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**OPTIMIZED SOLUTIONS**

Oracle White Paper  
February 2011

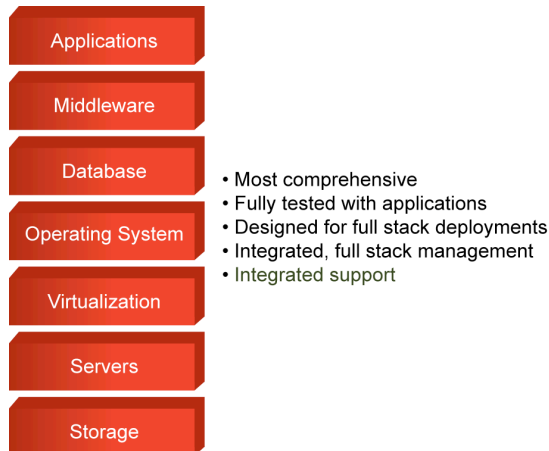
## Oracle Optimized Solution for WebLogic Suite – A Business White Paper

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## Executive Overview

In today's hyper-connected and fast-paced economy, companies are delivering more applications as Web-based services. As this trend continues, applications that once served only hundreds of internal users are transitioning to network-based solutions that support millions of consumers worldwide. While these business- and mission-critical services can take advantage of sophisticated and highly scalable solutions such as Oracle WebLogic Server and Oracle Coherence to deliver critical functionality and access, having the right hardware underneath it all can be the difference between mediocrity and business success.

Oracle is the only company that delivers all the pieces needed to create high-performance, scalable Web service deployments at less cost and with less risk. From enterprise applications and operating environments, to virtualization and management tools, to innovative computing systems, storage, and networking solutions, Oracle integrates, optimizes, and tests it all (Figure 1 Oracle provides unmatched full stack management for Web service deployments). Now organizations can take advantage of the unique characteristics of Oracle's modular and balanced hardware platforms to create a less complex, more agile Web service infrastructure that is easier to deploy and manage, adapts quickly to changing business conditions, and costs less to run.



**Figure 1 Oracle provides unmatched full stack management for Web service deployments**

## Introduction

Whether supporting retail portals, manufacturing processes, customer relationship management, or remote enterprise applications, Web-based services are pushing the limits of information gathering, processing, management, and presentation systems. Indeed, more data is generated and consumed than ever before—and datacenter infrastructure is failing to keep pace. Systems are overworked, security is mandated, full compliance is challenging to achieve, and users are dissatisfied with even small slowdowns in data access times. As a result, companies are turning to grid strategies that distribute workloads and handle increasing amounts of data to deliver Web-based services to users.

Based on scalable system architectures, data grids provide massively parallel processing capabilities that applications can exploit to search, sort, and aggregate information in real time. By caching data closer to applications to take advantage of unique hardware capabilities, data grids deliver the scalability, reliability, and high throughput needed to support massive amounts of users around the globe, and around the clock. However, data grids rely on software and hardware working together. Without proper planning and provisioning Web service delivery suffers—and even the best hardware cannot deliver data grid potential when combined with improper or inflexible software.

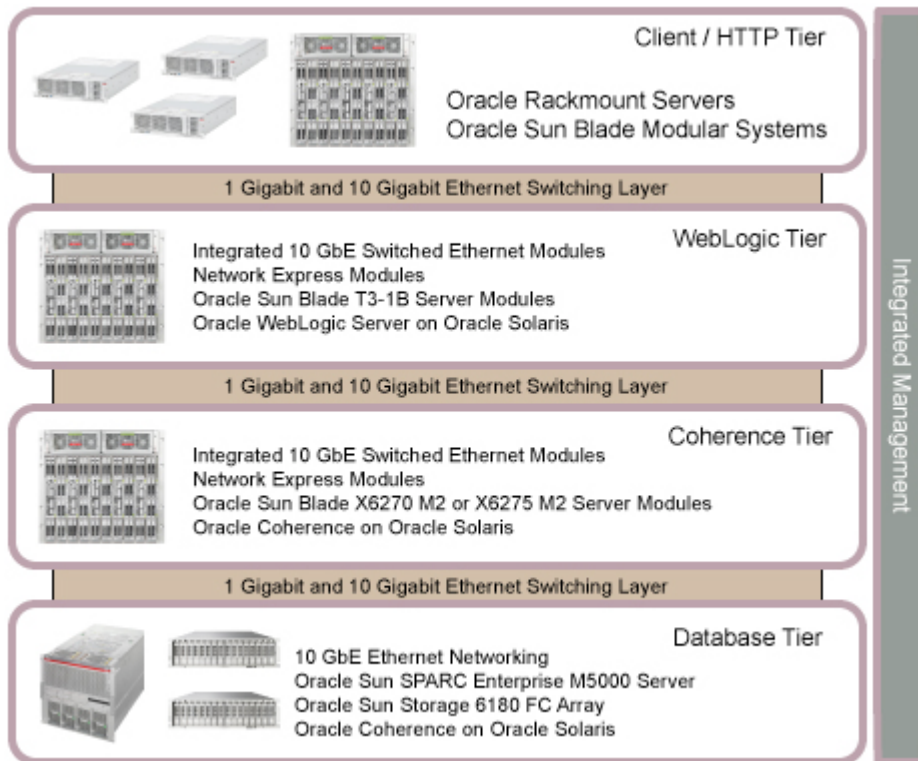
Most companies piece together data grid solutions with point products from many vendors, leading to integration difficulties, long design, testing, and deployment cycles, hit or miss security measures, and complex solutions that are not optimized to take advantage of platform capabilities. When contributing to business performance and living within budgets is a concern, knowing whether to stay the course with an ad hoc approach and live with the issues created by IT infrastructure fragmentation, or move to a standards-compliant platform, is key to delivering on goals and staving off competitive threats.

The truth is, IT innovation drives continuous business transformation. With the right processes, information, and technology in place, companies are better able to succeed in uncertain economic times. Yet making changes to infrastructure is seen as injecting risk into otherwise functioning environments—and evolving requirements for scalability, compliance, and security are making transitions harder to achieve. Finding effective ways to deploy technology that delivers results is key. The right approach integrates performance management strategies, hardware, and software technologies into a holistic environment designed to get the job done.

## Drive Business Innovation with an Integrated Web Services Solution

IT has the power to support business innovation. Whether delivering Web services to people across the room or on the other side of the world, IT creates new opportunities for information exchange, extended collaboration, and greater reach. However, a user's experience—good or bad—dramatically effects the perception, acceptance, and success of the company. IT must find ways to give users access to information and services at any time and from any location, and deliver the right result fast.

Oracle is the only company that offers a tightly integrated clustered computing solution that can be deployed, supported, and managed as a single system—from applications to disks. The solution combines industry-leading Oracle WebLogic Server, Oracle Coherence, and innovative Oracle servers and storage systems into an integrated and tested solution designed to maximize Web-facing application performance while minimizing risk (Figure 2 Oracle servers and storage systems combine with Oracle WebLogic Suite and Oracle Coherence to deliver Web services to users. Figure 2).



**Figure 2 Oracle servers and storage systems combine with Oracle WebLogic Suite and Oracle Coherence to deliver Web services to users.**

Oracle's balanced architecture combines the strengths of intelligent software with platform innovation to give organizations a solid foundation for Web services. Oracle WebLogic Server and Oracle Coherence work together to create an in-memory data grid with built-in services that help support and

enhance the flow of information. Data is partitioned automatically and moved closer to applications to reduce latency and improve performance. Underneath, Oracle platforms provide unique characteristics that let datacenter managers match resources to workload characteristics and scale capacity to meet growing demand—without sacrificing performance or security. In fact, organizations can start with rackmount servers and transition to blade-based systems as demand grows.

- **Modular blade systems.** Oracle's Sun Blade 6000 Modular System provides a solid backbone for Oracle WebLogic and Oracle Coherence software. Its modular architecture delivers the benefits of blade architecture without common drawbacks. Optimized for performance, efficiency, and scalability, these platforms take an open systems approach, employing the latest processors, operating systems, industry-standard I/O modules, expandable storage, and transparent networking and management. The Sun Blade X6275M2 Server Module is an ideal product for Coherence-only deployments, doubling the memory and CPU footprint of normal blade systems, and is therefore ideally suited to the in-memory caching architecture that Coherence provides.
- **Built-in switching technology.** Keeping information moving is essential in Web services environments. Oracle's solution includes a high-bandwidth, low-latency interconnect that speeds communication between the Oracle WebLogic Suite and Oracle Coherence software. A novel, full-featured, integrated switching module provides cut-thru switching capability for very low latency and high-speed 10 Gigabit Ethernet or InfiniBand connections to every server in the chassis. Additionally, when connecting to other blade chassis, no external switch is needed. Direct connections between the chassis allow for a more economical and performant interconnect than 3<sup>rd</sup> party switches.
- **Integrated management and monitoring tools.** Oracle's solution supports standard interfaces and network protocols to simplify management. The cross-platform Oracle Enterprise Manager Ops Center tool provides direct management over individual server modules and direct management of chassis-level modules using integrated lights-out management (ILOM) techniques. Combined with single sign-on capabilities, environmental monitoring, and more, Oracle's solution makes it easy to understand how systems are functioning, without requiring additional training or changes to management practices. In addition, the entire application stack — from applications to disks — can be managed from a single Oracle Enterprise Manager console, giving IT the freedom to eliminate disparate tools and maximize return on IT investments.
- **Blade Servers are economical.** With Oracle's modular blade systems, built-in switching technology, and integrated management, IT organizations can accelerate Web services deployment by up to 75%, reduce IT infrastructure complexity, increase server to administrator ratio by 85%, and save on space, energy, and capital expenses.

## Gain Simplicity

Building a lean and successful business requires efficiency. Applying best practices and utilizing intelligent and integrated solutions enables IT organizations to move from manual and fragmented

processes to automated, standardized, and repeatable methods that ease the deployment and management of Web-based services. Oracle's solution integrates administrative know-how and sophisticated management tools with systems designed with simplicity in mind.

- **Accelerate deployment.** Purchasing, configuring, provisioning, and deploying systems and services can be time-consuming. Oracle's pre-tested solutions dramatically reduce deployment time, with testing showing a nearly 75% decrease in deployment time for similar test configurations<sup>1</sup>. These reference configurations serve as the basis for deployments, taking the guesswork out of hardware selection and configuration. Tested configurations are available for most Oracle enterprise software, including Oracle WebLogic Suite. Furthermore, modularity and end-to-end integration let IT staff provision 100 new servers 20x faster than traditional methods with built-in automation facilities.
- **Replicate known environments.** Enterprise software often contains numerous components or modules that need to be installed and configured separately. Learning how to install products and researching needed patches can take time and reduce project ROI by delaying application or service deployment. Using Oracle's virtualization technologies, such as Oracle Solaris Containers or Oracle VM Templates, IT organizations can deploy one or more pre-built, pre-configured, pre-patched virtual environments and their application stacks 10x faster than using manual methods. For example, administrators can download the template file for Oracle WebLogic Server from the oracle.com site and import it to deploy a complete software solution within minutes.
- **Reduce complexity.** Deploying more Web-based services faster and responding to changing business priorities often is solved by throwing more servers at the problem. Connecting these systems together results in complex infrastructures that are difficult to manage. By building switching technology into the chassis, Oracle's Sun Blade 6000 Modular System provides access and an aggregated interface to all server modules, eliminating the need for expensive external switches and simplifying network infrastructure and management.
- **Ease management.** Administrators spend enormous amounts of time keeping services up and running. In enterprise deployments, many different types of servers, switches, and storage systems are in use, each with its own management and monitoring tools. Oracle is the only vendor to offer full stack management, from applications to operating environments, to virtualization technologies and systems and storage. Because management is integrated throughout the stack, companies can gain insight into solution function and performance, increase server to administrator ratio by 85%, and discover and inventory assets automatically on the network in a fraction of the time.

## Create an Agile Environment

Agile organizations understand how to deploy IT systems, services, and data sources so that new requirements can be handled without delay. The IT landscape must be dynamic and flexible, and utilize technology to the best advantage, if changes are to occur on time and within budget. Unfortunately, the large and complex Web services solutions deployed in many datacenters often are inflexible, hampering agility as IT looks to react to demand for new services and changing business conditions.

By deploying Oracle WebLogic Server and Oracle Coherence on Oracle's blade servers, IT organizations can deliver needed change with speed and quality. For Web services applications sized to take advantage of two-socket server economy, the Sun Blade 6000 Modular System delivers one of the industry's most compelling solutions. The system offers maximum performance, enterprise reliability, and easy scalability at less cost than competing products. Modular systems make it easier to build large Web server farms with maximum manageability and deployment flexibility. Organizations can add new capacity quickly, or redeploy hardware resources as required.

Support for multiple processing architectures gives IT architects the flexibility to adjust the design as necessary to best match the job at hand. With a choice of server modules based on the latest SPARC® and Intel® Xeon® processors, organizations can select the platforms that best match Web services applications or existing infrastructure. The flexible, modular architecture lets companies start small and grow as needed. Organizations can add blades and get a set amount of performance, without increasing infrastructure complexity. In addition, the move from rackmount systems to blades can be made over time, without sacrificing performance. Oracle's rack-to-blade equivalency makes it easy to correlate rackmount server performance to blade server performance and added power savings.

## Experience Extreme Performance

With more users demanding fast access to services and data around the clock, IT systems must be able to perform well on a consistent basis. Oracle's hardware platforms support the latest technologies and provide the speed datacenters need to keep Web service response time low and meet user expectations.

## Flash Technology Changes the Game

As demand rises and applications gain complexity, IT infrastructure must provide massive capacity and fast access to data in order to keep pace. Deploying more hard disk drives and arrays adds capacity—but fails to provide the performance needed to keep systems supplied with data for processing. Many Oracle systems include Flash devices or support Oracle's add-on Flash accelerator card. With fast read and write performance, a compelling price point, and incredibly low power requirements, Flash memory devices can expand the Web cache and boost deployment performance for Oracle WebLogic Server installations. For example, Oracle's Flash devices provide 2x better quality of service than hard drives at the same load, scale to 3x more users, and deliver 25% higher quality of service than hard drives operating at the maximum rate<sup>ii</sup>.

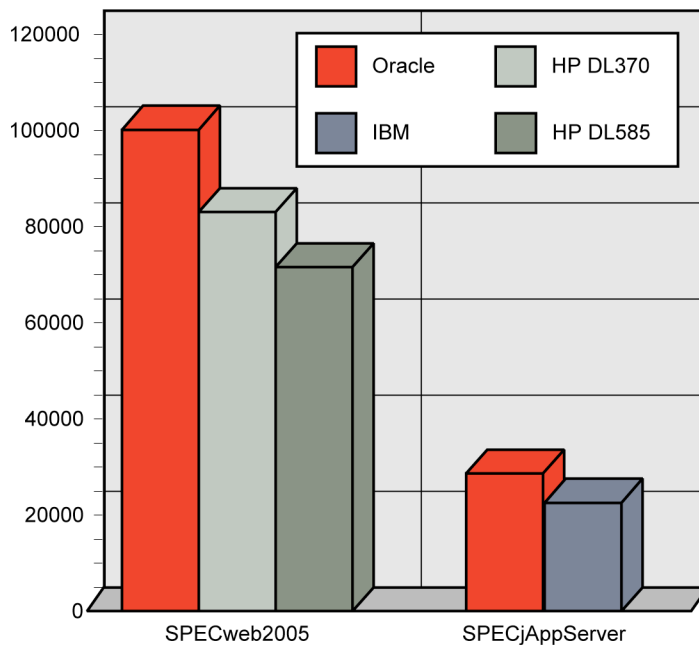
## Oracle Systems Deliver World-Record Performance

Supporting business objectives requires IT deployments with outstanding performance characteristics. With massive compute power in a small footprint, high-speed networking built in, and one of the fastest operating systems available, Oracle platforms deliver scalability and speed to Web services.

- **Web server performance.** The SPECweb@2005 benchmark measures Web server performance for Banking, E-commerce, and Support workloads to simulate real-world Web services deployments. Oracle's Sun SPARC Enterprise T-Series servers and Sun Storage F5100 Flash Arrays outperform

systems from other vendors. For example, Oracle’s solution is 21% faster than an HP DL370 server running Linux and 40% faster than an HP DL585 server running Linux on the same benchmark<sup>iii</sup>.

- **Application server performance.** Web services depend on application servers to handle user requests and deliver customer satisfaction. The SPECjApp<sup>®</sup>2004 benchmark measures the performance of Java™ 2 Platform, Enterprise Edition (J2EE) application servers. This multitier benchmark SPECjAppServer2004 stresses all J2EE technologies and the entire application environment—hardware, Java Virtual Machine, database software, network, and more—providing insight into how deployed solutions can be expected to perform. Oracle’s complete, open, and integrated solution used only one-third the number of systems, consumed 26% less physical space, and delivered 1.7 times better performance per rack unit than the best published result by IBM<sup>iv</sup>. (Figure 3)



**Figure 3 Oracle solutions outperform systems from other vendors on key SPEC<sup>®</sup> benchmarks.**

- **Consistent response time.** Failing to deliver predictable Web service performance can leave employees, partners, and customers frustrated. Oracle’s solution delivers consistent response time, as measured by the open-source On-line Hotel Room Searching and Reservation System workload benchmark. Representing a typical target implementation of Oracle Coherence for online Web and enterprise applications, the workload demonstrates how optimal hardware choice affects scalability. The test configuration provided near-linear scalability and consistent responsiveness, even when scaled to one million operations per second (Figure 4).

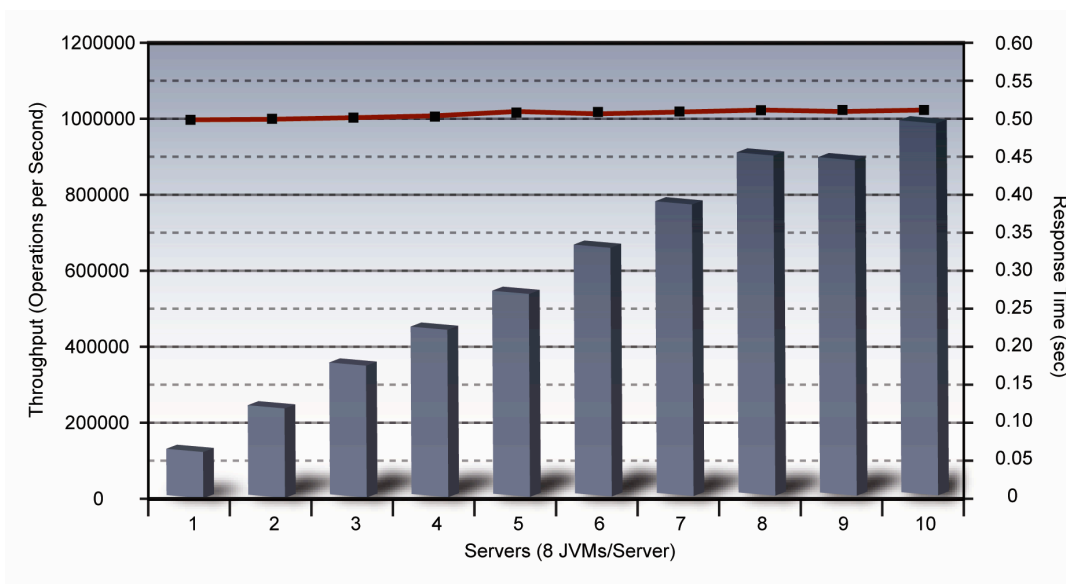


Figure 4 Performance and response time metrics for the Hotel Object benchmark

- Platform performance.** Oracle Solaris continues to set and reset world records and includes unique optimizations for Oracle Sun SPARC Enterprise T-Series and x86 systems and Oracle software. For example, the Predictive Self Healing technology, cryptographic capabilities, and enhanced TCP/IP stack built into Oracle Solaris are integrated and automated in a way unlike any other platform available today, to foster system uptime and performance.

## Maximize Savings

Enterprises turn to IT organizations for ways to drive cost out of the business. Infrastructure acquisition, real estate, energy, and management costs all contribute to capital and operational expenditures and are targets for cost reductions. With a focus on contributing to the bottom line, IT departments look for money saving opportunities in every aspect of the datacenter. Oracle platforms provide innovative ways to help IT save on space, power, cooling, and assets, and streamline operation.

- Save space.** Using Oracle Coherence, datacenters can reclaim up to 50% of valuable datacenter floor space. Organizations that move from legacy systems to Oracle's Sun SPARC Enterprise M-Series servers can experience 2x to 4x improvement in speed and system density over previous generation systems.
- Save energy.** With an eco-friendly design, Oracle's modular blade architecture delivers 10% to 15% power savings over rackmount servers<sup>v</sup>, and a significant reduction in power and cooling costs through the elimination of external switches.
- Save on equipment.** Oracle's modular, integrated blade server chassis delivers server, storage and switch cost savings. For example, using Oracle Sun Blade Modular Systems instead of point products delivers up to twice the server density over blade solutions from other vendors, and over 50% switch savings compared to deploying dedicated Cisco switches<sup>vi</sup>.

## Rest Assured with Industry-Leading Security

The widespread use of Web services can leave companies vulnerable to cyber attacks. As a result, most IT managers assume the IT infrastructure is a target for security threats. In addition, regulatory oversight requires data, applications, and systems to be secured. Proper audit controls and other procedures must be instituted to safeguard trade secrets, customer identities, and business data. All servers in Oracle's solution run the enterprise-class Oracle Solaris 10 operating system. With a sophisticated network-wide security system that controls the way users access files, protect system databases, and use system resources, Oracle Solaris 10 can help IT address security needs at every layer.

- **Restrain applications.** Administrators can grant new or existing applications only the appropriate privileges necessary to perform tasks. Many operating system components are already configured to run with reduced privileges by default, with no configuration required by administrators.
- **Limit access to administrative functions.** IT staff can grant or deny privileges to individual users to permit the execution of some privileged operations without giving them full access that leaves systems open to risk.
- **Secure networks and systems.** Datacenter managers can restrict which applications are available to remote users, control access to network services, take advantage of built-in firewall technology, guarantee file integrity, validate system consistency, track usage, and more. Using these integrated hardware features and industry-recognized software eases administrative effort for regulatory compliance and reporting efforts.
- **Protect communications.** Keeping data secure as it flows into and out of Web services necessitates the use of encryption and decryption techniques. Applications can access built-in cryptographic services and offload time-consuming operations to optimized encryption software or hardware accelerators configured on the system, without modifying code. Built-in wire speed cryptography supports the most common ciphers and hashing functions and delivers that functionality faster—outperforming competing add-on accelerator cards by 10x while saving on slots and power.

## For More Information

For more information on Oracle WebLogic Server, Oracle Coherence, Oracle platforms, and how they can work together to simplify Web services deployment, see the references listed in Table 1.

**TABLE 1. REFERENCES FOR MORE INFORMATION**

Oracle WebLogic Server and Oracle Coherence and Oracle Optimized Solutions	<a href="http://www.oracle.com/weblogicserver">http://www.oracle.com/weblogicserver</a> <a href="http://www.oracle.com/products/middleware/coherence">http://www.oracle.com/products/middleware/coherence</a> <a href="http://www.oracle.com/goto/optimizedsolutions">http://www.oracle.com/goto/optimizedsolutions</a>
Oracle Servers and Oracle Solaris Operating System	<a href="http://www.oracle.com/us/products/servers-storage/servers">http://www.oracle.com/us/products/servers-storage/servers</a> <a href="http://www.oracle.com/solaris">http://www.oracle.com/solaris</a>
Oracle Technology Network	<a href="http://www.oracle.com/technetwork">http://www.oracle.com/technetwork</a>

<sup>i</sup> See Oracle's *Sun Systems for Oracle Coherence: An Optimal In-Memory Data Grid Architecture* technical white paper, published in September 2010, on the Oracle Technical Network resource site.

<sup>ii</sup> Sun Fire X4270 server with 72 GB memory, 3 Sun Flash Accelerator F20 PCIe Cards, Sun Storage J440 array (12x15K RPM disks) compared to 1) 12 high-speed 15K RPM disks, 2) 3 Sun Flash Accelerator F20 PCIe Cards as a cache device, and 3) 64 GB server memory as a cache device. See [http://blogs.sun.com/BestPerf/entry/oracle\\_sun\\_flash\\_accelerator\\_f20](http://blogs.sun.com/BestPerf/entry/oracle_sun_flash_accelerator_f20) for testing details and results.

<sup>iii</sup> Sun SPARC Enterprise T5440 server, Oracle Solaris 10, Sun Java™ System Web Server 7.0 Update 5, Result: 100209; HP ProLiant DL370 G6 server, Red Hat Enterprise Linux 5.3, Rock Web Server v1.4.7 (x86\_64), Rock JSP/Servlet Container v1.3.2 (x86\_64), Result: 83073; HP ProLiant DL585 G5 server, Red Hat Enterprise Linux 5.3, Rock Web Server v1.4.7 (x86\_64), Rock JSP/Servlet Container v1.3.2 (x86\_64), Result: 71629. Results as of March 26, 2010. See <http://www.spec.org/web2005/results/web2005.html>

<sup>iv</sup> SPEC and SPECjAppServer are registered trademarks of Standard Performance Evaluation Corporation. All results from [www.spec.org](http://www.spec.org) as of June 14, 2010. Oracle WebLogic Server 11g on five-node Oracle Sun SPARC Enterprise T5440 cluster each with four 8-core UltraSPARC T2 Plus 1.6 GHz processors, 28,648.74 SPECjAppServer2004 JOPS@ Standard. (World Record SPECjAppServer2004 multi-node result) WebSphere Application Server V7 on IBM xSeries BladeCenter HS21 cluster (32 chips, 128 cores) 22,634.13 SPECjAppServer2004 JOPS@Standard. (Best IBM SPECjAppServer2004 result)

<sup>v</sup> Based on platform to platform comparisons performed using power calculators available at [oracle.com](http://oracle.com)

<sup>vi</sup> Based on internal testing and price studies conducted by Oracle.



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