



# JBoss Application Server.

QUALITY  
SUPPORT FROM  
THE SOURCE.

JBoss Application Server (JBoss AS) is the market-leading, open source Java 2 Enterprise Edition (J2EETM) application server, delivering a high-performance, enterprise-class platform for developing and deploying e-business applications. Combining a robust, yet flexible, architecture with a no-cost open source software license, JBoss AS has quickly become the most popular middleware system for developers, independent software vendors (ISVs), and enterprises alike.

JBoss AS not only delivers the performance and reliability expected from an industrial-strength application platform, it enables customers to scale technically and economically as well. With its revolutionary service-oriented architecture (SOA), JBoss AS ensures that applications are developed, deployed, integrated, and managed in a consistent manner. JBoss AS is widely known for its power and simplicity, and improves upon this with the introduction of the dramatically simplified Enterprise Java Bean (EJB) 3.0 programming model. This new version of the EJB standard simplifies the Enterprise Java programming model by exposing the power of Java Enterprise Edition platform services to simple Java objects through standard Java annotations.

By simplifying the way developers interact with middleware services, JBoss AS enables IT organizations to deliver greater value in less time. Faster development, combined with a zero-cost software license, greatly reduces overall business costs. Best of all, support for JBoss AS is delivered by full-time JBoss product experts and JBoss Authorized Service Partners, making JBoss AS the safe choice among enterprises for powering their mission-critical applications.





## Highlights and Key Values

### **Open-Source, Zero-Cost Product License**

JBoss AS is licensed under the Lesser GNU Public License (LGPL) and is, therefore, free to download and use for development and production deployment—regardless of the size of your deployment. The license also allows ISVs to embed and distribute JBoss AS free of charge.

### **Built for Standards**

JBoss AS not only meets the needs of today's standards, but also is best positioned to handle the standards and services of tomorrow by the nature of its forward-looking, modular architecture. As new standards emerge, such as EJB 3.0, they plug into JBoss AS in a consistent and predictable manner, which ensures that developers can quickly leverage these new technologies.

### **Enterprise-Class Reliability**

JBoss AS provides a proven foundation for mission-critical applications that require superior performance and scalability. Its high-availability services provide the clustering, caching, fail-over, load balancing, and distributed deployment features expected in a best-of-breed platform. Furthermore, you can develop and deploy your applications with confidence knowing that JBoss AS is J2EE compliant—having passed the 23,000 tests of the Test Compatibility Kit.

### **Embeddable, Service-Oriented Architecture**

JBoss AS is assembled from a set of independent, yet cooperating, components and services which are neatly packaged and fully hot-deployable. It is architected to be seamlessly embeddable in applications, and the nature of its embedding is completely customizable to the requirements of the application itself. Only the critical and necessary application server components, therefore, need to be brought along as part of the application's baseline footprint. Developers can also easily create and add their own services to the system, thus ensuring that custom services exhibit the same consistent behavior as the JBoss standard set of services.

### **Consistent Manageability**

With its elegant Java Management Extensions (JMX) based microkernel architecture, JBoss AS not only offers a consistent behavior of modules, but also offers the ability to manage and configure services through any management console that supports JMX. This ensures that applications built on JBoss AS can be managed easily and consistently.

### **Enterprise Java Made Easy**

JBoss AS embraces the new EJB 3.0 specification and programming model by providing access to a wide range of middleware services through the use of

standard Java annotations. This approach to Enterprise Java programming enables developers to quickly and easily apply the enterprise capabilities they need to any plain old Java object (POJO). Since this functionality is applied to POJOs using simple Java annotations, this greatly improves developer productivity by avoiding lengthy development, compilation, and deployment cycles altogether.

### **Enhanced Interoperability**

JBoss AS fully supports the Web Services standards required in the J2EE 1.4 specification, enabling different applications to work together, even if they are running on different operating systems and hardware architectures, and using different application infrastructures and programming languages. This technology independent interoperability enables IT organizations to maximize the value of their existing solutions, as well as enable enterprise application integration and eliminate corporate silos.

### **Superior 24x7 Support from the Source**

JBoss, Inc. pioneered the Professional Open Source model whereby open source software is backed up with expert support services delivered by the product experts themselves. JBoss, Inc. and our Authorized Service Partners offer a comprehensive set of support offerings to ensure that our products—such as JBoss AS— are the safe choice for your business.





## Components and Features

### EJB 3.0 in the Spotlight

Enterprise Java Beans (EJB) 3.0 is a deep overhaul and simplification of the EJB specification and is in Draft Release within the Java Community Process. Its goals are to simplify development by focusing more on writing plain old java objects (POJOs) rather than on complex EJB APIs.

EJB 3.0 support includes:

- Simplified EJB API for Session Beans, Message Driven Beans, and Entity Beans
- Java Annotations
- Dependency Injection
- Optional Callbacks
- Entity Manager API
- Simplified Persistence and Improved Queries
- EJB 3.0 TrailBlazer learning application that takes developers on a guided tour of the new EJB 3.0 features

### Web Application Services

JBoss AS supports the latest JSP and Servlet specifications and implements many other high-performance, advanced features to meet the demands of today's most complex Web applications.

- JavaServer Faces (JSF) Web application framework for developing feature-rich user interfaces
- Embedded Tomcat 5 container provides industry-leading JSP 2.0/Servlet 2.4 specification support

- Integration between Tomcat and other JBoss AS services provides increased reliability, scalability, and availability
- Integration with Apache Web Server provides the best Web Server, Web Container, and Application Server combination on the market

### Enterprise Services

JBoss AS includes the following J2EE 1.4 enterprise-class features that are required to satisfy the needs of today's scalable, distributed, transactional, and fault tolerant applications.

EJB 2.1 support, including:

- Stateful and stateless Session Beans
- BMP (Bean Managed Persistence) Entity Beans
- CMP (Container Managed Persistence) Entity Beans
- Message driven beans (MDBs)
- Interoperability using RMI-IIOP or JAX-RPC
- Ability to expose stateless session beans and MDBs as Web Services
- Support for sending and receiving messages via Web Services
- Easy provisioning and hot deployment of EJB and JMX-based Web Services.
- Access to EJBs from external CORBA objects

Bundled ORB (JacORB) that supports:

- Interoperability between EJB 2.1 and CORBA objects
- Full support for CORBA 2.3
- Portable Object Adaptor (POA)
- Asynchronous Method Invocations (AMI)

- Portable interceptors
- Dynamic Invocation Interface (DII), Dynamic Skeleton Interface (DSI), and Dynamic Management of Anys (DynAny)
- Built-in Java naming and directory interface (JNDI) support
- Built-in JTA for two-phase commit transaction support

### O/R Mapping and Persistence Services

JBoss AS bundles and integrates Hibernate, the de-facto leader in O/R mapping and persistence, to provide the following features:

- EJB 3.0 Entity Manager and Java Persistence API
- Virtualized filtering for temporal, historical, regional, and permissioned data
- Flexible object / relational mappings
- Single object to multi-table mapping
- Ability to override generated SQL with hand-written SQL
- Transparent persistence without bytecode processing
- Human-readable Object/Relational mapping definitions that can be generated via XDoclet
- XML binding that represents data as XML and Java objects interchangeably
- Event driven design that enables custom event objects to be created and registered to handle auditing scenarios or cascaded behavior semantics
- Powerful Object-oriented query language expressed in a SQL-like language
- Bulk update and delete by query
- Ultra-high performance



## Components and Features

### Web Services and Interoperability

One of the major advances of J2EE 1.4 over J2EE 1.3 was the addition of Web Services standards, more complete XML processing, and enhanced Web Services interoperability. The complete incorporation of all of these Web Services standards enables applications built on JBoss AS to dynamically interact with Web Services—using Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL), Universal Description, Discovery and Integration (UDDI), and XML—and benefit from the reliable, scalable, and production-ready infrastructure provided by JBoss AS.

### Integration and Messaging Services

JBoss AS supports the latest connector and messaging specifications in order to provide the base infrastructure needed to support the most demanding integration requirements.

- J2EE Connector Architecture (JCA) 1.5 support for connection
- Java Database Connectivity (JDBC) 3.0 support pooling, transaction, and security context propagation for any JCA-compliant resource adapters, including databases, legacy systems, and JMS servers
- JMS 1.1 support that allows asynchronous delivery of messages in distributed systems with optional quality of services parameters such as

persistence, guaranteed delivery, and transactions. Supports both queue and topic messaging styles and offers high-availability features that allow JMS applications to be deployed in a clustered environment

### High Availability Services

JBoss AS provides the following distinctive high-availability services:

- Clustering, fail-over, load balancing, and distributed deployment features provide the means to deploy large scalable robust applications. Features include:
  - > Automatic discovery of nodes
  - > Cluster-wide replicated JNDI context
  - > Failover and load balancing for JNDI, RMI, and all EJB types
  - > Stateful session bean state replication
  - > HTTP session replication
  - > High availability JMS
  - > Farming/distributed deployment of JBoss AS components; deploying on one node deploys on all nodes
- Embedded JBoss Cache that provides a replicated, transactional, tree-structured cache which enables easy clustering of data on a JBoss AS grid. JBoss Cache:
  - > Significantly increases performance via local access to data
  - > Enables session data to be replicated thereby providing an always-on, high availability cache of data on your grid
  - > Provides fine-grained replication for POJOs—an industry first!

### Security Services

JBoss AS implements the standard J2EE Authentication and Authorization (JAAS) security model, but also supports extended security models to provide support for context-sensitive authorization. Moreover, support for pluggable authentication modules (PAMs) enable integration with existing authentication frameworks in your enterprise.

### JMX-based Service Oriented Microkernel

At the core of JBoss AS is a SOA microkernel that is extremely small in footprint. By utilizing JMX, the microkernel delivers a lightweight component model that clearly defines the lifecycle, configuration, and management of services and supplies a standard mechanism for assembling service components which ensures that all services are accessed, managed, and integrated in a unified and consistent manner. Services deployed in JBoss AS can range anywhere from transaction and messaging services to connection pooling and security services. Services can easily be added or removed from the system—thus tuning the overall footprint to suit specific needs. Furthermore, developers can easily extend JBoss AS by creating custom services and packaging them as SARs (Service Archives) that are then individually, hot-deployable to JBoss AS.



# Components and Features

## Aspect and Annotation Framework

JBoss AS includes an aspect-oriented programming (AOP) framework that works in concert with object-oriented programming (OOP) to provide cross-cutting, declarative services (such as persistence, logging, and caching) to object-oriented POJOs. This framework is leveraged extensively for the EJB 3.0 and Extended Annotations that improve the readability, maintainability, and reusability of your code. By simply annotating their Java objects, developers can weave extended functionality into their existing applications quickly and easily. The framework also provides a great way to expand the Java language in a clean and elegant manner.

## Consoles and Tools

JBoss AS addresses the needs of application developers, architects, and administrators by providing easy to use tools and consoles.

JBoss Console provides ability to:

- View user-defined domain and MBeans
- Get management statistics for Servlets, EJBs, and deployment descriptor views
- Graph any numeric JMX attribute dynamically
- Monitor JMX attributes
- Receive email alert notifications based on specified thresholds
- Record snapshots of JMX attributes over time

- View into the microkernel and display all registered and active MBean services
- Display JNDI tree
- Generate thread dump
- Manage the deployment scanner
- Shut down JBoss AS

JBoss Eclipse IDE is available separately and provides:

- World-class development environment based on Eclipse 3
- Integrated debugging and monitoring of JBoss servers and control of their life cycles
- Easy configuration of the packaging layout of archives (packed or exploded)
- Simple deployment of the packaged and/or exploded archive to a JBoss AS server
- Several J2EE wizards to ease and simplify the J2EE development.
- JSP, HTML, and XML editors with syntax highlighting
- Comfortable and sophisticated support for XDoclet
- Integrated support for JBoss AOP and the development and use of aspects
- Integration of XDoclet, Packaging, and Deployment with Eclipse Job API
- EJB 3.0 project wizard
- Hibernate console for integrated HQL query execution and result-set browsing
- Hibernate XML mapping file editor
- Hibernate wizard for reverse engineering database schemas

## Platform and Standards Support

### Minimum System Requirements

- > JDK 1.4 or higher (1.4.2 is recommended)
- > JDK 5 or higher is required when using EJB 3.0
- > 512 MB RAM
- > 100 MB hard disk space
- > 400 MHz CPU

### Supported Operating Systems

Since JBoss AS is 100% pure Java, it is interoperable with most operating systems that are capable of running a Java Virtual Machine (JVM); including Windows, UNIX, Linux, and others.

### Supported Databases

JBoss AS is interoperable with any JDBC-compliant database; including Oracle, SQL Server, DB2, and others.

### Supported Standards

- EJB 3.0 Draft
- EJB 2.1
- JSP 2.0 and Servlets 2.4
- JavaServer Faces
- Java Management Extension (JMX) 1.2
- Java Messaging Service (JMS) 1.1
- Java Transaction API (JTA) 1.0.1B
- CORBA 2.3.1
- JDBC 3.0
- J2EE Connector Architecture (JCA) 1.5
- J2EE Management API 1.0
- J2EE Deployment API 1.1
- Java API for XML Processing (JAXP) 1.2
- Java API for XML-based RPC (JAX-RPC) 1.1
- SOAP with Attachments API for Java (SAAJ) 1.2
- Java API for XML Registries (JAXR) 1.0
- Web Services 1.1
- Java Naming and Directory Interface (JNDI) 1.2.1
- Java Authentication and Authorization Service (JAAS) 1.0
- JavaBeans Activation Framework (JAF) 1.0
- JavaMail 1.3
- Java Authorization Service Provider Contract for Containers (JACC) 1.0





## Support Services from the Source

Your success greatly depends upon your ability to learn, implement, and ultimately support technology such as JBoss AS.

That's where our team of product experts comes into play. JBoss and the large network of JBoss Authorized Service Partners offer a comprehensive set of support offerings for JBoss Application Server including Professional Support, Consulting, and Training.

- **Professional Support** helps you to overcome all JBoss AS related issues – including bug and patch management, production support, and general development and deployment assistance.

Three different levels of support are available, ranging from 8x5 support with 48 hour response times to 24x7 support with 2 hour response times. All JBoss Professional Support packages offer unlimited support with no restrictions on the number of hours or calls that you may log.

> **JBoss Network** access is included with every JBoss AS Professional Support contract. JBoss Network is a support offering that integrates knowledge access, software distribution and application management.

> **Indemnification** against any future legal action alleging that JBoss AS or JBoss Inc. infringes a valid patent or copyright is also included with every Gold or Platinum level Professional Support contract.

- **Consulting** includes both on-site and remote consulting services delivered by a trained JBoss AS consultant when in-depth product knowledge is essential. Our consulting services deliver the personal attention directly from the source that is critical for ensuring timely success for your launch of JBoss AS.

- **Training** is delivered both through public training courses hosted in major cities around the world or as private training courses hosted at your site. The following training courses are available for JBoss AS:

> **JBoss for Java Developers** is a four day course for proficient Java developers who wish to extend their knowledge to J2EE middleware programming using the JBoss Application Server.

> **JBoss for Advanced J2EE Developers** is a four day course for J2EE professionals who wish to take advantage of the JBoss Application Server internal architecture to enhance the functionality and performance of J2EE applications on the JBoss Application Server.

> **JBoss for Administrators** is a two day course for application support individuals, such as system administrators, configuration management and quality assurance personnel who wish to become proficient in configuring and administrating the JBoss application server and the applications deployed on the application server.

More information regarding JBoss services can be found at: [www.jboss.com/services/index](http://www.jboss.com/services/index)

We want your JBoss experience to be a positive one. If at any time you would like to contact JBoss, Inc. regarding our support, training, or consulting options, please send us an e-mail at: [sales@jboss.com](mailto:sales@jboss.com) or call us at our US Headquarters, +1 (404) 467-8555, or our European Headquarters, +41 32 720 9260.

### Getting Started

Contact us to learn more about JBoss Inc. support services. Please visit us at [www.jboss.com](http://www.jboss.com), e-mail us at [sales@jboss.com](mailto:sales@jboss.com), or contact one of our sales offices:

### US Headquarters:

**JBoss Inc.**  
3340 Peachtree Road, NE  
Suite 1200  
Atlanta, GA USA 30326  
Phone (404) 467-8555  
Fax (404) 948-1496

### European Headquarters:

**JBoss Europe**  
Place Numa-Droz 2, CP  
2522  
CH - 2001 Neuchâtel  
Switzerland  
Phone +41 32 720 92 60  
Fax +41 32 720 92 61

### UK Sales Office:

**JBoss UK**  
Regents Place  
338 Euston Road  
London NW1 3BT  
United Kingdom  
Phone: +44 20 7543 6910  
Fax: +44 20 7544 8401

