

**Integrating data and transactions  
for agile e-business.**



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## **The platform for dynamic e-business**

### ***Introduction***

Dynamic e-business is about adapting e-business processes and associated systems to support changing business strategies and tactics. This ability to adapt requires optimum control over a flexible e-business infrastructure. The introduction of IBM WebSphere® Application Server, Version 4.0 represents a move to a single application server family with flexible configuration options. These options can allow businesses to maximize control over their infrastructure by helping to enable them to choose how they respond to the changing marketplace. Businesses can scale seamlessly to meet the needs of changing workload and markets, without migrating to a different technology base or replacing existing technology investments. With WebSphere Application Server, Version 4.0, they can move their applications to more capable platforms or they can simply add to their existing infrastructure. WebSphere Application Server, Version 4.0 provides the right capabilities and functions based on specific business needs. WebSphere Application Server, Version 4.0 delivers dynamic e-business in another important way, too – leading the way in industry open-standards support. WebSphere Application Server, Version 4.0 provides integrated support for key Web services open standards, making it a leading production-ready Web application server for the deployment of enterprise Web services solutions. It also provides full Java™ 2 Platform, Enterprise Edition (J2EE™) certification with a rich set of enterprise Java open standards implementations on the market today. IBM leadership in open standards implementation is providing flexibility, choice and control for businesses because it allows them to adapt dynamically.

The intended audience for this white paper is technical professionals and IT architects who are evaluating and developing infrastructures for e-business solutions. This paper gives details of the enhancements with WebSphere Application Server, Version 4.0 that solidify its role as the foundation for the WebSphere software platform. Also, you'll find a review of the core abilities and product strengths that have given the WebSphere Application Server a strong position in the marketplace.

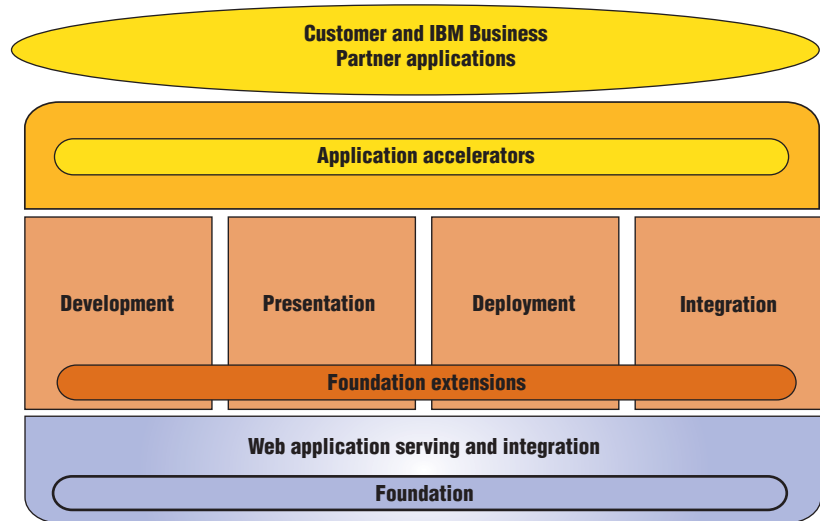
### ***An award-winning, integrated e-business software platform***

As e-business continues to grow in speed and complexity, so must the IT infrastructure that supports it. To provide a competitive advantage in a constantly evolving marketplace, the foundation of any e-business must facilitate fast and efficient responses. The need to improve both top- and bottom-line results drives businesses to bring new products and services to market faster, to create a compelling Web experience that improves the quality and quantity of site traffic, to increase transaction volume and frequency and to leverage reusable assets. Dynamic e-business is about creating business processes that can meet several of these goals with decreasing levels of incremental investment.

Dynamic e-business demands a robust, flexible software infrastructure that can enable you to:

- *Build applications based on open industry standards within multivendor environments*
- *Rapidly develop and deploy applications to meet your needs today—and then extend those applications dynamically as your needs change*
- *Incorporate mobile devices, new languages and locales and new trading partners, with a minimum amount of recoding or redeployment*
- *Provide high performance, scalability and security to maximize application integrity*

The IBM WebSphere software platform for e-business is a comprehensive set of award-winning, integrated e-business solutions. It's a software platform based on industry standards – making it flexible and pluggable, which can allow you to adapt *on the fly* as markets shift and business goals change. Building on this robust platform, you can integrate diverse IT environments to maximize current investments. Deliver core business applications to the Web. Grow these applications to meet changing needs and increasing demand. And create a differentiated e-business that sets your business apart from the competition. For more information about the full line of WebSphere software platform products and solutions, visit [ibm.com/websphere](http://ibm.com/websphere).



*IBM WebSphere software platform for e-business*

**WebSphere Application Server: high-performance integration and transactions**

As the foundation of the WebSphere software platform, WebSphere Application Server, Version 4.0 provides the core software to deploy, integrate and manage e-business applications. WebSphere Application Server has the ability to support applications that are 100 percent custom-built, based on integrated WebSphere software platform products or provided by an independent software vendor (ISV) or systems integrators. Such applications can range from dynamic Web presentations to sophisticated transaction processing.

### **What's new in WebSphere Application Server, Version 4.0**

IBM WebSphere Application Server, Version 4.0 reinforces its reputation as the premier, Java technology-based Web application server integrating enterprise data and transactions with the e-business world. It provides a rich, e-business application deployment environment with a complete set of application services, including capabilities for transaction management, security, clustering, performance, availability, connectivity and scalability. It can manage and integrate enterprise-wide applications while leveraging open technologies and application programming interfaces (APIs).

WebSphere Application Server, Version 4.0 includes powerful Web services for interoperability and business-to-business (B2B) applications, a rich set of open-standards implementations, and virtually any-to-any connectivity with transaction management and application adaptivity. Current enhancements solidify its role as the foundation of the WebSphere software platform:

- *Integrated support for key Web services open standards, such as Simple Object Access Protocol (SOAP), Universal Description, Discovery and Integration (UDDI) and Web Services Description Language (WSDL) – making WebSphere Application Server a leading production-ready Web application server for the deployment of enterprise Web services solutions for dynamic e-business*
- *Full J2EE, Version 1.2.1 certification with early support for many of the features specified in J2EE, Version 1.3, as well as industry-leading support for Extensible Markup Language (XML)*
- *Powerful interoperability between Web services and J2EE applications, which can enable key solution offerings for collaboration, B2B, portal serving, content management, commerce and pervasive computing*
- *Superior connectivity provided by a preview implementation of J2EE Connector Architecture (JCA), allowing integration with SAP, PeopleSoft, Oracle ERP Financials, J.D. Edwards, IBM CICS®, IBM IMS™ and IBM Host On-Demand applications, through a corresponding set of IBM adapters*
- *Broad cross-platform support, offering businesses a wide range of operating platforms to choose from*
- *Enhancements for performance, security and control*

- *An easy-to-use XML technology-based administrator client and user-friendly server environment for easy setup*
- *Integration with IBM WebSphere Studio Workbench, the new open development environment*
- *Value-added extensions, including support for message beans, dynamic business rules and advanced business processes, internationalization and ActiveX and third-party Common Object Request Broker Architecture (CORBA) integration*
- *Specialized configuration options that offer businesses the flexibility to decide how they want to respond to the changing marketplace*

### ***Powerful Web services for interoperability***

The WebSphere software platform for e-business provides products and services that make it easy to build, customize and publish standards-based services. Web services are self-contained, modular applications or components, based on open standards, that allow you to mix and match functional components from different sources so that you can deliver new processes and services to market quickly and efficiently. Everyday examples of Web services may include functions like integrated travel planning, loan applications or stock quotes.

You can benefit from new Web services functions by accessing the UDDI registry. Within the UDDI business registry, SOAP provides a common format for transporting messages to and from UDDI. XML can enable flexible, interactive application communications, and WSDL can provide a standard interface for Web services applications. The extensible and open programming model and architecture of WebSphere Application Server can enable Java technology-based applications to swiftly interoperate with Web services applications.

These integrated Web services in WebSphere Application Server, Version 4.0 extend WebSphere Application Server leadership in Web-based distributed transactions to dynamic e-business solutions. Coupled with the upgraded XML parser—based on the open source Xerces product and Xalan database—Web services support provides a high degree of flexibility within the foundation Web application server. An upgrade of the Lightweight Directory Access Protocol (LDAP) client interface is also provided, to help access directory services throughout the network.

### ***Rich J2EE open standards implementations***

With rich enterprise Java implementations built in and the full range of Java technology-based APIs and protocols supported, WebSphere Application Server, Version 4.0 offers full J2EE, Version 1.2.1 certification and provides a robust Java environment to build from. Support is also provided for many of the features specified in J2EE, Version 1.3. The most significant Java 2 compliance contributions included are Enterprise JavaBeans™ (EJB), Version 1.1 component technology and an upgrade of the Java Development Kit (JDK) base to JDK, Version 1.3 across all operating system platforms supported by WebSphere Application Server, Version 4.0. EJB, Version 1.1 provides more flexibility by using XML-formatted descriptor information for increased levels of connectivity and control. The Java security APIs have also been improved within the distributed security model.

### ***Best-of-breed interoperability beyond the WebSphere software platform***

Interoperability between Web services and J2EE applications enable key solution offerings for collaboration, B2B, portal serving, content management, commerce and pervasive computing. Open, flexible application deployment with a rich set of application execution services is integral to any WebSphere software solution offering. As a core element of these offerings, WebSphere Application Server provides compatibility and interoperability with other key products:

- *Lotus® Domino™ for collaboration*
- *IBM WebSphere Commerce Suite for e-commerce*
- *IBM WebSphere Business Integrator for B2B process management*

- *IBM MQSeries® middleware for reliable and asynchronous messaging*
- *IBM WebSphere Everyplace™ Suite for pervasive and mobile computing*
- *IBM WebSphere Business Components*
- *IBM VisualAge® for Java*
- *IBM WebSphere Studio*

### ***Superior connectivity for managing multiple, heterogeneous enterprise systems***

The WebSphere Application Server, Version 4.0 J2EE framework allows you to build your own connectors, while customizing them to suit your specific needs. A preview version of JCA and an enhanced set of application adapters for enterprise systems, including SAP, PeopleSoft, CICS, IMS, host integration and others provide a common layer of connection management with a consistent way of allowing Web applications and components to call application and resource adapters, or connectors. Based on the IBM common connector framework, JCA is expected to become the primary open standard for managing connections to multiple, heterogeneous enterprise systems.

In addition to support for Merant SequeLink Java Database Connectivity (JDBC™) database drivers, WebSphere Application Server, Version 4.0 features enhanced support for Microsoft® SQL Server, Oracle and Informix databases, along with continued support for IBM DB2® Universal Database™, Oracle and Sybase as storage devices for container-managed persistence within the deployment engine. DB2 Universal Database, Version 7.1 is now included with WebSphere Application Server, Version 4.0. And the Java Message Service™ (JMS) now supports JMS-XA extended architecture to provide for coordinated transactions involving reliable, asynchronous messaging through MQSeries integration software.



### ***Platform flexibility***

WebSphere Application Server, Version 4.0 supports Microsoft Windows NT®, Windows® 2000, Sun Solaris™, HP-UX, IBM AIX®, Linux® (Red Hat, SuSE, Red Flag), IBM OS/400®, IBM z/OS™ and IBM OS/390® (as well as Linux for OS/390). Offering such broad platform support means that businesses have the flexibility to install WebSphere Application Server on the operating platform most suitable to their environment.

### ***First-class, proven performance and scalability***

WebSphere Application Server, Version 4.0 provides extensive performance scaling, security and control for your advanced e-business applications. New performance tuning wizards are provided along with improved resource and log analyzers, to help optimize your transactional Web sites. A new Java Naming and Directory Interface (JNDI) cache is provided in WebSphere Application Server, Version 4.0 that sorts name server requests on behalf of Web applications deployed in WebSphere Application Server. The result? For applications requiring many name server calls, speed can increase up to two or three times. Enhancements to the connection pooling algorithms and support for dynamic reloading of EJB components means WebSphere Application Server, Version 4.0 can provide a high-scale and high-performance deployment environment.

Receiving a perfect score, WebSphere Application Server won *PC Magazine* Editor's Choice Award in the magazine's Application Server Benchmark competition. According to the reviewers, WebSphere Application Server was by far the fastest and most scalable server tested. At its peak, it maintained 4,000 users at 177 pages per second, consistently logging the best average response time on nearly all tests. Sophisticated dynamic page-caching algorithms made WebSphere Application Server a clear winner.

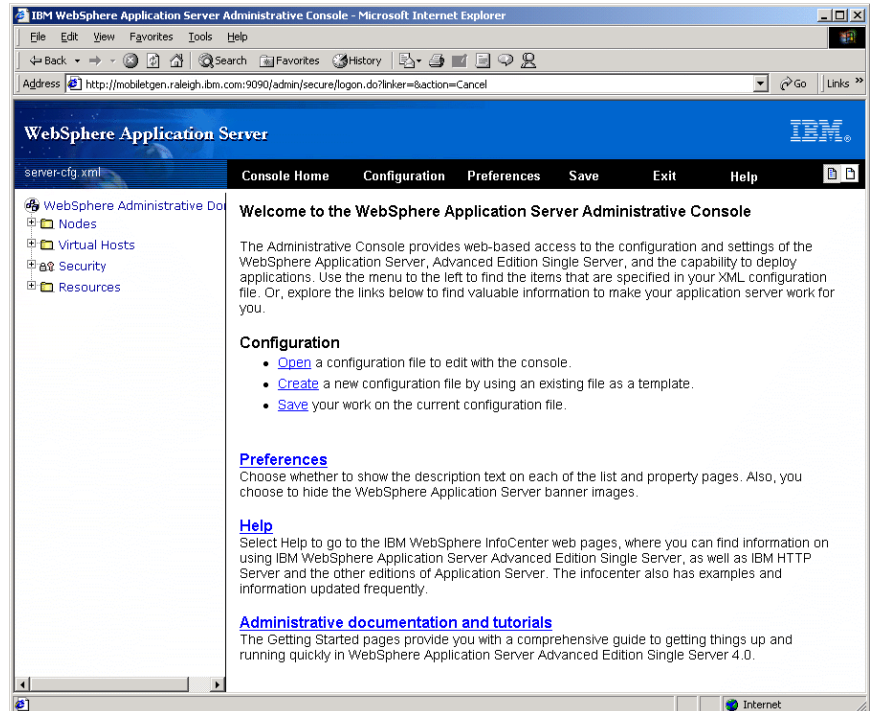
### ***Superior security with dynamic, interactive Web application serving***

For additional policy management, WebSphere Application Server, Version 4.0 now provides an interface that applications can leverage to interact with the WebSEAL component of Tivoli® Policy Director. This API can enable a Web application running in WebSphere Application Server to call the Tivoli Policy Director product for coexistence with existing user and application policies and for an added level of authorizations for your server-side execution environments. WebSphere Application Server can allow redirection of transaction requests from a Web server residing outside a firewall or within a DMZ – a secure zone between firewalls – to a WebSphere Application Server inside a firewall within an intranet environment. The engine has been enhanced for more secure connections through the firewall by leveraging the HTTP protocol, called HTTP Transport, and by replacing open servlet engine (OSE) and servlet redirector.

### ***User-friendly with one-touch installation***

To facilitate ease of use across installation, administration and product documentation, WebSphere Application Server, Version 4.0 has a comprehensive Web-based documentation center that users can take advantage of right from the start. The installation and administration procedures have improved usability while maintaining a rich and flexible set of selectable configurations and prerequisites for tailored, open and complete solutions.

A separately-installed EJB client environment application has been added in WebSphere Application Server, Version 4.0, allowing for easier setup of an EJB-compatible environment on a Web client machine. Now you can directly invoke EJB component applications from client machines, bypassing the HTTP path through a Web server. You can get faster execution, with more direct communication with EJB components and a shorter code path. The new Apache-powered IBM HTTP Server provides additional facilities for content repository management and performance through fast-response caching. Improved support for the beans scripting framework (BSF) benefits users generating applications with scripting.



IBM WebSphere Application Server, Version 4.0 browser-based administrative console

### ***An integrated development and deployment platform for Web services***

WebSphere Studio and VisualAge for Java include WebSphere Application Server, providing an industry-leading integrated development and runtime environment. Now, IBM WebSphere Studio Workbench provides an exciting new open integrated development environment (IDE) featuring an unprecedented level of flexibility. The workbench is based on open standards and provides plug-and-play capability for third-party application development tools.

### ***Bidirectional CORBA connectivity***

Many companies have made significant investments in CORBA applications and want to deliver new business value, leveraging these assets with the J2EE programming model. WebSphere Application Server, Version 4.0 offers broad support for CORBA and EJB interoperability and coexistence. CORBA applications can be invoked from the servlet or EJB calling in to CORBA – and EJB components can be invoked from these same CORBA applications.

### ***ActiveX client and server integration***

WebSphere Application Server, Version 4.0 support for ActiveX integration with J2EE through an ActiveX bridge makes Java classes dynamically available through ActiveX interfaces. For companies with investments in COM-based technologies, such as Visual Basic, Visual C++ and Active Server Pages, this enhancement offers J2EE connectivity from both ActiveX clients and ActiveX servers.

### ***Component and messaging integration***

WebSphere Application Server, Version 4.0 delivers a seamless blending of component and messaging technologies through message bean and JMS listener technology. Both inbound and outbound messaging flows are required to link external applications with the application server, yet customers have problems today managing the integration between inbound messages and Enterprise JavaBeans operations. WebSphere Application Server, Version 4.0 provides the solution. A JMS listener running in the background pulls messages arriving in an inbound queue into the application server. Message content is then dispatched against a general-purpose message bean from which specific business logic can be invoked. For retrieval of a message from a queue, transactional support means resources are updated during subsequent application server processing and any failures encountered are rolled back along with the original message. The result? Message handling and the subsequent processing can be managed automatically and with high integrity.

### ***Intelligent internationalization***

In a global economy it is critical that a server recognizes different client time zones and different client locales. The same is true of currency and decimal points. Because sorting rules vary by language, the server must be able to adapt to the specific needs of each language. IBM builds on current industry standards to address key language requirements for your enterprise. WebSphere Application Server, Version 4.0 delivers globalization services based on these requirements by providing simple APIs that server-side business objects can use to extract propagated information for localizing relevant computations.

### ***Transparent access to shared information***

Distributed applications typically comprise servlets, JavaServer Pages™ (JSP™) and EJB components. In some cases, thick Java clients provide direct support for end-user interactions. Each of these elements of the distributed application may need to share information that is of common interest. What if we could somehow generalize this ability to provide efficient access to arbitrary shared information? What if we could allow different parts of the application to record information that is of general interest to the application as a whole? In WebSphere Application Server, Version 4.0, IBM delivers the ability to transparently access shared information with a technology known as shared work areas. Work areas can be thought of as virtual scratch pads that allow you to read and write specific information, such as a customer's profile. By automatically sending the customer profile along the wire with the flow of execution, elements of the distributed application can obtain access to potentially useful information without the need to open up their interfaces. This can result in cleaner and more maintainable interfaces and provides a higher-performing alternative than issuing remote calls or using persistent storage as the mechanism for information sharing.

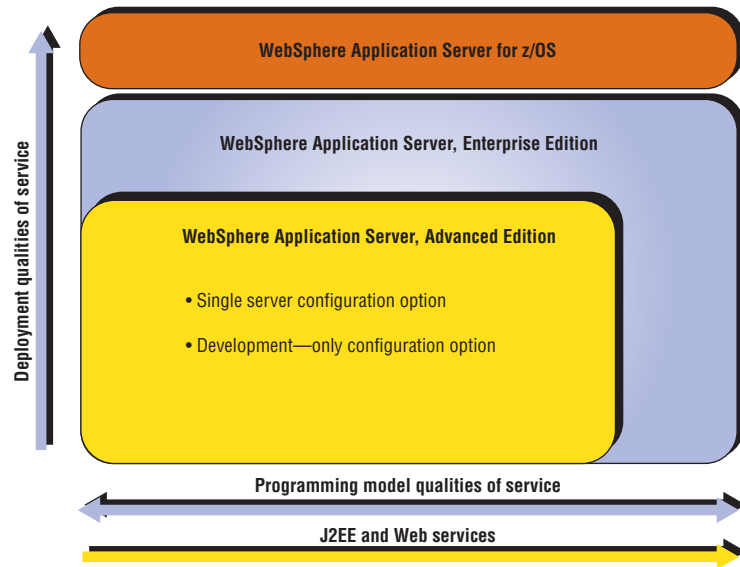
### ***Business rules support***

Companies today compete within a rapidly changing business environment. As a result, they must frequently change business processes to meet evolving customer needs and potentially to comply with changing industry regulations. Companies need the ability to model business logic in the form of reusable and externally manageable business rules. IBM addresses this requirement in WebSphere Application Server, Version 4.0 with business rule beans. Business rule beans can provide a way to externalize and to apply parameters to potentially pervasive and variable business practices, maintain rules administratively and change business behavior without modifying code. Business rule beans enable developers to separate reusable abstractions within a business domain – and base these abstractions on policies, regulations or anything else that tends to change over time. Most rules engines are inference engines. This is not the case with business rule beans, which comprise a lightweight framework. A number of basic business rules are included with the framework, while application developers can build others. Rules can be written to derive values, classify situations based on input values and execute scripts. Business rules can then be managed externally by business analysts through the sophisticated capabilities for rule modification offered as part of the business rule beans technology.

### ***Flexible packaging***

The introduction of WebSphere Application Server, Version 4.0 represents a move to a single code base that is supported by virtually all major platforms. The flexible and scalable configurations offered with this version give businesses more control over their infrastructures so they can respond as they want to the changing marketplace, without migrating to a different technology base.

With WebSphere Application Server, Version 4.0, a single-server configuration of WebSphere Application Server, Version 4.0, Advanced Edition delivers a browser-based administrative console with no database required. A subset of WebSphere Application Server, Version 4.0, Advanced Edition functionality can enable easy installation and management of single-server usage scenarios, including development and stand-alone business solutions. This configuration is also available with a development-only license currently at no charge.\* For applications requiring broader back-end integration capabilities and workload management, the fully customizable multiserver administration configuration, WebSphere Application Server, Version 4.0, Advanced Edition, is available.



*IBM WebSphere Application Server, Version 4.0 offers flexible and scalable configurations to help businesses efficiently respond to an ever-changing marketplace.*

WebSphere Application Server, Version 4.0, Enterprise Edition adds services to WebSphere Application Server, Version 4.0, Advanced Edition and includes IBM TXSeries™ technology to meet the most sophisticated needs of rapidly evolving, highly-distributed e-business infrastructures. WebSphere Application Server, Version 4.0, Enterprise Edition extends the Java programming model and provides additional qualities of service.

WebSphere Application Server, Version 4.0 for IBM z/OS and IBM OS/390 fully exploits the IBM zSeries™ and IBM S/390® architecture to achieve superior levels of scalability, performance, security and availability. Running WebSphere Application Server, Version 4.0 on the z/OS platform provides the same enterprise services as that offered on distributed platforms with premier qualities of service. WebSphere Application Server, Version 4.0 for z/OS and OS/390 exploits the workload manager that supports LPAR clustering technologies and is fully IBM Parallel Sysplex® technology-enabled.

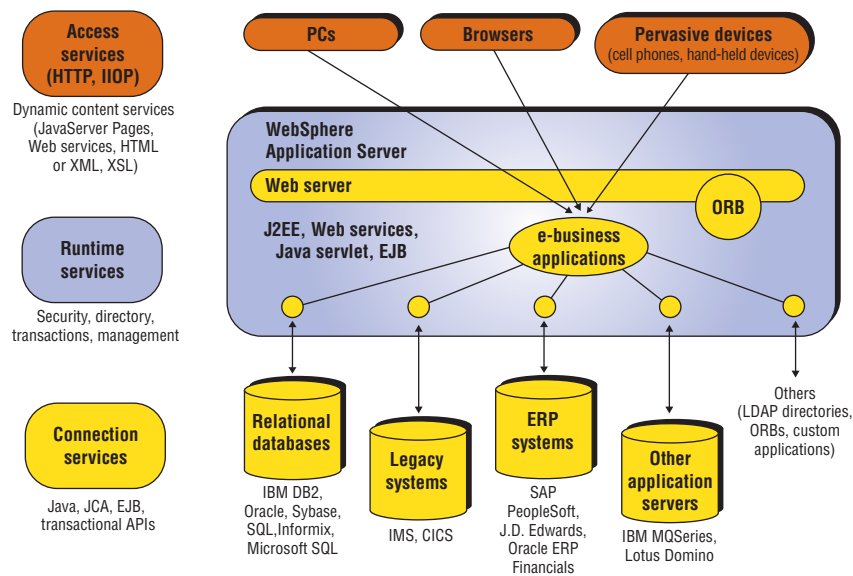
**Building on a firm foundation**

WebSphere Application Server, Version 4.0 provides a consistent e-business application deployment environment with a rich set of application services across a comprehensive list of operating platforms and implementations of leading-edge Java technologies and APIs. It focuses on open standards, Web services and connectivity to provide a powerful, high-performance, security-rich Web application server that is integral to key solutions offerings for commerce, collaboration, B2B and content management.

**WebSphere Application Server: Core Capabilities**

**An open, scalable application runtime**

WebSphere Application Server is the nucleus for the WebSphere software platform. It provides a rich deployment environment for Java technology-based applications and EJB components. Java servlets, JSP, JavaBeans and EJB components are executed and managed in a powerful transactional environment geared towards distributed, managed transactions and dynamic content generation for the Web. WebSphere Application Server can manage and



*IBM WebSphere Application Server, Version 4.0 provides integrated support for Web services, complete J2EE compliance, rich application services, connection management, extensive performance, scaling and security for your dynamic e-business applications.*



integrate enterprise-wide applications while leveraging open, Java technology and APIs. WebSphere Application Server is a scalable runtime environment with robust security features that supports HTTP Internet Inter-Object Request Broker Protocol (IIOP) and Enterprise Java.

WebSphere Application Server provides bean-managed and container-managed persistence with support for both session beans and entity beans for medium- to high-level transactional environments used in conjunction with dynamic Web content generation and Web-initiated transactions. WebSphere Application Server supports Java Database Connectivity (JDBC) and Java Transaction Service (JTS) within the EJB components, connecting to remote systems, servers and applications.

### ***Flexible to help enable future growth***

Users are no longer satisfied with Web sites that just provide visual appeal. They want functional and efficient online transactions – involving business logic, data stores and specialized back-end applications – to accomplish personal and professional work. These rising expectations impact the look, construction and operation of a Web site. Someone trading securities online wants to see a cash account balance and holdings up-to-the-minute, as well as get quotes and information. The bidder in an auction wants to know the counterbids as soon as they are made. The online shopper, whether business or personal, wants assurance that an item is in stock before placing an order.

With its focus on performance, scaling and security control, IBM WebSphere Application Server provides a strong, cross-platform and Java technology-based Web application platform that supports deployment of e-business applications and components – including Java servlets, JavaBeans, JSP and EJB components to complete transactions, enable enterprise system access and integration and create dynamic Web content. It includes application-level workload management and clustering, with enhanced container deployment environment services for servlets, EJB and JSP components. Improved transaction management intelligently deploys and executes across multiple applications and components, thereby optimizing object management and performance.

WebSphere Application Server improves the performance and scalability across the deployment environment by including workload management and load balancing, clustering, cloning and pooling support. The EJB server provides container deployment services for servlets, EJB and JSP components. The improved transaction management has the intelligence to recognize the type of applications being executed and can deploy and execute across multiple applications and components accordingly, optimizing for object management and performance.

Clustering includes workload management and provides load balancing at the EJB component application level for session beans and components that are generated by or dedicated to the clients. Essentially, a cluster of EJB component servers can be established with a logical, master EJB component server controlling the balancing and feeding of new EJB component execution requests to the appropriate EJB component server within the cluster. The cluster itself can be across nodes within a single box or across a network of processors. Cloning provides for multiple instances of execution environments that can be cloned across the nodes or processors in a cluster. A clone consists of the base Java Virtual Machine (JVM) and the Java applications running in the deployment environment. The advantage of cloning is more scalability in the ability to spread the workload across multiple nodes as well as providing failover and backup support in case one server goes down. Cloning is employed by the workload manager as well. With JVM pooling you can create as many JVMs as you need and then send them back to the pool when complete. Connection pooling maintains a pool of relational database connections, which can allow you to connect to a database, pull table information into a local cache, disconnect from the database and then can enable use of the cache for local manipulation of the data and information for dynamic Web content generation.

### ***Security and access control***

When extending enterprise systems to the Web, you have to consider the preservation of existing security schema and user registries already in place for data protection. A lot more is involved than authentication between the Web client and the Web server with data encryption between the two. You have to be able to access existing LDAP-enabled directories, user certificate management, third-party authentication schemes and security information passing among all servers within a cluster or a network. The objective is to protect access to and invocation of information sources and transactions for a restricted set of users. It involves authorizations for B2B transactions, connections in extending enterprise systems, e-commerce transactions, intranet protected applications, system and server access.

WebSphere Application Server provides additional access controls and application access protection. The secure access control lists can be established at a much more granular level than in the past. In addition to setting up security at the user and group levels, control and policies can be established for specific calls or methods within the EJB applications. Greater depth of control and protection is available within the server deployment environments. Related to security management is the ability to leverage user information being held in directories. WebSphere provides first class support for LDAP-based user registries including Lotus Domino, IBM SecureWay® Directory Server and Novell Directory Services.

Preserving existing security schema while protecting assets and applications executing within this environment is integral to successful e-business. WebSphere Application Server can enable policy setting from the user or group level down the EJB method or call level with credentials mapping and delegation support in its EJB server. Lightweight third-party authentication (LTPA) provides verification of client authorizations using LDAP to tie into user registries. Tokens are created and passed among the EJB servers in the cluster when invoking methods on EJB, using secure association services and Remote Method Invocation (RMI) over IIOP. The security application that issues the authentication tokens combined with the secure association services and third-party authentication, can provide method-level policy control across the EJB servers. LTPA combined with the Secure Sockets Layer (SSL) and encryption support within the IBM HTTP Server is a powerfully secure combination for protecting assets and applications.

### ***A cohesive transactional environment***

Today's e-business solutions need to communicate with multiple heterogeneous information sources across disparate and remote systems to provide a cohesive transactional environment. The simple action of ordering an item through an e-commerce site might involve several transactions—each communicating with separate systems and servers to accomplish a particular task. Once an order is placed, a relational database might need to be accessed. A user directory may be searched to determine user viability or to run credit checks. Inventory systems need to be checked, adjusted or restocked. If stock is depleted, a separate order to a distribution center might need to be placed. To complete most e-business transactions, multiple applications have to be coordinated and several different kinds of application servers and systems must be accessed. Connectivity management through the use of both gateway connectivity and adapter connectivity is important to success in e-business applications.

IBM WebSphere Application Server provides coordinated control of containers used and deployed within the EJB server environment. Persistent storage for transactional EJB components includes native support for DB2® (including DB2 for OS/390), Oracle, Sybase, Microsoft SQL Server (through Merant support) and Informix databases. Enhanced protocol and API support is key to dynamic content access, content generation and content presentation. Integration of an enhanced Java technology-based ORB within the EJB server provides RMI over IIOP support for improved object-oriented connections to CORBA-compliant objects. Enhanced JDBC support, included with the connection manager, provides flexible and open connectivity to relational databases.

WebSphere Application Server provides connectivity options for communication with and managing back-tier systems and servers, including relational, hierarchical and object-oriented databases, transaction processing systems, ERP systems and MQSeries technology-enabled applications. Much of the EJB server communications support is centered around using RMI over IIOP for Java component communications with other applications through the ORB. Support for enterprise Java APIs is integral to WebSphere Application Server connectivity, offering extended architected connectivity to databases using EJB, JDBC and Java Transaction API (JTA), to transaction processing systems using EJB and Java Transaction Service (JTS), to MQSeries technology-enabled applications using EJB and JMS components, and to directories using LDAP.

### ***Connect to customers with superior transaction management***

WebSphere Application Server can provide deployment and management capabilities for Java applications and EJB components that can enable interactions with enterprise databases, transaction processing systems and other applications. Benefiting from IBM technical innovation, product leadership and extensive experience in enterprise transaction processing, WebSphere Application Server can help businesses connect to customers through robust, managed e-business transactions.

### ***Plug-and-play applications for use across supported platforms***

Supporting open standards is essential for cross-platform portability and programmer productivity. When building new e-business applications, you want to increase productivity by creating plug-and-play applications that you can port and reuse on other operating platforms – minimizing the need to do additional coding. With WebSphere Application Server, you can develop consistent APIs to access systems and servers from any supported platform.

### ***Manage applications from a single point of access***

As new e-business applications are generated and deployed within the Web application server environments, you need to be able to control, maintain and manage these applications from a single point of access. You also need the ability to fine-tune the dynamic applications and static information serving within or among Web sites.

IBM WebSphere Application Server interoperates with other systems and application management products, such as WebSphere Site Analyzer for content usage and analysis and Tivoli Manager for WebSphere for system and application performance tuning products. A comprehensive administrative client controls the deployment of servlets, JSP components, JavaBeans and EJB components. You can enhance and improve Web site content and performance, making your site more enticing, informative and financially beneficial.

### Summary

IBM WebSphere Application Server is the core of the IBM WebSphere software platform – a comprehensive set of integrated, award-winning e-business solutions. No matter where you are in the e-business cycle, the WebSphere software platform can allow you to choose how to respond and scale – at the speed the market demands. Building on this robust platform, you can connect diverse IT environments to maximize your current investments and leverage existing skills. Deliver your core business applications to the Web using industry standards like Java technology and XML. And create next-generation applications that differentiate you from the competition. Advance to a powerful platform for integrated e-business – the WebSphere software platform.

From design to development to deployment, WebSphere Application Server helps you build dynamic Web sites capable of handling your advanced e-business applications. It includes many features that combine to make it an easy-to-use, comprehensive Java technology-based Web application platform, such as:

- *Enterprise JavaBeans technology and open standards support, providing a leading-edge foundation for enabling e-business and services*
- *XML Document Structure Services, including support for XML and enabling e-business applications that interchange data with XML to parse, generate, manipulate and validate content-based XML and Extensible Stylesheet Language (XSL)*
- *Security controls and application access protection, allowing for access control lists that can be established from the user and group levels to specific calls and methods within the applications for additional policy management*
- *Support for user registries based on LDAP, providing an open, vendor-neutral standard for centralized storage and management of information. LDAP-based directories provide the manageability and security you want to ensure that your information is accessible but still protected.*
- *Support for the IBM HTTP Server, powered by Apache, as well as support for other major Web servers*
- *Support for major industry-standard tools, enabling the use and reuse of tools to reduce the cost of deploying applications on all WebSphere Application Server-compliant platforms.*

**For more information**

Want to learn more about IBM WebSphere Application Server?

- *How WebSphere Application Server provides rich open standards support for Web services and J2EE*
- *Key values of running WebSphere Application Server on the industry's premier enterprise server – zSeries and S/390*
- *How WebSphere Application Server delivers new business value to the enterprise on a J2EE and Web services base*
- *How to leverage WebSphere software platform technology to design, develop and deploy extensible Web applications*
- *Competitive performance information*

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