Executive Summary
For more than fourteen years, organizations worldwide have relied on IBM® WebSphere® Application Server to deliver critical Java® applications to customers and employees. But as these applications become more complex and the data they rely on continues to grow, organizations need to squeeze every last ounce of performance out of their infrastructures. Poor performing applications can lead to diminished productivity, headaches for IT, and lost revenue.

Intel and IBM provide the foundation for high-performance applications with the latest Intel® Xeon® processor family processor and IBM WebSphere Application Server 8.5.5. This combination—energy efficient hardware powered by the Intel Xeon processor family and the WebSphere Application Server software tuned by both Intel and IBM—provides performance, cost savings, and scalability to meet the demands of today's demanding applications.

IBM WebSphere Application Server: Simplicity, Scalability, and Flexibility
Organizations rely on data-intensive applications more than ever. These applications come in many forms and power business across industries, from high-volume transaction processing to complex web services for sharing data in business-to-business environments. As the foundation for IBM's suite of high-performance application development and runtime tools, IBM WebSphere Application Server 8.5.5 provides a highly optimized platform for flexible, extensible, and powerful Java applications. WebSphere Application Server 8.5.5 includes a number of key features that improve application development for smaller web and mobile applications, increase availability, and provide optimized performance on hardware powered by the Intel Xeon processor family.

Simplified Development and Deployment with the Liberty Profile
Developing and deploying applications can be time-consuming and complex for developers, release managers, and systems administrators. Applications and servers often contain code that is not needed for the functionality that is being deployed, which can lead to unnecessary complexity. With WebSphere Application Server 8.5.5, IBM introduces the lightweight Liberty profile, a highly configurable and dynamic environment that is ideal for web and mobile applications and provides a simplified development environment. With the Liberty profile, developers only need to focus on the server features their applications need, instead of worrying about all of the additional overhead of a full Java Enterprise Edition (Java EE) environment.

The Liberty profile lets the WebSphere server provision only those features and resources that an application or a set of applications require. By providing a small memory and resource footprint, the Liberty profile increases application performance and reduces the resources and costs for web, mobile, and Open Service Gateway Initiative (OSGI) applications.
Developers and administrators also benefit from a number of productivity and performance-enhancing features:

• Simplified configuration using a single, editable Extensible Markup Language (XML) file that describes all server configuration, application, and resources requirements
• Faster server startup time, typically less than five seconds
• Smaller server memory footprint, typically less than 60 MB for web applications

IBM expands the flexibility of the Liberty profile even further by providing a version of WebSphere built specifically with simplicity in mind. IBM WebSphere Application Server Liberty Core provides a subset of the Liberty profile capabilities and conforms to the Java EE 6 Web Profile, which provides a streamlined platform for web applications that do not require the full Java EE stack.

These features make the Liberty profile an ideal environment to deploy applications for mobile devices—such as smartphones and tablets—while decreasing development time and complexity.

Resiliency Features
IBM WebSphere Application Server 8.5.5 integrates several key high availability features to mitigate single points of failure within the WebSphere environment. These features—previously found in WebSphere Virtual Enterprise—include:

• Intelligent Routing: This feature manages incoming application requests, giving highest priority to requests made to business-critical applications. Administrators can define specific response time goals and the number of application servers that process requests, which results in a WebSphere cluster automatically scaling the number of cluster members up or down to meet response times for specific applications and users.
• Application Edition Management: Deploying a new edition of an application in a high-availability environment is always risky. Administrators often must validate applications in test environments, which might not carry all of the dependencies and features of the production environment. With application edition management, administrators can validate applications in a production environment without affecting users and can also run multiple editions of a single application concurrently.

• Health Management: Monitoring the state of critical services within an infrastructure is a common practice in high availability environments, yet many monitoring tools are passive and cannot directly react when problems occur. WebSphere Application Server 8.5.5 provides active monitoring of the application server state and can be configured via policies to react to specific events with or without administrator interventions before the events impact the environment. Organizations can rely on these features and more to provide the highest levels of application uptime and performance while providing administrators measurable operational improvements.

Broad Programming Model Support
WebSphere Application Server 8.5.5 supports multiple industry-standard programming models. This flexibility gives developers the ability to create a wide range of applications and web services while taking advantage of their existing skills. Some of the specific programming models include:

• Java EE 6, which defines widely used standards for developing, deploying, and running enterprise applications.
• OSGi, a flexible, component-based programming model that provides greater flexibility in creating and managing applications. Benefits include the ability to remotely install, start, stop, update, and uninstall applications without rebooting the server.
• Session Initiation Protocol (SIP), a control protocol designed for applications that provide and manage interactive media services, such as voice and video.
• XML, which provides developers the ability to support industry-standard XML data in their applications.
• Service Component Architecture (SCA), a specification for building and deploying applications in a service-oriented architecture (SOA) environment.
• Web 2.0 Mobile, standards-based technologies that provide components for connecting web services, SOA services, and Java EE objects into applications that can be deployed across desktop web browsers and mobile devices.
• WebSphere Batch, which provides developers a rich batch programming model for performing automated, repetitive tasks.
• Communications Enabled Applications (CEA), a programming model that lets developers add web communications capabilities to applications without the need for extensive knowledge of telephony or SIP.

The broad WebSphere Application Server programming model support gives organizations opportunities to enhance their existing enterprise applications while providing the foundation for applications that support new devices, such as tablets and mobile phones. With these capabilities, developers can create data-rich enterprise applications that run within the walls of the organization, while providing mobile users the data and applications they need outside of the office. Together, these types of applications can give organizations increased flexibility by providing employees the tools and data they need wherever they are.

Intel and IBM: Continuous Performance Improvements through Engineering Collaboration
Organizations can realize significant performance benefits by taking advantage of the engineering collaboration between Intel and IBM. By combining engineering talent with the common goal of continuous improvement, Intel and IBM work together to increase the overall performance of the WebSphere Application Server running on the Intel Xeon processor family.
With each new generation of Intel microarchitecture, Intel software engineers work directly with IBM engineers to identify and provide specific optimizations that take advantage of the latest Intel microarchitecture enhancements. Increased clock speeds and more efficient instruction execution provide older versions of WebSphere Application Server faster performance on newer platforms, but IBM software engineers also optimize core components of WebSphere such as the Java virtual machine (JVM) to take advantage of new micro-architecture enhancements to push performance even further.

The collaboration between Intel and IBM has yielded performance improvements across every major release of WebSphere Application Server. In performance testing with SPECjEnterprise® 2010, WebSphere Application Server 8.5 running on the Intel Xeon processor E5-2690 performs nearly five times better than WebSphere 7 running on older Intel Xeon processor hardware.1 WebSphere Application Server 8.5.5 also benefits from the latest generation of Intel Xeon processors. In performance testing with the DayTrader* benchmark, WebSphere Application Server 8.5.5 running on a server equipped with the Intel Xeon processor E5-2697 v2 and Intel® Ethernet 10 Gigabit Server Adapters performs over two times better than a server equipped with the Intel Xeon processor E5-2680 and gigabit adapters.2

These performance enhancements translate into real-world benefits. Applications gain an instant performance boost when deployed on the latest WebSphere and Intel Xeon processor combination, which can improve user productivity, increase customer satisfaction, and lower performance-related helpdesk calls.

**Take Advantage of Server Refresh Cycles**

IBM has a long history of supporting a broad range of legacy technologies. But in order to focus on enhancing the current generation of WebSphere Application Server to provide more performance and value, IBM is ending support for IBM WebSphere Application Server 6.1 on September 30, 2013.

Organizations have an opportunity to move their applications to WebSphere Application Server 8.5.5, which provides increased scalability, resiliency, and security. In addition, WebSphere Application Server 8.5.5 provides a broader foundation for the latest programming models and WebSphere topologies that can provide organizations with solutions to many of today’s data and application challenges.

Systems architects and administrators can also take advantage of upcoming server refresh cycles to upgrade legacy hardware to the latest servers powered by the Intel Xeon processor family, in addition to newer Intel technologies such as Intel® Ethernet 10 Gigabit Adapters and Intel® Solid-State Drives (SSD).

Intel continues to lead the industry in server CPU performance with the latest Intel Xeon processor family. The Intel Xeon processor E5 family provides up to 80 percent more performance than the previous generation, the Intel Xeon processor 5600 series.3 With advanced features such as Intel® Advanced Vector Extensions (Intel® AVX), Intel® Turbo Boost Technology 2.0, and Intel® Integrated I/O with Intel® Data Direct I/O, organizations can realize significant application performance gains by upgrading their underlying infrastructure in addition to upgrading WebSphere Application Server. For mission-critical and high-availability applications, the Intel Xeon processor E7 family provides additional technologies—such as enhanced reliability, availability, and serviceability (RAS) features—that increase server reliability and application uptime. Organizations can extend performance gains even further by adopting the latest network and storage technologies. With Intel® Ethernet 10 Gigabit Server Adapters, organizations can increase network performance while reducing port counts across the data center. Intel Ethernet 10 Gigabit Server Adapters also provide features such as Fibre Channel over Ethernet (FCoE) that can help simplify network topologies by converging multiple networks onto one Ethernet fabric.

Intel SSDs can also provide dramatic performance improvements and reliability when compared to hard disks. By eliminating the mechanical limitations of hard disks, Intel SSDs provide higher I/O operations per second (IOPS) and increased mean time between failures. In I/O-intensive WebSphere environments, such as those that host large data processing applications, these features can dramatically improve application responsiveness and throughput.

**The Performance Advantage**

IBM WebSphere Application Server 8.5.5 provides a proven foundation for today’s data-rich applications. By combining 14 years of engineering expertise with modern features that increase developer
productivity and application performance. WebSphere Application Server can give organizations a robust, highly available environment to run their most demanding applications. Organizations can also realize significant performance gains by upgrading their hardware to take advantage of the latest Intel Xeon processor families, Intel Ethernet 10 Gigabit Server Adapters, and Intel SSDs. Combined, IBM and Intel provide a potent formula for competitive success in today’s business environment.

Contact your IBM representative to learn how you can take advantage of IBM WebSphere Application Server 8.5.5 running on Intel hardware.

Figure 2: IBM® WebSphere® 6.1 and 8.5.5 architecture comparison

2 Source: Performance comparison based on IBM® WebSphere® Application Server 8.5.5 running on 2-socket servers equipped with current and prior generation Intel® Xeon® processors. Using the DayTrader* performance benchmark application, the server equipped with the prior generation Intel® Xeon® processor E5-2680 with a gigabit Ethernet adapter scored 28,933 transactions per second. The same server equipped with an Intel® Xeon® 10 Gigabit Server Adapter scored 42,382 transactions per second. The server equipped with the latest generation Intel Xeon processor E5-2697 v2 and gigabit Ethernet adapter scored 30,873 transactions per second, while the same server equipped with an Intel Xeon 10 Gigabit Server Adapter scored 62,233 transactions per second. For more information about the DayTrader benchmark application, see http://geronimo.apache.org/GMOxDOC22/daytrader-a-more-complex-application.html.
3 Source: Performance comparison using best submitted/published 2-socket server results on the SPEC®cra insteadase2006 benchmark as of 6 March 2012. Baseline score of 271 published by Itautec on the Servidor Itautec MX203® and Servidor Itautec MX223® platforms based on the prior generation Intel® Xeon® processor X5690. New score of 452 submitted for publication by Dell on the PowerEdge T620 platform and Fujitsu on the PRIMERGY RX300 S7® platform based on the Intel® Xeon® processor E5-2690. For additional details, please visit www.spec.org. Intel does not control or audit the design or implementation of third party benchmark data or Web sites referenced in this document. Intel encourages all of its customers to visit the referenced Web sites or others where similar performance benchmark data are reported and confirm whether the referenced benchmark data are accurate and reflect performance of systems available for purchase. Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and the performance of Intel products, Go to http://www.intel.com/design/literature.htm. INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL’S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

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