Advisory Report

The Changing Role of the Application Server—Web 2.0 Era Requires a Lightweight Infrastructure

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Issue

Enterprise application servers are the foundation of the middleware portfolio offered by leading providers, but how well do these flagship products address the needs of an emerging class of developers who have their sights set on building Web 2.0 applications quickly and on platforms that support agility and low cost? Developers are questioning the need for high-priced app servers which include a lot of bells and whistles such as high availability and integration with back-end systems. Middleware vendors including VMware and Red Hat are helping to stir the debate by presenting reasons why developers should opt for low cost commercial alternatives built on Apache Tomcat, rather than proceed with the industry's most popular app servers, IBM WebSphere, Oracle WebLogic and others. The debate has been ongoing over the years, but interest in the topic has been sparked again as the industry ushers in a new generation of developers looking to exploit the Web and mobile computing to their full advantage in the simplest possible way.

This report discussed the changing role of the application server, from supporting highly transactional systems to supporting Web 2.0 and mobile functionality for mass-market developers.

Current Perspective

During the client/server computing era, the application server was the preferred way of building high speed transaction systems for sending data back and forth between clients. The Web shook things up in the late 1990s, and the role of the application server changed from a closed system to a more open platform that didn't need to adhere to the tight standards dictated largely by financial institutions and other organizations with mission critical application development needs. For example, communications protocols went from stateful to stateless protocols. Since then, app servers have expanded their roles to act as Web servers, running HTTP requests and supporting Web application requirements. Use of Apache Tomcat increased as developers found the applications they were building required only the servlet container inside their proprietary app server. The move into the Web 2.0 and mobile era has accentuated the need for lightweight app servers because of developers' need for a very rapid development process. Where several years ago developers and their QA teams might have worked on a new application for months before it finally entered production, current developers are creating applications that are Web-oriented with clear business drivers that are highly time-sensitive.

Clearly, advanced application server technology supporting complex applications such as those used by financial and travel industries are not going away anytime soon. Server workload segments requiring high performance, distributed transactions, high availability, security, messaging and integration requirements will insure a continued need for high-end application servers. This business model will continue to be...
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The core focus by IBM, Oracle and SAP, and others that offer application servers as part of a bigger middleware portfolio of products, where enterprise customers need a full app server that can deploy all J2EE components.

Vendors agree, however, that the definition of the app server needs to continue to evolve—including new deployment topologies such as cloud/hybrid scenarios. This evolution is important in meeting the needs of modern developers as they build and deploy applications of the future while looking for ways to reduce operating costs, app platform complexity and memory usage. For some, the solution is found in Apache Tomcat, a servlet engine, or commercial versions of Tomcat. Savings come in the form of reduced licensing costs and a reduction in hardware and software requirements, as well as administrative requirements associated with configuring, patching, and deploying complex systems. Lightweight application servers are also known for enabling increased developer productivity through their simplicity in acquiring, set up and operations, an important aspect in today’s development environment where developers are required to build Web applications faster than ever. The need for agility through a lightweight, horizontal and modular deployment architecture ensures developers can make changes to applications quickly and easily.

Vendor Strategies

While investing in open source platforms is not the priority among leading app server vendors, they can’t afford to ignore important market trends that influence their current or potential customers. As a result, vendors of proprietary software are increasingly becoming active members on projects within open source communities, contributing to open source initiatives and looking for ways to use open source within their products. SAP, for example, has been making an aggressive push into the open standards community and participating in projects such as Eclipse. Application platform providers are looking for ways to make consumption of their technology stack leaner and easier for the Java community. Vendors want to provide new developers with an easier entry point on which to start developing applications, and begin to create brand awareness to the next-generation of developers. A new crop of developers are graduating from universities with experience in Java and other modern lightweight scripting languages, and application infrastructure providers want to attract these developers with up-to-date technology that meets their current needs.

Notable vendor products among the enterprise application server market include: IBM’s WebSphere Application Server (WAS) product line, Oracle WebLogic Server (WLS) and Oracle GlassFish AS, derived from Oracle’s acquisitions of BEA Systems and Sun respectively, SAP NetWeaver Application Server, VMware vFabric tc Server coupled with the Spring Framework, and Red Hat JBoss Application Server. Vendors in this lineup have launched aggressive marketing campaigns around the importance of their particular approach in the app server market. While IBM and Oracle are most focused on promoting their enterprise edition app servers, agressively battling one another in performance issues supported by third-party benchmarks, open source vendors, including VMware, Red Hat and MuleSoft, are presenting their case for why enterprises should be migrating from full-featured app servers in light of developers’ need for a next-generation lightweight infrastructure with the latest implementations of Java, Java EE 6 and Java Web services. Primary advantages open source vendors cite for adopting lightweight app servers include:

- Significant simplification of dynamic application development and operation
- Lightweight framework that supports agile app development and high productivity
- Flexibility in deployment platforms to support low cost options
- Reduced configuration complexity
- Up-to-date standards support to insure faster development
Below is a summary of leading application platform providers’ strategies for addressing the Web 2.0 era with lightweight application servers. A scorecard illustrating application platform providers’ application server offerings and strategies:

### Application Platform Providers’ Application Server Offerings and Strategies

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Current Capabilities/Future Opportunities</th>
<th>Lightweight App Server Strategy Score (5 the best)</th>
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<tbody>
<tr>
<td>IBM</td>
<td>IBM WebSphere Application Server (WAS) represents the industry’s leading application server, and under that brand the company offers a number of approaches to application management. WAS v8 is the foundation of the IBM WebSphere middleware portfolio, and features extremely high performance and reliability, and is one of the few app server providers that is compliant with Java EE 6.0. WAS Express serves as a more affordable solution supporting dynamic Web site application development, and WAS Community Edition (CE) is a lightweight Java EE 5 application server that’s based on the Apache Geronimo open source project.</td>
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<tr>
<td>Oracle</td>
<td>Oracle WebLogic Application Server 11g also represents the industry’s leading application server, delivered in the form of a data grid solution and providing scalability to companies’ mission critical applications. The mature technology enables real-time analysis, extreme transaction processing and event processing. As a complement to WebLogic, Oracle began offering Oracle GlassFish Application Server (AS), stemming from an open source project originating from Sun, targeting developers of applications that need a streamlined application development cycle as well as support for the most recent implementation of Java EE (within the company, only Oracle’s GlassFish product includes Java EE 6 support). Through Java EE 6 (Web Profile) developers can load only the modules required, reducing set-up and required resources. GlassFish comes in open source and commercial versions.</td>
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<td>VMware</td>
<td>VMware promotes vFabric tc Server as the best place to develop Java Spring applications, considering it now owns the popular Spring Framework. The lightweight application server supports key operational management and mission critical support backed by VMware. Leveraging the company’s flagship technologies, the app server is also purpose-built for VMware vSphere virtualization, and includes packaging and a licensing model that allows for a simple migration to the cloud, specifically VMware’s Cloud Foundry PaaS unveiled over the past year.</td>
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<td>Red Hat</td>
<td>Red Hat recently released its next-generation server technology, JBoss AS 7, which supports Java EE 6 and is based on a modular service container, providing increased levels of productivity through significantly lower start-up time requirements, faster deployment, better management of large-scale deployments and reduced memory usage. The company has been at the forefront of promoting the notion of moving from traditional complex and expensive app servers to lightweight and agile options such as JBoss AS 7, to speed the development and deployment of enterprise Java applications.</td>
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<td>SAP</td>
<td>SAP NetWeaver Application Server, a key component of the NetWeaver platform, acts as a Web app server to SAP solutions. Traditionally SAP has maintained its distance from open source software, but is becoming increasingly involved in open source communities including the Eclipse project and Open JDK. Such involvement helps the company better gauge market trends around mobile and Web application development and influence how it develop its app server in ways to make it an easier entry point for new SAP customers.</td>
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<td>MuleSoft</td>
<td>MuleSoft Tcat is the company’s commercial offering of Apache Tomcat for the enterprise, and provides centralized application management across all of a customer’s Tomcat servers. Using its approach MuleSoft emphasizes reduced downtime, improved security, and a lower total cost of ownership (TCO), compared to competitive offerings. The company is aggressively promoting its Tcat product by launching a marketing campaign that describes how developers can migrate Java applications from Oracle WebLogic to Apache Tomcat.</td>
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<td>WSO2</td>
<td>WSO2 entered the commercial Tomcat server business in late 2010 with its WSO2 Application Server 4.0, a lightweight, high-performance platform for SOA. It is built on a number of Apache projects, and provides an enterprise-ready transactional runtime to deploy and manage Web services.</td>
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<td>Apache Tomcat</td>
<td>Open source Apache Tomcat is a servlet container developed by the Apache Software Foundation (ASF). It is not a full J2EE application server and does not include Enterprise JavaBeans (EJB). It also lacks in enterprise-class support, security and performance.</td>
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Recommended Vendor Actions

- Oracle needs to update its strategy and messaging around Oracle GlassFish AS, particularly regarding how the product will evolve to include the enterprise-class features found in Oracle WebLogic. This product represents an important opportunity for Oracle to broaden its interest in the open source community, not to mention providing a group of developers with an alternative application server that is more straightforward to install and configure than its traditional WebLogic app server. Such a broad portfolio that includes a known open source offering provides a key differentiator for Oracle, yet there is a perception in the industry that Oracle sales is not set up to reward its team for promoting GlassFish.

- IBM needs to outline its strategy around its standards-based app server, called WebSphere Application Server Community Edition (CE), which gets little attention under the popular flagship WAS brand. Rather than tossing into its product portfolio alternative open source products, IBM should be showing developers how it is addressing modern concerns within the context of its flagship enterprise products. For example, IBM recently addressed those developers interested in emerging opportunities—specifically mobile devices—by enhancing its WAS through its Web 2.0 and Mobile Feature Pack, to support application development for popular mobile devices.

- VMware should continue to increase its messaging around its open source approach which includes the popular Spring Framework and PaaS offering Cloud Foundry. Proprietary software competitors will feel increased pressure to address how their popular middleware solutions play within the open source realm and provide mainstream developers with a lightweight option.

- SAP needs to continue increasing its involvement in Java-related community projects to help gauge the importance of open-source based application server technology as an alternative to comprehensive and traditional app servers. The company should also conduct developer surveys to help determine potential business opportunities and general interest in lightweight app servers.

- Leading app server vendors IBM, Oracle and SAP need to increase their involvement in open source communities as a way to stay on the pulse of key technology trends, demonstrate support of open source projects, and contribute to these communities. If they are not invested in these communities, proprietary middleware vendors appear to be making only a token effort at an open source offering and providing developers with a lightweight infrastructure alternative.

- HP should consider Red Hat a viable acquisition target, one which would move the technology giant into the lucrative enterprise application platform space, which addresses developers’ need for a lightweight infrastructure. As a side benefit, HP is desperate to make its cloud business successful, so the company should consider how VMware’s 2010 purchased of SpringSource played an important role in strengthening its PaaS and IaaS cloud offerings through leading and relevant middleware technology. As a thriving and leading open source provider in this space, Red Hat would provide HP with similar success.

Recommended User Actions

- Users need to reexamine the changing role of the application server in light of developers’ increased focus on mobile and Web 2.0 applications, which is driving the need for high-productivity, low-cost infrastructures for these mass-market developers.

- Users need to be aware of the trade-offs of open source/commercial products, which is typically high performance, advanced technologies such as in-memory computing and security, and centralized management.

- Customers of traditional, proprietary application servers need to research how vendors plan to evolve their infrastructure technology to meet the growing need for a modular deployment architecture and general platform flexibility, compliance with up-to-date Java standards, and support for agile, fast application development and deployment platforms.