processing, cloud computing, metadata encoding of business logic, open source and event-driven architecture are the key drivers of change.

Click here to read about Caucho as a Visionary leader in the Gartner analyst report.

Click here for Gartner's definition of Visionaries in the EAS Magic Quadrant.

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WHAT YOU NEED TO KNOW

An application server is system software that acts as a container for applications' business logic. It is a form of middleware — or, more specifically, platform middleware. The key function of an application server is to host application software modules developed using the application server's prescribed programming model. The programming models — such as Java Platform, Enterprise Edition (Java EE); Spring Framework, Microsoft .NET Framework, or Common Object Request Broker Architecture (CORBA) — are used by programmers as frameworks, extending to the basics of the supported programming languages. Some application server programming models are bound into a single language (Java EE), whereas others (.NET Framework and CORBA) enable the use of multiple languages. Some programming models are offered via declarative (graphical) design tools and are encoded for execution or code generation as metadata. Other programming models are offered as libraries of application programming interfaces (APIs) and are compiled into runtime executable modules. An application server product provides the tools for the developer to encode the application business logic and tools for runtime to interpret and execute the encoded application.

At runtime, the application servers manage the optimization of system resources (such as memory and threads) and the connectivity of the application to external resources (including database management systems [DBMSs], networks and other applications). They also provide quality of service (QoS) support (including availability, reliability, security, management, performance and scalability) and enable manageability and the distributed deployment of applications.

Most application servers are also extended with differentiating add-on features — such as batch frameworks, object caching, event management, design tools and process management. Some extensions cross into other technology areas and can make a product labeled an "application server" represent a suite of multiple categories of system software surrounding the central application server core. The reverse is also often true: Products labeled as "other than application servers" (such as portal products, composite application platforms and process execution engines) carry much of an application server's functionality at the core of their offerings.

The prevailing categories of application server architecture (and the corresponding programming models) are the Microsoft-only .NET and the multivendor Java EE (previously known as J2EE). Although these products dominate the mainstream application server market, they compete with such emerging programming models (and platforms) as Spring Framework, PHP, Ruby on Rails, Apex Code, Plain Old Java Object (POJO) and a variety of proprietary frameworks. The application server market, therefore, is not limited to only the Java and .NET options, but incorporates a variety of challenger platform models as well.

Application servers can be offered as products for on-site deployment and use, or their functionality can be offered as a cloud service (as access to the application server technology deployed under the management of a third-party provider or host). The technology can be acquired and embedded in applications or other solutions, or as a separately standing software package. Most application servers are offered packaged, with some development and management capability. Although these are not strictly definitional features of the application server, they are essential for real-world adoption.

Enterprise application servers (EASs) are application servers that are suitable for systematic enterprise-class projects. Application server technology can be used in a variety of scenarios:

- To support "opportunistically oriented" projects — that is, application development that must be carried out very quickly to address a "can't wait" business requirement. These

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projects tend to focus on rapid application development and ease of use over requirements like scalability, availability or manageability (even if those capabilities are required, because often these applications get exposed over the Internet and serve large user constituencies).

- To support "mass market" projects — that is, development of applications that are typically not very complex and are created by IT organizations of small size and modest skills. These projects often serve satellite branches of larger organizations or midsize businesses (large enough to do their own software development, but too small to be equipped for advanced software engineering). Low cost, ease of deployment, support and management, and reliability are favored in users' selection processes over richness of functionality, scalability or performance.
- To support "systematically oriented" projects — that is, development of applications that are business-critical from an enterprise perspective, are of high business impact (if they don't work, revenues or customer satisfaction are negatively impacted), are expected to be in operation for multiple years (three years or more) and provide high QoS. Sophisticated internal functionality and advanced reliability, scalability, security, manageability, performance and dependability are key requirements when selecting application server products for these projects.

Definitionally, EAS vendors rated in this Magic Quadrant focus on the "systematically oriented" projects, and those projects are the primary audience for this research, but many vendors also address the other two scenarios to some degree, either through specific products or through stripped-down packaging of their high-end products.

In 2008, according to "Forecast: Enterprise Software Markets, Worldwide, 2008-2013, 1Q09 Update," the total application server market amounted to $2.5 billion, and EAS was a substantial subset of that total. We expect the application server market to grow at a five-year compound annual growth rate of 5.6%, reaching nearly $3.3 billion in 2013. The competition and innovation in the market will continue to be fueled by the market's size, rates of growth and the broad industry presence of its products in both the core business computing scenarios and leading-edge innovation initiatives.

A Magic Quadrant represents Gartner's judgment of vendors' ability to execute and the completeness of their vision in a technology market (in this case, the EAS market). The Ability to Execute criteria reflect the staying power and record of execution of vendors in the market. The Completeness of Vision criteria reflect vendors' ability to understand market trends, influence them, and follow them with agility and consistency.

Vendors that are strong in their execution and ability to follow and influence the market are labeled "market leaders." The most recent players in the market that have a limited record of execution, and well-executing vendors that are overly cautious on innovation and risk, are less likely to be leaders.

By its nature, a vendor rating process favors comprehensive offerings. A tightly focused product, even if exceptional, will typically not score as well as a comprehensive offering in this analysis. This, in turn, favors the larger vendors, because their extended resources allow them to offer the more-comprehensive collections of functionality, even if not all are best of breed. If your project is looking for a functionally complete EAS product, then you will find the Magic Quadrant to be the most helpful. However, if your search is for some specific subset of capabilities, then the best-fit offering for your project might be under-rated in the Magic Quadrant. Users should apply a considered judgment and understand Gartner evaluation criteria and weights, listed below, to take the best advantage of this research.

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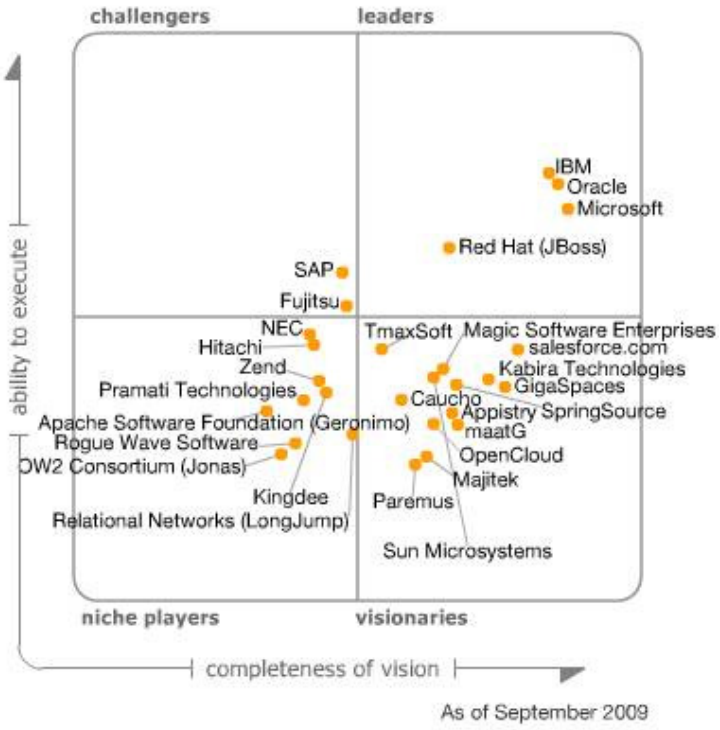
The Magic Quadrant can be seen as an arranged "long list" of vendors for a given market. Devise your own shortlist based on your organization's specific circumstances and requirements. Use this Magic Quadrant as one point of input, not as the sole deciding criterion.

MAGIC QUADRANT

Figure 1. Magic Quadrant for Enterprise Application Servers



Source: Gartner (September 2009)

Market Overview

Users and vendors in the EAS market are driven to support enterprise-class software development projects. These projects often differ broadly in scope and specific requirements, as well as user circumstances. The notion of "enterprise-class" is expanding to incorporate new application patterns as well. These differences lead users to a variety of solutions, and this range of demand supports broad supply options: This is a multibillion-dollar market that has dozens of notable vendors. We rate 28 technology providers in this Magic Quadrant, and we are tracking more, which may be added to future Magic Quadrants.

Users' requirements for products in this market are continuously changing. Formerly optional features (such as support of service-oriented interfaces and interoperability) have become essential, and formerly obscure innovations (such as grid orientation, microkernel-style plug-ins, distributed caching and multitenancy) have become important commercial differentiators. Some features, regulated by standards bodies and available from most competitors (such as basic Web services protocols or representational state transfer [REST] APIs), become near-commodity. Other features remain guarded vendor differentiators (such as extreme transaction processing

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[XTP]-oriented extensions, complex-event processing capabilities or multitenancy). Evaluation criteria for the EAS market change every time we revisit the market to reflect its current state-of-the-art and evolving priorities.

EAS technology is rarely a complete answer to a project's end-to-end requirements. Organizations and projects evaluating an EAS on its own merits are typically looking to assemble a best-of-breed suite of technologies, potentially from multiple vendors, to fulfill the total requirements of a project. This Magic Quadrant is targeted at such best-of-breed initiatives — the evaluation criteria and ratings are designed to model the best-of-breed approach to technology selection. The alternative "one vendor for the entire project" technology selection approach represents a market in its own right, where the EAS is a component among many in the evaluation process. Gartner's project-priority-driven Magic Quadrants (see "Magic Quadrant for Application Infrastructure for New Service-Oriented Business Application Projects, 2Q07" and "Magic Quadrant for Application Infrastructure for SOA Composite Application Projects") examine those markets in a separate research initiative.

In the time since the last publication of the Gartner EAS Magic Quadrant, major market-influencing events and trends included the acquisition by Oracle of BEA Systems — a long-term EAS market leader — the growing requirements for supporting large-scale deployments, the growing interest in cloud computing, the growing mainstream maturity of service-oriented architecture (SOA) and the constrained IT budgets driven by the worldwide economic downturn. These market conditions resulted in further consolidation of market leadership, the departure of some trailing vendors and the arrival of new visionary vendors, especially those pursuing the new cloud-computing opportunities in the EAS market. As is typical in times of economic distress, the largest and most viable vendors have gained market share at the expense of the more-risky innovators, which is reflected in this Magic Quadrant.

Innovation in the market also continues. Cloud computing introduces new requirements to application server technologies, such as multitenancy and horizontal scaling (see "Key Issues for Platform Middleware, 2009"). Some application servers are extended to offer multitenancy and become software as a service (SaaS)/cloud-enabled application servers (SEAP), while others are offered as a services and become (together with bundled development tools) application platforms as a service (APaaSs; see "Introducing SaaS-Enabled Application Platforms: Features, Roles and Futures"). Several vendors in this research offer one or both of these options, although they differ in the models of multitenancy that they support (see Note 1). As enterprise-worthiness of the cloud application platforms increases, we expect additional vendors to qualify as EAS providers, including Google (which now has a beta offering of App Engine with Java Servlet support) and Tibco (which has just introduced its beta of Silver service).

Market Definition/Description

The EAS market is populated by vendors that offer a system software product or service (APaaS) of the following minimal characteristics:

- Offers a "container" implementation for the execution of application software modules (SMs):
  - The container provides a programming model.
  - The container deploys as a long-running server operating system (OS) task (OS "daemon").
  - SMs are programmatically addressable on request remotely through services that are associated with the container.

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    - The container allocates and uses OS resources (memory, threads, tasks) on behalf of the individual SMs, freeing SM code from the necessity of direct interaction with the OS.
    - The container provides resource pooling (database connections and network connections), and the pools are shared by the SMs.
- Supports distributed computing (load balancing and failover via clustering of container instances) or horizontal scaling (grid).
- Provides an API or other means for authentication and authorization for access to the container and software components that the container controls.
- Provides an API or other means for monitoring the status and minimal management (such as start and stop) of the container instance(s).
- Provides an API or other means to access a file system by an SM.
- Provides an API or other means of access to a relational DBMS (RDBMS) by an SM.
- Provides an API or other means of invoking SMs by an SM:
    - Within the same container instance
    - Across like container instances
    - In other unlike container types
- Provides an API or other means to demarcate an atomicity, consistency, isolation, durability (ACID)-style transaction by an SM.

Leading EAS products typically have additional subsystems, such as those for message queuing; publish-and-subscribe messaging; some integration, business process management (BPM) and rules management; and system management, multichannel access, distributed caching and horizontal scaling over a hardware grid. These are important (and many are considered in our ratings), but not definitional.

Advanced application servers enable plug-in replacements of subsystems, cloud-computing features and ultra-high-end XTP features. These, too, are important, but not definitional.

If an application server is offered as a service or is designed to be offered as a service by customers, then an advanced product must have multitenancy and horizontal scaling. However, a traditional EAS, without either of these capabilities, can still be used to deliver an APaaS when multitenancy and horizontal scaling are delegated to the underlying system infrastructure (such as Amazon Elastic Compute Cloud [EC2] with CloudWatch or Windows Azure with Fabric Controller).

Basic application servers (not considered here) are similar products with a lesser set of features (transaction management, external interoperability and other features listed above are not required at all, or are required in reduced configurations).

Inclusion and Exclusion Criteria

A vendor is included in the Gartner EAS Magic Quadrant if it meets the following criteria:

- Offers an EAS product or service (APaaS) that matches the market definition above.

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- The minimal EAS product is delivered by the vendor (the definitional features must be available directly from the vendor as the vendor's own intellectual property or under an OEM agreement; the extended features may be available through partners).
- Product support for the minimal EAS product is available from the company or a partner.
- A major general availability (GA) release or a point GA release of the minimal EAS product had been delivered in the past 12 months, or the vendor has publicly committed to delivering one in the next three months from the Magic Quadrant's publication date.
- Enough information is available to Gartner from the vendor and its customers for the possibility of a fair rating.
- The vendor is proactively marketing EAS technology.

This Magic Quadrant includes two nonprofit open-source organizations (Apache Software Foundation and OW2 Consortium) that do not offer support for their technology projects and are not, technically, vendors, although they are technology providers. To rate these for the EAS market, we must take into account not only the technology of the named organization, but also the available support options. The supporting vendors are not named in the rating (in part, because there are multiple options), but their offerings are still rated and evaluated as essential to the ability of the open-source technology to compete in the commercial EAS market.

Added

- Rogue Wave Software — offers Hydra, a C++/Java/Business Process Execution Language (BPEL) application server that addresses requirements of advanced EAS users.
- Zend — recent technology releases (Zend Server) focus the company on the advanced requirements of the EAS market.
- Relational Networks (LongJump) — a multitenant SEAP is available as a platform product and as a platform service. The company increased its competitive presence in the past 12 months.
- maatG — a multitenant SEAP is available as a platform product. The vendor has increased its market presence in the past 12 months.
- Magic Software Enterprises — its uniPaaS multitenant SEAP is available as a platform product, now focused on enterprise application projects.

Dropped

- BEA Systems — acquired by Oracle.
- Iona Technologies — acquired by Progress, which is not proactively marketing Iona's EAS technology (Orbix).
- jNetX — exited the stand-alone EAS market, focusing the company effort and EAS technology on solutions for the telecom market.
- Micro Focus — exited the general EAS market, refocusing its EAS technology primarily on legacy modernization projects.
- Sybase — withdrew from active competition for new projects in the EAS market.

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- WareLite — minimal presence in the EAS market does not justify inclusion.

We also discontinued coverage of legacy TP monitors (IBM CICS, IBM IMS, IBM TPF, Oracle Tuxedo, TmaxSoft Tmax), because the number of new application initiatives considering these platforms in the EAS context declined. The platforms certainly remain in wide enterprise use, but, in most cases, as platforms of already-established applications, rarely chosen for new project starts.

Evaluation Criteria

Ability to Execute

The fundamental indication of a vendor's ability to execute is its attained industry and market presence and reputation; its record of business and technical execution; and the degree to which it has delivered the essential core functionality expected from a competitive product.

We consider the following product characteristics as fundamental requirements for well-executing vendors, rated under the Product/Service criteria:

- Interoperability and standards compliance
- Product maturity
- Vendor commitment to the product
- Installed base
- Functional completeness
- Functional depth and power
- Platform coverage (including cloud platforms)
- Breadth of add-ons and applications

Table 1. Ability to Execute Evaluation Criteria

Evaluation Criteria	Weighting
Product/Service	high
Overall Viability (Business Unit, Financial, Strategy, Organization)	standard
Sales Execution/Pricing	high
Market Responsiveness and Track Record	standard
Marketing Execution	standard
Customer Experience	standard
Operations	low

Source: Gartner (September 2009)

Completeness of Vision

The fundamental indication of completeness of vision is the degree to which a vendor anticipates and influences the prevailing market trends.

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We consider the following product characteristics as fundamental indications of a well-established market vision, rated under the Offering (Product) Strategy criteria:

- Advanced SOA support
- Event-driven architecture (EDA) support
- Tracking the latest and most impactful Web innovations
- XTP features
- Innovation in programming models and the use of metadata
- Innovation in administration/management technologies
- Innovation in internal architecture
- Support for SaaS/cloud-style deployment of applications
- Support for low total cost of ownership (TCO) deployments

Table 2. Completeness of Vision Evaluation Criteria

Evaluation Criteria	Weighting
Market Understanding	high
Marketing Strategy	standard
Sales Strategy	standard
Offering (Product) Strategy	high
Business Model	standard
Vertical/Industry Strategy	low
Innovation	high
Geographic Strategy	low

Source: Gartner (September 2009)

Leaders

Leaders in the EAS market combine insightful understanding of the realities of the market, the ability to influence the market's direction, the ability to attract a following and the capacity to lead. Leaders have the proven ability to deliver on their vision and to support their customers through periods of stability, as well as periods of change or economic hardships. The leaders control most of the market's business activity and are the primary influencers of market evolution.

However, a leader is not always the best choice for a particular user's project. Some are spread too thinly in their offerings, channels or geographies, which can cause them to fall behind more narrowly focused smaller vendors in support and commitment to individual mainstream customers. With one notable exception this year, leaders are typically large vendors with long-term industry records. They represent relatively safe choices, but they are not necessarily best-of-breed vendors in all circumstances.

In the circumstances of continuing consolidation of the market (Oracle's acquisition of BEA and the pending acquisition of Sun Microsystems, Progress' acquisition of Iona and many others) and the simultaneous pressures of the economic recession, which direct many projects to what they perceive to be safer choices, the leaders in this market have notably separated from the rest of

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the competitors in their ability to attract new business and generate revenue growth. Uniquely, as the evolution of Internet technologies and business practices continues to revolutionize IT (in the form of cloud computing, Web 2.0, social collaboration and many others), most execution leaders in this market are also strongly invested in innovation and, therefore, do not suffer the typical fate of execution leaders of a decline in completeness of vision.

In 2009, the leaders in the EAS market are:

- IBM
- Oracle
- Microsoft
- Red Hat

Challengers

Challengers excel in their ability to attract a large user following, but owe that ability to a relatively narrow focus on a particular use pattern, vertical industry, geographic location or other specialization for EAS technology. These vendors often trail the leading-edge industry innovations and lack a broad industry appeal; however, they excel in their dependable execution. Some of these vendors are conservative followers of older and well-proven technologies, whereas others offer a specialized focus. The conservative challengers are the best choices for similarly conservative users: Their time-proven technologies and support networks may carry certain guarantees that are not available elsewhere. The focused challengers excel in their chosen patterns and are the best choices for a subset of EAS users, while lacking some of the modern capabilities for others.

In 2009, the challengers in the EAS market are:

- Fujitsu
- SAP

Visionaries

Most of the vendors in the Visionaries quadrant are relatively small innovators, invested in excelling with highly differentiated variations of EAS offerings, usually at the expense of a lesser breadth of the total offering when compared with established, comprehensive products. Some vendors are attempting to introduce a radically new approach to the market, while others are addressing some limitations of mainstream options.

Some of the visionaries will eventually be acquired by the leaders or will merge with their peers; few may grow to become market leaders. Others will limit their target markets to focus on their core vertical or geographic competencies and become niche players, or they will grow to be challengers. Some will exit the market. Visionary vendors usually have relatively small numbers of customers and production deployments, and, therefore, represent higher long-term risk; however, they offer the greatest opportunity for differentiation for users looking for the competitive use of IT.

In 2009, the visionaries in the EAS market are:

- salesforce.com
- TmaxSoft

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- Magic Software Enterprises
- Sun Microsystems
- Kabira Technologies
- SpringSource
- GigaSpaces
- Caucho
- maatG
- Appistry
- OpenCloud
- Majitek
- Paremus

At the time of this Magic Quadrant's publication, Sun Microsystems is an independent company, but Oracle has announced a definitive agreement to acquire Sun. The acquisition is expected to close in late 2009. In rating Oracle and Sun for the EAS market, we took into account a degree of uncertainty for both of their product sets, as well as the inevitable period of some challenge during transition — should the acquisition be successfully approved. However, we also recognize that both product lines have a substantial installed base and are likely to persist for the period between publication of this Magic Quadrant and its next refresh, so the independent standing of the two offerings will remain relevant to many users during this period. Our ratings are, therefore, based on the merits of the two product lines, mostly as they are, pre-acquisition.

Niche Players

Niche players operate well in a vertical industry, a geographic segment of the EAS market or the OEM market segment. Niche players are often specialists in their areas, and may represent the optimum choice for some projects and for some IT organizations by offering the specialized expertise, more-relevant support practices, flexible terms and conditions, and greater dedication to their customers in a particular market segment or geography.

Some niche players look to grow their businesses to challenge the leaders. Others discover innovative solutions that attract interest beyond their target market segments and emerge as visionaries. However, most niche players are focused on serving their market segments, geographies and customer bases; and they generally limit their ambitions to maintaining excellence in their market segment, industry or geography.

In 2009, the niche players in the EAS market are:

- NEC
- Hitachi
- Zend
- Kingdee
- Pramati Technologies

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- Apache Software Foundation (Geronimo)
- Relational Networks (LongJump)
- Rogue Wave Software
- OW2 Consortium (Jonas)

Vendor Strengths and Cautions

Apache Software Foundation (Geronimo)

Apache Software Foundation is an open-source organization that manages a large number of projects. Those relevant in this market include Geronimo (Java EE 5 application server) and its components, including Apache Tomcat, ActiveMQ, OpenEJB, ServiceMix and others. Apache Geronimo also includes Apache RDBMS — an open-source RDBMS. Commercial support for Geronimo is provided primarily by IBM.

Strengths

- Apache's open-source business model and community support provide differentiation, a foundation for growth and a channel for adoption.
- Apache's excellent reputation and name recognition add credibility to otherwise modestly known Geronimo technology.
- Business endorsement, support and embedded use by IBM (in WebSphere Application Server Community Edition) open an enterprise adoption channel and encourage growing "mind share" for the project.

Cautions

- The company's small and slow-growing enterprise installed base is hard to accelerate in a mature and largely saturated Java EAS market. Strong competition from the more established and more visible Red Hat's JBoss Application Server and, increasingly, from Sun GlassFish reduces the product's ability to capitalize on its open-source differentiation.
- Light user adoption of IBM WebSphere Community Edition based on Geronimo negates some of the advantages of IBM's backing, and challenges IBM's business commitment to Geronimo.
- A minimal partnership following (apart from IBM) limits the company's distribution channels.

Appistry

Appistry is a 35-employees company that operates in the U.S. through a direct sales force, and in other geographies through partners. Appistry's CloudIQ Platform is a cloud-enabled application platform that includes CloudIQ Engine, the core EAS component, and CloudIQ Manager, which provides advanced management capabilities. CloudIQ Manager can also be purchased as a stand-alone item. Cloud IQ Engine (currently in version 4.1) is offered through a yearly subscription model (for on-premises, public cloud and hybrid deployments) and is also available in a free version (Community Edition) for deployments requiring up to 10 cores running on up to five physical or virtual servers. CloudIQ Engine is also available as a preloaded and preinstalled service in the Amazon Web Services, GoGrid and Skytap public cloud infrastructures.

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Strengths

- CloudIQ Engine has been in the market (under different names) since 2003, and has demonstrated an ability to support very large and business-critical deployments in large-scale enterprise environments for both transactional and analytical applications.
- CloudIQ Engine's support of Java, Spring, C# and C/C++ programming environments makes the product potentially appealing for a wide range of developers.
- CloudIQ Engine implements an advanced, elastically scalable and highly available platform; includes an embedded, distributed caching feature; and enables hybrid on-premises/public-cloud deployments to support large-scale transactional and analytical application requirements.

Cautions

- Most of Appistry's customers (approximately 100 to 125 users — of those, 25 are paying clients) deploy the platform on-premises, and only a few support public-cloud deployments.
- Production deployments of the advanced management capabilities of CloudIQ Platform (CloudIQ Manager) are limited to the CloudIQ Engine user base. No deployments of the stand-alone product are reported as of yet.
- Appistry's support organization is small and located exclusively in the U.S., which limits the company's ability to grow in other geographies and vertical markets where the company has not yet established specific partnerships.

Caucho

Caucho is a middleware vendor with the reputation for advanced high-performance technology. In the application server space, the company offers Resin (a Java application server) and Quercus (a cleanroom PHP application server hosted on a Java Virtual Machine [JVM]). Basic Resin is available under an open-source license, while several other editions, some with advanced functionality, are available under a traditional closed-source license — in all cases, all pricing is subscription-based. Resin internal architecture is highly scalable (especially with the most recent additions in Resin 4.0) and thus well-fit for cloud-style computing grids; however, there is no multitenancy offering at this time. Resin 4.0, released in August 2009, offers support of 10,000 simultaneous connections (the "Resin 10,000" feature), as well as several Java EE 6 components. The company also offers Hessian technology for high-performance binary Web communications.

Strengths

- In business for more than 10 years, Caucho has built up a large installed base for Resin, which it claims exceeds 7,000 organizations, including CNET, Kodak and salesforce.com; creative use of open source and supported closed source further broadens company sales channels.
- A reputation for high-performance technology (including challenging performance of the popular Apache Web Server and Apache Tomcat, and delivering high-end transaction throughput with Resin 10,000) attracts advanced Java project teams.
- Implementation of PHP 5 (Quercus) over a JVM uniquely enables colocation of PHP and Java software.

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- Early visionary investments in cloud-enabling grid scaling, distributed caching, Java Injection (JSR 299) and other emerging technologies maintain product reputation for technical excellence.

Cautions

- Not certified as Java EE-compliant (although it supports the Web-profile subset), thus lacking assurance of portability; lack of support of some basic enterprise Java programming models, such as Enterprise JavaBeans (EJB) and Java Message Service (JMS), deters some mainstream enterprise projects.
- Minimal investment, record or skill in product marketing leads to poor name recognition beyond the narrow circle of the leading-edge engineering teams, thus reducing the pace of growth.
- Minimal productivity-enhancing tools reduce the market to mostly advanced engineering teams.

Fujitsu

Fujitsu is one of the biggest application infrastructure vendors based in Japan making its presence known worldwide, and its EAS offering includes mainly two classes of application servers:

1. Interstage Application Server (IAS), for regular use, supporting multilanguage (Java, COBOL, C/C++) and basic high-availability features (e.g., hot standby, multicontainer-enabled and workload-balancing features)
2. Interstage Business Application Server (IBAS), for high-end use, with more mission-critical features (such as parameter-based application configuration, customizable flow control/secure message delivery and autorecovery for transaction failure), in addition to features of IAS.

Interstage Job Workload Server, for batch processing, can interact with business application servers to integrate "real time" processing with "batch" processing. CentraSite, as a repository product, enables application/service development life cycle management and governance, and has close integration with the configuration management databases (CMDBs) of Systemwalker (Fujitsu's system management software) in the context of SOA and Information Technology Infrastructure Library (ITIL) combinations for business service management.

Strengths

- IAS/IBAS are proven foundations of the Interstage product family, such as Interstage Service Integrator, Interstage Host Access Service, Interstage Interaction Manager (Fujitsu's portal) and Interstage Business Process Manager. Fujitsu extended its capability on "security, performance and reliability" to a cloud platform, named Trusted-Service Platform, part of Fujitsu's global initiative — Triole.
- Fujitsu has maintained its leading position of the EAS market in Japan through its system integration business, especially targeting the mission-critical area for large enterprises (the Interstage application infrastructure family is deployed in more than 3,500 enterprises). The company has been steadily expanding its installed base, along with BPM product deployments, in the context of a BPM-SOA combination in selected large enterprises outside Japan.

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- IAS is a proven, reliable Java EE 5-compliant offering, which has rich and advanced EDA-based features that are effective in mission-critical requirements, such as container-level multiplexing or work-unit partitioning, autorecovery of abnormal transaction/message termination along with advanced/secure transaction/message control, and proactive system resource acquisitions. It will be OSGi/Spring-enabled and will support Java EE 6, as well as service component architecture (SCA)/service data object (SDO), along with auto-integrated management/operation with grid technologies at the virtualized OS layer.

Cautions

- Fujitsu is not strongly aggressive with innovative, Web 2.0-focused and opportunistically oriented features, since Fujitsu's focus has been and will be on the mission-critical/high-end requirement area, where the company believes it will differentiate Interstage's capability against others.
- Fujitsu is aggressive to support grid technology for XTP and virtualization/cloud-oriented features, but currently lacks distributed cache technology and has limited usage scenarios of EDA/CEP engines.
- Although Interstage Application Server supports cloud capabilities such as multitenancy, Fujitsu's Interstage APaaS scenario is still limited.

GigaSpaces

GigaSpaces is a software company operating in North America, Europe and Asia. EAS is the core focus of GigaSpaces, which offers the Java- and .NET-enabled GigaSpaces eXtreme Application Platform (XAP), an XTP-oriented and cloud-capable product. XAP, currently in version 7.0 released in July 2009, is available in various versions (Premium, Standard and In-Memory Data Grid), differentiated by functional capabilities, but based on the same technology foundation. In addition, GigaSpaces offers the XAP Community Edition, a free-of-charge, functionally stripped-down version of XAP aimed at seeding the market, and also makes available a special no-cost adoption program for startup companies. XAP is also available "as a service" on top of the Amazon Web Services EC2 public-cloud infrastructure.

Strengths

- XAP is a proven product, in the market since 2003, and its 300 or so user base (approximately 50% paying clients) has successfully deployed a significant number of business-critical applications with very demanding scalability, availability and performance requirements in a variety of vertical markets and application scenarios, including public cloud and SaaS.
- Despite its relatively small size (Gartner estimates its revenue for 2008 to be in the $12 million to $15 million range), GigaSpaces enjoys a fairly good market awareness in many geographies and industry sectors, is perceived as an industry innovator and its support capabilities are positively rated by its customers.
- XAP combines, into an advanced and cohesive architecture, a JavaSpaces-based distributed caching platform, Spring, a Java EE-compatible Web container (Jetty), an ESB (Mule) and other features to provide elastic scalability and multitenancy support. XAP can be deployed in hybrid public/private settings, aimed at supporting advanced XTP and event-processing scenarios, as well as at mainstream JavaServer Pages (JSP)/servlet applications requiring greater scalability and availability.

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Cautions

- Because of its strong dependence on the financial services sector (which accounts for about 50% of the company's revenue), 2008 proved particularly hard for GigaSpaces. The company changed top management and had to significantly downsize its sales and professional services operations. GigaSpaces is now focusing its direct sales on financial services. To help penetration in other vertical markets, the company is also re-engineering its operations and products to better support indirect sales and outsourced professional models, which may pose support and growth challenges.
- The recently released XAP 7.0 introduced a significant set of new add-on capabilities. Although a few users already successfully migrated to XAP 7.0, the "production readiness" of the new add-on features needs to be further demonstrated through more real-life production deployments, both in on-premises and public-cloud scenarios.
- Even if GigaSpaces opened XAP to third parties through APIs and standards support, for the moment, neither GigaSpaces nor independent software vendors (ISVs) offer a great deal of add-on tools and packaged applications on top of the platforms. Therefore, users would still primarily rely on GigaSpaces for tools (for monitoring, administration and management), and only advanced "build-oriented" organizations have a potential interest in the product.

Hitachi

Hitachi is one of the big application infrastructure vendors in Japan, and its EAS offering is uCosminexus Application Server of Java EE 5-compliant products, a core foundation of the Cosminexus software family, with advanced features, such as no-halt time by preventive full garbage collection (GC) avoidance. uCosminexus Application Server is also a Java-based batch application runtime environment with JVM ready-to-run (memory resident) for a stand-alone Java batch application, along with job scheduling, a statement pool and a connection pool for high performance. uCosminexus Navigation Platform (front integration) supports Ajax-based user interaction functionality with flowcharts and guidance (even for business users).

Strengths

- uCosminexus Application Server is a proven mission-critical/large-scale product that has been deployed in a large number of installed bases through Hitachi's system integration business and its packaged applications (in Japan). It has been deployed in more than 1,000 enterprises across various vertical segments, and supports hundreds of millions of transactions per day in railway gate systems.
- Hitachi's CEP technology used for XTP is uCosminexus Stream Data Platform. It addresses continuous real-time stream data processing by in-memory, unit-window-based (lines, time, group) incremental processing with continuous query language to describe an analysis scenario for huge amounts of events/information (e.g., traffic jam detection/analysis), achieving 100 times as many as conventional TP monitor/DB performance.
- Hitachi made its system solution knowledge (best practices) available to partners by offering uCosminexus SI Navigation System, which advises them to shorten development cycles and improve solution quality with the use of Hitachi's uCosminexus for developers who do not have deep design skill sets.

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Cautions

- Hitachi Cosminexus has a very limited presence as an application infrastructure brand outside Japan, since the Hitachi Software Division has not been aggressive at expanding its reach to non-Japanese enterprises outside Japan, while, as a corporate strategy, Hitachi started its global expansion initiatives around the storage/server hardware business and consulting business.
- Even if Hitachi is innovative in high-end transaction processing and offering Web activity monitoring, it is not aggressive for typical Web innovation technologies, such as dynamic language style.
- Hitachi needs to accelerate its SaaS/cloud-related capabilities (lack of competitive speed against others) to support Web-innovation-related technologies.

IBM

IBM's EAS offering includes the WebSphere Application Server (WAS) family of closed-source, Java EE 5-compliant products (WAS Express, WAS Base, WAS Hypervisor Edition and WAS Network Deployment [ND]), the Apache Geronimo-derived WAS Community Edition (CE), and the Web 2.0-oriented PHP and Groovy capable WebSphere sMash. Complementary elements of IBM's EAS proposition are the WebSphere eXtreme Scale (WXS) distributed caching platform; the WebSphere Virtual Enterprise (WVE) set of application virtualization and advanced management/administration tools; the WebSphere Compute Grid for batch processing; the WebSphere CloudBurst Appliance for facilitated deployment on large, distributed and virtualized configurations; the WebSphere Real Time JVM; and other tools. Moreover WAS core products can be extended through what IBM calls "Features Packs," which provide new capabilities (e.g., support to emerging standards like SCA or OSGi) without forcing users to migrate to the next release of WAS. Some of the products of IBM's EAS offering (WAS, WebSphere sMash) are available on the IBM public cloud. These products and WXS are also available as preinstalled services on Amazon Web Services EC2 public cloud. IBM's EAS technology also powers IBM's SaaS offerings, like LotusLive and BPM BlueWorks.

Strengths

- The WebSphere family includes a comprehensive EAS offering at the foundation of several other IBM software products and supports a wide range of requirements — from opportunistically oriented (WebSphere sMash), to mass-market (WAS CE, WAS Express), all the way to large-scale (WAS ND, WVE, CloudBurst Appliance and other products) and XTP-class applications (WXS) — in combination with the IBM Rational set of application development tools and the IBM Tivoli set of administration, management and monitoring products.
- IBM has maintained market share coleadership in the EAS segment for many years, which, in turn, has generated a wide and loyal installed base (in the order of many tens of thousands of deployed instances of WAS products), a vast industry following and extensive third-party support.
- WAS is a widely proven, state-of-the-art Java EE 5-compliant and OSGi-enabled product line supported by a visionary road map covering Java EE 6 compliance and an "SOA inside" modular architecture. It supports multiple programming models (e.g., SCA, OSGi/Spring, dynamic languages), communications-enabled applications, event-processing and XTP architectures, and virtualization/cloud capabilities.

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Cautions

- The open-source-based and mass-market-oriented WAS CE has thus far gained limited industry following and user adoption, despite being in the market for several years. The innovative, Web 2.0-focused and opportunistically oriented WebSphere sMash, released in mid-2008, has a still relatively small installed base and limited third-party support.
- Some virtualization/cloud-oriented and XTP products (e.g., WAS Hypervisor Edition, CloudBurst Appliance) have been introduced only recently, whereas others (e.g., WXS) still have smaller installed bases than some of their leading competitors. Their "production readiness" must be further proven with more real-life deployments.
- IBM's strategy for APaaS and cloud support for its EAS offering is still in its early stages and doesn't manifest the same forward-looking vision of specialized cloud vendors or other leading competitors.

Kabira Technologies

Kabira's offerings for EAS include the Kabira Transaction Platform (KTP), an XTP-oriented application server, based on an event-driven internal architecture. The company also offers Kabira Fluency, a Java extension to the C/C++-based KTP. This way, Kabira hopes to make its technology more appealing to mainstream organizations and partners in vertical markets and geographies where the company has minimal presence at the moment. Fluency is currently available to selected clients through a beta program. Kabira operates through a direct commercial presence in the U.S., France, the U.K. and Japan, as well as through partners in Asia, Africa and Latin America.

Strengths

- KTP has been in the market for more than 10 years, with an installed base of approximately 100 to 120 leading-edge organizations, and has been amply proven in large-scale, high-performance, business-critical, event-driven applications in telecom, financial services and government vertical sectors.
- Kabira's go-to-market strategy — laser-focused on the telecommunications and financial services markets, for which the company offers a range of KTP-based packaged applications, supported by a network of system integrators (SIs) and OEM partners — is centered on business-oriented value propositions that shorten the sales cycle and offer numerous opportunities for cross-selling.
- KTP is based on an advanced, native event-based internal architecture focused on high-performance event processing, providing high-availability, model-driven (UML) development and in-memory data caching technology, and it is evolving to provide support for Java developers through Fluency.

Cautions

- The Java-based Kabira Fluency technology is not yet generally available and has no real-life production references; therefore, its production readiness still needs to be fully proven through business-critical deployments.
- Since inception, Kabira has been proposing its technology to leading-edge organizations and has no track record in selling solutions to mainstream organizations. The introduction of the Java-based Fluency technology will pose Kabira unexplored sales, marketing, pricing, channel and support challenges.

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- Despite being in the market for almost 15 years, Kabira has limited market awareness outside of the core vertical markets where it operates. This, and its limited focus on emerging industry trends (like cloud computing) or standards (like SCA or OSGi), risks cornering Kabira on a niche market of ultra-high-end requirements, despite Fluency.

Kingdee

Kingdee is one of the notable leading innovative-minded application infrastructure vendors (especially in the Java space) in China. It has been playing a leading role since the early days of Java in China as a subsidiary of Kingdee International Software Group, which offers ERP business applications globally and has established its leading position in small and midsize business (SMB) ERP business application areas in China. Kingdee's EAS offering is Apusic application server, a certified Java EE 5 application server. It is microkernel-architecture-based and supports advanced international standards such as SDO and BPEL4people, as well as aggressive support for dynamic language styles and rich Internet application (RIA) technologies for the Web.

Strengths

- Apusic application server is a leading, and one of most mature, Java application servers in China with mission-critical features for high availability/reliability/security (e.g., cluster buffer). It plays a significant role in Kingdee's business applications, is popular among SMBs in China and is a core foundation.
- Apusic application server is aligned to industry standards (such as Java EE 6, SCA/SDO, JSR311, etc.) and provides a rich set of features (such as EDA/CEP and a distributed cache platform for XTP), as well as SaaS/cloud support, such as "management as a service," for heterogeneous environments.
- Kingdee Apusic has a large installed base in government and SMBs, has relationships with key SIs and ISVs in certain vertical sectors and is influential in the Chinese IT industry via collaboration with The Open Group and the Chinese industry standard body, and a major Chinese university.

Cautions

- Even if Kingdee is trying to go international, its installed base is mostly in China.
- Kingdee's middleware targets SMBs as its primary customer class and needs more of a track record in more-severer/more-complex/high-end demands to prove its capability — even though it has been demonstrating its capability of incorporating innovative features for ease of development/management.
- Kingdee's SaaS/cloud business plan is not clear yet.

maatG

maatG is a 300-employee company that operates primarily in Europe and Latin America through a combination of direct and indirect channels. maatG offers the "G" enterprise application server, a product based on grid computing and advanced, dynamically extensible, proprietary DBMS foundations. G is currently in version 3.0 and is sold through a traditional software license, plus a yearly maintenance subscription model.

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Strengths

- G is a very sophisticated and advanced platform providing a wealth of functionality (multimedia content management, data federation, application integration, adapters, natural language support, metadata management, rule management, orchestration and several others) on top of the core enterprise application server functionality. G also provides elastic scalability and shared-everything multitenancy support.
- G has a significant installed base of approximately 500 customers, mostly midsize organizations, using the product to run a variety of custom and packaged applications in healthcare, local government, financial services and other industry sectors both in Europe and Latin America.
- G is natively "cloud capable," and is available on top of Amazon Web Services EC2. MaatG is developing technology to support a go-to-market strategy aimed at providing various forms of "G as a service" in partnership with telecom operators and other service providers.

Cautions

- MaatG has little brand recognition and limited third-party support outside of its home country (Spain).
- The majority of the G installed base is in Spanish local government organizations using the platform to run industry-specific packaged applications developed by maatG. Therefore, the ability of the platform to support very large, XTP-class applications has limited market proof.
- To test the technology, build a critical mass of clients and win partnerships, maatG has expanded G functionalities in multiple directions, trying to support as many application requirements in as many vertical sectors as possible. Therefore, maatG's key challenge is now to concentrate its efforts around a focused value proposition so that the company doesn't spread its resources too thin.

Magic Software Enterprises

Magic's EAS offering is uniPaaS (formerly eDeveloper). It is a multitenant-capable, all-in-one platform for new and composite application development and deployment, characterized by high-productivity, metadata-driven graphical development tools and support for advanced RIA client options. The platform offers an RPG-like development language in addition to the graphical tools. UniPaaS is also optionally available with iBolt — the company's comprehensive integration platform.

Strengths

- An established presence and reputation for a high-productivity development platform for new applications with many enterprises and ISVs, as well as the available full-featured integration platform (iBolt), provides an installed base to upsell new capabilities, including the recently added RIA and multitenancy capabilities.
- Early support of multitenancy in the platform attracts ISVs interested in developing SaaS-style application services and those who anticipate future transitions to cloud computing.
- A large network of partners and geographic presence provides a broad set of channels, and historical emphasis on SMBs further helps with the company's cloud efforts, as most

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of the early investment in cloud application platforms has come from SMB-related projects and ISVs.

Cautions

- Early investment in multitenancy (including the naming of the flagship platform product) might distract the company from its core business — productivity-seeking, in-house software development projects. Meanwhile, without an APaaS offering, the multitenancy offering has limited market.
- Most of the company's historic presence is in midsize projects, where productivity is a top priority, but the transition to mainstream enterprise use can be challenging given the nonstandard programming model of the platform.
- Minimal support for event-driven application architectures or XTP capabilities excludes the offering from consideration for many advanced enterprise projects.

Majitek

Majitek is a 55-employee company that operates in Australia, the Middle East and Asia. Majitek's EAS offering is based on the Majitek GridSystem, a Java-based, XTP-oriented, elastic and shared-processing multitenant application server, built on top of a JavaSpaces-based distributed caching platform. GridSystem is offered through a traditional software license arrangement, but also via a revenue-sharing model for SaaS providers.

Strengths

- Majitek is extending GridSystem and other related products to implement an advanced vision for cloud computing (codename LEAP) aimed at offering, primarily to SaaS providers, an APaaS (both in the form of a product and a service) extended with configuration, self-provisioning, payment, billing, operational support and other functionality.
- The LEAP vision is supported by funding and a go-to-market partnership from Cisco and is focused on fast-growing geographies like the Middle East and southeast Asia.
- GridSystem technology has been proven in a relatively small, but significant, number of large, business-critical scenarios, including support for SaaS-like deployments.

Cautions

- Although Majitek already has a few pilot production deployments for LEAP, the platform is still under development and won't be fully available until the end of 2009 or early 2010.
- Majitek's go-to-market strategy calls for a combination of direct and indirect sales (including OEMing of the core LEAP technology), an APaaS model and the provisioning of a SaaS solution for smart community operations (building management systems, facilities management and others). Despite Cisco's support, Majitek may find itself spreading its resources too thin in the attempt of pursuing all these opportunities.
- Since its inception (2001), the company has dedicated minimal efforts to marketing; therefore, it is hardly known outside of its home country (Australia).

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Microsoft

Microsoft's .NET Framework, combined with IIS (both are integrated with Windows Server OS), offers a full-scope of application server functionality, although no product on the Microsoft product list is identified as an application server. In the future, an IIS-independent rendition ("Dublin") of the application server technology will also be offered as a back-end, high-performance application platform. Another programmable application platform is Microsoft BizTalk Server. There is also a variety of programming capabilities for the user-facing front-end, including ASP.NET, SharePoint and Silverlight. All the programmable capabilities are referred to by Microsoft as components of one Microsoft Application Platform — some of its elements are available with Windows Server licenses and some require separate licensing. A cloud offering of the same platform technology (Windows Azure Platform [formerly Azure .NET Services]) is in beta. A separate, programmable cloud platform technology (xRM) has also been recently announced.

Strengths

- Massive installed base and large community of skilled developers and ISVs makes Microsoft's nonstandard EAS offering a de facto standard. Exclusive integration with Windows OS provides opportunities to optimize performance, improve ease of deployment and use, and, in some cases, reduce the cost of ownership of business applications.
- Strategic visionary plans for cloud platform technology (Azure, xRM), XTP (Dublin application server and Velocity distributed caching technology) and modeling-based software engineering (Oslo) use vast company engineering and business resources to surpass leading competitors.
- Long-standing commitment to developers and ease-of-use have produced a near-dominating position of Microsoft EAS with small-scale software projects, while growing adoption of .NET in mission-critical enterprise projects and improving Microsoft practices in support of high-end IT organizations increases its competitiveness with enterprise projects.

Cautions

- Exclusive Microsoft reliance on Windows OS limits users' application, tools and middleware deployment options to a single OS and a single vendor for much of the software infrastructure portfolio (although cross-platform integration capabilities are available).
- Strategic focus on the mass-market is the core of Microsoft's business success, but leads to delays in adopting important high-end enterprise initiatives (such as XTP, EDA and SOA).
- Business challenges in the company's core Windows markets and the emergence of some new formidable competitors (Google, Salesforce, VMware) challenge the company on two potentially conflicting fronts: maintaining and extending its strength in traditional business, and redefining itself to establish leadership in emerging markets.

NEC

NEC has one of the major application infrastructures, and its EAS offering is WebOTX as "service execution platform," which has evolved from reliable/high-availability technologies established in mainframe/CORBA/COM. WebOTX is a certified Java EE v.5 application server with

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multilanguage support (C++/COBOL), and includes a Session Initiation Protocol (SIP) container for SIP applications, which is mandatory for NEC's next-negation network (NGN) business.

Strengths

- NEC's EAS technology — WebOTX Application Server — is Java EE v.5-certified (officially) and has been proven in mission-critical environments for high-performance and robust/nonstop capabilities (especially large financial enterprises), offering advanced features for nonstop operation/automatic-failed-process recovery (such as real-time monitoring/recovery on process failure), and supports multitenancy for SaaS/cloud use.
- NEC has its own XTP offering named WebOTX Parallel Stream Monitor, which is based on stream-based transaction processing architecture with an in-memory table, named Parallel Stream Architecture, to enable high speed, high throughput (parallel/aggregate), high scalability (flexible container configuration) and high availability (container duplexing) as a service platform.
- NEC concentrates its focus/resources on NGN and its application server, rather than expanding its business scope/technology coverage.

Cautions

- NEC WebOTX Application Server has a very limited presence and needs to improve its presence outside Japan, even if the company has a plan to expand WebOTX sales, leveraging NEC's radio frequency identification (RFID) integration or NGN business outside Japan, starting with China and moving to other Asia/Pacific countries.
- NEC has dual product portfolios in the context of system integration business. One is the pure NEC product family around WebOTX AS for NEC branding projects. The other is Oracle WebLogic/Tuxedo for addressing customers' broader choices/requirements. This makes WebOTX influence/opportunities weaker than it should be in the application server market, even if WebOTX is NEC's core application platform technology.
- NEC is not aggressive at offering advanced EDA/CEP features.

OpenCloud

OpenCloud offers, as its primary offering, the Rhino application server. The product (currently in version 2.1) is natively based on an event-based JSLEE 1.1-compliant architecture. Rhino is priced through a "sessions per second" model primarily to telecom operators. The company has 50 employees and operates in the U.K., Spain, the U.S., Indonesia, Singapore, Japan and New Zealand. Motorola is one of the investors in the company.

Strengths

- OpenCloud is 100% focused on the mobile telecom market. Rhino is designed to support carrier-grade requirements. On top of Rhino, the company offers specific products (Rhino Service Interaction Server and Rhino Charging Sentinel) and has listed partnerships with key players in this market, like Motorola, Nokia Siemens Networks and others.
- Rhino is natively designed on a Java-based, event-driven foundation (the advanced JSLEE standard) and is primarily focused on high-performance event-processing, high-availability and interoperability in telecom network environments.

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- Rhino has been available in the market since 2004, and has a good installed base of approximately 40 to 50 clients — some of whom are using the product to support highly demanding production applications (e.g., online charging) in the mobile telecom carrier market.

Cautions

- OpenCloud's undivided focus on the telecom industry, scarce industry following for JSLEE outside of the telecom sector and Rhino's limited support for mainstream industry trends (such as OSGi, Web 2.0, cloud computing and others) make the product scarcely attractive for nontelecom users, even if they could be potentially interested in the event-processing capabilities of the product.
- OpenCloud has limited brand awareness and recognition in industry sectors other than telecom, including in countries where it operates directly.
- OpenCloud's support organization is small and primarily focused on the Asia/Pacific region and Europe, which limits Rhino's appeal to multinational organizations in countries where the company has not yet locally implemented its global partnerships.

Oracle

Oracle's EAS offering includes the strategic Oracle WebLogic Server (WLS) family of Java EE 5-compliant products, deriving from the 2008 acquisition of BEA Systems and the internally developed J2EE 1.4-compliant Oracle Application Server (still supported but not strategically promoted anymore). The WLS product line includes WLS Standard Edition, WLS Enterprise Edition and the WebLogic Suite, which bundles extra capabilities like the Oracle Coherence distributed caching platform, extended management capabilities, WebLogic Real Time (an enhanced version of Oracle's JRockit JVM) and WebLogic Operations Control for application virtualization. Other products that play an integral part in Oracle's EAS offering include the Oracle JDeveloper integrated development environment (IDE), the Oracle TopLink object/relational mapping tool and Oracle Enterprise Manager for advanced monitoring, administration and management. The popular Oracle Application Server is supported for maintenance purposes, but Oracle doesn't plan for major evolutions and actively encourages users to replace it with the strategic WLS product, by means of specific migration tools.

If completed, the anticipated acquisition of Sun (still pending due to certain conditions, including clearance from the European Union at the time of publication of this Magic Quadrant) will further extend Oracle's portfolio of EAS-related technologies. In particular, crucial for the future of the Java-based EAS market will be Oracle's strategy about Java technology and the Java Community Process, of which the company will gain ownership and control. Oracle's strategy about Sun's open-source GlassFish application server, which Oracle will probably position as the entry level of its EAS family of technologies, will also have a strategic relevance from an industry perspective by being the product reference implementation of the Java EE standard.

Strengths

- WLS is a comprehensive EAS offering sitting at the foundation of Oracle Fusion Middleware (OFM) — Oracle's strategic application infrastructure stack — and Oracle's packaged application business products. WLS is primarily focused on enabling business-critical applications, but is able to support a wide range of user requirements, from small to midsize business-oriented packages to advanced XTP-style applications via Oracle Coherence, one of the leading products in its category.

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- BEA Systems was able to build, since 1998, a market share coleadership that was maintained for many years and that has generated a wide and loyal installed base (in the order of many tens of thousands of deployed instances of WLS products), a large industry following and massive third-party support. This adds to the notable Oracle Application Server customer base accumulated by Oracle since its entry in the market in 2001.

- WLS is a widely proven, state-of-the-art, Java EE 5-compliant and OSGi-enabled product that is supported by a visionary road map covering compliance with the future Java EE 6 and dynamic "SOA inside" modular architecture, support for multiple programming models (e.g., SCA, OSGi/Spring, Scala), massive scale-out capabilities and autonomic/rule-based management, specialized event-processing server technology, support for XTP architectures, and extensive use of metadata and virtualization/cloud capabilities.

Cautions

- Both WLS and Oracle Application Server are frequently used to support opportunistically oriented products. However, pending the Sun GlassFish integration in the offering, Oracle doesn't yet have specific EAS products focused on addressing the fast-productivity, low-cost requirements of mass-market developers, nor does it support Web 2.0-style or opportunistically oriented application projects.

- The demotion of Oracle Application Server to a nonstrategic role creates opportunities for both closed-source and open-source Java EE vendors. Should the transition to WLS prove too expensive or too difficult or undesirable for other technical or commercial factors, competitors may be able to attract Oracle Application Server customers (especially those not locked into Oracle via packaged applications or other OFM layers).

- Despite Oracle's track record in managing acquisitions, the many potential challenges of the forthcoming acquisition of Sun may distract Oracle's management or slow down the company's EAS plans, and may create new business and technical discontinuities.

OW2 Consortium (Jonas)

OW2, an open-source consortium (known formerly as ObjectWeb), manages a variety of open-source projects. Those that are relevant in this market include Jonas (a Java EE 5 application server), Jasmine (Jonas management), EasyBeans (EJB 3 implementation), Java Open Reliable Asynchronous Messaging (JORAM; JMS implementation) and Orchestra (BPEL implementation). Commercial support of Jonas is provided primarily by Bull of France.

Strengths

- OW2 has an open-source business model and community support form an agile foundation for long-term project evolution.

- Long-term support by Bull ensures financial support and commercial backing to business initiatives; partnership initiatives in China might open a large new market for the product and the organization.

- It recently rearchitected the core of the product for native support of the OSGi standard, offering advanced flexibility and extensibility of the product.

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Cautions

- Limited installed base and name recognition (especially in North America) slows community growth and delays acceptance of technical viability of the product.
- Lack of investment in emerging EAS trends, such as cloud computing, XTP, model-driven programming and CEP, holds back the project's ability to differentiate it in a saturated market.
- Insufficient momentum in partnerships with SIs and ISVs reduces the product's rate of growth.

Paremus

Paremus was incorporated in 2001, is privately held and primarily operates in the U.K., but has started operations in the U.S. and Japan (through a distributor). The EAS market is the primary focus of Paremus, which offers the OSGi and Spring-enabled Paremus Service Fabric, a Java-based platform. The product (currently in version 1.5) is sold through a yearly subscription license that includes maintenance and support. The core technology is also available through the open-source Paremus Service Fabric Community Edition (formerly project Newton).

Strengths

- Paremus Service Fabric — based on an advanced, distributed, caching-enabled platform, based on an "SOA inside" modular, elastic and zero downtime architecture implemented according to the OSGi technology standards — can be appealing for technically advanced users.
- Paremus Service Fabric support for a wealth of programming environments and APIs (including Spring, SpringDM, Peaberry [Guice], iPOJO, Scala, JavaSpaces, JMS, WS and REST) offers a very rich application development environment that can be attractive to organizations needing an EAS to support a variety of application scenarios, including SOA, XTP and complex event processing (CEP; through embedded support of the open-source Esper CEP engine).
- The product evolution is supported by an advanced technical road map that includes features like the ability for an application to autoprovision the platform components it requires to function, close alignment with OSGi specification advances, support for public cloud, integration of a Java EE server, service ontology and other leading-edge technologies.

Cautions

- Paremus Service Fabric accounts for approximately 10 clients, and, at the moment, the company publishes no public reference for the product.
- Paremus has minimal market awareness and enjoys industry support only from a few SIs. This makes the product scarcely appealing for organizations in geographies where the company doesn't have a presence (e.g., continental Europe).
- Paremus Service Fabric is supported by strongly technical, developer-oriented, OSGi-minded value propositions that only the most leading-edge, technically savvy organizations are able to appreciate at this stage of industry evolution.

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Pramati Technologies

Pramati's EAS offering is a pure Java-based application server, Pramati Server version 6, which supports Java EE 5 features, various standards (such as SAAJ1.3, WS-RM, WS-Policy, etc.), POJO, Java annotation, REST style for SOA/Web services, and is micro-kernel-based, primarily focusing on OEM/embedded usage scenarios. Recently, Pramati greatly shifted its business scope/focus from an OEM-centric EAS offering strategy to a cloud/SaaS and social-computing-centric offering. Pramati plans to offer two more distinct products by usage purpose: Pramati Server Cloud Edition, supporting a pay-as-you-go model, and Pramati Social Application Server, supporting social features using REST APIs, enabling Qontext (Pramati's future enterprise social networking product).

Strengths

- Pramati has strong relationships with big vendors in the application infrastructure market and system integration market, as well as with a relatively broad range of ISVs (e.g., portal, BPM, DBMS, network management, banking, supply chain management, mobile, cloud infrastructure, etc.).
- The company has stable operations with high-maintenance subscription rates from OEMed customers, with very efficient operations by leveraging offshore centers in India.
- Pramati has been putting its focus on innovative Web technologies/user-facing application support technologies and Web 2.0-related initiatives for ease and rapid/less development/deployment while it offers autoscaling of cluster feature as an XTP functionality.

Cautions

- Although Pramati Server demonstrates its capabilities in mission-critical area (especially in the financial industry segment), its recognition is very limited, and its usage scenario is also limited, with relatively narrow feature coverage as a general-purpose application platform. The company does not have EDA capabilities, nor is it planning any in the future.
- Pramati's XTP technology offering lacks strategic capabilities in its distributed cache, even if it can be complemented by memcache (distributed cache), terracota and coherence.
- Pramati's cloud technology is still partial, and its price structure is not clear yet for a cloud scenario. It has also not been optimized for the multicore CPU era.

Red Hat (JBoss)

JBoss EAS is a Java EE 5-compliant JBoss Application Server. It is available for free source download (without support) or packaged for enterprise use as JBoss Enterprise Application Platform with a paid support subscription. Additionally, JBoss Enterprise SOA Platform combines the application server with a JBoss ESB, registry, process management and other relevant technologies. JBoss Communications Platform is a separate EAS offering using JSLEE as its programming model, supporting SIP and targeting primarily the telecommunications industry. Red Hat also offers and supports JBoss Enterprise Web Server, which includes Apache Tomcat application server, for simpler servlet-based, Web-facing applications. JBoss Operations Network is available for managing a JBoss runtime environment. Red Hat also offers JBoss Developer Studio, Enterprise Portal Platform, Enterprise Business Rules Management System and MetaMatrix-based Enterprise Data Services. All software — distributed free or under a paid

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subscription contract — is offered under the LGPL 2.x license or Apache Software License, and is available in both source and object forms.

Strengths

- Red Hat has achieved clear leadership in the open-source EAS market, with the largest installed base and largest partner following.
- It has an excellent technical reputation of the core JBoss EAS technology.
- Wide portfolio of open-source offerings are positioned to compete with application infrastructure portfolios of the leading closed-source vendors.

Cautions

- Red Hat's business requirements force the JBoss division to pursue higher margins and revenues, sometimes resulting in the slowing of engineering innovation or operations.
- The challenge of transforming JBoss momentum from the established, but narrow, *application server* market to the broader, but essential, *application infrastructure* market requires a new marketing, sales and business outlook.
- Limited investment in XTP, event processing and cloud-related technologies might make the company vulnerable to the next wave of competitors.

Relational Networks (LongJump)

LongJump is a division of Relational Networks — a SaaS-style application provider that specializes in call center application services. LongJump Business Application Platform (BAP) is a SEAP (see "Introducing SaaS-Enabled Application Platforms: Features, Roles and Futures"), available as a product as well as an APaaS. When offered as a product, both a single-tenant and a multitenant option are available. When offered as a service, the hosting environment is Rackspace. Multitenancy support is "shared processing" — that is, the tenants are operating in a shared application server environment, but each has a separately allocated logical database (see "Reference Architecture for Multitenancy: Enterprise Computing 'in the Cloud'").

Strengths

- Dependable business in the SaaS application space by Relational provides the company with financial and other business resources, mitigating the risks of its application platform initiative.
- Availability of both on-premises and cloud options for application development provides a ramp-up opportunity for users that can plan to first develop an application on-premises and later move it to the cloud. Users can also feel safer using the cloud platform service knowing that they can move the application in-house if necessary.
- Relational's high-productivity development environment attracts some SMB organizations to the single-tenant option, and SMB ISVs to the multitenant option.

Cautions

- Transition from an as-a-service to an as-a-product offering requires changes to the business model, and imposes new version control and multiplatform requirements.

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- The company's as-a-product multitenant offering (SEAP) serves ISV customers well, but adds little to enterprise prospects that are typically not interested in multitenancy (only the largest IT organizations may organize their divisions as tenants).
- The product customization management and platform deployment options are limited due to the company's heritage in single-platform hosted service offerings.

Rogue Wave Software

Rogue Wave was founded in 1989, is privately held and operates in the U.S., France, Germany and the U.K. In its diversified product portfolio, Rogue Wave offers the SCA-enabled Rogue Wave Hydra, a hybrid C++, Java and BPEL application server. Hydra, currently in version 4.3, is available through a traditional software license model.

Strengths

- Hydra is based on an innovative SCA and SDO-based internal design focused on enabling scale-out and multicore hardware architectures. It also supports C++, Java and BPEL programming environments and provides an Eclipse-based development environment.
- Rogue Wave's go-to-market strategy is focused on exploiting the declining interest in the C++ developers' community for CORBA products (still the primary C++ deployment platform) by concentrating its efforts on positioning Hydra as the new application server for C++.
- Rogue Wave has approximately 2,000 clients for its SourcePro C++ set of C++ development components to which cross-sell Hydra. The recent acquisition of Visual Numerics, a provider of numerical analysis and visualization software, creates even more opportunities for Hydra sales.

Cautions

- Hydra has a relatively small installed base of approximately 50 to 60 clients, but only a few are using the most recent versions (4.x), which provide support for key EAS features like clustering, high availability and others.
- Despite Hydra's technical merits and innovative hybrid C++/Java/BPEL programming environment, Rogue Wave's value proposition, focused on C++ developers, risks cornering the product into a still-popular, but not anymore mainstream, market.
- Rogue Wave has dedicated limited resources to promoting Hydra; therefore, the product is rarely known by potential customers.

salesforce.com

Salesforce.com offers a multitenant APaaS — Force.com — including an execution environment for a metadata-driven Apex Code programming environment, Visualforce (client development service), Force.com IDE (on-premises development tool) and an embedded Force.com database. Multitenancy support is "shared-everything" (see "Reference Architecture for Multitenancy: Enterprise Computing 'in the Cloud'"). Salesforce.com also offers Force.com AppExchange, an online directory of applications and application services available on Force.com. An on-premises version of the platform is not offered (except for a development tool). Although Force.com originates from the company's SaaS CRM offering, the platform is application-independent in that it competes for independent business-application projects.

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Strengths

- A large application installed base for salesforce.com's CRM as a service, total revenue of more than $1 billion and a large ecosystem of ISV partners create strong business momentum.
- Force.com is well-ahead of all major players in SaaS (CRM) and enterprise APaaS markets in support of multitenancy and a cloud ISV ecosystem.
- Native XTP-based and metadata-driven platform technology for APaaS is designed from the ground up to optimize "as a service" performance (including large transaction volumes, user integrity, flexible scalability up and down, version control, ease of management and on-ramp).

Cautions

- The company's APaaS business model is unproven and must overcome the skepticism of the conservative, mainstream enterprise base. Lack of an on-premises option increases the company's challenge in this area.
- A nonstandard programming model limits the platform's mainstream-enterprise appeal and developer following. Emerging offerings, such as Java APaaS from Google (App Engine) or the .NET APaaS from Microsoft (Windows Azure Platform) exacerbate this challenge.
- Salesforce.com has difficulty gaining market mind share as a platform vendor because of the general market perception of the company as a CRM provider, and because many see cloud computing equated to just advanced virtualization.

SAP

SAP's EAS strategy is based on a dual-technology approach. The proprietary Basis platform supports the Advanced Business Application Programming (ABAP) language and is primarily adopted by SAP itself in the development of its packaged business application products. Frequently, SAP clients leverage Basis/ABAP to implement customizations of SAP packages. The Java EE SAP NetWeaver Application Server (AS) is also used under the covers of many SAP packaged applications and is the foundation for a variety of other members (e.g., SAP NetWeaver Portal, SAP NetWeaver BPM and SAP NetWeaver Process Integration) of the SAP NetWeaver stack of application infrastructure products. The Java EE platform is recommended by SAP to users and partners wishing to develop composite applications extending and complementing SAP's core packaged application offerings. The most recent version of SAP NetWeaver AS (Java EE 5-compliant) cannot be purchased as a stand-alone item, but is only available for new users' and partners' development as part of the SAP NetWeaver Composition Environment, which also includes Eclipse-based development tools, user interface design tools (such as Visual Composer and Web Dynpro), service composition technology (Composite Application Framework), BPM and business rule technologies, and an enterprise service repository.

Strengths

- SAP EAS technology is an essential prerequisite for the SAP Business Suite set of packaged applications and other SAP products. This has generated a large installed base and significant ISV and SI support, especially for the Basis/ABAP technology platform.

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- SAP EAS technology has demonstrated the ability of supporting the most challenging scenarios by enabling SAP Business Suite development and multiple thousands of business-critical deployments of SAP's business packaged applications.
- SAP was one of the first vendors to release a Java EE 5-compliant application server.

Cautions

- Despite being in the market for more than five years, SAP's Java EE technology never achieved a level of user adoption, industry following and third-party support comparable to that of the leading EAS products.
- SAP Business Suite still requires support for Java EE 1.4 provided by SAP NetWeaver 7.0. Therefore, the installed base of the Java EE 5 technology is limited to a few hundred NetWeaver Composition Environment 7.1 customers. Hence, its suitability for large business-critical scenarios is not fully proven.
- SAP's lack of focus on the best-of-breed EAS market implies a more conservative vision for the product's road map (for example, SAP doesn't plan support for XTP), and much lower EAS-specific sales/marketing investments than those of leading vendors.

SpringSource

Pending acquisition by VMware, SpringSource offers two key EAS offerings: an extended rendition of Apache Tomcat (SpringSource tc Server), as well as a unique variant of Tomcat with OSGi as a key component model for business applications (SpringSource dm Server). Both products are based on free open-source technologies (such as Apache Tomcat, Apache HTTP Server, Spring Framework and others), but are offered under the non-open-source commercial license (dm Server is alternatively available under a General Public License [GPL] and both products are free to developers as part of the SpringSource Tool Suite). SpringSource Tool Suite is the Eclipse-based development environment for Spring. Recently acquired Hyperic is an innovative application management tool. The company is a lead contributor to Spring Framework, Apache Tomcat, OSGi and other open-source projects. In addition to Java, Groovy and Grails programming models are also supported (all producing JVM byte code executables). The company has recently announced Cloud Foundry — an Amazon EC2-based offering (now in beta). Following acquisition by VMware, the SpringSource cloud-computing option (both public and private) is likely to increase in priority, building on the shared-hardware multitenancy capabilities of the VMware virtualization technologies, as well as the Cloud Foundry technology suite.

Strengths

- A large, loyal community of developers using open-source Spring Framework in combination with partners' application servers and XTP platforms results in a large developer and partner community.
- SpringSource creatively uses (and has influence over) the popular and fast-growing OSGi specification as the component assembly model for business applications (the OSGi Blueprint Container specification is based on SpringSource Spring Dynamic Modules technology).
- The company has an increasingly powerful enterprise offering combining the appeal of open-source projects, enterprise-class custom add-ons and visionary programming models.

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- There are unique potential cloud opportunities post-acquisition by VMware,

Cautions

- The leading Java application server vendors that, in the past, freely endorsed and recommended Spring Framework as complementary technology, are now competitors (since SpringSource offers several application servers of its own, targeting the same markets). Entering a saturated and mature EAS market with modest execution resources (150 employees) requires breakthrough product initiatives to be differentiated and noticed.
- Not a certified or complete Java EE offering, which limits appeal to some mainstream prospects; most enterprise products offered by the company are not open source, which conflicts with the company's image as an open-source provider.
- There are potential challenges to establishing leadership in the post-acquisition VMware management team.

Sun Microsystems

Sun's core EAS is its open-source GlassFish Java EE 5 Application Server. A Java EE 6 preview is also available in GlassFish Application Server v.3 Preview. The technology is the Java EE reference implementation and is available for free download from Sun. Sun also offers a broad application platform suite, the GlassFish Portfolio, including the GlassFish Enterprise Server, GlassFish Web Stack, GlassFish Web Space Server and GlassFish ESB (based on the OpenESB open-source project and some technology from Java CAPS product line). The GlassFish Enterprise Server is also available stand-alone, including four- and 32-socket subscriptions, and unlimited subscriptions.

Sun also offers a support subscription for GlassFish Web Stack — a combination of Apache HTTP server and Tomcat, Sun MySQL and other open-source software for Web-facing applications. Sun GlassFish Communications Server, aimed at the telecommunications industry, supports the SIP servlet programming model. Sun NetBeans is the Sun-preferred development framework for business applications, but the GlassFish Tools Bundle for Eclipse is also available. GlassFish Web Space Server is the Sun-supported enterprise version of the open-source, Liferay-based portal offering. The road map for all offered products is subject to review after Oracle's acquisition of Sun.

Strengths

- A massive worldwide hardware installed base and name recognition form a good basis for software upsell and leadership.
- Industry leadership in defining Java and Java EE standards injects Sun into all Java-related industry initiatives, while a strategic all-company commitment to the open-source software distribution model differentiates Sun from most Java competitors.
- Sun has a comprehensive set of application infrastructure technologies, including the well-established identity/directory offering, and growing momentum of the new GlassFish EAS (including in the telecom market) — now extended with an RDBMS (post-acquisition of MySQL).

Cautions

- Sun has modest historic adoption of EAS offerings, and a mixed record in software acquisitions and the software industry overall.

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- Sun was late to market with a new variation of an open-source EAS. The company is now facing a dominating, established, open-source alternative and several well-entrenched, closed-source options.
- The company's historic alignment and financial dependence on the server hardware and OS markets challenges the company's strategic commitment to application infrastructure and EAS investments.
- The pending acquisition by Oracle deters many prospects from committing to Sun software offerings.

TmaxSoft

TmaxSoft's EAS is Java Enterprise User Solution (JEUS) v.6, which is a Java EE 5-certified EAS rearchitected to embrace joint-development results with open-source communities (e.g., JPA and Web services interoperability). JEUS has been incorporating innovative technologies and standard implementations aggressively. TmaxSoft puts its efforts to form "coherence" in its environment and offers a model Tmax SOA Suite composed of frameworks to enable enterprise-class SOA implementations by offering enterprisewide IT asset views, including Unified Tmax SOA Studio (which provides a unified development environment across a RIA solution, an ESB solution, and an application framework to close interconnections across system stacks), Tmax SOA Data Services (which provides a starting point for implementing SOA-based data management by enabling access to distributed and heterogeneous data sources via services) and Tmax SOA Governance Center (which facilitates features such as an enterprise resource repository for integrated security features and transaction monitoring for enterprisewide management).

Strengths

- TmaxSoft's EAS technology, JEUS, has proved itself in high-volume/heavy-transaction environments of large enterprises, along with ProFrame, an application framework to provide stability/reliability/reusable and modularized service/microflow management capabilities, broadly deployed, especially in the financial industry, where TmaxSoft is focused.
- TmaxSoft offers a broad range of application infrastructure solutions to offer a well-integrated model and development/runtime environment to leverage/optimize all individual product features to form a consistent experience and manageability, even including third-party products, such as Oracle DBMS, along with its initiatives on data service architecture.
- TmaxSoft has been aggressive to incorporate innovative technologies or develop advanced features for Web and EDA/CEP.

Cautions

- Even if TmaxSoft is expanding its international partners (e.g., SIs and hardware vendors), increasing its presence and installed base outside Korea will take time.
- Even if TmaxSoft's product acceptance and number of partners are increasing outside Korea, creating a basic ecosystem scenario outside Korea will take time.
- Even if the company is preparing to add new features for SaaS/cloud and modifying its business model for pay-as-you-go, basic value propositions/usage scenarios for its SaaS/cloud business will take time.

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Zend

Zend's PHP engine is the widely used open-source distribution of the PHP language, deployed primarily for website front ends. (Note that Zend is a commercial technology provider, while PHP is an open-source language managed by an independent PHP group.) In recent reorganizations of its product offering, Zend has offered a new family of PHP application server products aimed at enterprise-class application projects: the single-server Zend Server, available with annual paid-subscription or as a free Zend Server Community Edition subset; a clustered multiserver Zend Platform; or its subset, Zend Core. The company offers Zend Studio for development projects targeting its EAS offerings.

Strengths

- Broad deployment of its PHP engine for website development results in a large developer community, application installed base and ISV partnerships.
- Strong acceptance of PHP 5 — the enterprise-oriented upgrade of PHP — by the installed base of PHP developers and partners creates the basis for company growth in enterprise-class projects.
- Important partnerships (including Microsoft, IBM and Oracle) and notable customers (including GE and BNP Paribas) provide assurances of company viability.

Cautions

- The increasing focus on enterprise-class projects challenges the ability of Zend to retain simplicity, essential to its core user base of developers in opportunistic and mass-market projects.
- Zend's limited record and name recognition in supporting demanding enterprise-class application projects deters adoption by some mainstream prospects.
- Minimal ability to support SOA governance, XTP-style scalability and event processing deter some advanced enterprise projects.

RECOMMENDED READING

"Trends in Platform Middleware, 2009: Facing the Cloud Upheaval"

"Who's Who in Application Platforms for Cloud Computing: The Cloud Specialists"

"Who's Who in Application Platforms for Cloud Computing: The Enterprise Generalists"

"Evaluating IBM, Microsoft, Oracle and SAP Application Infrastructure Strategies for SOA Application Projects"

"A Summary of Magic Quadrants for Application Infrastructure"

"The Impact of SaaS on Application Servers and Platforms"

"Application Infrastructure for Cloud Computing: An Emerging Market"

"Key Issues for Platform Middleware, 2009"

"Magic Quadrant for Application Infrastructure for New Systematic SOA Application Projects"

"Magic Quadrants for Application Infrastructure Reflect New Dynamics in Software Markets"

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"Extreme Transaction Processing: Technologies to Watch"

"Magic Quadrants and MarketScopes: How Gartner Evaluates Vendors Within a Market"

Note 1
Models of Multitenancy

Multitenancy implies sharing resources between tenants. There are several models of multitenancy that differ in the degree of resource sharing, from minimal sharing of hardware to complete sharing of the entire computing space (see "Reference Architecture for Multitenancy: Enterprise Computing 'in the Cloud'"):

- Shared-nothing tenancy — also known as "isolated tenancy." Tenants are fully isolated. This is not multitenancy the way the provider sees it, but the users may experience the service as multitenant in some respects (same application, same Web location and same support contacts for all tenant-enterprises). There is no benefit of resource sharing or elasticity. The platform technology has no multitenancy features and no requirement for a specialized programming model. Example: IBM WebSphere on EC2.

- Shared-hardware multitenancy — with the use of virtualization and automatic bidirectional scaling at the level of the OS. All tenants share a common pool of hardware. Each tenant has a fully dedicated stack of software above the virtualization layer. Only the hardware resources are shared and balanced. Automatic scaling allows for coarse elasticity. The platform technology has no multitenancy features and no requirement for a specialized programming model. Examples: Microsoft Azure .NET Services and SpringSource Cloud Foundry.

- Shared-processing multitenancy — the application container (application server) runs all logical tenant instances, but each tenant is allocated its own isolated logical or physical DBMS. Most process execution resources are shared, allowing fine-grained elasticity. The application platform has multitenancy features responsible for tenant isolation and for targeting all data exchanges to the correct DBMS instances. Some specialized features are required in the programming model. Examples: Magic Software uniPaaS and Rackspace Cloud Sites.

- Shared-database multitenancy — all tenants share the database (although the custom data schemas may be isolated), but processing of the application logic for each tenant (or each user) runs in a separate instance of an application container.

- Shared-everything multitenancy — the application platform runs all tenant instances in a shared space and one DBMS instance is used to hold data of all tenants. The application platform multitenancy features control all resources, including data management, offering maximum potential elasticity. Some specialized features are required in the programming model. Examples: salesforce.com Force.com and Google App Engine.

- Custom multitenancy — application developers, using standard enabling technologies, build multitenant behavior into the application itself.

Vendors Added or Dropped

We review and adjust our inclusion criteria for Magic Quadrants and MarketScopes as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant or

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MarketScope may change over time. A vendor appearing in a Magic Quadrant or MarketScope one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. This may be a reflection of a change in the market and, therefore, changed evaluation criteria, or a change of focus by a vendor.

Evaluation Criteria Definitions

Ability to Execute

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

Overall Viability (Business Unit, Financial, Strategy, Organization): Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood of the individual business unit to continue investing in the product, to continue offering the product and to advance the state of the art within the organization's portfolio of products.

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

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

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

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

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

Completeness of Vision

Market Understanding: Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen and understand buyers' wants and needs, and can shape or enhance those with their added vision.

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

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

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

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

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

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

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

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REGIONAL HEADQUARTERS

Corporate Headquarters
56 Top Gallant Road
Stamford, CT 06902-7700
U.S.A.
+1 203 964 0096

European Headquarters
Tamesis
The Glanty
Egham
Surrey, TW20 9AW
UNITED KINGDOM
+44 1784 431611

Asia/Pacific Headquarters
Gartner Australasia Pty. Ltd.
Level 9, 141 Walker Street
North Sydney
New South Wales 2060
AUSTRALIA
+61 2 9459 4600

Japan Headquarters
Gartner Japan Ltd.
Aobadai Hills, 6F
7-7, Aobadai, 4-chome
Meguro-ku, Tokyo 153-0042
JAPAN
+81 3 3481 3670

Latin America Headquarters
Gartner do Brazil
Av. das Nações Unidas, 12551
9° andar—World Trade Center
04578-903—São Paulo SP
BRAZIL
+55 11 3443 1509

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