

IBM WebSphere Application Server Enterprise, Version 5.0 and IBM WebSphere Studio Application Developer Integration Edition for Linux and Windows, Version 5.0

Highlights

- Offers a powerful but simplified build-to-integrate framework to leverage your existing assets, reduce IT complexity and automate business processes
- Offers dynamic application support to help you build applications that can adapt on demand to the ever-changing e-business world
- Enables integration of existing, prepackaged applications, offering you the ability to build application adapters
- Leverages the latest J2EE technology to let you deploy a high-performance e-business infrastructure designed to cut costs and promote business agility
- Helps reduce development costs through support for a service-oriented architecture that allows your developers to choreograph services through intuitive, visual workflow

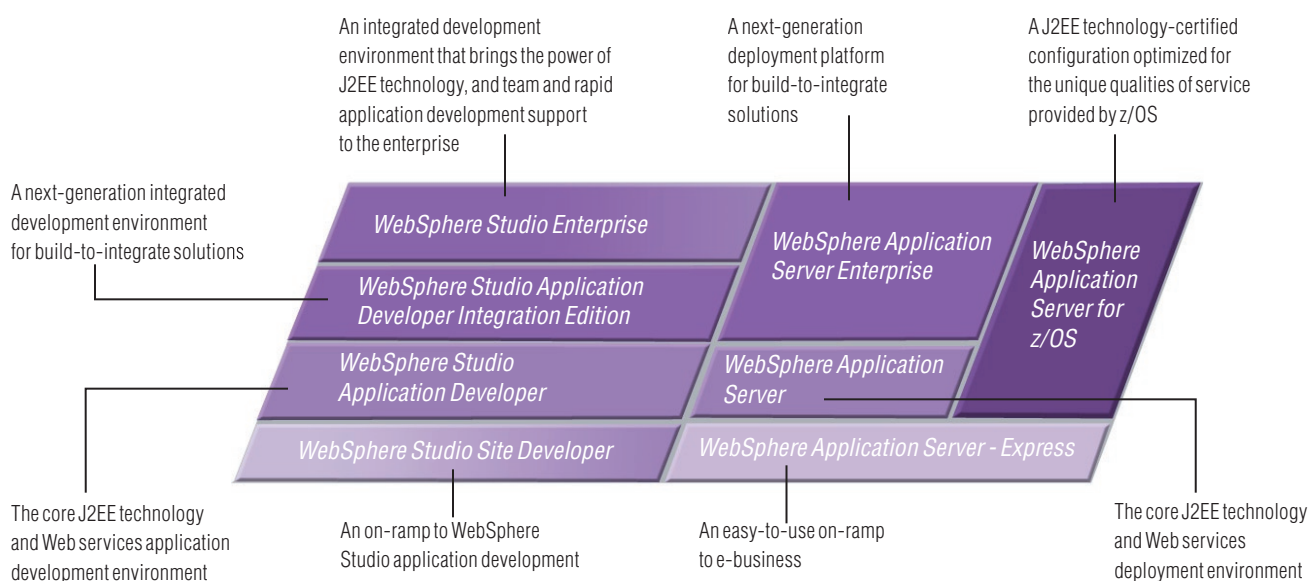


Figure 1. WebSphere Application Server, Version 5.0 and WebSphere Studio configurations

Today's enterprises face constant pressure to create new applications that cut costs, build customer loyalties and gain a competitive advantage. But companies also face a growing challenge as they explore new e-business initiatives. The past several decades have left an enterprise-computing infrastructure that is heterogeneous, widely distributed and increasingly complex. Business logic and application data are often scattered throughout enterprises across a multitude of software assets and can reside in databases, packaged applications, such as enterprise resource planning (ERP) systems, and back-end systems, like IBM CICS® or existing Java™ applications.

Instead of reinventing the development process with every new application you build, you want a way to reuse your existing software assets and leverage the power of Web services to develop new, Java 2 Platform, Enterprise Edition (J2EE) technology-based applications. Together, IBM WebSphere® Application Server Enterprise, Version 5.0 and IBM WebSphere Studio Application Developer Integration Edition for Linux and Windows, Version 5.0 include a next-generation application server and development environment designed to deliver

e-business on demand™ applications by simplifying build-to-integrate tasks, accelerating large-scale application development and enabling realtime application flexibility.

Reuse existing assets through service-oriented architecture

Building new applications that integrate business logic and application data within your organization and with suppliers, trading partners and customers is critical to your success. But integration can be complex, expensive and risky. A service-oriented architecture can leverage open standards to represent nearly all software assets as services, including legacy applications, packaged applications, J2EE components or Web services. This approach provides developers with a standard way to represent and interact with software assets without having to spend time working with unique interfaces and low-level application programming interfaces (APIs). Individual software assets become building blocks that can be reused to help reduce the time and costs of developing new e-business applications.

Using a service-oriented approach to integration, WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition can help reduce the complexity, cost and risk of integration by providing a single, simple Web services-based framework to build, manage and deploy application functionality.

Leverage workflow capabilities

Integrated J2EE workflow capabilities provide intuitive, flow-based development tools to quickly define how existing software assets are used within J2EE technology-based applications. You can easily create services that leverage existing software assets to help build a new J2EE technology-based application workflow. For example, you could combine inventory information from a packaged ERP application and J2EE components from a previously built customer-facing application with new business logic to create a new, online order entry application. The reach of the application could then be extended by offering it as a Web service for use by trading partners. The result can be faster development of new applications, improved consistency and reduced costs through the reuse of existing IT investments.

WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition offer integrated workflow capabilities that include:

- ***A visual process editor (choreographer)***
Provides intuitive drag-and-drop tools to easily compose and choreograph application interactions and dynamic workflows among J2EE components, Web services, existing applications and manual business processes. Developers can quickly build, debug and deploy complex applications using powerful workflow tools and advanced messaging capabilities to streamline and automate business processes. Add new services or modify existing services without affecting other components in the business process.
- ***Manual interaction***
Offers support to include activities that require an employee to perform a task as a step in an automated business process and allows the dynamic assignment of responsibilities based on existing organizational definitions.
- ***Event triggering***
Offers support for asynchronous events, like Web services or manual interactions, to include them as part of business processes. Use events to trigger the start of a business process, or configure a business process to stop and wait for

an external event to occur before resuming the process. For instance, developers can now create an application that starts a business process to generate an e-mail requesting managerial approval for credit card application requests higher than \$20,000. The process waits for the approval before finishing its processing, providing greater control within your dynamic application.

- ***Compensation pairs support***
Allows you to visually define an associated undo service for each step in your business process. For example, in an order that has already begun manufacturing, the compensating transaction could be to put the complete item into inventory, rather than disassembling the item.
- ***Flexible workflow design***
Allows developers to design workflows using a top-down, bottom-up or meet-in-the-middle approach. Using a top-down method, developers can create skeleton processes that choreograph the sequence of events in a workflow without worrying about the underlying implementation. Building from the bottom-up, developers first create the individual components and then use them as building blocks to define a workflow. A meet-in-the-middle approach offers the flexibility of using both approaches simultaneously.

Reduce complexity with advanced transactional connectivity capabilities

The J2EE platform offers increasingly high levels of enterprise support for integration, including support for messaging, security and database access. The J2EE Connector Architecture (JCA) 1.0 standard, for example, offers support to integrate with packaged and legacy applications. However, integrating many back-end resources and legacy data can still be difficult when data standards are not adhered to or if transactional support is limited.

WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition offer advanced transactional capabilities to help developers avoid custom coding, providing support for the challenges related to integrating existing software assets within a J2EE environment. The capabilities include:

- ***Dynamic application adapter support***
Offers the ability to build and deploy rich, open standards-based application adapters for popular enterprise information systems (EIS) like SAP and IBM CICS.

- **Last participant support**
Provides automated coordination for transactions to help eliminate manual coding and include one-phase commit resources—common for many legacy and package applications—in real transactions.
- **Activity session services support**
Provides the ability to extend the scope of and group multiple local transactions that can then be committed based on deployment criteria or through explicit program logic. This ability helps reduce the complexity of handling commitment rules and limitations associated with one-phase commit resources.
- **CORBA C++ Software Development Kit (SDK)**
Helps integrate various C++ assets, allowing C++ clients to invoke J2EE components using CORBA technology. It also lets WebSphere applications incorporate C++ assets behind CORBA wrappers.

Optimize application performance

Increasingly, organizations use Web applications—internally and externally—to incorporate customers, trading partners and suppliers as part of their business processes. For these mission-critical processes, application performance can make the difference between competitive advantage and failure to compete.

WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition can help you optimize performance and minimize downtime for applications that require highly available, high-volume, multiserver environments through robust application-profiling techniques, sophisticated deployment management and advanced support for Web services.

Application profiling support

WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition offer new application profiling capabilities that allow you to carefully optimize the performance of applications with almost no impact on source code. This capability offers a mechanism to specify the access intent (read or update) of persistent entity Enterprise JavaBeans (EJB) applications. Depending on the access intent of the application that calls it, the EJB applications can interact with the runtime infrastructure, such as a database, as needed. The result is unprecedented control in defining strategies that dynamically control concurrency, pre-fetch and read-ahead. With this functionality, you can create more dynamic applications with greater performance benefits.

Deployment manager

The deployment manager provides enhanced workload management and dynamic caching, centralized security capabilities and performance management tools that distribute workload across multiple servers through sophisticated load balancing and clustering features. The deployment manager also allows isolation of application servers to avoid single points of failure, and provides first-failure data capture to report and analyze problems if they occur.

Advanced Web services support

WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition offer advanced support to create security-rich Web services that can be deployed throughout your enterprise. The support includes a Universal Description, Discovery and Integration (UDDI) registry that acts as a repository to store business units that describe basic Web services, and a Web services gateway that enables users from outside the firewall to invoke Web services with the benefit of robust security protection. Advanced Web services support also extends the Web services gateway by providing a programming model that allows you to use the gateway in large-scale Web services implementations to serve as a bidirectional control point for critical tasks, such as validation, logging, transformation, auditing and metering.

Edge components

With additional load balancing and caching capabilities based on WebSphere Edge Server, WebSphere Enterprise can help provide a scalable solution to distribute and route HTTP, servlet and EJB requests. Custom advisors can be used to load-balance requests based on unique application and platform criteria. To extend the load balancing capabilities, you can use consultant code to optimize server performance within a Cisco or Nortel infrastructure.

Enable next-generation application development

One of the primary benefits of J2EE technology is the functionality that each revision of the specification brings. However, developers often require more control over their applications than the J2EE specifications provide. For these developers, WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition enable next-generation development by leveraging the latest J2EE innovations to provide greater control over application development, execution and performance than possible ever before. These innovations include:

- **Asynchronous beans support**
Offers exceptional performance enhancements for resource-intensive tasks by allowing execution of a single request as multiple tasks, or threads, processed in parallel within the J2EE environment. Asynchronous scheduling facilities can also be used to process parallel processing requests in batch mode at a designated time.
- **Startup beans support**
Allows automatic execution of business logic when an application starts or stops. For example, startup beans might be used to pre-fill application-specific caches, initialize application-level connection pools or perform other application-specific initialization and termination procedures.
- **Scheduler service capabilities**
Minimizes IT costs and increases application speed and responsiveness by maximizing existing computing resources. The scheduler service provides the ability to process workloads using parallel processing, set specific transactions as high priority and schedule less time-sensitive tasks to process during low traffic or off hours.
- **Object pools support**
Increases application performance by allowing reuse of objects instances, potentially reducing overhead. Creating an object pool allows an application to obtain an instance of a Java object and return the instance to the pool when the application has finished using it.

Increase development productivity

The time required to roll out new applications is a key concern across all industries. One way to vastly improve developer productivity is to reduce the need for handcrafted solutions that are time-consuming, costly and difficult to maintain. WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition are designed to improve developer productivity by providing supported, prebuilt solutions for many of these challenges. The solutions are:

Extended messaging support

The extended messaging capability offers automated support for inbound and outbound messaging, allowing you to focus on business logic instead of complex messaging APIs. Handcrafted Java Message Service (JMS) code is no longer required. WebSphere Application Server Enterprise includes IBM WebSphere MQ and WebSphere MQ Event Broker to further extend your messaging infrastructure to leverage qualities of service and to enable seamless integration with existing WebSphere MQ infrastructures.

Internationalization service support

WebSphere Application Server Enterprise allows you to automatically recognize a client's time zone and location information so your application can act appropriately. This technology helps you deliver the right date and time information, the appropriate currencies and languages and the correct date and decimal formats.

Work areas

WebSphere Application Server Enterprise provides a global-variable ability to efficiently share information across a distributed application. For example, you might want to add profile information as each customer enters your application. By placing this information in a work area through numerous application interfaces, it becomes available throughout your distributed application and eliminates the need to hardcode a solution or to read and write information to a database.

Best-in-class integrated development environment

WebSphere Studio Application Developer Integration Edition includes a fully integrated application development environment to create and maintain

J2EE applications and Web services.

Built on Eclipse, Version 2.0 innovations and written to J2EE specifications, WebSphere Application Developer Integration Edition helps optimize and simplify J2EE application development with best practices, visual tools, templates, code generation and a comprehensive development environment.

Enable realtime application flexibility

Maintaining competitive advantage in today's changing business environment requires companies to respond quickly to customer demands, market opportunities and external risks. Often, this means making frequent updates to e-business applications to reflect changing market conditions or to provide access to strategic information. Unfortunately, these updates can take time to shut down the application, make programming changes, test the new application and redeploy.

To enable realtime application flexibility, WebSphere Application Server Enterprise and WebSphere Studio Application Developer Integration Edition offer dynamic application support with business rule beans and dynamic query service support to let you build

applications that can easily adapt to the ever-changing world of e-business on demand. Business rule beans offer a powerful realtime framework to define, execute and manage business rules, which encapsulate business policies that vary based on changes in the business environment. For example, a simple business rule might be, "If a customer's shopping cart is greater than \$X, then offer a Y% discount." Once the business rule is defined, a developer or a business analyst can update the business rule at runtime, using a straightforward user interface without the need to shut down the application server.

Dynamic query service support delivers unprecedented application flexibility by allowing you to dynamically build and submit queries that select, sort, join and perform calculations on application data at runtime. Dynamic query service provides the ability to pass in and process Enterprise JavaBeans Query Language (EJBQL) queries at runtime, eliminating the need to hardcode required queries into the deployment descriptors during development.

Delivering innovations today

IBM delivers solutions to solve complex problems today. By incorporating and intensively testing J2EE specifications and key Web services open standards, WebSphere Application Server Enterprise provides an e-business infrastructure with full J2EE, Version 1.3 compatibility. Most organizations, however, need to extend their processes beyond the limitations of these industry standards to meet important business requirements. WebSphere Application Server Enterprise builds upon the world-class, open-standards implementation of WebSphere Application Server by offering the same leading-edge Web services capabilities and J2EE development accelerators that extend beyond the J2EE programming model.

IBM remains committed to open standards and is an active contributor to the Java community. IBM is currently driving these extensions into the J2EE standards by submitting multiple Java Specification Requests (JSRs), with two submissions pending—JSR 149 and JSR 150.

WebSphere business integration portfolio

IBM offers a wide range of middleware and operating systems for virtually every computing platform, to give you the right tools to be an e-business on demand. The IBM WebSphere business integration portfolio delivers market-leading middleware that allows you to unite applications, people and business processes to work as one. Built on open standards, like J2EE, XML and new Web services standards, this robust portfolio offers reliability, scalability and a security-rich environment—the core strengths you've come to expect from IBM.

With a WebSphere business integration solution, your business managers can effectively model and simulate business processes—and refine those processes to increase efficiencies as needs arise. Your IT staff can quickly and easily integrate previously disparate systems within your existing infrastructure—and with new applications and systems. Your systems can connect seamlessly with your customers' and trading partners' systems to deliver immediate, dynamic—and personalized—information.

For more information

To learn more about IBM WebSphere Application Server Enterprise, Version 5.0, visit: ibm.com/software/webservers/appserv/enterprise.

To learn more about IBM WebSphere Studio Application Developer Integration Edition, Version 5.0, visit: ibm.com/software/ad/studiointegration.

To learn more about how the IBM WebSphere software platform can help you succeed in e-business, contact your IBM representative, IBM Business Partner or visit: ibm.com/websphere.

WebSphere Application Server Enterprise, Version 5.0*

Java programming model

- Full J2EE 1.3 support
- XML support

Web services

- Full Web services support
- Support for private UDDI registries
- Web services gateway
- Web services gateway filters

Database support and connectivity

- JDBC and Connection Management for access to IBM DB2®, SQL Server 2000 and Oracle 9i
- Extended JDBC support for access to Informix and Sybase
- Restricted DB2 license

Web server support

- Extended HTTP Server included

Security

- Enhanced authentication and authorization through Common Secure Interoperability (CSI), Version 2.0, single sign-on and embedded Lightweight Directory Access Protocol (LDAP)
- Advanced authentication and authorization, including Java Authentication Authorization Service (JAAS) and Java Cryptographic Extension (JCE)

Platform support

- Basic platform support for Microsoft Windows®, Windows NT®, Windows 2000, Linux® and Linux on zSeries SLES only
- Extended platform support for IBM AIX®, Sun Solaris operating environment

Application connectivity

- Full JMS support
- Microsoft component object model architecture
- Restricted WebSphere MQ license included
- Advanced transaction support
- Application profiling
- Dynamic and extended query capabilities
- Container-managed messaging

Performance support

- Dynamic caching, IBM Tivoli® Performance Viewer and integration with third-party tools
- Migration tools and assistance
- Internalization service
- CORBA C++ SDK

Application development

- Work area service
- Integrated J2EE technology-based workflow engine
- Internalization service
- Business rule beans
- Business process beans
- Asynchronous processing

Administration and workload support

- Browser-based administration for remote administration across firewalls
- Intelligent workload distribution across a cluster
- Failure bypass
- Clustering support network

*WebSphere Application Server Enterprise, Version 5.0 builds upon all of the same functionality contained in WebSphere Application Server Network Deployment, Version 5.0. For more specific functional information, please see the WebSphere Application Server Overview at: ibm.com/software/webservers/appserv/was/.

IBM WebSphere Studio Application Developer Integration Edition, Version 5.0

Tools integration

- Based on Eclipse technology
- Includes a single development environment for Java, EJB, XML, HTML, JSP, Web services*

Service-oriented architecture

- Creates services from Web services, JavaBeans, stateless session EJB, process flows or JCA 1.0 resource adapters
- Offers a service definition wizard to create new service definitions
- Provides a service proxy wizard to create JavaBeans service proxies

Visual process editor

- Drag-and-drop tools to visually define processes
- Top-down, bottom-up or meet-in-the-middle process development approaches
- Transformer wizard to map data between nodes in a process (described in XSLT)
- Define compensation services for a step in a process
- Dedicated output node for exception handling
- Staff activity nodes to represent manual interactions in a process
- Process that includes other nested processes to multiple levels
- Customizable event nodes triggered by outside process events

Manual interaction support

- Automatic persistence of process state and metadata
- Dynamic assignment of responsibilities
- Worklists to notify the designated recipient that action is required

Process debugger

- Visual debugger to step through the process node by node
- Seamless integration with Java debugger

Application integration support

- Support for JCA 1.0 connectors to access back-end systems
- Enhanced tools integration with JCA tool plug-in extensions
- JCA 1.0 resource adapters for CICS, IBM Host On-Demand and IBM IMS® (development use only)
- Create application adapters by managing JCA connectors as services in a process
- Wizards to manage the low-level data handling requirements for JCA connectors
- Wizards to import definitions from COBOL and C

Cheat sheets

- Checklist for common development patterns

Extended messaging support

- Automated support for asynchronous outbound (and inbound) JMS messaging
- Wizards to create the sender and receiver beans that automatically handle JMS messages

Server support

- TomCat 3.2.1 and 4.0 (Web only)
- Support for services offered by WebSphere Application Server Advanced Edition, Version 4.0 and WebSphere Application Server Enterprise Edition, Version 5.0
- Integrated unit test environment for WebSphere Application Server Advanced Edition, Version 4.0 and Version 5.0 and WebSphere Application Server Enterprise Edition, Version 5.0

* *WebSphere Studio Application Developer Integration Edition for Windows and Linux, Version 5.0 includes all of the functionality of WebSphere Studio Application Developer for Windows and Linux, Version 5.0. For more information about IBM WebSphere Studio Application Developer, see IBM announcement letter 202-330 issued December 3, 2002, or the WebSphere Studio Application Developer for Windows and Linux, Version 5.0 spec sheet.*

IBM WebSphere Application Server Enterprise, Version 5.0 at a glance

Hardware requirements with supported operating environments*

Windows NT and Windows 2000

- An Intel® technology-based PC running Microsoft Windows NT Server, Version 4.0, Service Pack 6a or higher; or Windows 2000 Server or Windows 2000 Advanced Server with Service Pack 3 or higher
 - Intel Pentium® processor at 500MHz or faster
 - CD-ROM drive
 - Minimum of 520MB available disk space for installation (including IBM SDK)
 - Minimum of 256MB memory, 512MB recommended
 - Support for a communication adapter
-

AIX

- IBM RS/6000® or IBM RS/6000 SP™ running IBM AIX, Version 4.3.3 with the 4330-10 recommended maintenance package, or Version 5.1 with the 5100-02 recommended maintenance package
 - IBM RS/6000 604e workstation at 375MHz or faster
 - CD-ROM drive
 - Minimum of 712MB available disk space for installation (including IBM SDK)
 - Minimum of 256MB memory, 512MB recommended
 - Support for an appropriate network interface
-

Red Hat Linux operating environment on Intel

- Red Hat Linux Advanced Server 2.1, SLES 7.0, based on kernel 2.4
 - Intel x86 processor at 500 MHz or faster
 - Support for TCP/IP and an appropriate communication adapter
 - CD-ROM drive
 - Legacy application support RPMs installed (provided on SuSE and Red Hat distribution CD-ROMs)
 - Minimum of 510MB available disk space (including IBM SDK)
 - Minimum of 256MB memory, 512MB recommended
-

Red Hat Linux on IBM @server zSeries operating environment

- IBM @server™ zSeries™ server running Linux distribution SuSE 7.0, based on kernel 2.4
 - G5, G6 or higher processor
 - Legacy application support RPMs installed (provided on SuSE distribution CD-ROMs)
 - CD-ROM drive
 - Minimum of 672MB available disk space for installation
 - Minimum of 256MB memory, 512MB recommended
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Sun Solaris operating environment

- A workstation running Sun Solaris operating environment, Version 8 at a maintenance level of July 2002 or higher
 - Sparc workstation at 440MHz or faster
 - CD-ROM drive
 - Minimum of 732MB available disk space for installation (including the IBM SDK)
 - Minimum of 256MB memory, 512MB recommended
 - Support for TCP/IP and an appropriate communication adapter
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* Total minimum disk space required includes minimum disk space for base WebSphere Application Server, Version 5.0.

IBM WebSphere Application Server Enterprise, Version 5.0 at a glance (continued)

Software requirements with supported operating environments

Windows NT

- Windows NT Server 4.0, Service Pack 6a or higher
 - Netscape Navigator, Version 4.7.9 or Microsoft Internet Explorer, Version 5.5, Service Pack 2 or higher
 - Web browser that supports HTML 4 and cascading style sheet (CSS)
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Windows 2000

- Windows 2000 or Windows 2000 Advanced Server with Service Pack 3 or higher
 - Netscape Navigator, Version 4.7.9 or Microsoft Internet Explorer, Version 5.5, Service Pack 2
 - Web browser that supports HTML 4 and CSS
-

AIX

- AIX, Version 4.3.3 with the 4330-10 recommended maintenance package or Version 5.1 with the 5100-02 recommended maintenance package
 - Netscape Navigator, Version 4.7.9
 - Web browser that supports HTML 4 and CSS
-

Red Hat Linux operating environment on Intel

- Red Hat Linux Advanced Server 2.1, SLES 7.0, based on kernel 2.4
 - Netscape Navigator, Version 4.7.9
 - Web browser that supports HTML 4 and CSS
-

Red Hat Linux on zSeries operating environment

- zSeries server running Linux distribution SuSE 7.0 or Red Hat Linux 7.2, based on kernel 2.4
 - Netscape Communicator 4.79
 - Web browser that supports HTML 4 and CSS
-

Sun Solaris operating environment

- Sun Solaris operating environment, Version 8 at a maintenance level of July 2002 or higher
 - Netscape Communicator, Version 4.7.9
 - Web browser that supports HTML 4 and CSS
-

Supported HTTP servers

- Apache Server, Version 1.3.26 for AIX, Solaris, Windows NT, Windows 2000, Red Hat Linux on Intel and Red Hat Linux on zSeries
 - Web Server Enterprise Edition 6.0.4 for Solaris operating environment, Windows NT and Windows 2000
 - Microsoft Internet Information Server, Version 4.0 for Windows NT
 - Microsoft Internet Information Server, Version 5.0 for Windows 2000
 - IBM Lotus® Domino™ Enterprise Server, Release 5.0.5 and Release 5.0.6 for AIX, Solaris operating environment and Windows NT
 - IBM HTTP Server, Version 1.3.26 or Version 2.0 for AIX, Solaris operating environment, Windows NT, Windows 2000 and Red Hat Linux on Intel and Red Hat Linux on zSeries
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IBM WebSphere Studio Application Developer Integration Edition at a glance

Hardware requirements

- Intel Pentium II processor minimum; Pentium III at 500MHz or faster recommended
 - CD-ROM drive
 - 940MB minimum disk space for installation; additional disk space required for development resources
 - Minimum of 512MB memory, 768MB recommended
 - Support for a communication adapter
-

Software requirements

Operating systems

- Windows NT Server 4.0, Service Pack 6a or higher
 - Windows 2000 Server with Service Pack 2 or higher
 - Windows 2000 Advanced Server with Service Pack 3 or higher
 - Red Hat Linux Advanced Server 2.1, SuSE 7.3, based on kernel 2.4
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Web browser

Windows

- Microsoft Internet Explorer, Version 5.5, Service Pack 1 or higher
 - Netscape Navigator Version 4.76
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Linux

- The universal test client, Web Services Explorer and the help system require Netscape Version 4.6 or Mozilla, Version 0.7 or higher.
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