

# Oracle9i Application Server - The Application Platform for Linux

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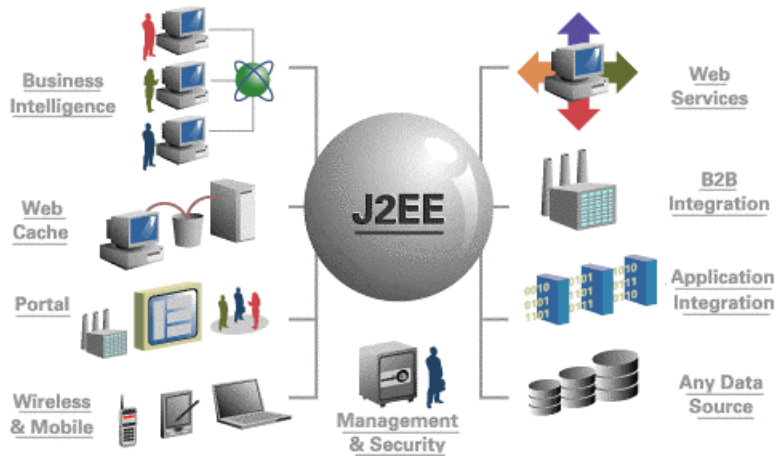
## **EXECUTIVE OVERVIEW**

The adoption of the Linux Operating System for large-scale deployment of IT applications is stronger than ever before. Small, medium and large companies around the world are drawn to Linux on the premise of higher return on investment and lower total cost of ownership. Perhaps more importantly the industry is taking notice that major software vendors such as Oracle have demonstrated their commitment to the Linux Operating System as a foundation for the new IT infrastructure required to support successful companies in the new millennium.

This white paper describes how Oracle9i Application Server (Oracle9iAS) on Linux provides businesses with an enterprise-ready middle-tier platform that offers the cost-benefits of Linux while delivering the complete and integrated infrastructure required to support new and innovative ways of conducting business.

## **INTRODUCTION**

Oracle9iAS is the industry's fastest, most complete and integrated J2EE-certified application server. Over 11,000 companies rely on Oracle9iAS to run their business applications and Web sites. Oracle9iAS has revolutionized the fast-growing application server market by being first to integrate all the technology required to build and deploy e-business portals, transactional applications, and Web services in a single product. Oracle9iAS supports all key Java, XML and emerging Web services industry standards. Its open and integration-ready architecture ensures that Web applications can integrate with your IT environment, including legacy systems, the applications of your suppliers and partners, and Oracle and non-Oracle databases.



**Figure 1: Oracle9i Application Server**

At the core of Oracle9iAS is a fast, lightweight J2EE-certified engine developed using pure Java technology for O/S and hardware independence. Oracle9iAS has excelled as an application server due to its high performance, scalability, reliability and manageability—all available in a single pre-integrated product for a variety of Operating Systems and hardware platforms. With Oracle’s strong commitment to Linux, Oracle9iAS has emerged as a one-stop solution for deploying enterprise-scale business applications on Linux.

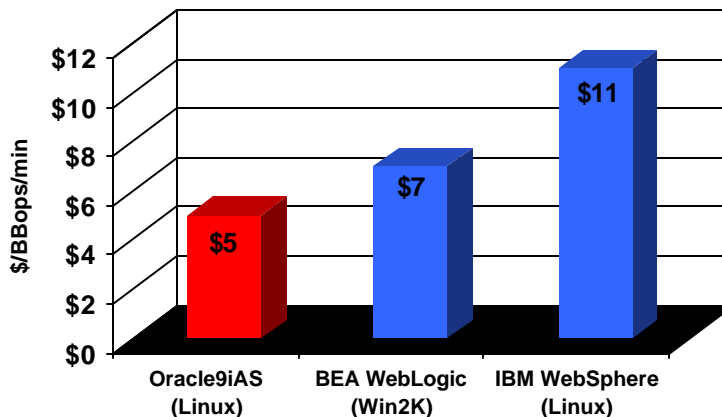
### **MOST COST EFFECTIVE APPLICATION SERVER ON LINUX**

One of the key reasons businesses are attracted to Linux is its low cost. However, the cost savings offered by Linux will only translate into real savings if the *application server* platform makes efficient use of the Linux Operating System. Recent benchmark results, based on the J2EE standard benchmark, ECperf<sup>1</sup>, have demonstrated that Oracle9iAS offers the best price/performance and is the most cost-effective application server on Linux. This ensures that the cost benefits you enjoy from the Linux platform directly translate into the best return on investment and lowest total cost of ownership for your business solution.

Oracle9iAS has undergone rigorous testing as part of the ECperf benchmark. ECperf measures cost effectiveness as the ratio of total cost of the system tested (price) divided by the benchmark business operations per minute result (performance). Oracle9iAS is the world record holder for best ECperf Price/Performance in ECperf version 1<sup>2</sup>. This result was obtained on the Linux operating system.

<sup>1</sup> Please see <http://ecperf.theserverside.com>

<sup>2</sup> As of July 9, 2002: Oracle, 24,639.37 BBops/min @ Std, \$5/BBops/min @ Std



**Figure 2: Best ECperf Price/Performance Results for Oracle, BEA and IBM<sup>3</sup>**

Oracle9iAS achieved the best ECperf Price/Performance result using a 3-node cluster of 2-CPU Linux servers in the middle-tier and a 4-CPU database server also running Linux. This benchmark configuration is representative of real-world customer deployments and shows that it is possible to attain high performance at lowest possible cost. In contrast, BEA WebLogic achieved its best ECperf Price/Performance result on a small system designed primarily to achieve best price/performance.

Oracle9iAS attained this record-setting ECperf result because the software is able to utilize server resources more efficiently. Three application servers have published ECperf results on clusters of 2-node Intel-based servers running Linux: Oracle9iAS, BEA WebLogic and IBM WebSphere.<sup>4</sup> A comparison of the throughput per node shows that Oracle9iAS has a per-CPU throughput advantage of 30% over BEA WebLogic and 123% over IBM WebSphere.

### FASTEST J2EE APPLICATION SERVER

Industry benchmarks show that Oracle9iAS, with its small and efficient J2EE engine, is the industry's fastest and most scalable application server. Oracle9iAS is the also world record holder for best ECperf Performance.<sup>5</sup> Figure 3 below compares best ECperf Performance achieved by each of the major application servers in the market today.

<sup>3</sup> As of July 9, 2002: Oracle, 24,639.37 BBops/min @ Std, \$5/BBops/min @ Std. BEA, 7,539.90 BBops/min @ Std, \$7/BBops/min @ Std. IBM, 32,581.47, \$11/BBops/min @ Std.

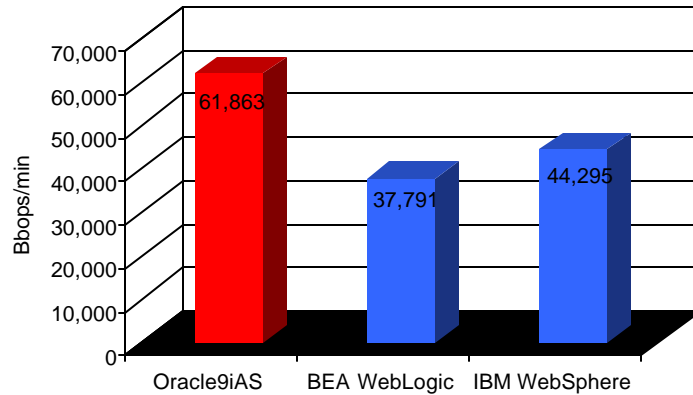
Source: <http://ecperf.theserverside.com>. ECperf is a trademark of Sun Microsystems Inc.

<sup>4</sup> As of July 9, 2002: Oracle, 24,639.37 BBops/min @ Std, \$5/BBops/min @ Std. BEA on HP (sponsor), 25,394.60 BBops/min @ Std, \$9/BBops/min @ Std. IBM, 25,658.13 BBops/min @ Std, \$12/BBops/min @ Std.

Source: <http://ecperf.theserverside.com>. ECperf is a trademark of Sun Microsystems Inc.

<sup>5</sup> As of July 9, 2002: Oracle, Sun, 61,862.77 BBops/min @ Std, \$28 BBops/min @ STD. BEA on HP (sponsor), 37,379.1 BBops/min @ Std, \$36/BBops/min @ Std. IBM, 44,294.97 BBops/min @ Std, \$23/BBops/min @ Std.

Source: <http://ecperf.theserverside.com>. ECperf is a trademark of Sun Microsystems Inc.



**Figure 3: Best ECperf Performance Results for Oracle, BEA and IBM<sup>5</sup>**

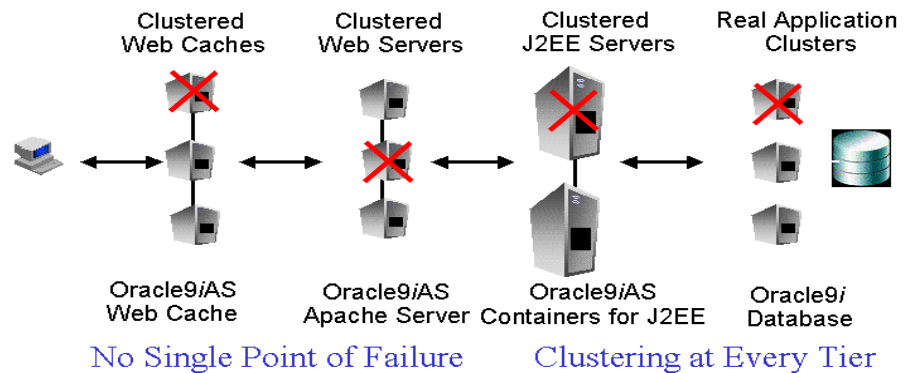
### UNBREAKABLE RELIABILITY

With the Internet erasing the concept of “office hours,” all companies now require *unbreakable reliability* and *high availability* to ensure that their mission-critical business applications and Web sites are operating 24x7. Furthermore, with the drive to improve profit margins and closer ties between IT spending and financial objectives, businesses can no longer ignore the impact of not implementing high availability.

The optimal strategy is to implement a highly fault-tolerant solution with enterprise strength reliability, at very low cost. A key new deployment feature of Oracle9iAS is advanced clusters, which make it possible to turn low cost commodity hardware into highly reliable and fault-tolerant systems. Oracle9iAS also offers features to ensure *Zero Planned Downtime* and *Zero Unplanned Downtime* so that your applications stay up and running 24x7 with no downtime.

### End-to-end Clustering

Oracle9i Application Server ensures no single point of failure in a multi-tier deployment configuration.



**Figure 4: End-to-end Clustering with Oracle9i Application Server**

As illustrated in Figure 4, if a node in a cluster fails, client requests are transparently routed to another node in the cluster and the end-user never knows that a failure has occurred. As a result, any business application deployed on the application server will remain up and running without interruption.

This architecture highlights the advantage of end-to-end clustering, whereby failure of a single node does not interrupt the functioning of the system as a whole.

### Zero Planned Downtime

Oracle9iAS offers a number of new features that enable administrators to achieve *Zero Planned Downtime*.

Oracle9iAS supports *Dynamic Reconfiguration* of the system at runtime, allowing administrators to automatically add and remove nodes without bringing down the system.

With the new *Hot Deployment* features, J2EE applications can be deployed to Oracle9iAS without shutting down or restarting the application server.

The new *Rolling Upgrades* feature allows administrators to group application services together and then upgrading them in sequence. This ensures that applications continue to run even during the upgrade process.

### Zero Unplanned Downtime

Oracle9iAS eliminates loss of service in the event of unforeseen errors by featuring a new *Fast Start Fault Recovery Architecture™* that ensures graceful recovery of cluster nodes. This enables the infrastructure to detect failures automatically and auto-recover.

The Fast-Start Fault Recovery Architecture™ provides multiple levels of failover including: automatic server restart in case of nodal failure, transparent re-routing in case of database connection failure (*Transparent Application Failover*), and complete transparency of fault recovery.

## PRODUCTIVE DEVELOPMENT

Organizations developing on the Linux platform rely on many open source products and utilities. This is not a surprise considering the Linux platform's strong roots in the open source movement. Oracle9iAS offers extensive support for the major development frameworks, tools and utilities commonly used by the Linux developer.

Oracle's commitment to Linux developer productivity is exemplified by the integration of the *Apache Web server* in the Oracle9iAS platform. Oracle HTTP server, a component of Oracle9iAS, is completely based on the Apache Web server software and fully supports the Apache Modular Architecture. Oracle9iAS also ships with a number of Apache "mods." Linux developers particularly appreciate the fact that the integration is complete, so in order to leverage the scalability of the Oracle9iAS infrastructure (Servlet engine, EJB container, load balancing and failover, clustering) there are no compromises to be made. Every capability offered by Oracle9iAS in this area is supported via the Apache-based Web server<sup>6</sup>. Administrators also appreciate the Apache integration. Oracle9iAS provides all the components necessary for complete deployment of the Web server, eliminating the need for extra downloads or patches.

Oracle9iAS also supports *Apache Struts* as a framework for J2EE applications and *Junit* for J2EE testing. Oracle9iAS provides integration with *Apache Ant* for J2EE packaging and deployment and *CVS* for version control via Oracle9i JDeveloper.

## ACCELERATED DEPLOYMENT

With Oracle9iAS on Linux, customers are closer than ever to realizing the concept of server farms on commodity hardware. We have shown how Oracle9iAS offers unbreakable reliability on the Linux platform. Now customers can attain mainframe reliability at the affordable price of commodity hardware. Using Intel-based servers running Linux, customers are able to deploy vast farms of application servers using Oracle9iAS for the deployment of enterprise-wide applications.

It is a well-known fact that as the number of nodes in a server farm grows, the deployment costs will also increase. Oracle offers two solutions to address this problem: certification of Oracle software on key Linux platforms, and certified configurations that include pre-configured and tested hardware and software.

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<sup>6</sup> Other vendors such as BEA require you to use the native Web server for certain operations such as clustering. This limits their value for the Linux/Apache developer.

## **Certification**

Oracle maintains a *certification*<sup>7</sup> policy for both the database and the application server for the major flavors of Linux—Red Hat, SuSE and Caldera. This provides customers with the assurance that Oracle products have been tested thoroughly for their development and deployment environments, eliminating the possibility of running into unforeseen problems and last minute surprises.

## **Certified Configurations**

Oracle dramatically reduces the cost of deploying large server farms by offering *certified configurations*<sup>8</sup> for Linux. Certified Configurations are system stacks of hardware and software that have been integrated, stress-tested and pre-installed, offering the fastest and most cost-effective<sup>9</sup> and reliable method of deploying Oracle software. Oracle9iAS and Oracle9i database are available on Linux certified configurations from Dell and HP.

## **ONE STOP SHOPPING FOR LINUX**

It is a well-known fact that majority of the system costs occur after deployment. Oracle offers a single stop solution that enables customers to eliminate vendor finger pointing and dramatically reduce the cost of maintaining live systems.

## **Technical Support for Linux**

In addition to supporting its complete product line on Linux, Oracle offers support for *Red Hat Advanced Server*. Working closely with Red Hat, Oracle provides direct technical support for the entire software stack including the Linux operating system.

## **Complete Support Outsourcing**

More and more customers are turning to outsourcing to reduce their ongoing maintenance costs. Oracle offers complete application, database, and hardware management services<sup>10</sup>. By maintaining a continuous connection to monitor customer systems and applications, Oracle has shown that it can reduce support response time by as much as 56% in an outsourced environment.

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7 Please see [http://otn.oracle.com/tech/linux/pdf/AllOracleLinux\\_Certs\\_July02.pdf](http://otn.oracle.com/tech/linux/pdf/AllOracleLinux_Certs_July02.pdf)

8 Please see [http://www.oracle.com/ip/std\\_infrastructure/cc/index.html?content.html](http://www.oracle.com/ip/std_infrastructure/cc/index.html?content.html)

9 Please see independent study by Hurwitz Group [http://www.oracle.com/ip/std\\_infrastructure/cc/oracle\\_tco\\_wp\\_final.pdf](http://www.oracle.com/ip/std_infrastructure/cc/oracle_tco_wp_final.pdf)

10 Please see [http://www.oracle.com/online\\_services/](http://www.oracle.com/online_services/)

## CONCLUSION

This paper outlined Oracle's commitment to the Linux operating system as a viable platform for enterprise application development and deployment. The paper described the various ways Oracle9iAS enhances the Linux operating system to run applications faster, attain unbreakable reliability, increase developer productivity and reduce total cost of ownership. More importantly this paper demonstrated that Oracle offers one-stop shopping for customers in search of a complete solution for developing, deploying and maintaining enterprise applications on Linux.

Visit <http://www.oracle.com/appserver> to learn more about Oracle9iAS on Linux.



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