Principles of dynamic e-business:

Intelligent end-to-end application optimization

WebSphere Application Server Version 5

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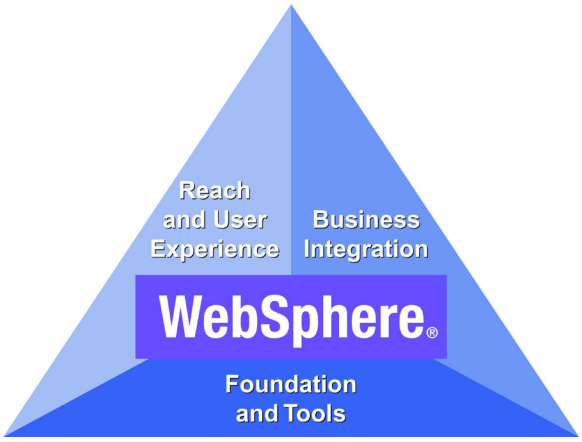
IBM WebSphere Application Server



Intelligent end-to-end application optimization

Once a dynamic e-business infrastructure is established, the challenges of application integration result in a set of requirements for end-to-end optimizations with increasing levels of performance, scale and availability within the Web application server environment. A company has to be able to preserve and improve performance and scale characteristics to meet the response demands of dynamically changing and constantly shifting business environments.

Given the importance of availability of Web sites, application servers and enterprise systems in an e-business world, there is a continuous and growing need to deliver fault tolerance and failover capabilities to offer higher levels of service to end users and customers.

Along the way, there is an increasing requirement to support multiple ranges of security and data protection for all enterprise assets, including the applications deployed on the Web application server. Equally important is the ability to integrate with existing security policy and security infrastructures. IBM *WebSphere® Application Server, Version 5* delivers enhanced, end-to-end authorization and authentication capabilities across applications and users—enabling more secure e-business.

WebSphere Application Server, Version 5 continues to deliver the highest levels of service, performance, scale and availability. For the powerful IBM z/OS™ operating system platform, *WebSphere Application Server, Version 5* exploits key facilities like Workload Manager (WLM), Parallel Sysplex and Intelligent Resource Director for true optimizations in that environment. When z/OS is a part of the existing infrastructure, it's the best platform choice for enabling Web application serving and optimizing for security, performance, availability and scale.

Handle volume dynamically

Just imagine the efficiencies gained if application servers could be taught to allocate proportionately more of the shared work to the most capable machines? What if application servers could be made smart enough to detect variable runtime conditions, then redirect work dynamically to the machines least busy? What if application servers could access databases faster than ever before support concurrent database usage more flexibly than ever before? What if application servers could leverage runtime information to intelligently and automatically tune themselves? All of these performance optimizations are extremely valuable to a business—and are just what *WebSphere Application Server, Version 5* provides.

New and enhanced in *WebSphere Application Server, Version 5* is a more dynamic implementation of workload management, offering more intelligent application-level load balancing across WebSphere clusters—with usage of load balancing advisors to help guide the control points for better and faster application execution. A new load-balancing component within *WebSphere Application Server, Version 5* enables weighted round-robin workload distribution. Routing of servlet and Enterprise JavaBean (EJB) requests can be done based on information provided by the advisors. Also, the attributes and operations defined within the

load-balancing routines will be exposed through a Java™ Management Extension (JMX) standard interface. For example, an external management system can define what metrics are to be collected for each WebSphere cluster and what proportion of importance each metric will be given. The JMX interface can expose the methods for starting and stopping the controller, and attributes for setting timeouts, network communication parameters, log levels and high availability parameters.

To better handle changing transaction volume and varying stress levels, WebSphere exposes performance monitoring interfaces—allowing other Tivoli and third-party performance monitors to help fine-tune your WebSphere systems for the best possible overall performance regardless of the typical peaks and valleys of transactional application needs. Dynamic caching, administrative data caching, proxy caching and application caching (for JNDI calls) are all implemented to provide the highest and most consistent performance levels possible.

Scaling means you can easily handle more work, and this becomes more important as your business grows. Effective scaling helps customers receive the service they deserve, and provides growth without breaking the bottom line—letting your business expand beyond its traditional boundaries to embrace new partners and suppliers.

Effective scaling also means you can effectively manage highly scalable environments—including those where the applications extend out to the edges of the internal network—and allows a company to leverage investments already made in existing management and security software as well as operational skills.

A final point about scaling goes beyond the immediate boundaries of the enterprise, and this ties with the Web services story. Making Web services more accessible and efficient means your business can easily scale its business model. This includes the publication of tested and approved business services through a private UDDI registry. It also includes monitoring and management of Web services invocations, and the ability to easily map Web service definitions to existing service implementations, wherever they happen to reside.

Always on, always available

In a dynamic e-business environment, where a company bets its business on their e-business infrastructure, the availability of enterprise and middleware systems is extremely important. *WebSphere Application Server, Version 5* offers capabilities absolutely necessary for Web sites and Web application server-based middle-tier environments, which need high-availability in order to be always available.

Highly available systems need at least two of everything—allowing work to continue with a backup system in the event of component failure in one system. The more failure bypasses that a system offers—including the failure of internal components—the less disruption will occur when something goes wrong. By reducing unplanned outages, a company can clearly reduce costs and make itself more accessible to customers and partners as part of the evolved business models that link the company with others.

Beyond running applications, you should also note that fault tolerance is important in managing application servers. This includes the deployment of applications, making it possible to update the application environment whether the application servers happen to be online or offline.

And given the need to take application servers offline sometimes, another aspect of intelligently managing application servers is allowing for work in process to be completed properly before an application server is taken down.

Of course, there is always the risk that failures of an individual component do occur, for at least some part of the system. What's needed is a way to capture the root cause of the failure, then quickly diagnose the necessary corrections. If remote support is needed to fix a problem, then everything the remote support team needs for diagnosis should be automatically captured for further investigation. Another aspect of effective problem determination is configuration verification to provide early detection of topology problems. *WebSphere Application Server, Version 5* provides the administration facilities and dynamic management for a highly effective problem avoidance strategy.

Instill confidence with security

WebSphere Application Server, Version 5 delivers enhanced authorization and authentication capabilities across applications and users enabling more secure dynamic e-business through:

- Common Security Interoperability (CSI) - offers security levels and access protection for EJB components and CORBA applications.
- Java Authentication and Authorization Service (JAAS) - extends the security architecture of the Java 2 platform with additional support to authenticate and enforce access controls upon users. JAAS is the latest development in the Java Security Architecture, building upon the Java security package in the core SDK, the Java Secure Socket Extension (JSSE), the Java Cryptography Extension (JCE) and the Java Security Tools. JAAS enables developers to authenticate users and enforce access controls upon those users in their applications. It simplifies application development by serving as a building block for developers. By abstracting away the complex underlying authentication and authorization mechanisms, JAAS minimizes the risk of creating dangerous but subtle security vulnerabilities in application code.
- Java Cryptography Extension (JCE) - a set of packages that provide a framework and implementations for encryption, key generation and key agreement and Message Authentication Code (MAC) algorithms.
- Web Services Gateways - offer more security and protection by filtering Web services access to registries and other applications.

Harness the Power of z/OS

Building new applications requires flexibility and real-time adaptability to intra-application flows and behaviors. *WebSphere Application Server, Version 5* extends the Web environment from the smallest machine up to the largest and most powerful IBM @server zSeries™

configuration. *WebSphere Application Server for z/OS* is not a port of the base application server, but built from the ground up to take advantage of the z/OS and zSeries qualities of service. It is fine-tuned and optimized to really take advantage of and leverage the exceptional scalability and availability aspects of the z/OS operating system environment.

The difference between a port and being built from the ground up is crucial. *WebSphere Application Server for z/OS* utilizes z/OS and zSeries specific features including:

- z/OS failover capabilities are leveraged, ensuring high reliability and availability while allowing for the avoidance of both a hardware and software failure.

- WebSphere *Application Server for z/OS* allows heterogeneous two-phase commit capability across z/OS resource managers and is the only offering providing this level of interoperability among IBM IMS™, IBM CICS® and IBM DB2®.

- Inherent proximity to data benefits. Much of the world's data resides on the zSeries and IBM S/390®--enabling shorter path lengths for increased performance, ease of management and overall architecture simplification.

- *WebSphere Application Server for z/OS* exploits the zSeries parallel sysplex, giving massive scalability, exceptional availability and ensuring data integrity. Another feature, workload manager, ensures that your system can self-manage and can fully utilize its resources according to business goals under peak load. This includes managing constraints in the network and Web server traffic. You can be assured that any workload spikes that may arise will be handled dynamically by your system.

If business needs demand, a Java application developed for any platform can be migrated without code changes to the zSeries. This is an important fact that cannot be understated. An application developed to standards can be deployed on any platform, even the zSeries.

With *WebSphere Application Server for z/OS*, you can leverage your existing assets and investments without new skills or hardware purchases. Well-established operational procedures for the zSeries can be re-used for your Web environment. Only *WebSphere Application Server for z/OS* is so tightly integrated with z/OS and zSeries.

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Produced in the United States of America
06-02

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