WebSphere Application Server Roadmap & Direction
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The app revolution
Fundamentally changing the way we interact with technology.

Apps are everywhere
The quantity and usefulness of web and mobile apps has led to an “app revolution” among consumers and businesses alike.

Experience matters
Customers and employees now expect a delightful and seamless experience across all interactions with a business.

Cloud makes it possible
Apps today can be stitched together quickly with pre-built assets. Cloud makes the API economy possible.
App development is about speed and choice

Developers’ expectations have evolved.

- Seconds to Deploy
- Friction Free
- Failing Fast
- Continuous Integration
- Any Language
- Mobile Ready
- Useful APIs
- Choice of Tools
- Focus on Code
- Developers’ expectations have evolved.
IBM WebSphere Liberty Buildpack

The Buildpack for IBM WebSphere Liberty is freely available for developers.

https://github.com/cloudfoundry/ibm-websphere-liberty-buildpack

- Push deploy applications to PaaS-provided WebSphere Liberty
- Hosted or on-premise
- Currently development-use only. But free!
  - Includes IBM Java 7
  - Uses Cloud Foundry extensible buildpack architecture
  - The WebSphere Liberty buildpack is an open source contribution to the Cloud Foundry community and provisions developer-licensed instances of WAS Liberty Core V8.5.5.0

Contributed to open source Cloud Foundry community
Visit our developer community at http://wasdev.net
IBM BlueMix: http://ibm.com/bluemix
WebSphere Liberty is the BlueMix Java Runtime

- WAS Liberty Profile is the Java runtime for IBM BlueMix
  - Reduce development time when integrating cloud services
  - Auto-scaling policies react to changing workload
  - Cloud tools to extend your WAS Developer Tools for Cloud deployment
  - APIs and Services: A catalog of open source, IBM and third-party APIs services allow a developer to stitch together an application in minutes.
  - Cloud integration: Connect to on-premises systems of record plus other public and private clouds. Expose your own APIs to your developers.
  - Built on IBM SoftLayer
WebSphere Liberty is the BlueMix Java Runtime
WebSphere Liberty Buildpack for PaaS

On-premise Cloud Foundry

app is packaged with runtime by liberty buildpack

+ +

cf push app.war

IBM hosted BlueMix

app is auto-wired to cloud services

Twilio
Mobile Data
Log Analysis
Elastic MQ
Data Cache
Mongo DB
Monitoring and Analytics
Session Cache
SQL (DB2) Database
MySQL
MySQL

8
4 years ago WAS faced The Innovator’s Dilemma. How do we continue to support thousands of existing deployments and provide the next generation platform at the same time? Independent technology bases? Or…
WebSphere Application Server Editions

**WAS Liberty Core**
- Web, mobile, OSGi apps
- Java EE Web Profile
- Subset of Liberty profile
- High performance transactions

**WAS (Base)**
- WAS Liberty profile included w/ Base
  - Everything in Liberty Core
    - Java messaging
    - Web services
    - noSQL DB
  - Full Java EE
  - Distributed transactions
  - Advanced security

**WAS ND or z/OS**
- WAS Liberty profile included w/ ND
  - Everything in Liberty Base
    - Enterprise class clustering
    - Topology management
  - Everything in WAS Base
    - High availability
    - Intelligent mgmt
    - High scalability
    - and more…

**Qualities of Service and Enhanced management**

Increasing number of servers & concurrent users
WebSphere Application Server
A proven platform for Web, Mobile and Cloud applications

Cloud

Mobile

Right fit application server
WebSphere Application Server Liberty Profile

For rapid development and light-weight production deployment with high scalability

- Web Profile certified (Liberty Core Edition)
- Small footprint (< 54MB), quick startup (< 3 sec)
- Developer-first design of simple, shareable XML configuration
- Dynamic runtime and configuration
- Unzip install and deploy
- Fidelity to WebSphere Application Server Full Profile
- Add custom features and integrate 3rd party components via Liberty extensions interface
- Install new features from repository with no server restart
- Lightweight collective management scales to 10,000 servers
Simplified Server Configuration

```
<server>
  <featureManager>
    <feature>jsp-2.2</feature>
    <feature>jdbc-4.0</feature>
  </featureManager>

<logging traceSpecification="webcontainer=all=enabled:*=info=enabled"/>

<application name="tradelite" location="tradelite.war"/>

<dataSource jndiName="jdbc/TradeDataSource">
  <properties.derby.embedded databaseName="${server.config.dir}/tradedb"/>
</dataSource>
</server>
```

Features control which capabilities (bundles) are installed in the server

'singleton' configurations specify properties for a runtime service like logging

'instance' configurations specify multiple resources like applications and datasource definitions

Any of this configuration could be put into a separate xml file and 'included' in this 'master' configuration file
Liberty Core Edition

Java EE 6 Web Profile,
OSGi apps, other core features

“Base”, Express and Developers’ Editions

Adds some Java EE 6 Full Profile features

Network Deployment Edition

Adds centralized management and clustering features

z/OS Edition

Adds z/OS exploitation features

Lightweight and Dynamic Runtime…
...Based on Composable Features
WAS ND - Intelligent Management Capabilities

Part of WAS ND V8.5.0+ and WAS for z
Builds on traditional ND cell-based operational management
Added Liberty Profile (assisted lifecycle subset) in V8.5.5.1

Application Edition Management

Server Health Management

SLA based Dynamic Clustering

Intelligent Routing and SLA Enforcement

Better TCO through management efficiency and performance, Intelligent Management delivers the ability to sense and respond quickly to changes

Up to 45% less hardware
Up to 60% less administration
Up to 45% less software
Up to 90% fewer outages

Source: Based on 60+ Operations Optimization Value Assessments done to date by IBM for real customers
Cost reductions are compared to traditional WAS ND deployment

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Operational Flexibility

- WAS ND Cell-based management and routing

- Loosely-coupled server Collectives (new in ND V8.5.5)

- Standalone server farms (WAS plugin licensing relaxed)

In each case, app server tier behind an HTTP reverse-proxy tier.
Load-balancing in all cases.

WAS-provided, integrated central point of management for first 2 only
WAS ND: Scalable Collectives – Looser Coupling Than Cells

**Liberty Collective**

1. `wlp/bin/server create {controller}`
2. `wlp/bin/collective create {controller}` …
3. `wlp/bin/server start {controller}`

**server.xml**

```xml
<featureManager>
  <feature>collectiveController-1.0</feature>
</featureManager>
```

**server.xml**

```xml
<featureManager>
  <feature>collectiveMember-1.0</feature>
  [ <feature>clusterMember-1.0</feature> ]
</featureManager>
```
WAS ND: Lightweight Management Clusters

Add cluster feature:

server.xml

<featureManager>
  <feature>collectiveMember-1.0</feature>
  <feature>clusterMember-1.0</feature>
</featureManager>

Name the cluster:
WebSphere Liberty Repository to pick up new Liberty product features, samples, and tutorials:

• Easily extend your development and production environments with new features

Administer production apps with the WebSphere Liberty Administrative Center

• Flexible, extensible, mobile ready, next generation admin UI to manage Liberty Servers

Extend existing enterprise data and business logic to Web, Mobile or Cloud apps

• Leverage Websphere Liberty Java Connector Architecture (JCA) feature to connect in to and extend existing enterprise backend systems
• Use WebSphere Liberty z/OS Connect for secure enterprise connectivity to easily extend existing assets to Mobile & Cloud applications using RESTful services and JSON.
• IBM WebSphere Liberty Optimized Adapters for z/OS (WOLA): a function of WAS Liberty for z/OS that allows very fast, efficient, and low-latency memory to memory exchanges between WAS z/OS and CICS, IMS & Batch.

Different options for using WebSphere Liberty in the Cloud

• Build applications using the Liberty Buildpack and Caching services on IBM BlueMix
• Deploy WAS Liberty patterns using Pure Application Pattern service on SoftLayer
• Bring your own existing entitlement of WAS to SoftLayer or Amazon cloud environments
New Features Being Delivered In A New Way

An **online repository** to deliver new Liberty function to users. Starting with the current release, new Liberty features will be delivered via the Liberty repository for use in production.

- Accessed through Installation Manager, Liberty featureManager command and WDT
- Dependencies calculated and installed
- Service applied the same way regardless of how feature installed.

Other Content available in the repository:

- Code that allows non-Liberty products to easily integrate with Liberty
- Samples using Liberty features and/or 3rd party tool integrations that work as part of Liberty’s Ecosystem
…Including the Liberty Administrative Center

- Evolve from one-size-fits-all console
- Lightweight, task-oriented applications / app store approach with customizable toolbox for “right-sized” UI per user / device
- Extensible: New Administrative Capabilities will be delivered continuously through the Liberty Repository
- Initial focus: Discover, control and monitor the life-cycle of applications, servers and clusters in a Collective
z/OS Connect provides REST transformation and standardized security access for calling in to z/OS applications in all major environments - CICS, IMS, batch, Unix System Services, and ISV software. It supports SAF-based security integration allowing for individual z/OS Connect services to have unique sets of authorized users. z/OS Connect is a WAS Liberty server process.

Types of Applications: Developers can access existing z/OS assets in WAS, CICS, IMS and other z/OS environments via z/OS Connect from a mobile, cloud or web client.

Systems of Engagement

Systems of Record
WAS Delivery Is Changing….

- WAS Next Beta drivers will roll out in a much more continuous fashion to show more accurately what we are working on. Not just during formal programs.
  - Monthly updates

- Productized function will also be delivered more continuously, for the WAS Liberty Profile, through the Liberty Repository.
  - Accessed through Installation Manager, Liberty featureManager command and WDT
  - Dependencies calculated and installed
  - Service applied the same way regardless of how feature installed.

- Intention to provide offline (on premise) management of Liberty Repository instances
  - Like Installation Manager repositories, providing local service for IM, WDT and command-line clients
  - Also inside BlueMix for faster staging of right-size droplets
Previews of technologies that allow you to write engaging and responsive enterprise business applications

WebSocket
Enrich applications supporting bi-directional conversation between browser and a server

*Exchange live content with browser without being solicited by the client*

**EJB Lite 3.2**
Write portable transactional & secure business logic with small & powerful subset of full EJB API

*e.g. Bank account transfer or updating inventories*

**Servlet 3.1**
Add Asynchronous IO to Servlet which allows to break up the writing of large content into asynchronous writes that do not block

*e.g. Streaming video, it is ideal to send the data at just over the rate that it is consumed by a viewer*

**WebRTC**
Write rich, real time multimedia apps (voice and video) on web without requiring plug-ins, downloads or installs.

*Strong industry support. Enables contextual communications!*

**Java Batch 1.0**
JSR 352 batch container and WDT tools

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**Additional features available on WASdev.net:**

- Developer Productivity:
  - Java EE Concurrency Utilities 1.0, JSON-P 1.0
  - JMS 2.0
  - Administrative Center
  - EJB 3.2, JPA 2.1, Mongo and CouchDB NOSQL

- Enhanced Security:
  - OpenID and OpenID Connect

- WDT Tools and Knowledge Center Connectivity
  - WOLA
  - z/OS Connect
  - JCA 1.6

- And more to come

Java EE 7 Themes

- More annotated POJOs
- Less boilerplate code
- Cohesive integrated platform

- WebSockets
- JSON
- Servlet 3.1 NIO
- REST

- Batch
- Concurrency
- Simplified JMS
Remember This?

<table>
<thead>
<tr>
<th>Edition</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberty Core Edition</td>
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</table>
Things to look out for in the Beta over coming months

- **Network Deployment Edition**: Add [Intelligent Management](https://www.ibm.com) features for Liberty Collectives
- **“Base”, Express and Developers’ Editions**: Add some Java EE 6, all Java EE 7 Full Profile features
- **Liberty Core Edition**: Java EE 6 and Java EE 7 Web Profile, OSGi apps, other core features
How would Java EE features look in Liberty?

- base
  - javaee-7.0
  - javaBatch-1.0
  - javaMail-1.5
  - jca-1.6 / jca-1.7
  - wmqJmsClient-2.0

- core
  - javaConcurrent-1.0
  - javaMgmt-1.5
  - jaspic-1.1
  - wasJmsClient-2.0
  - jmsMdb-3.2

- webProfile
  - beanValidation-1.1
  - cd-1.1
  - jpa-2.1
  - jsonp-1.0
  - jaxrs-2.0
  - ejbLite-3.2
  - jdbc-4.1
  - jsf-2.2
  - jsp-2.3
  - servlet-3.1
  - websockets-1.0
  - webProfile-7.0

- other
  - entWebSvcs-1.4
  - ejb-3.2
  - jacc-1.5
  - jmsMdb-3.2

appClient-7.0
Zero Migration By Design

- **There is no migration needed for Liberty configuration**
  - the same server configurations can be used with different versions and service levels of the runtime
  - set WLP_USER_DIR to shared configuration and apps

- **Existing features will not change behavior**
  - new feature ‘versions’ will be added and will contain all updates and changes

- **Supported versions of Java (J2SE) will move forward**
  - Several of the Java EE 7 technologies require Java 7
  - Java 6 will go out of support at some point
    - WebSphere Application Migration Tool already has support to identify J2SE 6 -> 7 changes needed by an application
WebSockets

- WebSockets solves difficulties of 2-way HTTP Communications.
  - Previous options:
    - HTTP Polling
    - HTTP Long Polling
    - HTTP One Way Streaming
    - Combination of the above

- `@ServerEndpoint` annotated POJOs packaged in WARs
  - simple server-side programming model.

- HTML5-compliant devices as clients
  - Also Java client API and `@ClientEndpoint` annotation for POJOs.
Web Real-Time Communications

WebRTC offers web application developers the ability to write rich, real-time multimedia applications on the web, without requiring plugins, downloads or installs. (source www.webrtc.org)

Why is WebRTC so disruptive?

- Eliminates complexity of delivering codecs and streaming protocols.
- Closely aligned with HTML 5.
- Enables real-time data communications in addition to voice and video.
- Strong industry support.
- **Enables contextual communications!**

WebRTC does not define the signaling plane. It only defines a model for sending and receiving media and a set of protocols for traversing firewalls.
WAS Operational Roadmap

WAS vNext

WAS ND 8.5.5

WAS ND 8.5
Cloud

Mobile

Right fit application server
WAS Delivers Cloud Choices

Brings the best of “born-on-the-cloud” native development while leveraging existing enterprise data and services

- BYOSL of WAS/AI to your Cloud environment of choice (SoftLayer, Amazon, etc.)
- IBM BlueMix changes the game for developers (WAS Liberty, Caching, SQL/NoSQL and more)
- WAS services reused with Mobile apps (including zOS)
- WAS services exposed using API Management Services (including zOS)
- WAS Liberty z/OS Connect – leveraging backend z data and services

Ultimate business flexibility with PureApplication Patterns to deploy cloud-enabled workloads

- Develop once and deploy same pattern to SoftLayer, PureApplication System or on-premise
- Web Application pattern includes WAS ND with Intelligent Management and elastic caching
Reduce complexity in provisioning middleware

Common Pattern Engine

Dispenses WAS topology

PureApp Service

Dispenses WAS topology

PureApp System

Dispenses WAS topology

Smart Cloud Orchestrator (SCO)

Off-premises Cloud

On-premises Cloud

On-premises BYO h/w (Distributed and z)

Benefits of Cloud technologies consistently available for on-prem and off-premises, enabling self service of middleware technologies
Cloud

Mobile

Right fit application server
Creating a truly engaging Mobile experience involves far more than building great Mobile apps.

- **Building Mobile apps** that support a range of devices, are easy to use and look really cool.
- **Increasing speed to market** to deploy capabilities.
- **Rapidly innovating** to keep enhancing experience.
- **Protecting Mobile access** to enterprise data.
- **Scaling elastically** to deliver responsiveness.
- **Integrating** Mobile activities with rest of business.
How WAS Full profile and WAS Liberty profile deliver

- WDT tools allow you quickly build mobile web apps with mobile widget libraries (DOJO, jQuery, …)
- Integrate WorkLight studio with WDT on the developer desktop to build mobile applications for native, hybrid
- Build new services (APIs) or use existing services (APIs) on WAS or in back end systems
- WebSphere helps secure your application with:
  - OAuth
  - SAML/SSO
  - OpenID & OpenID Connect
- Use existing services in/via:
  - EIS systems (CICS, IMS, ..)
  - z/OS Connect
  - MongoDB
  - Relational databases

- WebSphere Extreme Scale to help scale
- High availability and clustering support for reliability
- Service Level Agreement policies to manage inbound traffic from clients
September beta!

What's new

SEPTEMBER 24, 2014
JRebel with Liberty in 5 minutes and 10 easy steps
Liberty profile enables you to re-deploy your application without restarting the application server each time. JRebel, from ZeroTurnaround, adds to this by enabling you to instantly reload your code without needing to redeploy or restart the application each time either. It seamlessly integrates with Liberty and the WebSphere Developer Tools.

SEPTEMBER 17, 2014
New in OSGi Applications: Custom Blueprint Namespace Handlers, and bring-your-own ConfigAdmin
Improvements to Liberty profile's OSGi Applications programming model in the September beta.

SEPTEMBER 16, 2014
Announcing: IBM Eclipse Tools for Bluemix September beta
The latest and greatest IBM Eclipse Tools for Bluemix September beta is now available for download! Find out what's new in this release.

SEPTEMBER 12, 2014
Announcing: Liberty profile September beta
The September beta includes Java Batch 1.0 with optional tools support, JPA Entity Listener Injection via CDI, featureManager enhancements, and...