WebSphere Application Server Family

Accelerate development and deployment of applications. Increase productivity and flexibility.

Highlights

- Enhanced capabilities to speed the development and delivery of new applications and services
- Enhanced Intelligent Management for industry-leading resiliency
- Enhanced operational control, efficiency, and reliability
- Tool bundles for a comprehensive runtime solution
- An affordable, lightweight runtime option for Java EE Web Profile applications
- Enhanced responsiveness with improved elastic-caching capability

Today’s changing technology landscape requires flexibility and scale in back office systems, with access that is appropriate and security-rich. IT leaders and businesses alike face increasing challenges dealing with today’s accelerating rate of change. Leaders are motivated to manage new scalability requirements caused by unpredictable transaction volumes. Customers expect fast and seamless access to applications from anywhere, at any time and on any device. To keep pace with market dynamics, company leaders now demand rapid application development and deployment. To succeed, business leaders require fast, flexible and efficient application development solutions that are paired with leading service-oriented architecture (SOA) runtime environments.

The IBM® WebSphere® Application Server family of products has provided industry-leading solutions for the past 15 years. This family of products offers a broad range of application foundation and programming model choices to support applications that are built for businesses of any size. WebSphere Application Server services applications from the front office to the back office—whether mobile, web, cloud or mission-critical enterprise applications—to support straightforward “systems of interaction.” These systems of interaction are key to the success of customer-facing engagements. A system of interaction provides flexibility and scale in back-office systems to keep pace with the rate of change, and connects back-office systems to all of the new endpoints of front-office engagements.
WebSphere Application Server V8.5 (announced in 2012) provided significant enhancements in terms of developer experience and high-end resiliency. For developers who require a quicker, simpler development run time, and for leaders whose organizations require a lightweight production runtime, the Liberty profile was introduced. The Liberty profile is a strong option for building and deploying web applications that do not require the full Java Enterprise Edition (Java EE) environment of traditional enterprise application server profiles. For administrators and business leaders who strive for operational excellence through management efficiency, responsiveness, and performance, Intelligent Management capabilities were included in the full-profile WebSphere Application Server V8.5 to enable resiliency, virtualization, enterprise-level batch processing and autonomic responsiveness to problems.

Now the latest release, WebSphere Application Server V8.5.5, continues this focus with enhancements to Liberty profile capabilities and qualities of service. IBM clients and IBM Business Partners can build a strong foundation and reduce cost through:

- Fit-for-purpose application server solutions
- Rapid development and delivery of new applications and services
- Operational excellence, resiliency and reliability

IBM WebSphere Application Server V8.5.5 can help provide richer experiences for developers with the faster, easier-to-use WebSphere Application Server Liberty profile with programming model and tools enhancements. Enhanced developer productivity reduces development costs and schedules. The Intelligent Management functions can help enable higher availability by prioritizing business critical applications, optimizing for application health conditions, and simplifying rollout of new application versions.

**Enabling rapid development and deployment of versatile applications**

To help ensure that your applications can keep up with the fast changing demands of your business, the WebSphere Application Server family provides a choice of application foundations for building, deploying and managing most types of applications. From business critical enterprise applications to the smallest departmental applications, IBM provides the foundation to balance key considerations such as scalability and manageability with cost and simplicity in homogenous or mixed environments. The different editions of WebSphere Application Server V8.5.5 now also include the WebSphere Application Server Liberty Core (Liberty Core), an entry-level offer that is a subset of the dynamic Liberty profile of the application server. Liberty Core edition provides a simplified and lightweight development and application serving environment for web, OSGi and mobile applications to help rapidly build and deliver web apps that do not require the full Java EE stack. Liberty Core edition was developed to help enhance developer productivity and to help streamline production scenarios. The most recent version of WebSphere Application Server also comes with expanded tools bundles along with toolkit and programming model enhancements to help enable flexible
and faster development of innovative, portable applications.
The enhancements made to WebSphere Application Server V8.5.5 have numerous benefits:

- **Help you complete tasks more quickly and efficiently with the latest WebSphere Application Server Liberty profile.** The Liberty profile is designed to adapt to the requirements of the application in a dynamic manner to ensure that only the necessary application functions are started. This capability minimizes server startup time and memory footprint. You can download the WebSphere Application Server V8.5.5 Liberty profile at no charge for development purposes. The download size is less than 60 MB, and server start and restart times are under five seconds. The Liberty profile provides a superset of the Java EE Web Profile that includes JAX-WS and JAX-RS web services, JMS and MDB programming models along with deployment models for both traditional Java EE applications and modular OSGi applications. The Liberty profile provides a simplified and lightweight runtime that enables improved developer productivity. The profile can help you to focus on your most frequent developer tasks and complete them more quickly and with less effort. These capabilities can help reduce development and maintenance costs, shorten development schedules and significantly enhance time to productivity. Other capabilities of the Liberty profile include:
  - Simple, shareable Extensible Markup Language (XML) configuration file that can be treated as a versionable artifact
  - Small memory footprint
  - Integrated and powerful tools (Eclipse-based)
  - In addition to IBM Installation Manager, you can optionally use simple zip-and-unzip for deployment

- **Enable rapid development and deployment with the Liberty Core edition.** New in Version 8.5.5 is a lightweight and dynamic offering of WebSphere Application Server. This edition is targeted at web applications that do not require a full Java EE stack. Composed of a subset of the developer-friendly Liberty profile and certified to the Java EE 6 Web Profile specification, the WebSphere Application Server Liberty Core edition enables rapid development and deployment of web-centric and mobile-centric applications, enabling business teams to quickly respond to enterprise and market needs. Highlights of the new Liberty Core edition include:
  - Extremely lightweight offering, composed of the Liberty profile certified for the Java EE Web Profile
  - An excellent development and production run time for web applications
  - Fast time-to-value: small download, small footprint and fast startup
  - Easily package applications (including configuration) for deployment

- **Help you move applications from development to production without changes.** You can run applications developed with the WebSphere Application Server Liberty profile in Liberty profile production environments or you can deploy the applications with full fidelity to WebSphere Application Server “full profile” environments (that is, to the non-Liberty profile WebSphere Application Server environment). This means that you can move applications from development to various WebSphere Application Server production environments without changes.
• **Enable development of high quality enterprise applications.** Multiple tool bundles are available for WebSphere Application Server users. These tool bundles provide developer tools to help enhance productivity and flexibility for building new applications. You can develop, assemble and deploy Java, Java EE, OSGi, Web 2.0, web services, service-oriented architecture (SOA), portal and mobile applications to WebSphere Application Server, including the WebSphere Application Server Liberty profile, with the IBM WebSphere Application Server Developer Tools for Eclipse V8.5.5 lightweight tool set and with the IBM Rational® Application Developer V9 tool set. The bundles provide you with an unlimited number of licenses of WebSphere Application Server Developer Tools for Eclipse V8.5.5 and Rational Application Developer V9 to help you develop, deploy and manage high quality enterprise applications.

• **Enable you to use a variety of programming frameworks.** Not only does WebSphere Application Server itself support a broad range of industry standard programming models, this IBM offering also enables you to run additional third party frameworks in your WebSphere environment, such as the Spring Framework. WebSphere support for leading industry standards gives you the flexibility to add the frameworks of your choice to the industry's premier Java Runtime Environment.

• **Help you smoothly migrate applications from other application servers.** With the Application Migration Toolkit (available with the latest version of WebSphere Application Server), you can take action to scan the applications that you need to migrate from earlier versions of WebSphere Application Server or from non-IBM application servers. You can identify changes that are required and automatically make those changes to help ease the migration process and speed time to value.

• **Give you the developer desktop for all editions.** Now you can get WebSphere Application Server, and the corresponding tools needed to create and develop applications, fully supported on developer desktops. This capability comes as part of your WebSphere Application Server license. If you have an active support contract for your production WebSphere Application Server, you are allowed to install the same WebSphere Application Server edition onto developer machines for use on developer desktops. These installations of WebSphere Application Server are entitled for support on the developer machine as long as an active support contract is in place for the production server. You can also download at no charge the WebSphere Application Server for Developers and WebSphere Application Server Developer Tools for Eclipse. This applies to WebSphere Application Server V8.5 and later versions.

• **Enable you to take advantage of enhanced modular application development.** With the new version of WebSphere Application Server, you can help your organization take advantage of enhanced modular application development. You can assemble OSGi applications from reusable bundles that contain Java EE components such as servlets and Enterprise JavaBeans assets, using Java EE technologies such as Java Persistence Architecture (JPA). The Java EE assets in your OSGi bundles can be developed “from scratch,” or you can include existing assets such as Enterprise JavaBeans and migrate the assets to use OSGi modularity with minimal code changes. A modular application-development approach is a good way to enhance business flexibility in a cost-effective manner. This helps make your applications flexible and easier to extend in the future.
Enable you to add Liberty features through a new system programming interface. A fundamental characteristic of the Liberty profile is the composable nature in which capabilities are exposed as features or building blocks for the server. While the Liberty profile includes many immediate-use features, significant value is added by being able to extend the capabilities. WebSphere Application Server V8.5.5 makes it possible for customers and partners to extend the Liberty profile through the addition of features using a system programming interface (SPI). The SPI supports the complete feature lifecycle that includes packaging, installing, and servicing third-party features.

Help adapt applications seamlessly for smartphones and tablets. The WebSphere Application Server Web 2.0 and Mobile Toolkit can help you to extend SOA benefits by connecting web services, SOA services and Java EE objects into interactive desktop web and mobile web user interfaces. With this feature of the enhanced toolkit, you can adapt and deploy applications that were initially developed for web browsers to smartphones and tablets. You can help enable your organization to target new customers who use mobile devices. And you can help provide a more-consistent experience for existing users when they use different media.

Provide the option to use Java 7 features in applications. WebSphere Application Server now has a selectable Java Development Kit (JDK) option. You can install Java 7 as a feature extension to a new WebSphere installation or to an existing WebSphere installation. You can then switch between Java 6, which is the default Java Virtual Machine (JVM) used in WebSphere Application Server V8.5.5, and Java 7 for application servers. This flexibility can help facilitate the selection of the most appropriate level of Java support for a particular situation in both development and production environments. Note that when you use WebSphere Application Server Liberty profile in a development environment, you can use any JDK of your choice as long as it is JDK6 or above.

Provide support for the Macintosh operating system when you use the WebSphere Application Server Liberty profile as a development server.

Helping enable higher availability and resiliency with Intelligent Management
Version 8.5 of WebSphere Application Server introduced Intelligent Management capabilities. Intelligent Management capabilities are designed to deliver breakthrough levels of resiliency and reliability, and include capabilities formerly available from the IBM WebSphere Virtual Enterprise product. With the Intelligent Management features, you can extend the quality of service provided by your middleware environment. You can use configurable operational policies to govern the performance and health of your applications. Intelligent Management has numerous benefits:

Helps improve likelihood of customer conversion by prioritizing business critical applications. The intelligent routing capabilities of Intelligent Management can help you to prioritize business critical applications. Intelligent routing is designed to prioritize requests to the applications and to route the requests based upon rules that are set by the administrator. With intelligent routing, you can determine in near-real time if the request is queued. You can determine how long the request has been queued based upon current demand considering the resource utilization of the target servers. For example, intelligent routing can give priority to a customer who is attempting to purchase an item from your website, rather than to a customer who is just browsing through your catalog. This improves the likelihood of a sale and revenue.
• **Helps enable enhanced reliability by optimizing application health conditions.** You can use the application health-management capabilities of Intelligent Management to monitor the health conditions of your application server environment. Take corrective measures before user outages occur. Application health management is designed to help you define health policies that can identify potential problems and to help you notify your administrator or take preventive action. When health policy violations happen, an action plan can be executed automatically or you can define custom actions that can be executed. By optimizing the health conditions of your application infrastructure, you can help improve availability and quality of service.

• **Helps maintain brand reputation with smooth rollout of new versions of applications.** Application release cycles are becoming shorter because of fast-changing customer preferences. For example, how can you ensure that it is “business as usual” when your organization upgrades from version 6 to version 7 of a business-critical application? With the application edition management capabilities of the latest version of WebSphere Application Server, you can help reduce significantly the chances of user outages by validating a new edition of an application in the production environment and then upgrading the application with minimal or no interruptions. You can also run multiple editions of a single application at the same time and you can direct different users to different editions.

• **Helps meet service-level agreements with dynamic clustering.** The Intelligent Management capabilities include a dynamic clustering feature that helps you to provision—and start or stop—new instances of application server JVMs based on workload demands. With dynamic clustering, you can dynamically scale the application server up or down, based upon business demands or spikes in usage.

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**Enabling improved operations and control**

The new version 8.5.5 of WebSphere Application Server is designed to extend the operations and control features of the earlier versions. With capabilities such as WebSphere Batch, Automatic Resource Management in Java V7.0 and Cross Component Trace (XCT), WebSphere Application Server improves on the security, operations and control features of the earlier versions. WebSphere Application Server is designed to enable the entry, execution and management of Java Batch processing with the enterprise-grade managed batch execution environment that WebSphere Batch offers. WebSphere Batch provides an infrastructure for batch processing that is designed to share the same application server environment for batch processing and for online transaction processing (OLTP) applications, thus eliminating the need for separation of batch and OLTP. This also eliminates the need to have offline batch windows. This capability is highly desirable these days, when applications are accessed 24X7 and are no longer limited to normal business hours.

With the Automatic Resource Management set of features in Java V7.0, you can automatically close statements and connections to external resources with the Java framework. This feature can help you alleviate problems with error handling and resource control in your applications. You can optimize the logic of your applications for more meaningful transactions as you enable your applications to focus less on resource management tasks. XCT enables you to correlate log and trace entries. Using XCT, you can identify the root cause of problems throughout components. XCT helps you to annotate log and trace entries; log entries that are related to a request that is serviced by more than one thread, process or server are identified as log entries that belong to the same unit of work. With this enhancement, administrators and support teams can follow the flow of a request as it traverses thread boundaries or process boundaries. If you run applications that were built
using SOA, you can use XCT to help facilitate problem
determination throughout multiple services on different
systems. Last but not least, new memory detection capabilities
were added so that developers can identify potential memory
leaks in their applications. This feature can, in some cases,
remove the memory leak in the deployed application in the
event that a change in the application cannot be done in a
 speedy way.

WebSphere Application Server also offers a variety of key
feature updates, including:

- Security enhancements, problem determination and monitor-
ing capabilities with Liberty profile
- New Liberty administrative model, enabling the grouping
  of Liberty servers into collectives for common management
- Service mapping
- Session Initiation Protocol (SIP) improvements
- Improved Load Balancer for Internet Protocol Version 4 and
  Internet Protocol Version 6
- Liberty profile packaging and installation enhancements
- Performance enhancements

**WebSphere eXtreme Scale elastic caching**
The WebSphere eXtreme Scale platform provides distributed
object caching. This type of caching is essential for elastic scal-
ability and next-generation cloud environments. Elastic caching
helps applications process massive volumes of transactions with
extreme efficiency and linear scalability. The combination of
WebSphere Application Server and WebSphere eXtreme Scale
helps you to improve the consumer experience through
enhanced performance and responsiveness. You can also
improve scalability and fault tolerance. Several editions of
WebSphere Application Server V8.5.5 include entitlement to
WebSphere eXtreme Scale capabilities for both Liberty profile
and full-profile WebSphere Application Server.

The extent of entitled WebSphere eXtreme Scale capabilities
varies depending on the WebSphere Application Server edition:

- WebSphere Application Server includes entitlement to
  session caching and to the Dynamic Cache API that is
  informally known as DynaCache and can be used only in
  support of WebSphere Application Server.
- WebSphere Application Server for z/OS includes full
  entitlement to WebSphere eXtreme Scale for z/OS. This
  provides client APIs for connecting to distributed
  WebSphere eXtreme Scale servers.
- WebSphere Application Server Network Deployment soft-
  ware includes full entitlement to WebSphere eXtreme Scale.
- WebSphere Application Server for Developers software
  includes full entitlement to WebSphere eXtreme Scale on
  the developer workstation.

**Fit-for-purpose servers support a wide range of scenarios**
The WebSphere Application Server family is designed to
provide an agile, robust foundation that can help lower total
cost of ownership, foster innovation and support the reuse of
applications for your SOA environments. The WebSphere
Application Server family offers multiple options of configura-
tions that can help support multiple business models, scenarios
and deployment platforms.
WebSphere Application Server V8.5.5 editions are built on a common server foundation that is designed to deliver the same Java EE and broad programming model support and transactional engine. The result is that you can facilitate higher qualities of service throughout production configurations. Version 8.5.5 provides the ability to configure web-server plugins for an unlimited number of server profiles for simple load balancing and failover. The availability of the WebSphere Application Server Liberty profile throughout the editions helps to provide additional flexibility to develop and deploy WebSphere applications.

For organizations that run mainframes, IBM WebSphere Application Server for z/OS is designed to integrate with IBM System z® hardware and the IBM z/OS® operating system. WebSphere Application Server for z/OS has functional equivalence to WebSphere Application Server Network Deployment. WebSphere Application Server for z/OS is designed to provide additional capabilities such as prioritized workload management, advanced transactional integrity, intense scalability, and data and workload collocation. With these capabilities, this edition can help you take advantage of the qualities of service for which System z and z/OS are well known.

Targeted at server virtualization environments, IBM WebSphere Application Server Hypervisor Edition includes the robust features of WebSphere Application Server Network Deployment. Designed to reduce installation and configuration time, WebSphere Application Server Hypervisor Edition can help reduce development, testing and deployment times for WebSphere-based applications. Deploying WebSphere Application Server Hypervisor Edition with IBM Workload Deployer, a cloud computing appliance that manages IBM products in a cloud environment, can help reduce operational costs and increase business agility further.

IBM WebSphere Application Server Network Deployment V8.5.5 configuration incorporates advanced clustering, new Intelligent Management capabilities, robust security capabilities and centralized management and administration. These features can help enable near-continuous availability, dynamic scalability, easier management and reduced total cost of ownership for your business critical applications.
# IBM WebSphere Application Server Family V8.5.5

<table>
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<tr>
<th>Edition</th>
<th>Features</th>
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</thead>
<tbody>
<tr>
<td><strong>WebSphere Application Server for Developers</strong></td>
<td>Enables efficient development of innovative apps that will run on WebSphere Application Server in production.</td>
</tr>
<tr>
<td>Tools Edition</td>
<td>New</td>
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<tr>
<td>WebSphere Application Server Hypervisor Edition</td>
<td>The WebSphere Application Server Network Deployment server, optimized to run instantly in IBM PureApplication™ System, VMware, IBM PowerVM®, IBM z/VM® and other server virtualization environments.</td>
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<tr>
<td>Tools Edition</td>
<td>New</td>
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<tr>
<td>WebSphere Application Server Network Deployment</td>
<td>Delivers near-continuous availability, with advanced performance and intelligent management capabilities, for mission-critical apps. Full entitlement to WebSphere eXtreme Scale.</td>
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<tr>
<td>Tools Edition</td>
<td>New</td>
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<tr>
<td>WebSphere Application Server for z/OS</td>
<td>Takes full advantage of the IBM z/OS sysplex to deliver a server experience that is extremely reliable, security-rich and resource-efficient. Entitlement to WebSphere eXtreme Scale z/OS client.</td>
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<tr>
<td>Tools Edition</td>
<td>New</td>
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<tr>
<td>WebSphere Application Server</td>
<td>Provides a security-rich, high-performance transaction engine for moderately sized configurations, with web tier load balancing and failover across application server profiles. Includes entitlement to WebSphere eXtreme Scale for HTTP session caching and DynaCache on the entitled WebSphere Application Server.</td>
</tr>
<tr>
<td>Tools Edition</td>
<td>New</td>
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<tr>
<td>WebSphere Application Server Liberty Core</td>
<td>A lightweight and reduced-cost offering that is Liberty profile-based (not full-profile WebSphere Application Server). Provides the capabilities to rapidly build and deliver web apps that do not require the full Java EE stack.</td>
</tr>
<tr>
<td>Liberty profile (Web Profile only)</td>
<td>New</td>
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<tr>
<td>WebSphere Application Server Express</td>
<td>A reduced-cost, ready-to-go solution to build dynamic web sites and apps, including WebSphere Application Server Liberty profile and full-profile WebSphere Application Server. Restricted to a set amount of processor value units (PVUs).</td>
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</tbody>
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This chart describes the key features of each WebSphere Application Server edition.
<table>
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<tr>
<th>WebSphere Application Server Liberty Core</th>
<th>WebSphere Application Server Express</th>
<th>WebSphere Application Server</th>
<th>WebSphere Application Server Network Deployment</th>
<th>WebSphere Application Server Hypervisor Edition</th>
<th>WebSphere Application Server for z/OS</th>
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<tr>
<td>Optimized for: Smaller scale deployments of dynamic web applications. This version of the Liberty profile delivers the Web Profile option. It delivers a reduced-cost, ready-to-go solution.</td>
<td>Developers or business leaders at small and midsize businesses who need an easier, reduced-cost, ready-to-go solution for smaller scale deployments of dynamic web applications</td>
<td>Developers or business leaders at medium to large businesses who need a scalable foundation to build, run and manage dynamic web applications on a single server or in moderately sized deployment environments</td>
<td>Developers or business leaders who need advanced management, scalability, automated performance optimization and near-continuous availability for their most mission-critical applications</td>
<td>Developers or business leaders who need advanced management, scalability, automated performance optimization and near-continuous availability for their most mission-critical applications</td>
<td>Developers or business leaders at enterprises that require z/OS qualities of service to achieve optimized performance and near-continuous availability for their most mission-critical applications</td>
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### Programming Models, Standards and Development

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<th>Java EE 6 compliance</th>
<th>Java EE 6 Web Profile compliance</th>
<th>Java Platform, Standard Edition 6, and 7</th>
<th>Web 2.0 and Mobile</th>
<th>OSGi Applications</th>
<th>Messaging and web services</th>
<th>Java Batch</th>
<th>Service Component Architecture (SCA)</th>
<th>Session Initiation Protocol (SIP)</th>
<th>Dynamic caching</th>
<th>System Programming Interface (SPI) for extensibility</th>
<th>Application assembly and deployment tools</th>
<th>Dynamic server configuration (without server restart)</th>
<th>Integration with z/OS services</th>
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| Key: ■ = Supported with WebSphere Application Server full profile, ● = Supported with WebSphere Application Server Liberty profile, blank = not supported
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<tr>
<th>Administration, High Availability and Performance</th>
<th>WebSphere Application Server Liberty Core</th>
<th>WebSphere Application Server Express</th>
<th>WebSphere Application Server</th>
<th>WebSphere Application Server Network Deployment</th>
<th>WebSphere Application Server Hypervisor Edition</th>
<th>WebSphere Application Server for z/OS</th>
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<td>High performance extensible logging (HPEL)</td>
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<td>Cross Component Trace (XCT)</td>
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<td>Edge-of-network services</td>
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<td>Managed directory-based Java EE application installation, update and uninstall</td>
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<td>HTTP session affinity and failover</td>
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<td>Intelligent Management</td>
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<td>Managed clustering</td>
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<td>Enterprise-scale management and administration</td>
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<td>Prepackaged virtual deployment images</td>
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<td>Advanced security</td>
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<td>Kerberos authentication, single sign-on, and Security Assertion Markup Language (SAML)</td>
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<td>WebSphere secure proxy, domains, and auditing</td>
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Key: ■ = Supported with WebSphere Application Server full profile, ● = Supported with WebSphere Application Server Liberty profile, blank = not supported

Table 1. Key features and functions of IBM WebSphere Application Server configurations

Table 1 describes the key features and functions of each WebSphere Application Server edition, so that you can choose the configuration that best fits your current business strategy and so that you can be prepared to enhance your solution as your needs evolve. For the latest comparison information, visit: ibm.com/websphere/was/compare
Why IBM?
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IBM Corporation
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Produced in the United States of America
September 2013
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2 IDC; Worldwide Application Server Middleware 2010 Vendor Shares, Doc # 228921, June 2011

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