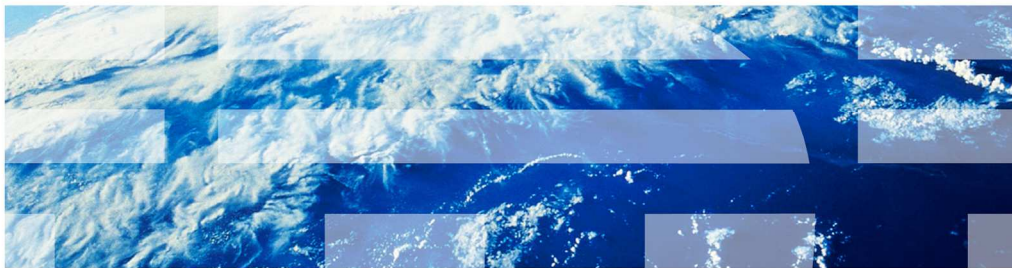


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# IBM WebSphere Application Server V8.5.5

## Release overview



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This presentation provides an overview of IBM WebSphere® Application Server V8.5.5.



## Introducing WebSphere Application Server V8.5.5

Delivering value to enterprises, partners and developers through  
fit-for-purpose application servers, flexible and extensible platforms, and ease of development

- **Developers – Easy and no-charge access; Lightweight developer friendly tools**
  - Fast and free download of WebSphere Developer Tools for Eclipse
  - Robust set of programming models, including several new ones for the Liberty profile
  - Extensible runtime with ability to add custom features
  - Simple configuration and rapid server restart
  - Free and supported installation of server runtime on developer machines, with active server service and support
- **Enterprises – Fit-for-purpose application servers**
  - Breadth of application server types from lightweight to highly-resilient
  - Develop, test and run on one common application platform
  - Entitlement to WebSphere eXtreme Scale included with some WebSphere Application Server editions
  - Highly resilient application environments with enhancements to Intelligent Management
- **Partners – Easily develop, package and deploy custom applications**
  - Extend the Liberty profile with custom features
  - Ability to package the server runtime, configuration and application
  - Minimized server packages for maximum installation density and rapid deployment
  - New lightweight Liberty profile-only offering for web profile applications

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WebSphere Application Server V8.5.5 is a fix pack of WebSphere Application Server V8.5. Entitlement to V8.5 automatically gives you entitlement to V8.5.5.

WebSphere Application Server V8.5.5 continues to deliver value to developers, enterprises, and partners. For developers, it continues to offer a no-charge developer offering, with lightweight developer-friendly tools. It supports a robust set of programming models, including several new ones for the Liberty profile. It is built as an extensible runtime with the ability to add custom features, and with simple configuration and rapid server restart. New in V8.5.5, installation of the server runtime on developer machines is free and supported, if you have active server service and support.

For enterprises, WebSphere Application Server V8.5.5 offers fit-for-purpose application servers, with a breadth of application server types from lightweight to highly-resilient. You can develop, test, and run on one common application platform. Use intelligent management to deploy a highly-resilient application environment. New in V8.5.5, entitlement to WebSphere eXtreme Scale is included with some WebSphere Application Server editions.

WebSphere Application Server V8.5.5 makes it easy to develop, package, and deploy custom applications. You can extend the Liberty profile with custom features. You can package the server runtime, configuration files, and applications in a single package. And you can minimize the size of the packages for maximum installation density and rapid deployment. A new lightweight Liberty profile-only offering for web profile application is also available.

## WebSphere Application Server V8.5.5 family

<p><b>WAS for Developers</b></p> <p>Tools edition Liberty and full profiles +WXS</p> <p>Enables efficient development of innovative apps that will run on WebSphere Application Server in production. Includes Eclipse adapters. <b>New!</b></p> <p>WebSphere Application Server and WebSphere Development Tools for Eclipse editions freely available for development desktops. Supported under production runtime licenses.</p>	<p><b>WAS Hypervisor Edition</b></p> <p>Liberty and full profiles Intelligent mgmt +WXS</p> <p>The WAS ND server, optimized to instantly run in PureApplication System, VMware, PowerVM®, zVM and other server virtualization environments</p>	<p><b>WAS Network Deployment</b></p> <p>Tools edition Liberty and full profiles Intelligent mgmt +WXS</p> <p>Delivers near-continuous availability, with advanced performance and intelligent management capabilities, for mission-critical apps. Full entitlement to WXS.</p>	<p><b>WebSphere Application Server for z/OS®</b></p> <p>Liberty and full profiles Intelligent mgmt +WXS client</p> <p>Takes full advantage of z/OS Sysplex to deliver a highly secure, reliable, and resource-efficient server experience. Entitlement to WXS z/OS client.</p>
<p><b>WebSphere Application Server</b></p> <p>Tools edition Liberty and full profiles +WXS</p> <p>Provides a secure high-performance transaction engine for moderately-sized configurations with web tier clustering and failover, across up to five application server profiles. Includes entitlement to eXtreme Scale for HTTP session caching and dynamic web cache on the entitled WebSphere Application Server.</p>			
<p><b>WebSphere Application Server Liberty Core</b></p> <p>Liberty profile (web profile only) <b>New!</b></p> <p>A lightweight and low-cost Liberty profile-based offering (not full-profile WAS), providing the capabilities to rapidly build and deliver web apps that do not require the full Java EE stack</p>		<p><b>WebSphere Application Server Express®</b></p> <p>Liberty and full profiles</p> <p>A low-cost, ready-to-go solution to build dynamic websites and apps, including both Liberty- and full-profile WebSphere Application Server. Restricted to a set amount of IBM Processor Value Units.</p>	

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There are some new additions to the WebSphere Application Server V8.5.5 family.

One is the WebSphere Application Server Liberty Core edition. It is a new, entry-level, lower-cost edition that supports only the Liberty profile with the Java Enterprise Edition web profile.

Secondly, entitlement to WebSphere eXtreme Scale is available for the WebSphere Application Server base edition to support HTTP session caching and dynamic web caching. Full entitlement to WebSphere eXtreme Scale is available for the Network Deployment edition, Hypervisor Edition, and the WebSphere Application Server for Developers edition. For the z/OS edition, only the eXtreme Scale client is available because the eXtreme Scale server does not support z/OS.

And finally, if you have active service and support for WebSphere Application Server, you can install the same runtime for use by developers without additional charge.



## WebSphere Application Server V8.5.5 delivers

Fit-for-purpose servers enabling an unmatched combination of application server runtime and development experience, from the highly-resilient to the lightweight and nimble

Developer experience	Application resiliency	Operational excellence
<p><b>Fast, flexible and simplified application development</b></p> <ul style="list-style-type: none"><li>▪ New lightweight <b>WebSphere Application Server Liberty Core</b> edition</li><li>▪ Liberty profile<ul style="list-style-type: none"><li>▪ Java EE 6 web profile</li><li>▪ Web services</li><li>▪ JMS, MDB</li><li>▪ NoSQL DB (MongoDB Client)</li><li>▪ Support for WebSphere Web dynamic caching</li><li>▪ Add custom and vendor Liberty profile features</li></ul></li><li>▪ Asynchronous work management</li><li>▪ Enhanced developer tools</li><li>▪ Supported WAS and WebSphere Developer Tools on dev desktops</li></ul>	<p><b>Intelligent management and enhanced resiliency</b></p> <ul style="list-style-type: none"><li>▪ Liberty collective administration</li><li>▪ Liberty clustering</li><li>▪ WebSphere Application Server Network Deployment and WAS z/OS full profile enhancements in V8.5<ul style="list-style-type: none"><li>▪ App edition mgmt</li><li>▪ App server health mgmt</li><li>▪ Dynamic clustering</li><li>▪ Intelligent routing</li><li>▪ Messaging resiliency</li><li>▪ Enterprise Java batch</li><li>▪ Memory leak protection</li></ul></li><li>▪ Intelligent management in the web server</li></ul>	<p><b>Improved operations, security, control and integration</b></p> <ul style="list-style-type: none"><li>▪ Liberty profile<ul style="list-style-type: none"><li>▪ Security enhancements</li><li>▪ Problem determination</li><li>▪ Monitoring</li><li>▪ Packaging and installation enhancements</li></ul></li><li>▪ Service mapping</li><li>▪ SIP improvements</li><li>▪ Improved load balancer for IPv4 and IPv6</li><li>▪ WebSphere eXtreme Scale integration</li></ul>

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The themes for WebSphere Application Server V8.5.5 continue to be developer experience, application resiliency, and operational excellence.

For developer experience, the Liberty profile now offers the Java Enterprise Edition 6 web profile, web services, and messaging. In addition, it provides support for the MongoDB client, WebSphere Web Cache, and custom Liberty profile features. Additional capabilities include asynchronous work management, enhanced developer tools, and support for installations on developer desktops with existing support and service. Use the Liberty Core edition if you only require the Java Enterprise Edition 6 web profile.

For application resiliency, the Liberty profile offers collective administration and clustering of Liberty servers. For the WebSphere Application Server full profile, starting in V8.5, intelligent management is supported. And, in V8.5.5, there is the optional new capability to configure and run intelligent management in the web server.

For operational excellence, the Liberty profile offers additional security, problem determination, monitoring, packaging, and installation features. The full profile offers new service mapping, Session Initiation Protocol, or SIP, and an improved load balancer for IPv4 and IPv6 features. In addition, WebSphere eXtreme Scale can now be deployed to some editions.



## WebSphere Application Server Liberty Core V8.5.5

Liberty Core, a new Liberty profile-only edition, enables rapid development of lightweight, flexible and extensible applications for maximum-density deployments

### What is Liberty Core:

- ✓ Simple, lightweight, low-cost WebSphere Application Server edition
- ✓ An alternative to open source that includes WebSphere quality of service
- ✓ Liberty profile only (not full-profile WebSphere Application Server)
- ✓ Subset of Liberty profile in WebSphere Application Server, Network Deployment (no JMS, WS, WebSphere eXtreme Scale)
- ✓ Scoped to web profile capabilities
- ✓ Easily embeddable (zip and go)
- ✓ Extensible by way of Liberty Extensions System Programming Interface
- ✓ Clear migration path up the stack to WebSphere Application Server and Network Deployment (gaining programming models, management, resiliency, scale)

### Benefits for developers:

- ✓ Lightweight, flexible, easy-to-use runtime; rapid server restart
- ✓ Free to download tools with support on developer desktop

### Benefits for operations:

- ✓ Fidelity across WebSphere Application Server editions; consistent dev / test / run
- ✓ Manage across traditional and cloud infrastructures

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The WebSphere Application Server Liberty Core edition is a new, entry-point, lightweight edition. It is a good alternative to open source and supports the Java Enterprise Edition 6 web profile programming model.

The benefits for developers include a lightweight, flexible and easy-to-use runtime. Also, this edition provides a rapid server restart, and freely available and downloadable tools. The Liberty Core edition is also supported on your desktop, if you have existing service and support.

The benefits for operations include fidelity across WebSphere Application Server editions, consistent development, test, and production behavior, and management across traditional and cloud infrastructures.

## WebSphere Application Server V8.5.5 Liberty profile “enhanced”

WebSphere Application Server V8.5.5 delivers significant enhancements to the Liberty profile, including new programming models, administration, qualities of service and development tools

### Dynamic server profile

Not static like web profile; configuration by application at a fine-grained level

### “Developer first” focus

Simplified, shareable XML server configuration. New integrated messaging server. Dynamic cache support. New programming models, such as web services, JMS and EJB Lite

### Start fast, run efficiently

Starts in <3 seconds; memory footprint <50 MB (TradeLite benchmark)

### Small download

50 MB for web profile features

### Integrated tools

Powerful tools in WDT feature. Enhanced for V8.5.5 programming models, Maven integration, ++

## WebSphere Application Server V8.5.5 Liberty profile and

## WebSphere Application Server Developer Tools for Eclipse (WDT)

### Web profile certified

Create web apps for the Java EE web profile standard

### Dynamically extensible

Install new features from repository (local or remote) with no server restart

### Lightweight cluster mgmt

Liberty servers can join a lightweight cluster for workload balancing and high availability

### Unzip installation and deployment

Intelligent management or extract to install. New option to deploy “server package” of application + configuration + required subset of server runtime for highest-density deployment

### Liberty Extensions

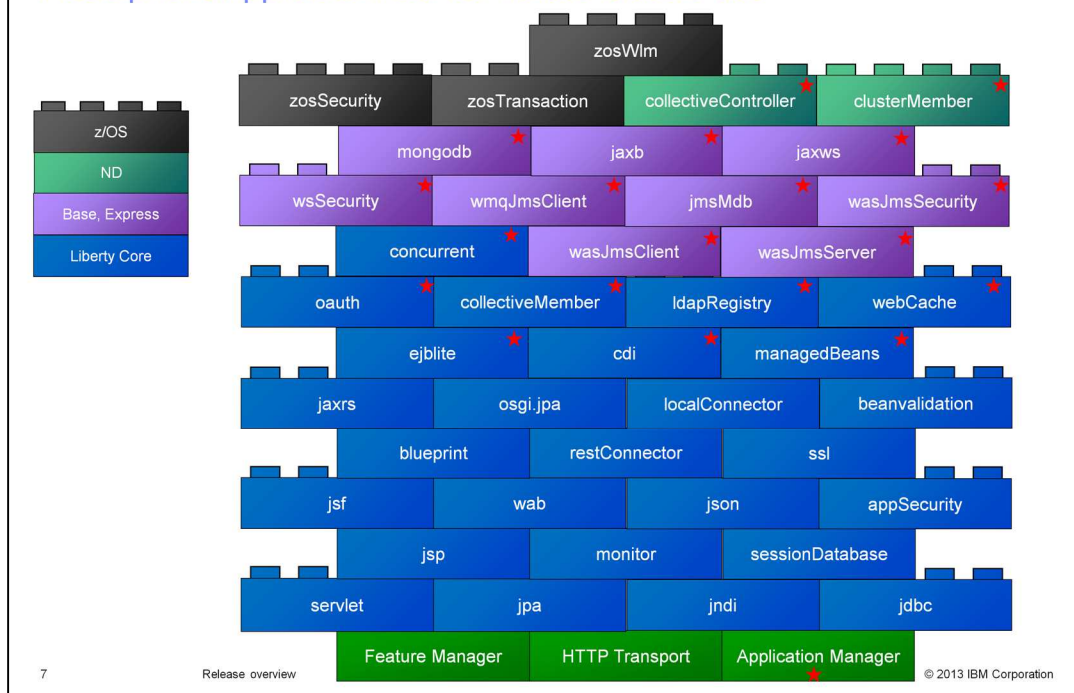
Add custom features and integrate third party components by way of Liberty Extensions interface

### Fidelity to full-profile WebSphere Application Server

Same reliable containers and quality of service. Develop on Liberty profile and deploy to Liberty- or full-profile WebSphere Application Server.

In WebSphere Application Server V8.5.5, the Liberty profile includes improvements to the integrated tools and adds Java Enterprise Edition 6 web profile certification. It now supports lightweight cluster management and dynamic extensibility by way of a repository. A new extensions interface allows you to add custom features.

## WebSphere Application Server V8.5.5 feature set



WebSphere Application Server V8.5.5 Liberty Core edition includes EJB Lite, Contexts and Dependency Injection, and managed beans, which completes its web profile certification. Liberty Core edition supports a concurrent-1.0 feature for asynchronous work management. It also contains additional production features, including OAUTH-2.0, LDAP registration, dynamic web caching, and collective administration.

Move up to the Base or Express editions to get additional programming models, like Java API for XML Web Services, Message Driven Beans, Java Message Service, and support for WebSphere MQ.

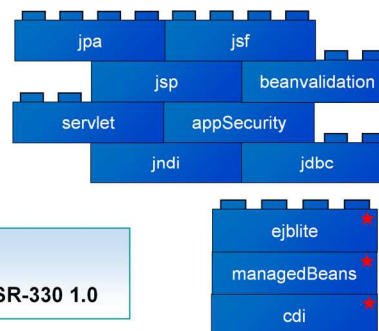
Upgrade to the Network Deployment edition to get Liberty profile-based collective administration and clustering of Liberty profile servers.

The z/OS edition continues to support z/OS security, transactions, and workload management.

## Liberty – Java EE web profile completion

The Java EE web profile provides a proper subset of the Java EE specification, enabling capabilities focused on developing lightweight web applications

- Supported by all WebSphere Application Server editions
- Enables a lightweight and standard runtime as a best practice for building web applications
- `<feature>webProfile-6.0</feature>` enables all features of the web profile:
  - Servlet 3.0
  - JavaServer Pages (JSP) 2.2
  - Expression Language (EL) 2.2
  - Debugging Support for Other Languages (JSR-45) 1.0
  - Standard Tag Library for JavaServer Pages (JSTL) 1.2
  - JavaServer Faces (JSF) 2.0
  - Common Annotations for Java Platform (JSR-250) 1.1
  - Java Transaction API (JTA) 1.1
  - Java Persistence API (JPA) 2.0
  - Bean Validation 1.0



- Enterprise JavaBeans (EJB) 3.1 Lite + Interceptors 1.1:
- Managed Beans 1.0:
- Contexts and Dependency Injection: JSR-299 1.0 and JSR-330 1.0

Here is a look at what is new in V8.5.5 in a little more detail.

The Liberty profile now provides a complete implementation of the Java Enterprise Edition web profile, with the addition of the Managed Beans 1.0, Contexts and Dependency Injection 1.0, and EJB Lite features. Note that the WebSphere Application Server full profile is Java Enterprise Edition 6-compliant starting in V8.0.

An application that uses all the technologies of the web profile can either specify all eleven of the features that are shown here as blue bricks, or specify the single web profile-6.0 feature, which enables all eleven of them. You might notice that there are some technologies in the web profile that do not appear to map directly to features that you specify in server.xml, for example, Java Transaction API. These features are loaded implicitly by the Liberty kernel because higher-level features, such as Java Persistence API, have dependencies on them. Automatically loading these features, rather than requiring you to specify them, simplifies the development experience.



## Liberty – EJB Lite support

The EJB Lite support in WebSphere Application Server V8.5.5 provides a subset of the full EJB 3.1 API. This enables a convenient and lightweight EJB implementation, meeting the needs of many applications.

- EJB 3.1 Lite is a key component of the Java EE web profile specification
- The subset of EJB 3.1 specification focused on session beans and local interfaces
- Keeps EJB implementation small and lightweight
- Available in all WebSphere Application Server editions



	EJB 3.1 Lite (Liberty and full profile)	Full EJB 3.1 (Full profile)
Session beans (stateful, stateless, singleton)	✓	✓
Message-driven beans		✓
CMP V2/BMP V1 entity		✓
Java Persistence 2.0	✓	✓
Local/No interface	✓	✓
Remote V3.0		✓
Remote home/component V2		✓
JAX-WS web services		✓
JAX-RPC web services		✓
EJB timer service		✓
Async bean invocation		✓
Interceptors	✓	✓
RMI-IIOP interoperability		✓
Container-managed transactions / Bean-managed transactions	✓	✓
Declarative programmatic security	✓	✓
Embeddable API	✓	✓ (only required for EJB Lite)

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EJB Lite is the well-defined subset of the EJB 3.1 specification that is required for the web profile. With the WebSphere Application Server full profile, you get all of EJB 3.1, which is a superset of earlier versions of the EJB specifications. The EJB Lite feature of the Liberty profile provides the web profile subset capabilities of the EJB 3.1 specification. These include: stateless and stateful session beans, managed persistence, transactions, and security within the EJB container, and packaging of EJB modules in EAR or WAR files.

Though not required by the EJB Lite specification, the Liberty profile also supports the combination of the ejblite feature with other features for jax-ws and Java Message Service. This allows enterprise beans to be used as JAXWS endpoints and message driven beans. Applications that require EJB V2, Java API for XML-based RPC and remote EJB interfaces need to use the WebSphere Application Server full profile – these are not part of the Liberty profile.

## Liberty – web services

The WebSphere Application Server V8.5.5 Liberty profile provides both client and server functionality for SOAP-based web services. This enables easy development, integration and management of web services.

- Apache CXF implementation
- Supported APIs:
  - Java API for XML Web Services 2.2
  - JAXB 2.2
  - web services for EE 1.3
  - Both POJO- and EJB-based web services
  - JDK-bundled APIs also available: SAAJ, Java API for XML Processing, StAX
- Protocols
  - SOAP/HTTP
  - WS-Security
- Simplified development and deployment
  - WebSphere Developer Tools for Eclipse wizard supports top-down WSDL-to-Java generation and bottom-up POJO-to-web service
  - WebSphere Developer Tools for Eclipse plug-in supports rapid edit-compile-debug cycles
  - For EJB-based implementation:
    - No router WAR generation required
    - No EAR wrapper required



Two features, Java API for XML Web Services, or jax-ws, and Java Architecture for XML Binding, or jaxb, support web services in the Liberty profile. Liberty uses Apache CXF as its web services engine. For portability, applications can only use the supported APIs that are defined by jax-ws and jaxb.

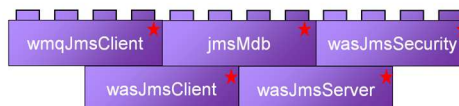
Supported protocols are SOAP/HTTP and HTTPS, and WS-Security for message-level security.

WebSphere Developer Tools for Eclipse is a free Eclipse plug-in, for which IBM offers optional support. It has been enhanced with wizards to support both top-down WSDL-to-Java generation and bottom-up Plain Old Java Object-to-web service development strategies. It does not support bottom-up EJB-to-web service generation. Unlike the WebSphere Application Server full profile, EJB-based web services do not require the generation of a router WAR or an EAR wrapper. All WebSphere Developer Tools for Eclipse capabilities are also provided in the IBM Rational Application Developer product.

## Liberty – Java messaging support

V8.5.5 provides Java messaging support for the Liberty profile, including a lightweight single-server message provider and connections to message providers such as WebSphere MQ

- JMS and MDB programming models
- Lightweight messaging engine localizes messaging destinations (queues and topics)
  - Integrates with transactions and security services
  - For development and testing
  - Supports security across process boundaries
- Inter-operates with WebSphere Application Server full profile systems integration bus
  - Liberty client-to-full WebSphere Application Server systems integration bus
  - Full WebSphere Application Server JMS client to Liberty
- WebSphere MQ client:
  - Integration with WebSphere MQ for production messaging



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Java Message Service and Message-Driven Bean programming models are supported by several new features. An embedded lightweight messaging engine is provided and enabled on the hosting server by the WebSphere Application Server JmsServer feature. Destinations defined on a message engine on a remote Liberty profile or full profile server can be accessed by configuring the WebSphere Application Server JmsClient feature. Destinations defined on a remote WebSphere MQ queue manager can be accessed by configuring the wmqJmsClient feature.

## Liberty – MongoDB

Create applications for mobile and cloud environments using the Liberty profile and new integration with the MongoDB NoSQL database

- MongoDB is an open source highly-scalable NoSQL database
  - Document-oriented
  - JSON data model with dynamic schemas
- Configure Liberty server to point to MongoDB Server
- Programming models supported:
  - Injection, lookup through JNDI, J2SE-style
  - Application uses MongoDB Java API directly, after obtaining reference
- Available in the Liberty profile for WebSphere Application Server, WebSphere Application Server Express, WebSphere Application Server Network Deployment, and WebSphere Application Server z/OS
- Value: Easy for developers to create web applications and integrate with MongoDB as a document store (for example, for user-created data). Minimal impact to business when applications change in response to business changes.

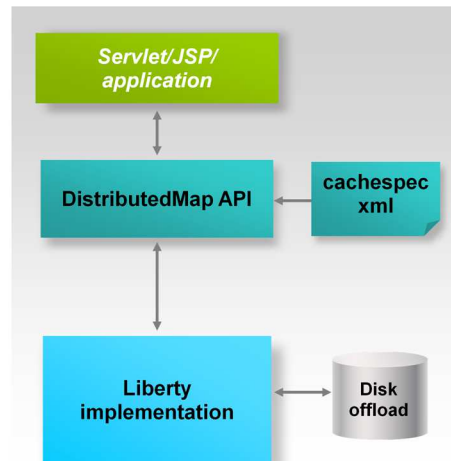


WebSphere Application Server V8.5.5 now supports client-to-MongoDB, an open source highly-scalable NoSQL database with a JSON data model and dynamic schemas. It is easy for developers to create web applications and integrate with MongoDB as a document store, for example, to store user-created unstructured data that is not amenable for traditional schemas in an SQL database. Programming models include resource injection, JNDI lookup, and J2SE-style construction of a MongoDB client.

## Liberty – Support for WebSphere Web Cache

WebSphere Application Server V8.5.5 provides support for WebSphere Web Cache, enabling a local caching service for simplified development of applications

- Local server cache for dynamic web content
- Enables developers to easily develop and test applications for local server caching solutions
- Same API as full WebSphere Application Server
- Optional disk offload
- LRU replacement policy
- In production, either run web cache as a local server cache or move applications unchanged to distributed caching using WebSphere eXtreme Scale

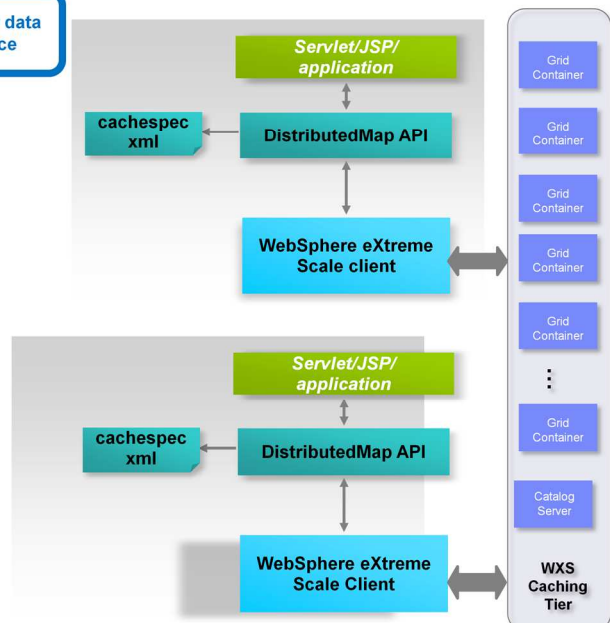


To simplify the development of high-performing web applications, the web cache feature provides the WebSphere dynamic cache API and declarative servlet cache configuration on the Liberty profile. The web cache feature also provides a built-in in-memory cache implementation with optional disk-offload. Applications and containers can cache and share Java objects by storing a reference to the object in a cache instance that is injected or looked up in JNDI. The cache eviction policy is least recently used.

## Upgrade to WebSphere eXtreme Scale for web caching

Upgrade to WebSphere Extreme Scale for greater data elasticity and higher caching qualities of service

- Massive data volume with linear scalability
- Elasticity: add more instances dynamically and runtime redistributes data automatically
- Cache consistency
- Configurable number of replicas: balance between read and write operations
  - No need to store cache at every application server



For distributed caching, the built-in cache provider can be replaced by a WebSphere eXtreme Scale Liberty feature. This moves the storage of the cacheable objects into a caching tier for huge linear scale, cache consistency, and greater availability.

## Liberty – SPI for Liberty Extensions

Liberty Extensions System Programming Interface (SPI) provides the ability to extend the Liberty profile with custom features, including full life cycle management

- Add your own Liberty features by way of OSGi bundles
  - Web application bundles also supported
- Allows complete integration of new function into the Liberty runtime and development tools
- Full life cycle: packaging, installation and uninstallation
- System Programming Interface (SPI) for:
  - Adding your own configuration
  - Interaction with Liberty kernel
- Class visibility protected by class loader
- Sample scenarios:
  - Extend OSGi applications programming model
  - Provide new infrastructure (for example, a custom user registry)

One of the benefits of the modularity of the WebSphere Application Server Liberty profile is that it is easily extensible. Features are packaged as collections of OSGi bundles, with metadata to describe the feature-level services and packages exposed. WebSphere Developer Tools for Eclipse provides a project type to assist with authoring of the metadata. Your features are installed and uninstalled to the runtime using the same mechanism as the platform features, and enjoy all the same benefits of dynamic life cycle management and isolation. Configuration metatypes can optionally be defined for a feature to allow feature-specific configuration to be exposed in the server.xml configuration, monitored for changes to the Liberty runtime, and injected into the feature when it changes. This mechanism enables you to extend the platform.

## Asynchronous work management

Provides a multi-threaded programming model in the application server, enabling concurrent processing

- New capability in V8.5.5 on both full-profile WebSphere Application Server and Liberty profile, enabling concurrent processing and improved performance
- Allows application to use `java.util.concurrent.ExecutorService` to perform work asynchronously, while retaining context of the calling thread
  - Fire and forget: `execute`
  - Wait for completion: `invokeAll`, `invokeAny`, `submit`
- Access `ExecutorService` through
  - JNDI
  - Resource injection
- Server configuration defines the JNDI name and the contexts to propagate, for example, `securityContext`



```
<managedExecutorService jndiName="concurrent/execSvc1">
  <contextService>
    <!-- One or more of these -->
    <jeeMetadataContext/>
    <classloaderContext/>
    <securityContext/>
    <zosWLMContext/>
  </contextService>
</managedExecutorService>
```

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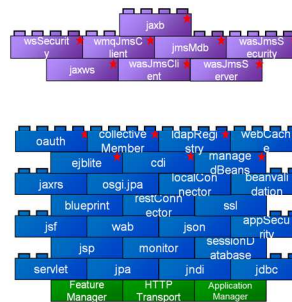
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Asynchronous work management is a new capability in both the Liberty profile and the full profile. It allows applications to use `java.util.concurrent.ExecutorService` to perform work asynchronously, while retaining the context of the calling thread. It supports both fire-and-forget and wait-for-completion patterns. The `ExecutorService` can be accessed through JNDI or resource injection. The configuration file determines whether the Java EE metadata context, class loader context, security context, or z/OS workload management context are propagated to the new threads.



## Liberty – Minimized server packages

- **Install** only what you need to **minimize disk footprint**
  - Modular “Archive Install” or
  - Standalone Installation Manager repository



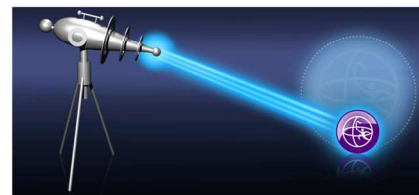
Liberty **extended** archive 30 MB

Liberty **runtime** archive 50 MB  
(Java EE web profile)

- **Start** only what you need - Only configured features are started by the Liberty kernel to **minimize memory footprint**

- **Package** only what you need to **minimize a packaged server:**

```
server -package serverName --include=minify
```



WebSphere Application Server V8.5 introduced the notion of “Liberty server packaging”, a simple mechanism supported from the command line and tools to produce a completely self-contained archive of an application. This is the server definition required for the application and optionally the Liberty server runtime. It delivers a dramatically-simplified approach to moving an application through the delivery life cycle from development, to integration, to pre-production, and finally to production. This mechanism is very easily scriptable and simple to integrate with arbitrary continuous-delivery systems.

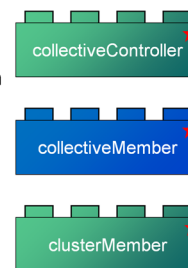
An enhancement in V8.5.5 is to apply the intelligence of runtime modularity to the server packaging step. Analysis is done to determine the set of features required at runtime and only package those in the archive. As a result, the size of a packaged server is minimized to include only what is required by the application. This is the “minify” option of the server package command.

Additionally, the installation of the Liberty profile has been modularized so that you can choose how much to install in the first place. For example, the web profile, a compliant set of Liberty features, is a 50-MB installation. Additional capabilities like JMS and web services add an additional 30 MB. Regardless of how much you choose to install, nothing more than what is needed is loaded at runtime.

## Liberty – Collective administration

WebSphere Application Server V8.5.5 introduces a new administrative model, enabling the grouping of Liberty servers into collectives for common management and static clustering

- New Liberty collective management infrastructure
  - No dependency on full-profile WebSphere Application Server
  - Agent-less administration
  - Deployment of Liberty topology
  - Static cluster management
  - Application and server deployment/update
  - JMX API through Java, Jython, and Jconsole clients
- Configuration:
  - Controller: Requires WebSphere Application Server Network Deployment or WebSphere Application Server z/OS license
  - Managed server:
    - Can be Liberty Core, WebSphere Application Server Base, WebSphere Application Server Network Deployment, or WebSphere Application Server z/OS
  - Static cluster supported on WebSphere Application Server Network Deployment and WebSphere Application Server z/OS
- Highly available
- Highly scalable: Scales to 1000s of JVMs



Starting in V8.5.0, it is possible to manage individual Liberty server processes directly through JMX or through the WebSphere Application Server Network Deployment full-profile job manager. Additionally, web traffic is workload-balanced by the same web service plug-in as the full-profile WebSphere Application Server. This workload balancing is to distribute web traffic, maintain session affinity, and failover the affinity when needed.

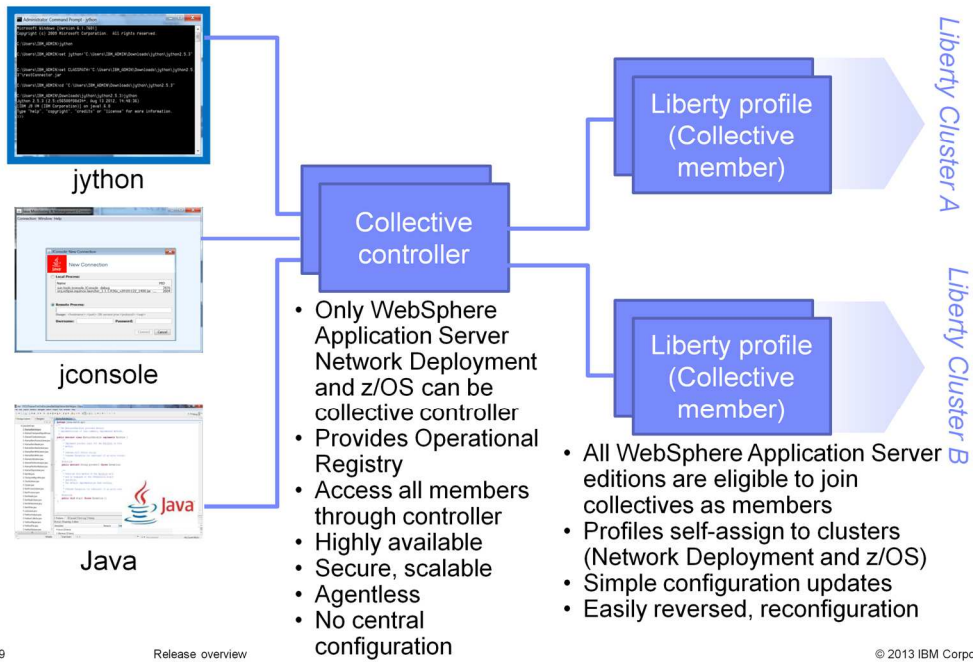
Three new Liberty profile features are introduced in WebSphere Application Server V8.5.5 to provide an end-to-end, lightweight, administrative capability that does not require the full-profile job manager.

First, in V8.5.5 of the Network Deployment edition, one or more Liberty servers can be configured as management endpoints that can act as proxies for one or more clusters of Liberty servers. The management endpoint is called the collective controller. The set of Liberty servers being managed by a collective controller is referred to as the “collective” of servers and forms a management domain. Liberty servers join a collective by enabling the collective member feature and registering with a collective controller. They retain ownership of their configuration, but can be managed through the collective controller.

Second, the collective controller provides operational access to all servers that are members of its collective. This includes operations to start and stop servers, invoke mbeans, and perform file transfer, which supports configuration changes and application installation and uninstallation scenarios.

Third, the Liberty collective offers Liberty cluster management. A collective member Liberty server can optionally declare itself a member of a cluster by inserting the “cluster” feature into its configuration. All servers that declare the same cluster name are part of the same cluster and can be the target of single management commands through the collective controller.

## Liberty – Collectives and clusters



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Release overview

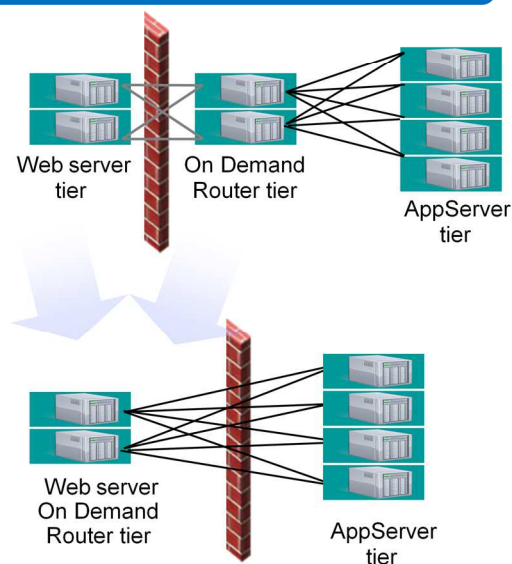
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The collective controller supports JMX interfaces, which can be accessed through a Jython plug-in, jconsole, or a J2SE Java application. The collective controller is a feature of the WebSphere Application Server Network Deployment and z/OS editions. The collective member feature is available for all editions.

## Intelligent management in WebSphere web server

V8.5.5 enhances intelligent management through integration of the On Demand Router capability into the WebSphere web server plug-in, simplifying topologies and reducing total cost of ownership

- On Demand Router integrated into the WebSphere web server plug-in in WebSphere Application Server Network Deployment
- Supported in IBM HTTP Server and Apache web servers
- Key benefits:
  - Topology consolidation and simplification
  - Increased resiliency
  - Fewer resources
  - Lower latency
  - Lower total cost of ownership (configuration/monitoring)
  - Faster problem determination



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Release overview

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In V8.5, the intelligent management features require the configuration of an On Demand Router. New in V8.5.5, you can optionally enable the On Demand Router as a function of the WebSphere web server plug-in, reducing the complexity of the topology, request latency, and total cost of ownership.

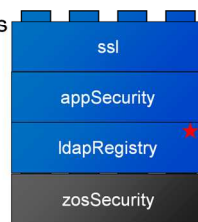
## Liberty – Security

Enhanced security capabilities extend deployment options for the Liberty profile

- Secure
- All opened ports are local host only
- Exposes no remote management by default
- Seamless transition when enabling security
- Goal is to make security painless

### New for Liberty profile in WebSphere Application Server V8.5.5

- Federated LDAP repositories
- Custom user registry
- OAuth
- Password encryption and hashing in configuration files
- Trust association Interceptor



Includes the SSL-specific code

Includes all the security services (authentication, basic registry, authorization) and web-specific security code

Optionally use one or more (federated) LDAP user registries

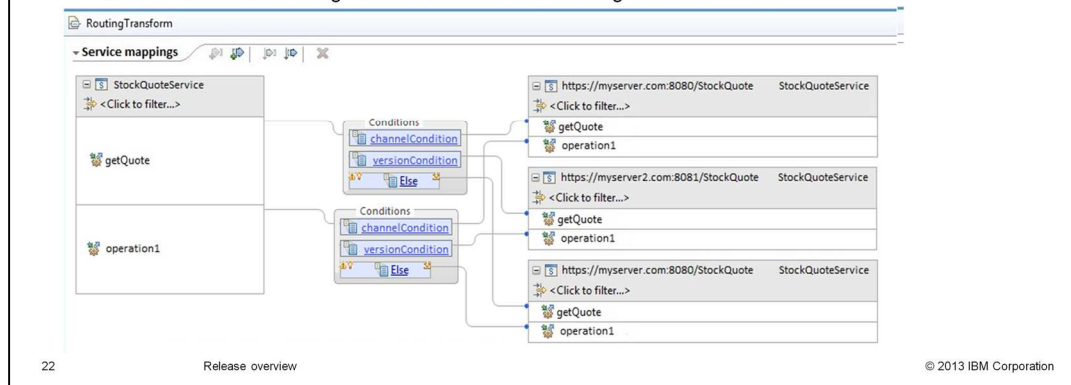
Includes the SAF registry and authorization code

New in V8.5.5, the ldapRegistry feature allows you to federate multiple LDAP registries together. The Liberty profile also supports custom user registry and trust association interceptors that were previously only supported in the full profile. They are implemented as new feature extensions for the Liberty Profile. The Liberty profile supports password encryption and hashing in configuration files. Password hashing allows you to store a one-way hashed password in the user registry that is defined in the Liberty profile's server configuration. It is mathematically extremely difficult to reverse engineer the original password. Password encryption allows you to store a password that is encrypted using AES. This password is required to authenticate with backend resources in the server configuration. The keys for encryption and decryption are not stored with the server.xml file. This makes it safe to send the server.xml file to support organizations, or other interested parties, without revealing the original password or the keys required for encryption and decryption.

## Service mapping

Map one application's interface or location to a different application through simple content-based routing and message transformation

- Service mapping is introduced into WebSphere Application Server full profile in V8.5.5 and provides dedicated visual tools within IBM Rational Application Developer
- **Graphical message mapping** of input message to output message fields
- Use cases:
  - **Service versions:** Account for differences in interface version modifications
  - **Meet in the middle:** Integrate new services with existing services



Service mapping is only available in the WebSphere Application Server full profile in V8.5.5 and provides dedicated visual tools within Rational Application Developer. These visual tools provide graphical message mapping of input messages to output message fields. Use cases include 'service versions' to account for differences in interface version modifications and 'meet in the middle' for integration of new services with existing services.

## Session Initiation Protocol enhancements

Serviceability and troubleshooting enhancements to Session Initiation Protocol provide support for more resilient processing of media streams, such as voice and video over IP

- New PMI counters at the SIP container and proxy
  - **SIP container:** Thread and message congestion issues, number of replicated/non-replicated SIP sessions, rejected requests, SIP timers
  - **SIP proxy:** Monitor queue statistics, SIP container and load balancer health status, none valid SIP messages received
- SIP context added to High Performance Extensible Logging (HPEL) logs for SIP container and proxy
  - Automatic logging for SIP enables tracing of call flow through all SIP components
- Utility to dump SIP application sessions and session IDs for improved debugging of SIP container sessions
- Application composition performance improvements
  - The number of composed applications that can be deployed is increased through avoidance of serialization and de-serialization of the request headers
- New API to provide callback when message is not matched to existing dialog
- Enhanced SIP proxy logging for complete message and rejected messages

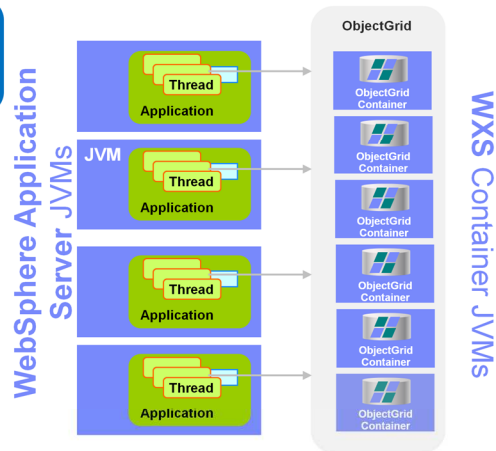
Session Initiation Protocol, or SIP, is a signaling protocol widely used for controlling communication sessions, such as voice and video calls over IP. The protocol can be used for creating, modifying and terminating two-party, known as “unicast”, or multiparty, known as “multicast”, sessions. Sessions can consist of one or several media streams. The improvements in V8.5.5 are primarily in the areas of monitoring, logging, debugging, and performance.



## WebSphere eXtreme Scale (WXS) integration

Easily enable applications for caching of data to improve application performance by leveraging WebSphere eXtreme Scale packaging and entitlement with WebSphere Application Server V8.5.5

- WebSphere eXtreme Scale packaged with WebSphere Application Server V8.5.5 with entitlement by edition
- Enables installation of elastic caching with WebSphere eXtreme Scale on WebSphere Application Server server
- Gain the advantage of integrated caching
- Grow your environment to distributed caching servers as load increases



### Entitled WebSphere eXtreme Scale IBM Processor Value Units dependent on joint or separate installations

- Joint installation: WebSphere eXtreme Scale and WebSphere Application Server can share up to the entitled WebSphere Application Server IBM Processor Value Units
- Separate installation: WebSphere Application Server IBM Processor Value Units plus WebSphere eXtreme Scale IBM Processor Value Units cannot exceed entitled WebSphere Application Server IBM Processor Value Units

### Entitled WebSphere eXtreme Scale capabilities dependent on edition

- Network Deployment: WebSphere eXtreme Scale not limited and can be used in support of entitled WebSphere Application Server or for other purposes
- Base: WebSphere eXtreme Scale limited to HTTP sessions and dynamic cache, and only in support of entitled WebSphere Application Server
- z/OS: WebSphere eXtreme Scale limited to only the WebSphere eXtreme Scale client on z/OS
- Express/Liberty Core: Not applicable

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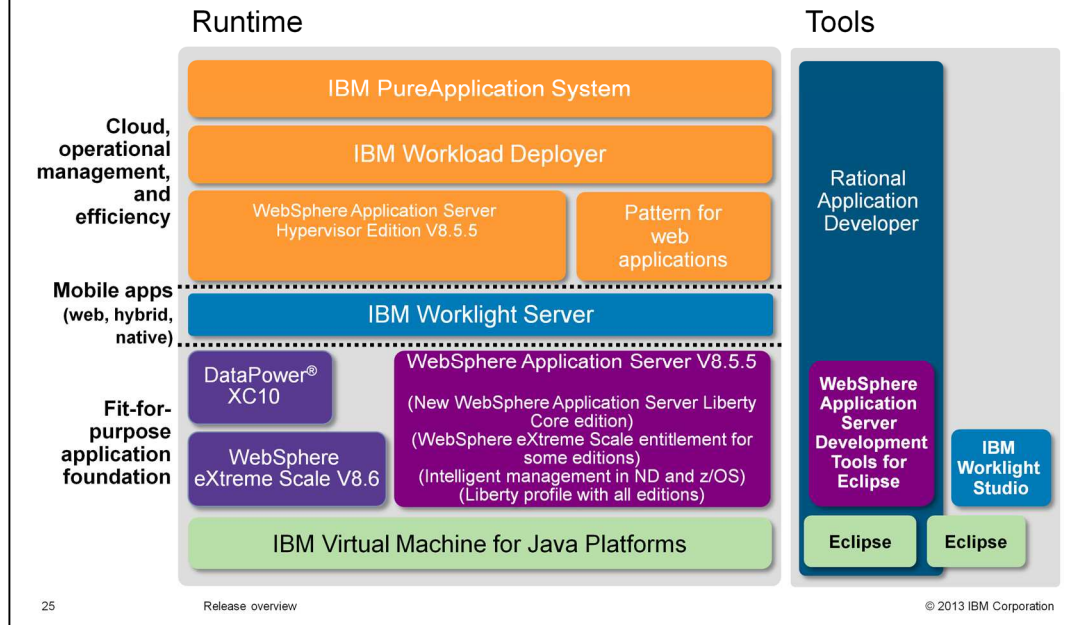
Release overview

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WebSphere eXtreme Scale is now packaged with WebSphere Application Server V8.5.5, with entitlement by edition. Installation of elastic caching on WebSphere Application Server is now available by default. With an integrated elastic cache, you can dynamically grow your environment of distributed caching servers as load increases.



## WebSphere application infrastructure (June 2013)



This concludes this presentation of the new features in WebSphere Application Server V8.5.5. Other products in the portfolio are as follows. WebSphere eXtreme Scale V8.6 is your caching solution. It can be installed together with the application server or separately. DataPower XC10 is your caching appliance. IBM Worklight Server is for development and deployment of hybrid and native mobile applications. WebSphere Application Server Hypervisor Edition is for deployment to virtual machines. IBM Workload Deployer enables you to deploy infrastructure-as-a-service patterns, or software-as-a-service patterns by way of Pattern for web applications. And finally, IBM PureApplication System offers you IT life cycle simplicity, providing a standardized cloud application platform for your web and database applications.

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