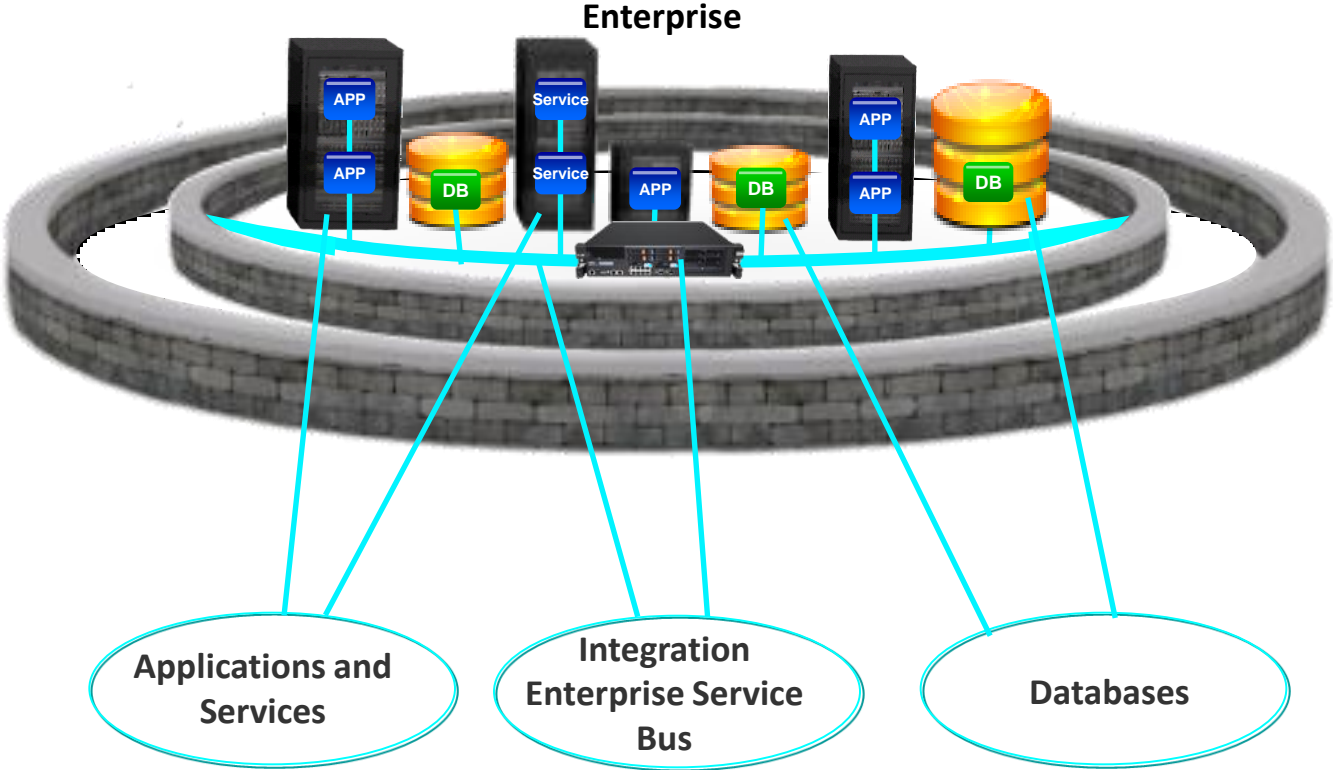


# Development Environment for building WebSphere applications on premise and in the cloud

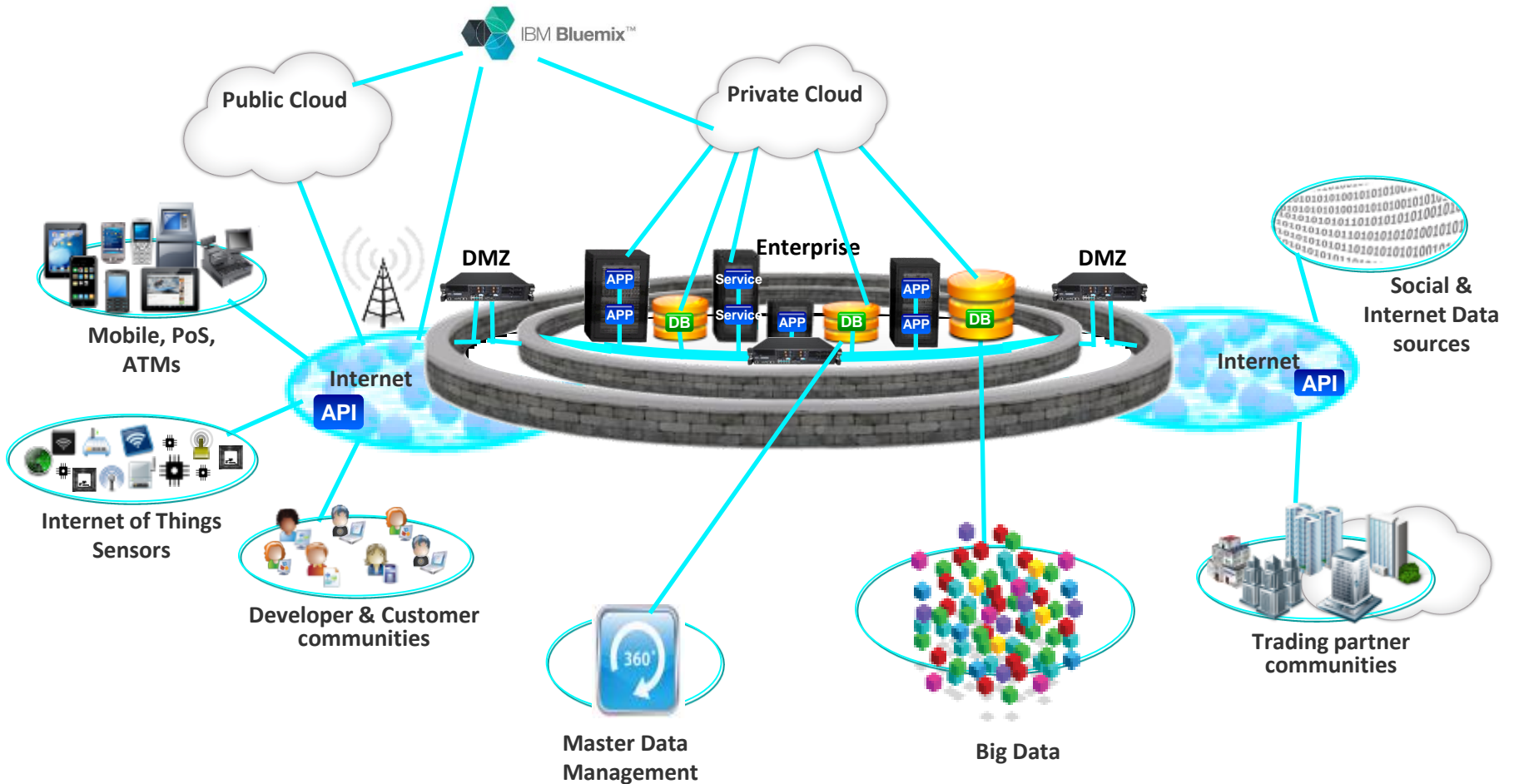
Anita Rass Wan

WebSphere Product Manager

# The topology of a traditional Enterprise



# The topology of an Integrated Digital Enterprise



# Application Platform for the Digital World

*Accelerate your digital transformation with an application platform that provides speed and agility across a fluid hybrid landscape to support today's mobile, social and data hungry applications so that you can capitalize on new business initiatives when the opportunity is right.*

- **Freedom of Choice**

*Choice of industry standards, open technologies, programming languages for faster delivery of new products and services anywhere, any device, anytime*

---

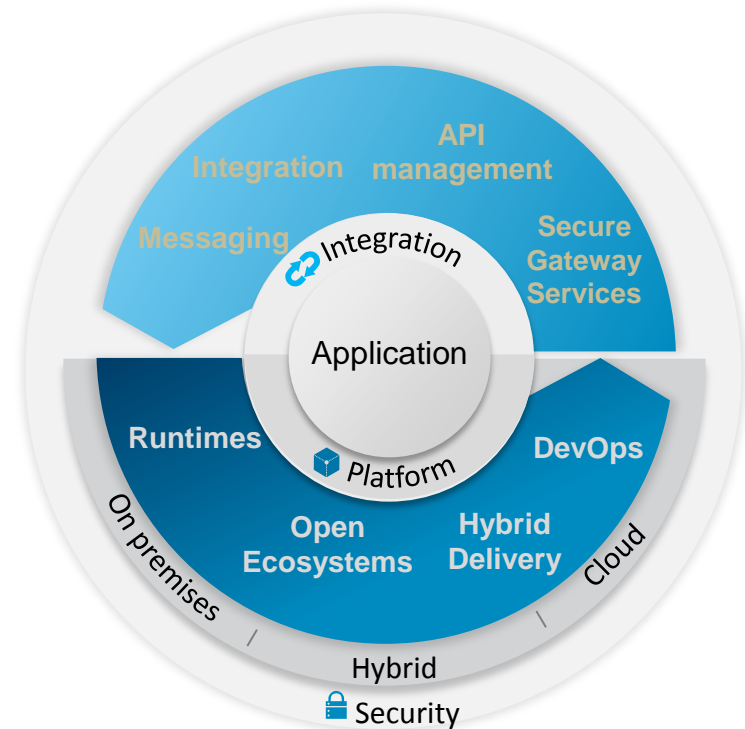
- **Accelerated Application Delivery**

*Continuous experimentation and **rapid iteration** of cloud application development and **delivery** across both traditional and modern applications and services*

---

- **Dynamic Scale**

*Scales dynamically with agility, visibility, Insights and control to capitalize on Customer needs and market shifts with confidence*



# Application Platform for the Digital World

*Accelerate your digital transformation with an application platform that provides speed and agility across a fluid hybrid landscape to support today's mobile, social and data hungry applications so that you can capitalize on new business initiatives when the opportunity is right.*

## Runtimes

WebSphere Application Server

IBM SDK for Node.JS

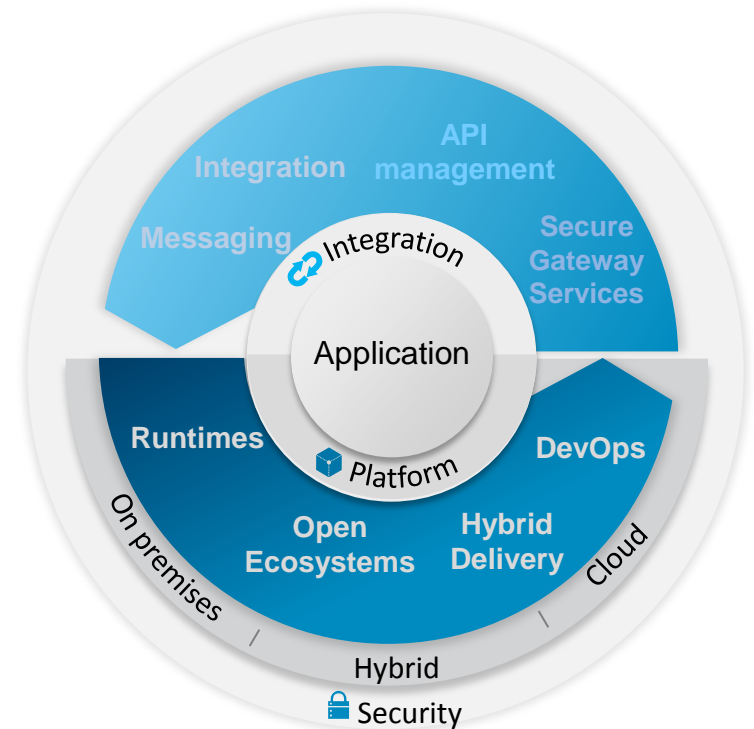
## Hybrid Delivery

PureApplication

IBM Bluemix

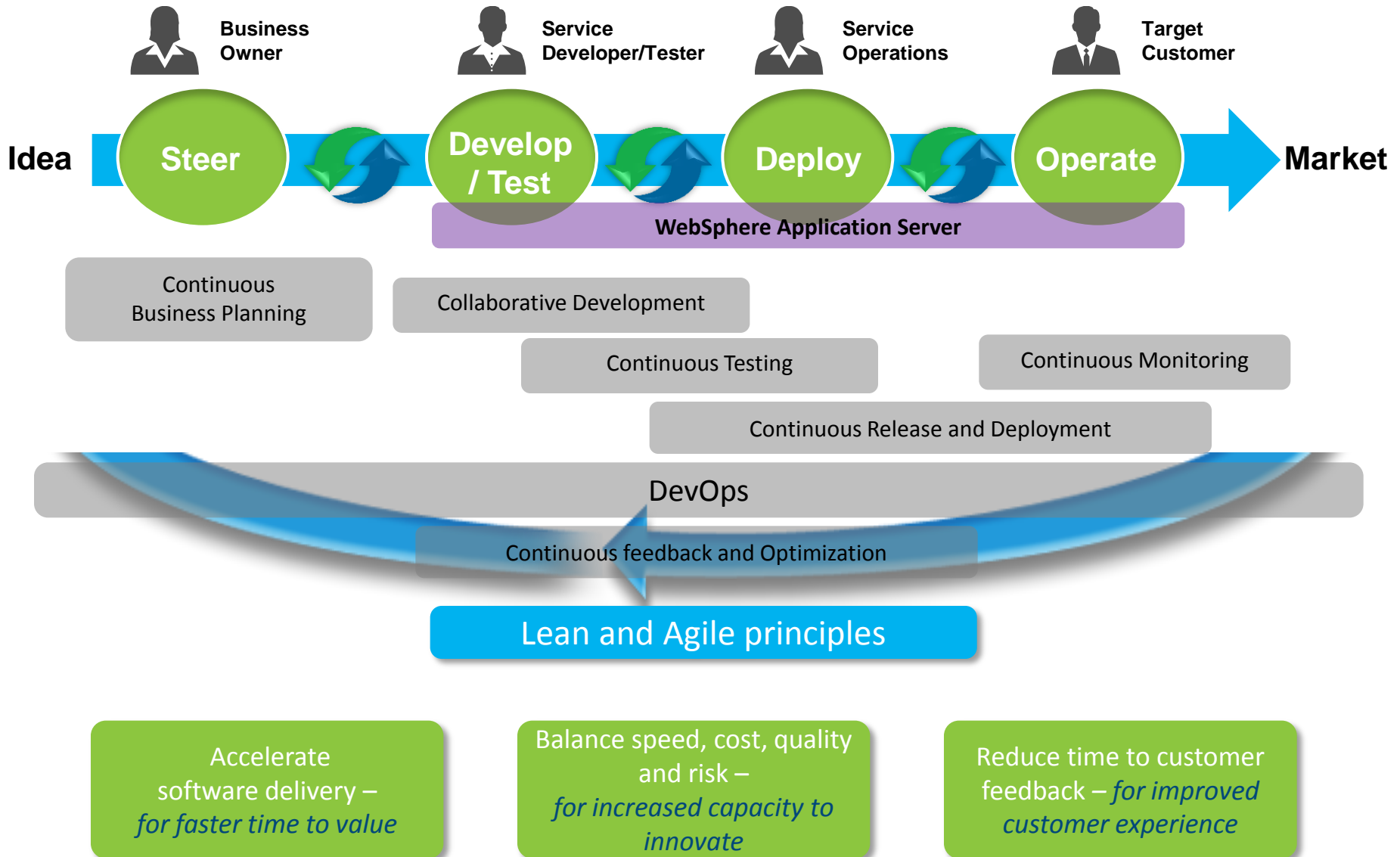
## IBM DevOps

- Collaborative Lifecycle Management
- Continuous Testing
- Continuous Release and Deployment
- Continuous Monitoring & Analytics

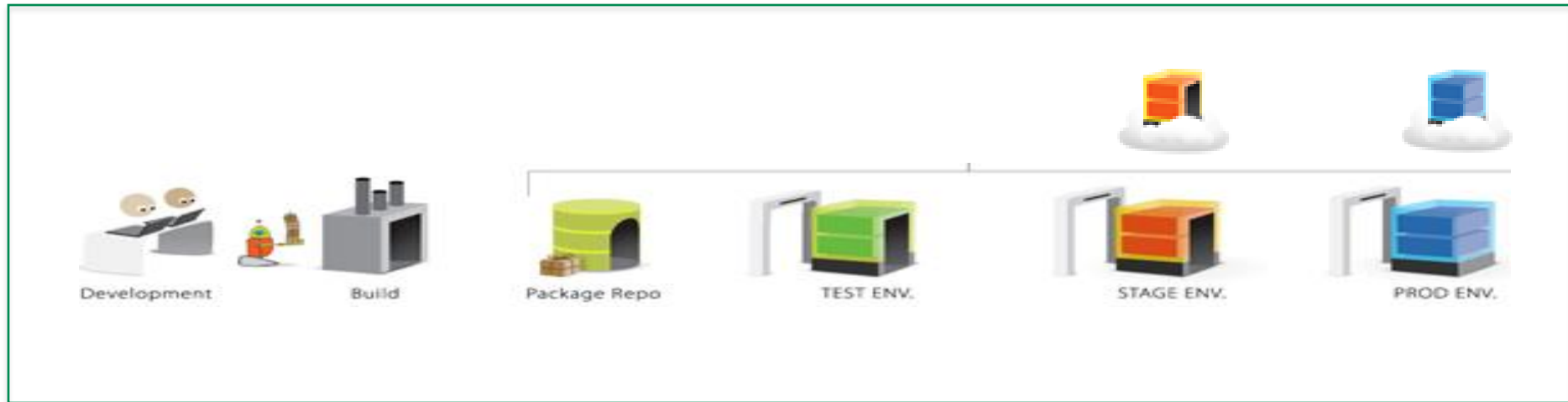


# IBM DevOps point of view

Enterprise capability for continuous software delivery that enables organizations to seize market opportunities and reduce time to customer feedback



# DevOps as the Optimization of the Software Delivery Pipeline

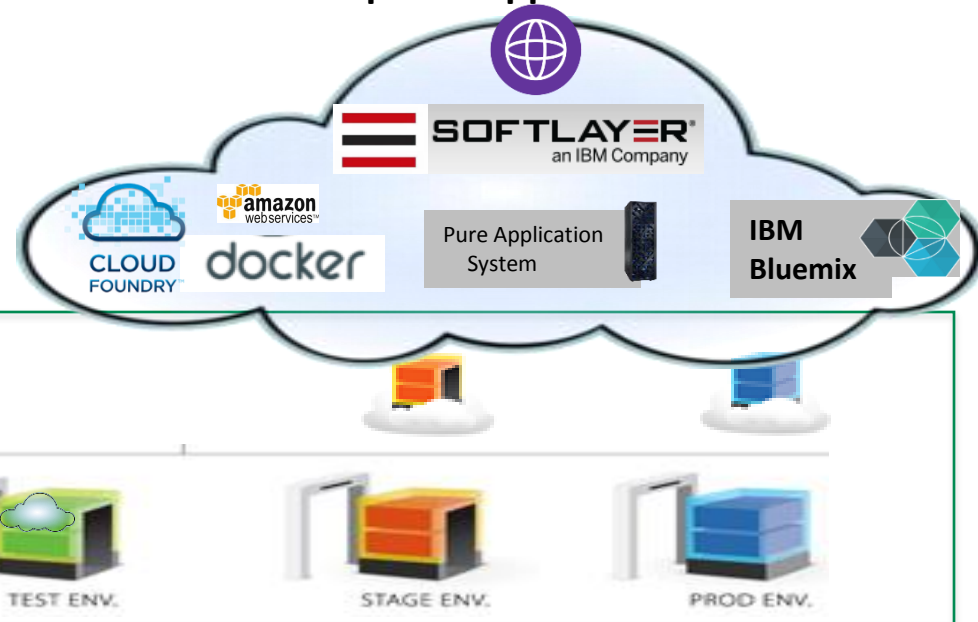


## Optimizing the software delivery pipeline

- Reduce time to market
  - Improve quality
  - Decrease costs

Just one example ...


## WebSphere Application Server



 **Rational Collaborative Lifecycle Management**

  
**Jenkins**

**Rational Test Workbench**  
**Rational Test Virtualization Server**

  
**WebSphere Application Server**

  
**WebSphere Application Server Developer Tools**

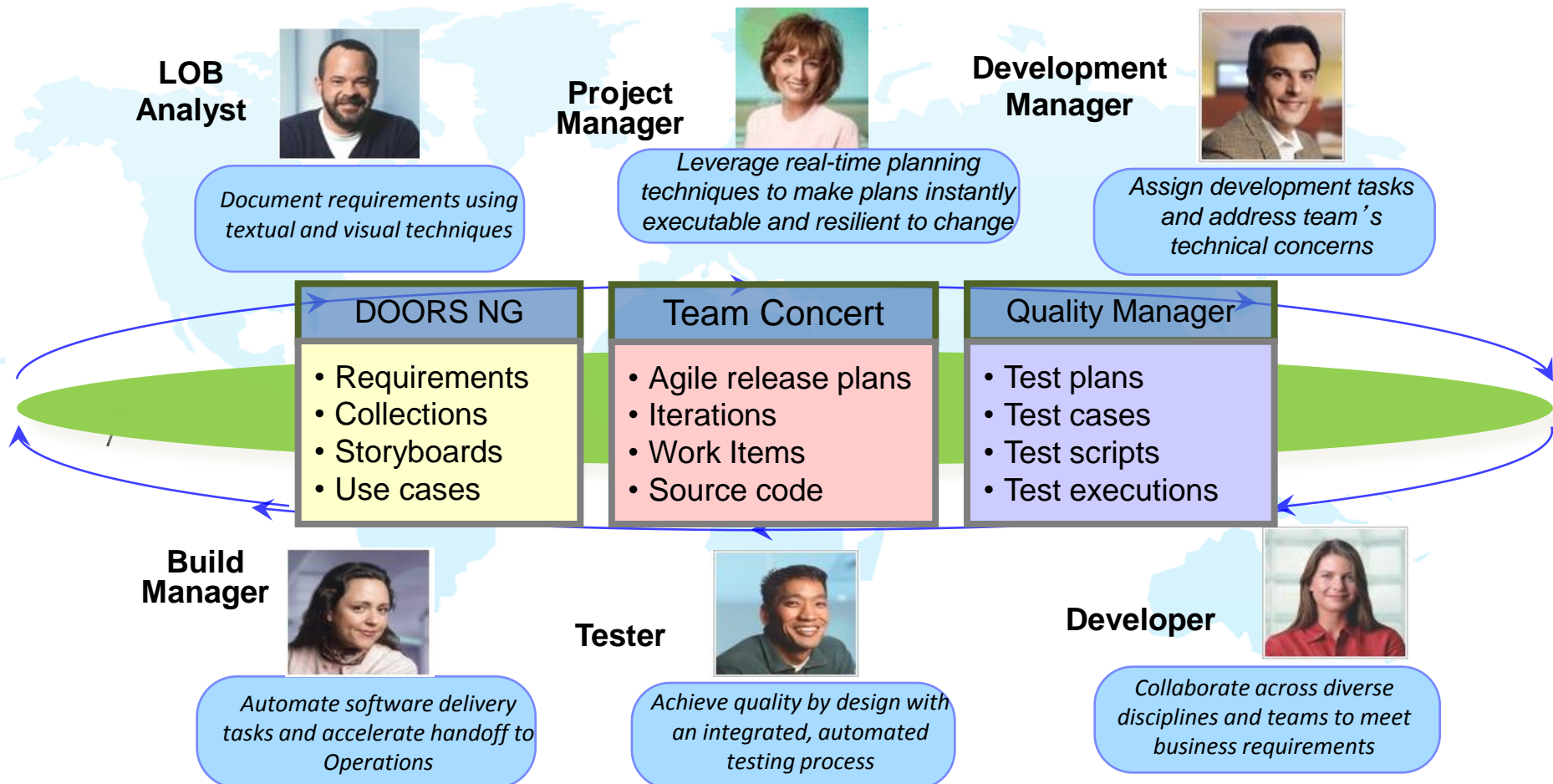
  
**CHEF**  
**IBM UrbanCode Deploy**

  
**Git**  
9



# Develop: Collaborative Lifecycle Management (CLM)

- **Collaboration** – unifies teams across geographic, organizational, and infrastructure barriers
- **Integration** – allows Access to a consolidated hub of information by role
- **Optimization** – provide dashboard metrics & complete test coverage/traceability to improve quality & ALM processes



# WebSphere Application Server Developer Tools

A set of Eclipse plugins available in the Eclipse marketplace to build your WebSphere applications for on premise or in the cloud

*Programming models*



*Runtimes*



**WebSphere v7.0.x**  
**WebSphere v8.0.x**  
**WebSphere v8.5.x**



- **WebSphere 8.5.x Liberty Profile**
- **WebSphere Liberty Profile V9 Beta**



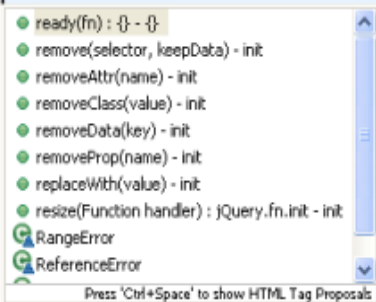
\* When Bluemix tools for Eclipse are added

# WDT helps with things like...

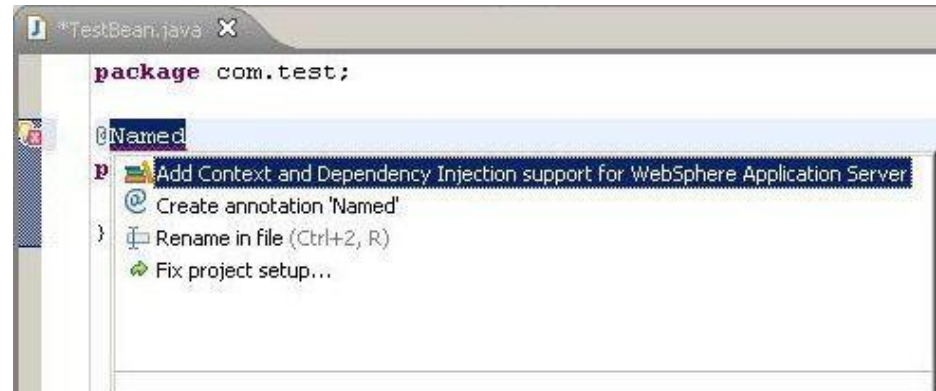
- Provides tools support for the WebSphere Application server programming models
- Pervasive assists, automations, & “instructors”
  - Autocomplete
  - Autocorrect
  - Code snippets
  - Code templates
  - Refactoring
- Form-based editors

```
<!DOCTYPE HTML>
<html>
<head>
<title>index</title>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<script src="jquery.js"></script>
<script type="text/javascript">
  $(document).r
</script>
</head>
<body>

</body>
</html>
```



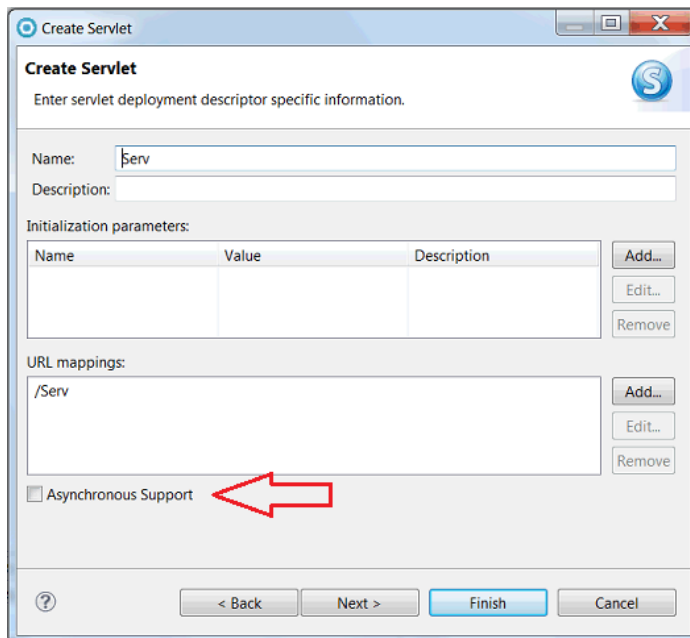
Press 'Ctrl+Space' to show HTML Tag Proposals



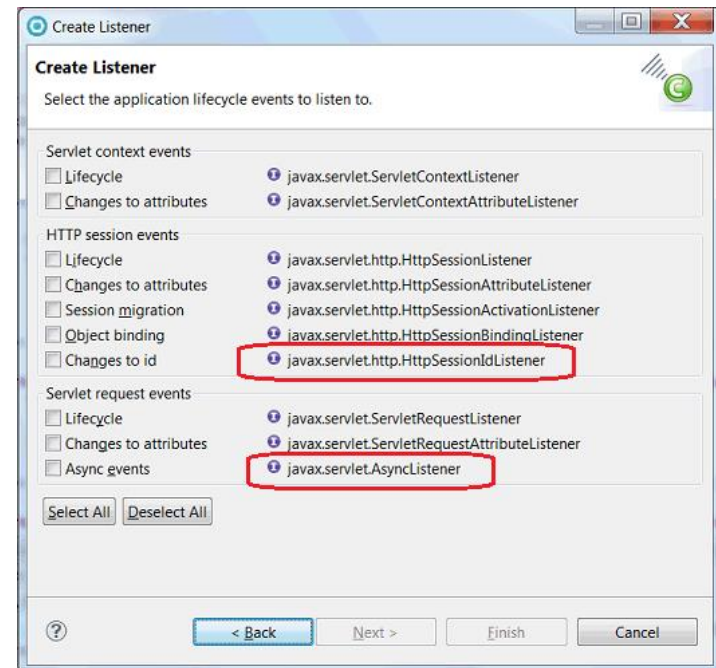
# Servlet 3.1 Tools (JSR-340)



## Asynchronous Servlet support



## Listener wizard enhancements

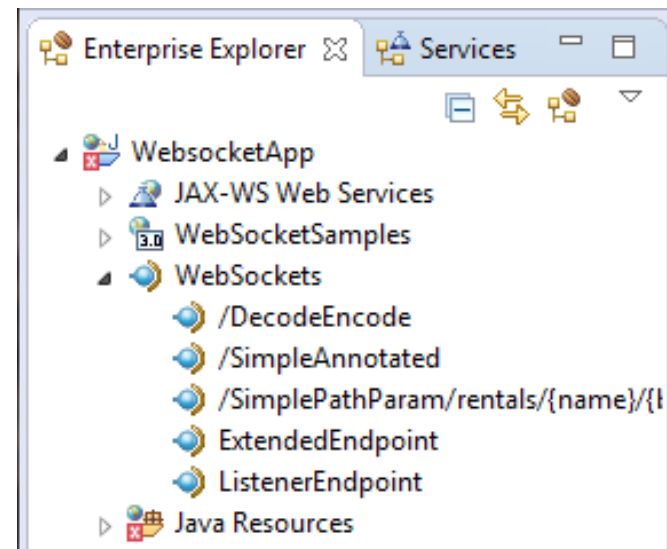
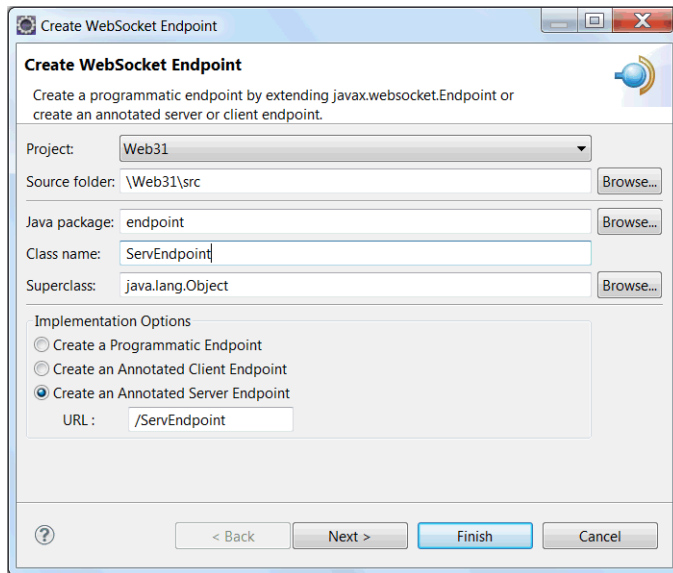


New validations for URL patterns, error pages, and absolute ordering among others.

# Websockets 1.1 (JSR-356)

Java EE 7

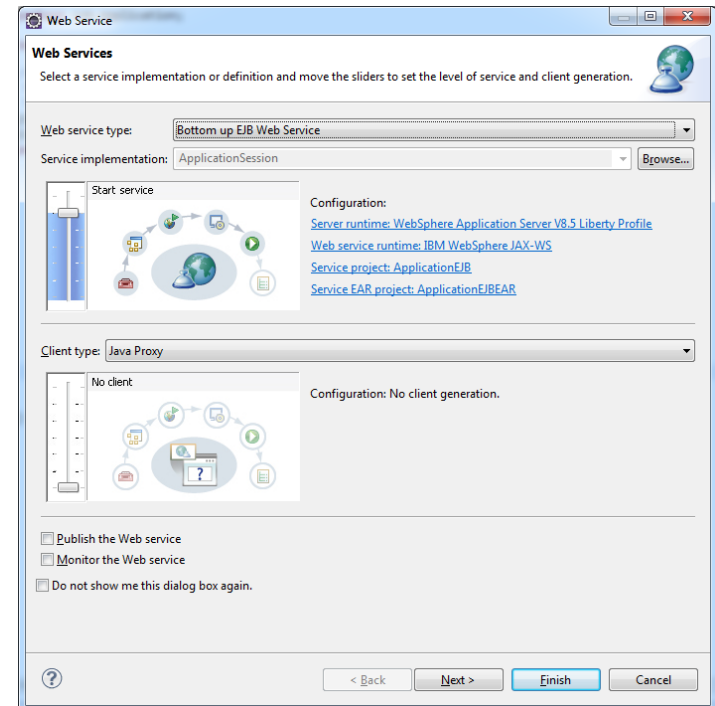
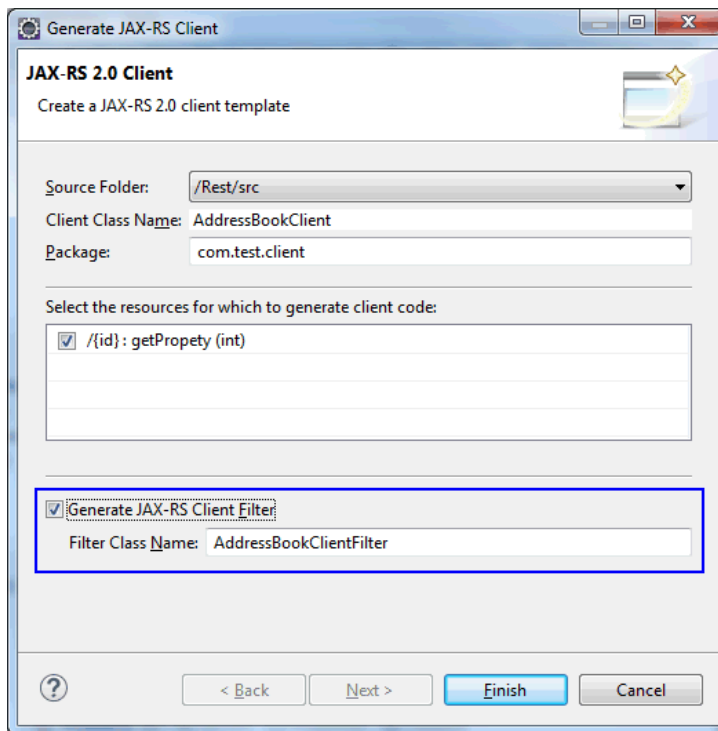
- Endpoint wizard creates endpoints using interface or annotation patterns
- Navigator node identifies Websocket endpoints
- Validates correct usage of @ServerEndpoint, @ClientEndpoint, @PathParam, @OnOpen, @OnClose, @OnError, @OnMessage



# Web Services

Java EE 7

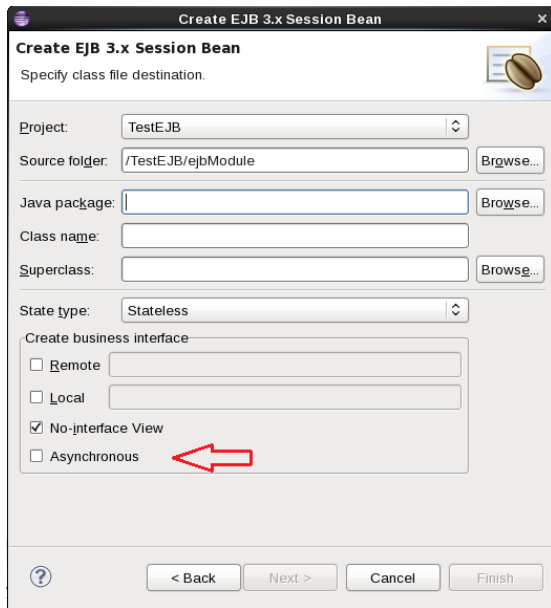
- JAX-RS 2.0 (JSR-339)
  - Client template wizard
- JAX-WS 2.2 (JSR-224)
  - Bottom-up EJB Web Service support for JAX-WS



# EJB 3.2 Tools

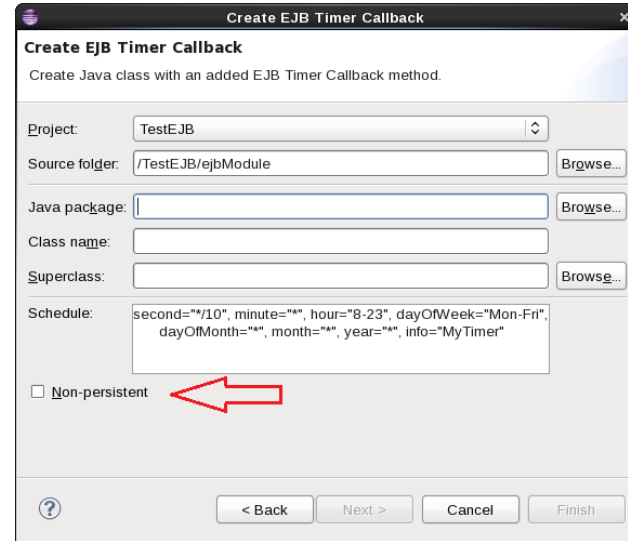


Creation wizards assist with asynchronous annotations



```
@Asynchronous
public class AsynchronousBean {
    public Future<String> operation1().....
```

Non-persistent Timer support

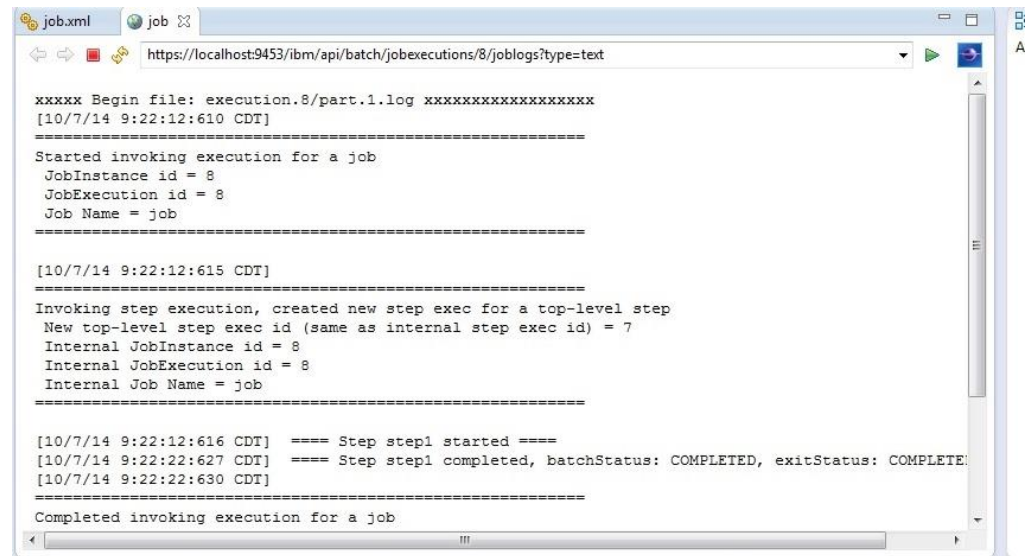
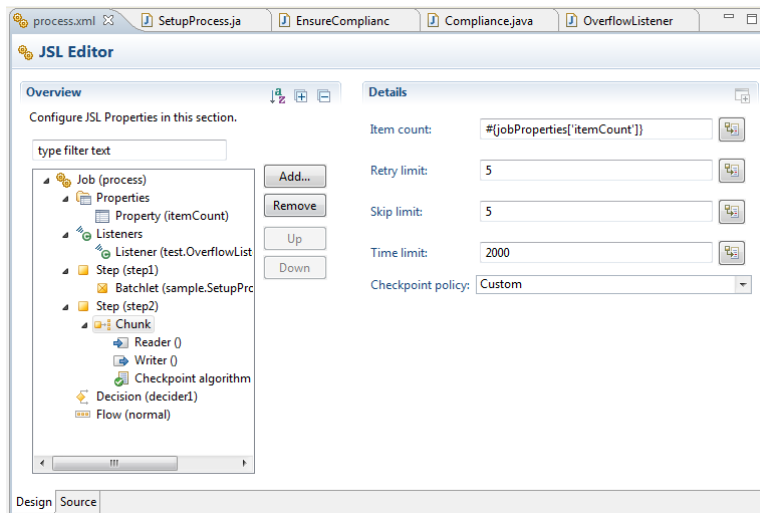


```
@Schedule(second="*/10", minute="*", hour="8-23",
dayOfWeek="Mon-Fri", dayOfMonth="*", month="*",
year="*", info="MyTimer", persistent=false).....
```

# Java Batch (JSR-352)



- Batch project, job, and batch class creation wizards
- Job submission & launch configuration
- JSL editor – EL expression content assist
- Job Log view



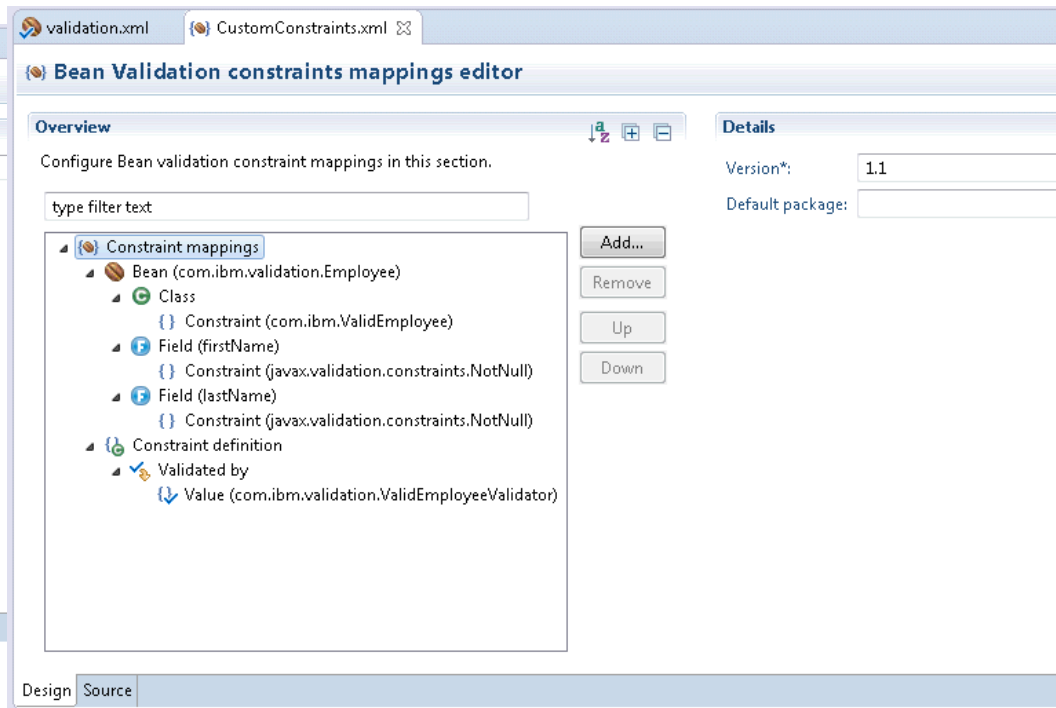
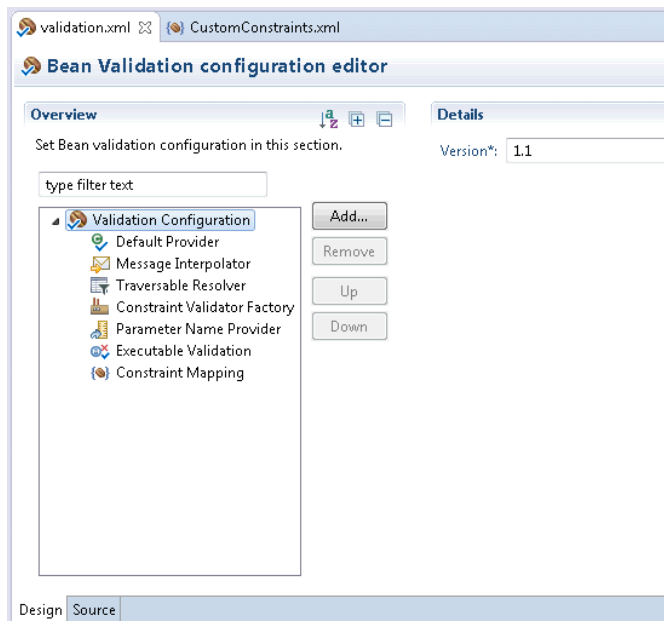
Job	Instance	Execution	Exit status	End time	Server
job	1	1	FAILED	2014/10/07 08:37:44.779 -0500	WebSphere Application Server Liberty Profile at localhost
job	2	2	COMPLETED	2014/10/07 08:38:53.050 -0500	WebSphere Application Server Liberty Profile at localhost
job	3	3	COMPLETED	2014/10/07 08:40:44.627 -0500	WebSphere Application Server Liberty Profile at localhost
job	4	4	COMPLETED	2014/10/07 08:48:06.222 -0500	WebSphere Application Server Liberty Profile at localhost
job	5	5	COMPLETED	2014/10/07 08:48:50.921 -0500	WebSphere Application Server Liberty Profile at localhost
job	6	6	COMPLETED	2014/10/07 09:09:08.625 -0500	WebSphere Application Server Liberty Profile at localhost
job	7	7	COMPLETED	2014/10/07 09:21:53.066 -0500	WebSphere Application Server Liberty Profile at localhost
job	8	8	COMPLETED	2014/10/07 09:22:22.627 -0500	WebSphere Application Server Liberty Profile at localhost
job	9	9	COMPLETED	2014/10/07 09:22:22.627 -0500	WebSphere Application Server Liberty Profile at localhost



# Bean Validation 1.1 (JSR-349)

Java EE 7

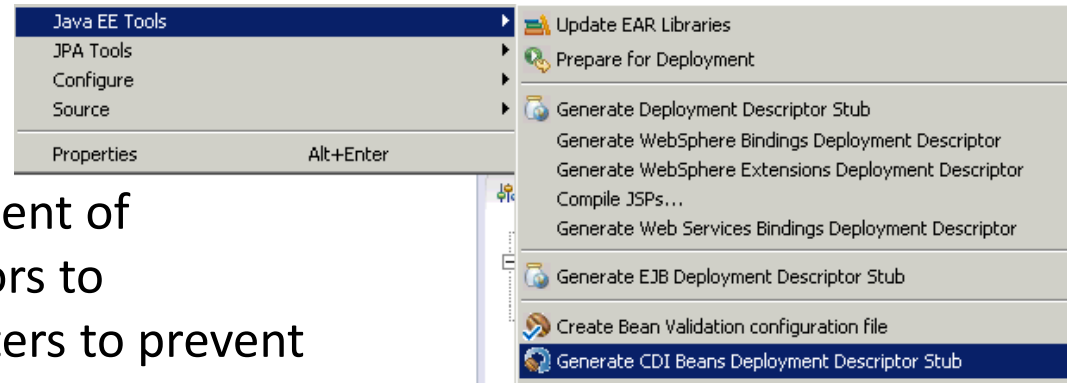
- Easily integrate validation by utilizing predefined annotations
- Bean validation configuration editor
- Create your own rules with custom constraint mapping editor



# CDI 1.2 (JSR-346)



- More validations for new CDI annotations (eg. @Vetoed)
- Now optional beans.xml creation and editor

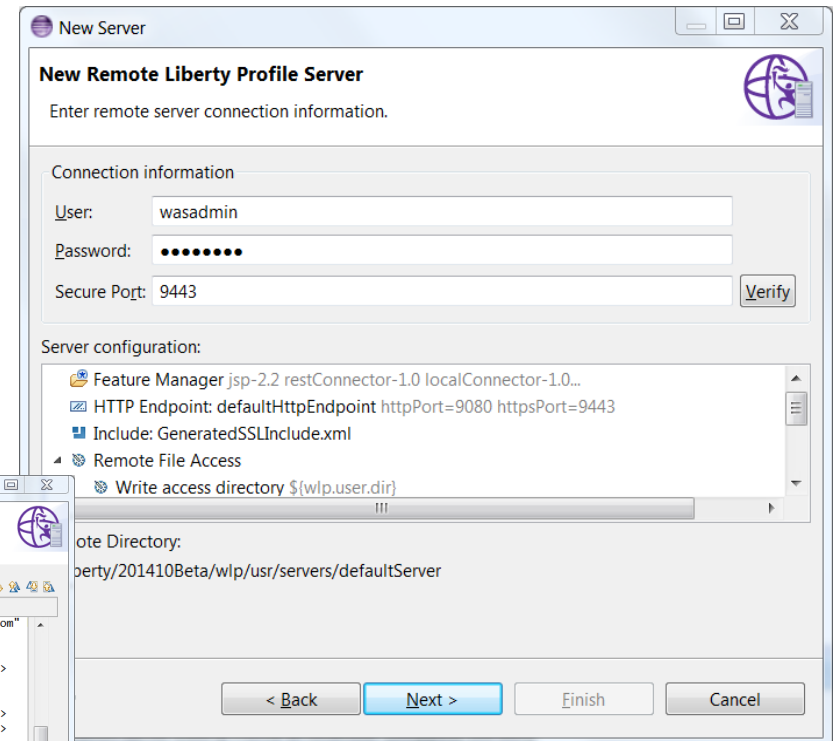
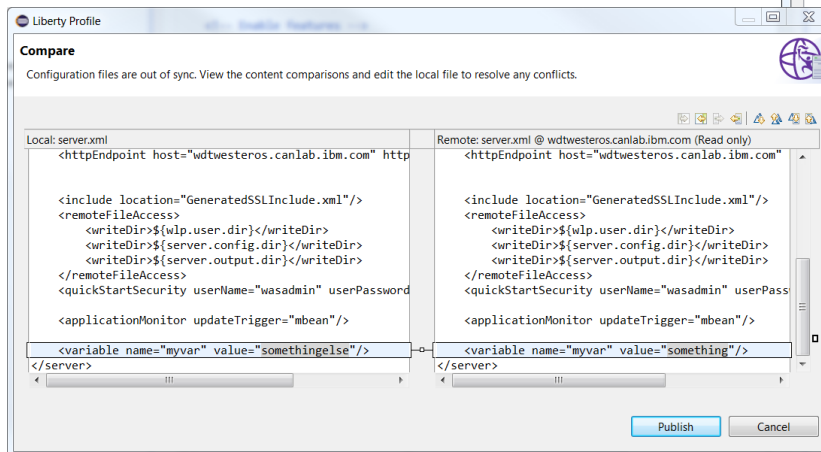


- Assistance with global enablement of interceptors, binding interceptors to constructors, class exclusion filters to prevent scanning of classes



# New: Remote Liberty Servers

- Connect, control and publish to remote servers!
  - Edit server config
  - Publish applications
  - View/control server
  - Debug applications
  - View logs
  - Detect and compare server configuration change conflicts



# Installing the Tools

- Install IBM Eclipse Tools for Bluemix from Eclipse Marketplace

## IBM Eclipse Tools for Bluemix



SHARE    ...



Details | Screenshots | Metrics | Errors | External Install Button

Enables rapid deployment and integration of applications with IBM Bluemix or the Cloud Foundry Clouds, including support for JavaScript and EAR publishing. **A Java 7 Execution Environment is required.** For more information about installing this version of the tools, see [https://developer.ibm.com/wasdev/downloads/#asset/tools-IBM\\_Eclipse\\_Tool...](https://developer.ibm.com/wasdev/downloads/#asset/tools-IBM_Eclipse_Tool...)

 Install

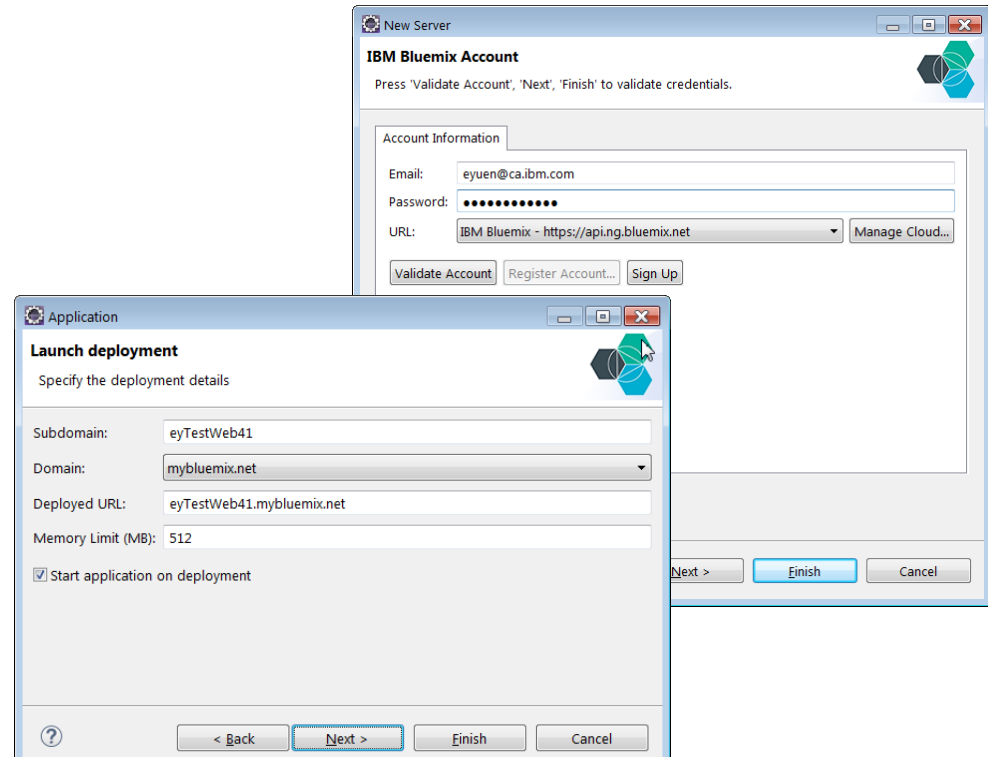


- Includes core WDT Liberty tools. If you're doing development install the full WDT as well!



# IBM Eclipse Tools for Bluemix

- Tools allow developers to easily develop, test, and push applications to the Cloud, directly within Eclipse
- Based on open source project Cloud Foundry Eclipse Tools
- The tools support the following application types:
  - Enterprise Applications
  - Web Applications
  - Node.js Applications
  - Liberty Packaged Server
- Debug and incremental publish of java applications running in Bluemix!



# Liberty Ecosystem (wasdev.net)



IBM integrations



maven

Scala



tapestry



Jenkins



uDeploy



JRebel  
XRebel

myeclipse  
blue

Third party integrations

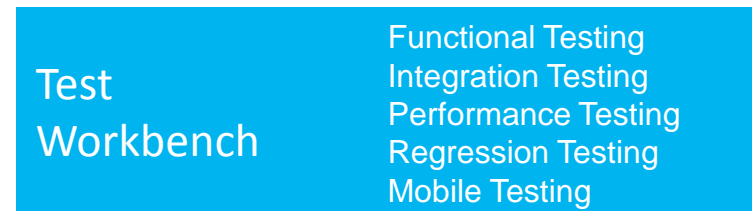
Continuous Testing utilizes highly automated approaches to dramatically reduce time and effort to deliver quality results

### IBM Rational Test Workbench

- Enable functional, performance and integration testing throughout your project lifecycle
- With a scriptless, wizard-driven test authoring environment and support for more than 70 technologies and protocols including WAS, IIB, and MQ

### IBM Rational Test Virtualization Server

- Model real system behavior to eliminate test dependencies and simulate production,
- Accelerate testing and reduce the setup and infrastructure costs of traditional testing environments.



Test Lab Infrastructure

# Deployment

- Customers have a choice of deployment technologies to use

## Most Popular

WebSphere Application Server – Deployment

76



IBM UrbanCode Deploy

IBM WebSphere Application Server Middleware Config

10



IBM UrbanCode D

GitHub



WASdev

Filters

[ci.chef.wlp](#)

Chef cookbook for installing and managing WebSphere Application Server Liberty Profile #devops

Updated on Feb 20

[ci.chef.iim](#)

Chef Cookbook to install, configure and run IBM Installation Manager

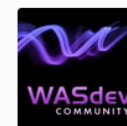
Updated on Dec 9, 2014

[ci.chef.ihs](#)

Chef cookbook for installing and managing IBM HTTP Server #devops

Updated on Sep 24, 2014

GitHub  Explo



WASdev

Filters

[ci.puppet.wlp](#)

Puppet module for installing and managing WebSphere Application Server Liberty Profile #devops

Updated on Feb 9

[ci.puppet.iim](#)

Puppet module to install, configure and run IBM Installation Manager

Updated on Sep 12, 2014

[ci.puppet.ihs](#)

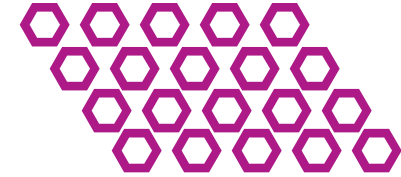
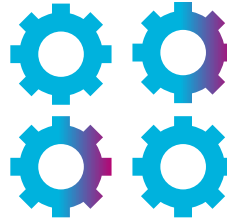
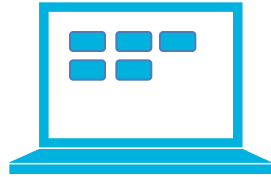
Puppet module for installing and managing IBM HTTP Server

Updated on Sep 12, 2014

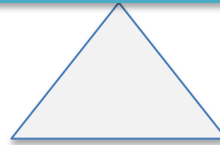


# WAS Provides The Optimal Infrastructure For A Wide Spectrum Of Emerging Workloads

Consistent Java Runtime, Yet freedom to choose the right architecture for App



- ✓ Robust and proven
- ✓ Complete Control
- ✓ Enterprise security



- ✓ Lightweight
- ✓ Composable
- ✓ Security
- ✓ Flexible
- ✓ Dynamic
- ✓ Extensible
- ✓ Cloud-ready

WebSphere Application Server Liberty profile

WebSphere Application Server full profile

Java EE, SIP, WebRTC, Batch, OSGI

Flexible Deployments – WAS Liberty Everywhere

# WAS Delivers the Right Fit Platform

Delivering Consistent Runtime Yet Differentiated Qualities of Service

*Allows organizations freedom to move apps to cloud at their own pace*

**Build &  
development  
tools**

**DevOps and  
Ecosystem**

**Internet  
scaling**

**Flexible  
deployment  
options**

**Integrated  
Caching**

**Rock solid  
security**

**Connect to  
systems of  
record**

**Ease of  
problem  
determination**

**WebSphere Application Server Liberty profile**

**WebSphere Application Server full profile**

**With variety of choices to choose from Bare metal to on-  
premises and off-premises cloud**

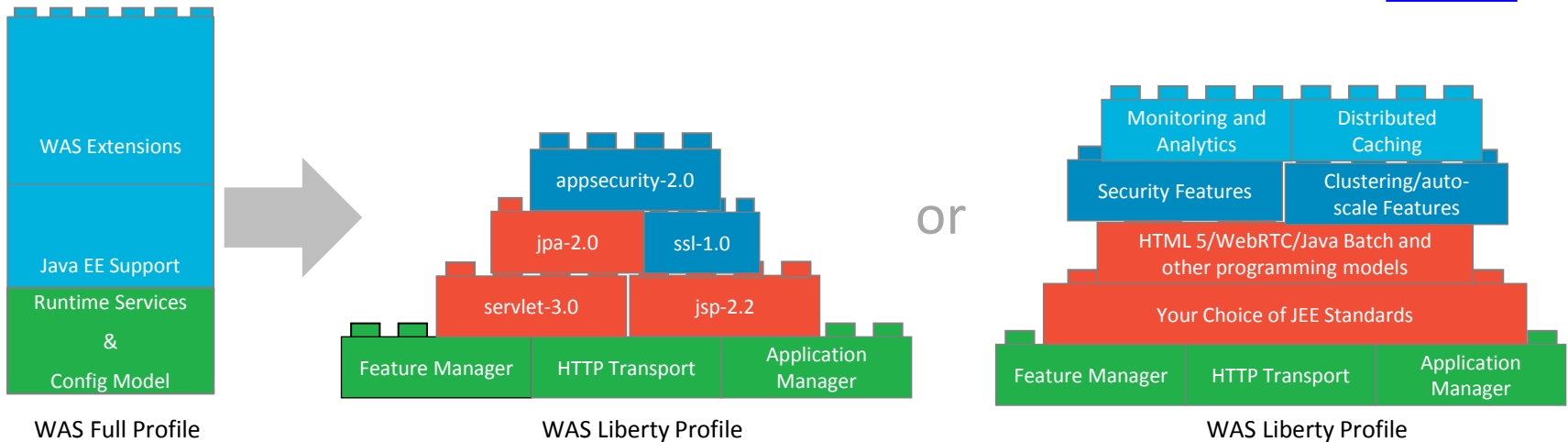
# Flexible Java Runtime for Next Generation Apps & Services

## WebSphere Application Server Liberty Profile V9 Beta

- Cloud ready, lightweight & simple
- Start fast and simple, and grow with your application needs
- Built on self-contained composable blocks of features
- Dynamic, Extensible, & Embeddable
- Open Standards including JEE 7 features, WebRTC, Java Batch
- Integration with open ecosystem
- Frictionless access to tools and runtime



WebSphere Liberty Profile V9 Beta  
Download features from: [WASDev.net](http://WASDev.net)



# Current Liberty feature set – including JEE7

## Install and Repository

## Repository only

zOS

zosSecurity-1.0

zosTransaction-1.0

zosWlm-1.0

zosConnect-1.0

zosLocalAdapters-1.0

ND

collectiveController-1.0

clusterMember-1.0

scalingController-1.0

scalingMember-1.0

dynamicRouting-1.0

Base

wsSecurity-1.1

wasJmsServer-1.0

mongodb-2.0

jaxb-2.2

wmqJmsClient-1.1

jmsMdb-3.1

mdb-3.1

jms-1.1

jcaInboundSecurity-1.6

jaxws-2.2

wasJmsClient-1.1

wasJmsSecurity-1.0

couchdb-1.0

jca-1.6

Core

ldapRegistry-3.0

jaxrs-1.1

collectiveMember-1.0

osgiConsole-1.0

json-1.0

restConnector-1.0

oauth-2.0

concurrent-1.0

monitor-1.0

timedOperations-1.0

wab-1.0

sessionDatabase-1.0

webCache-1.0

blueprint-1.0

serverStatus-1.0

distributedMap-1.0

adminCenter-1.0

osgiAppIntegration-1.0

openid-2.0

openidConnectClient-1.0

openidConnectServer-1.0

New in 1Q15

spnego-1.0

New in 4Q14

jdbc-4.1

websocket-1.1

websocket-1.0

Web Profile

ejbLite-3.1

jdbc-4.0

ssl-1.0

jsf-2.0

jndi-1.0

beanValidation-1.0

jsp-2.2

appSecurity-2.0

cdi-1.0

servlet-3.0

managedBeans-1.0

jpa-2.0

el-3.0

jsonp-1.0

jsp-2.3

servlet-3.1

# I have many apps, what do they use?

## WAS Application Migration Toolkit (WAMT) Tech Preview

- Provides a high level report showing which Java EE technologies your application uses
- Run in eclipse against application source or headless against application binaries (new)
- Provides an indication of support by WAS profile and edition
- Provides detailed analysis recommending any actions required to run on target edition.

### Application Evaluation Report

Your application uses technologies provided by these IBM platforms:

Product Edition	IBM Bluemix	WebSphere Application Server 8.5.5 Liberty Core	WebSphere Application Server 8.5.5	WebSphere Application Server 8.5.5	WebSphere Application Server Network Deployment 8.5.5	WebSphere Application Server Network Deployment 8.5.5	WebSphere Application Server for z/OS 8.5.5	WebSphere Application Server for z/OS 8.5.5
Profile	Liberty for Java	Liberty profile	Liberty profile	Full profile	Liberty profile	Full profile	Liberty profile	Full profile
Web application technologies								
Java Servlet	✓	✓	✓	✓	✓	✓	✓	✓
JavaServer Pages/Expression Language (JSP/EL)	✓	✓	✓	✓	✓	✓	✓	✓
Enterprise application technologies								
JavaMail - Provided by application	✓	✓	✓	✓	✓	✓	✓	✓

This report was generated on 11/24/14 10:49:43:362 CST for the following modules:  
C:\backup\SimpleWebProject.war



# WebSphere Application Server - Flexibility everywhere

## On-Premises

*Total Control  
Maximum Flexibility*

### Build Your Own Cloud

Use virtualized WebSphere App Server on your hardware



### PureApplication System & Software

Build reusable & redeployable patterns using the WebSphere App Server



docker

## IaaS

*Public Cloud Economies  
Time to Market*

### SoftLayer/Bluemix

BYOS&L - WebSphere App Server



PureApplication Service  
**SOFTLAYER**  
an IBM Company

### Amazon

BYOS&L - WebSphere App Server



### Microsoft Azure

BYOS&L - WebSphere App Server  
Pay-as-you-Go WAS VMs



Microsoft Azure

docker

## PaaS

*Packaged Services  
Rapid Development*

### Bluemix

Composable services  
Liberty Buildpack



### Cloud Foundry

Liberty Buildpack



docker

# SoftLayer - IaaS

## Bare Metal vs. Virtual Servers

- **Isolation.** Does your application environment require a level of isolation that is not provided in a shared hypervisor environment?
- **Raw Compute.** Some applications are so resource intensive that running with dedicated resources is necessary, as a guest under hypervisor control may be sub-optimal or impossible.





# SoftLayer - IaaS



## Right-Sizing

- Not unlike running on your own physical hardware, you need to right-size the environment – too big and you'll pay too much – too little and your application won't have the right performance characteristics.
- Adding resources in SoftLayer or any IaaS is simple and straight-forward, however so you can take more risk with smaller configurations.



## Networking

- **Isolation.** SoftLayer offers a variety of networking configurations for your applications.
  - Private VPN for access to applications and operating systems
  - Private Links to Softlayer from your enterprise<sup>[1]</sup>

# SoftLayer - IaaS

## Licensing



WebSphere at the moment is BYOSL (Bring your own Software License) which is a perpetual PVU license, whereas the Softlayer IaaS may be pay-as-you-go.

- You need to have enough PVU licenses to cover your high-water mark of software deployments.
- IaaS lets you create and destroy images as you would like
  - Example: If you create 5 WebSphere images, run them for 2 months, stop 3 leaving 2 running for 2 months, and then start 5 more for a total of 7, you'll need enough PVUs to cover the period of time you are running 7 images.
  - **Monthly PVU licenses** now available
- BYOSL applies to Amazon/SoftLayer/Azure
- [http://www-01.ibm.com/software/passportadvantage/eligible\\_public\\_cloud\\_BYOSL\\_policy.html](http://www-01.ibm.com/software/passportadvantage/eligible_public_cloud_BYOSL_policy.html)
- <http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=AN&subtype=CA&htmlfid=897/ENUS315-001&appname=USN>

### 3<sup>rd</sup> Party Licensing and Service.

- Does your application use 3<sup>rd</sup> party frameworks or software to be deployed in the IaaS?
- Does your vendor offer licenses that permit IaaS deployments and will they service their product in the Softlayer environment or will you be required to recreate on premise?

# Promotion: IBM WebSphere on SoftLayer

Use your WebSphere PVUs both on-premise and in IBM cloud!



- No restrictions on use. Support through your S & S
- No need to contact IBM or “order” anything. Customers track “dual usage” of PVUs
- Cost of the cloud infrastructure is not included as part of the promotion
  - Requires SoftLayer. PureApplication Service is optional
- When promotion ends, customer will need to purchase additional WebSphere PVUs to continue running in the cloud.
- Announcement Letter Number: ZAAM5188A

# PureApplication

## PureApplication v2.1

Cloud application platform to provide simple, end to end application lifecycle management

Announce 2/17, GA 3/13



1

## PureApplication System

Pre-integrated hardware & software platform for enterprise applications on POWER & x86



2

## PureApplication Service on Softlayer

Dedicated pre-integrated hardware and software platform in SoftLayer datacenters worldwide to speed off-premises cloud adoption for enterprise applications



3

## PureApplication Software

Cloud application platform software that can run on your own hardware

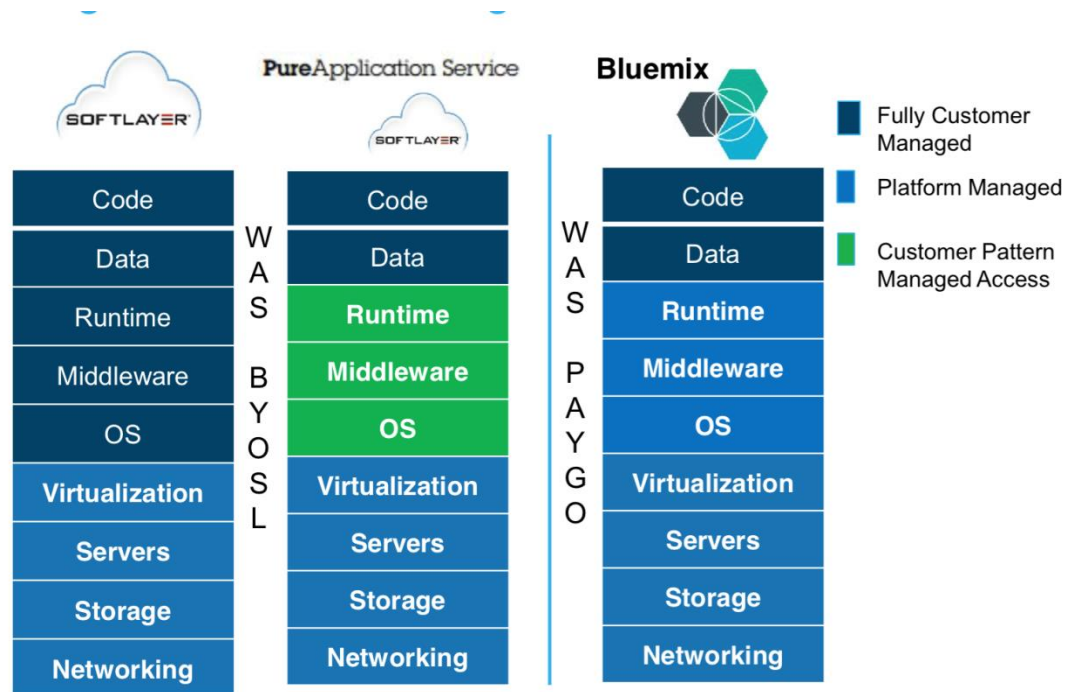
NEW



# Bluemix/Cloud Foundry - PaaS

## Automatic

- In an PaaS – you give up specific control, so the infrastructure can automatically provide your application needs dynamically



# Bluemix/Cloud Foundry - PaaS



## FileSystems

- The Cloud Foundry/Bluemix application filesystem is ephemeral.
  - Be careful... filesystem I/O does “work”, however...
  - It is destroyed when the application crashes, is stopped or restaged.
  - One per instance – not a good shared cache!
- Find cloud persistent storage service to store data
  - No-SQL Database (Cloudant) is a good alternative.
  - Cache Services
- Logs and Dumps are managed from Bluemix Console.

## Memory

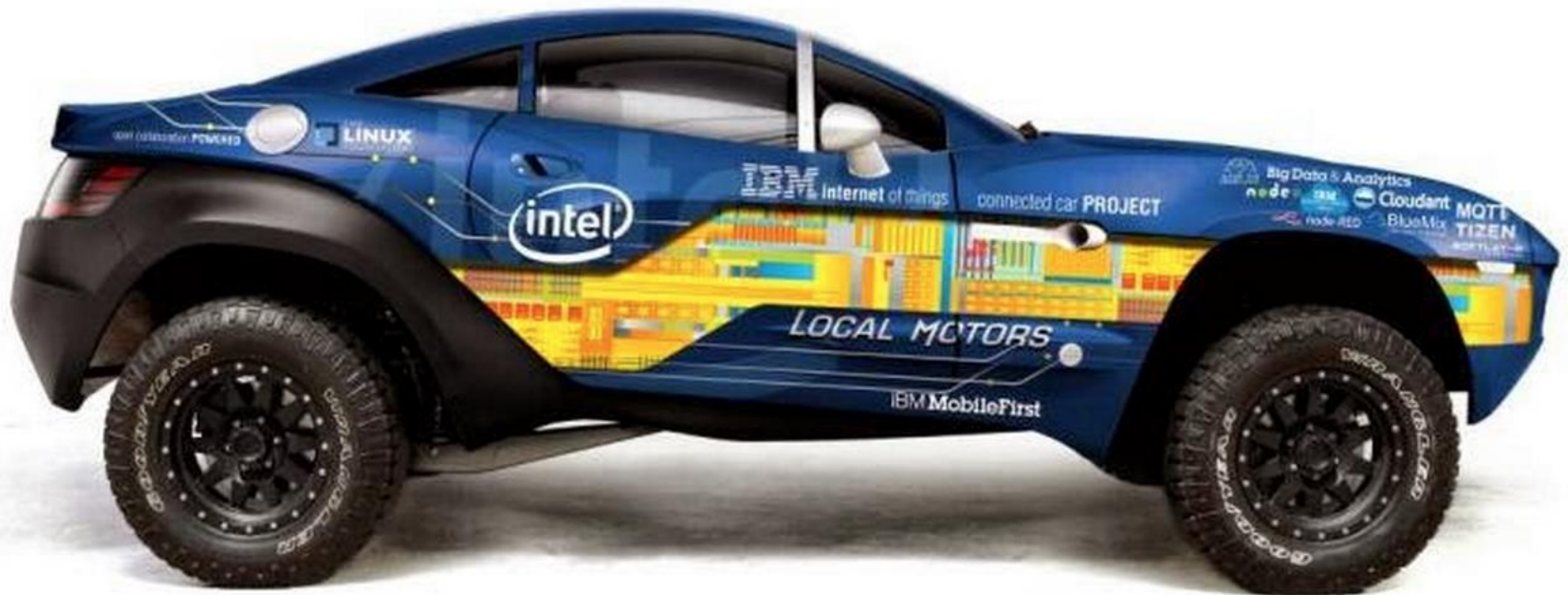
- Recommend adjusting the application memory setting using the PaaS controls rather than trying to manage the Heap directly – the PaaS will adjust the heap for you automatically.



# Bluemix/Cloud Foundry - PaaS

## Customization

- Liberty buildpack supports pushing a packaged Liberty Server to Bluemix, where one can provide additional configuration in the traditional server.xml.
  - Support CF environment variables in server xml
  - PaaS and Liberty Buildpack will automatically merge the specified configuration and any cloud service configuration necessary to support bound services.



# Bluemix/Cloud Foundry - PaaS



## Data Access and Services

- Cloud Integration Service
  - Secure access to your enterprise
- Cloud Data Services
  - Cloud-centric - SQL and no SQL options like DB2 and Cloudant
  - Service Binding vs. Server Configuration/MetaData
- Simplified wiring to many cloud services

## Licensing



- Included with the platform for the runtimes - pay-as-you-go billing
- Services have unique “plans” which allow you select (or upgrade) to desired QoS
- 3<sup>rd</sup> party software might be better refactored to leverage their cloud based service, rather than using their product directly as you would on-premise



# Bluemix/Cloud Foundry - PaaS

## Software Levels and Maintenance



- The operating system level and maintenance is automatically managed by the PaaS provider
  - App instances can be stopped and restarted to pick up new OS levels
- Default levels are typically upgraded by the PaaS provider
  - Some access to prior levels, but generally upgrades happen at PaaS provider cadence
  - App staging required to pick up new middleware maintenance
- Dedicated Bluemix gives customers more flexibility in buildpack level and manage maintenance windows.

# Bluemix/Cloud Foundry - PaaS



## Java

- The Liberty buildpack in Bluemix recognizes and supports the following Java packages:
  - WARs
  - EARs
  - JARs
  - Packaged servers (EBAs)



## Add-Ons

- Leverage the power of the PaaS by simply “adding” rich features
  - Monitors
  - Log analytics
  - Auto-scaling

## Other Languages (buildpacks)

- Your tool box is typically much larger in a PaaS → Some languages are better for the specific task at hand.
- Bluemix also supports Node, Go, Ruby, PHP, and Python and custom buildpacks for additional language support



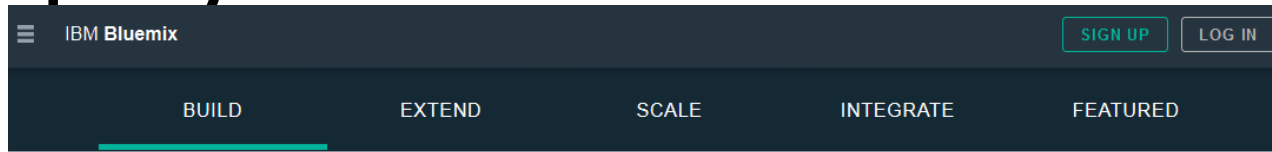
# Bluemix/Cloud Foundry - PaaS

## Options/Features Restrictions






- Bluemix offers the WebSphere Liberty Profile Buildpack as its premiere Java implementation
  - Composable, Light-weight, configure-by-exception, pay-as-you-go
- Liberty Features not enabled for Bluemix
  - Transaction Manager. 2pc transactions have not been a priority for systems of engagement – cloud services tend to be non-transactional.
  - Admin Center. Manage your applications and infrastructure using Bluemix.
  - Collectives. General scaling features provided by PaaS platform
- Intelligent Management features
  - While the PaaS offers a wide-range of auto-scaling – if you are using the ODR to do work load management or application versions, these features are not available in Bluemix. Consider Softlayer – IaaS.
  - Individual servers are essentially stateless - they are not externally addressable.
- Inbound protocols
  - Cloud Foundry application endpoints are limited to HTTP, HTTPS and WebSockets

# Deployment Choices in Bluemix



## Build your apps, your way.

Use a combination of the most prominent open-source compute technologies to power your apps. Then let Bluemix handle the rest.

<p><b>Instant Runtimes</b></p> <p>App-centric runtime environments based on Cloud Foundry.</p>  <p><a href="#">Check out runtimes on Bluemix</a></p>	<p><b>Containers</b></p> <p>Portable and consistent delivery of your app without having to manage an OS.</p>  <p><a href="#">Check out containers on Bluemix</a></p>	<p><b>Virtual Machines</b></p> <p>Get the most flexibility and control over your environment with VMs.</p>  <p><a href="#">Check out VMs on Bluemix</a></p>
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Expanding Bluemix's reach

# Docker and WebSphere Application Server

- Support for WebSphere Application Server Liberty Profile and Full Profile running under Docker
- WAS Liberty images on Docker Hub for Development use
  - Latest WAS V8.5.5. Liberty driver
  - WAS Liberty V9 Beta with Java EE 7
- Dockerfiles on WASdev GitHub to:
  - Upgrade the Docker Hub image with Liberty Core, Base or ND commercial license
  - Build your own Docker image for Liberty or Full Profile



**websphere-liberty** 

3 days ago

Official IBM WebSphere Application Server for Developers Liberty Profile image.

[https://registry.hub.docker.com/\\_/websphere-liberty/](https://registry.hub.docker.com/_/websphere-liberty/)

# WebSphere Application Server Patterns

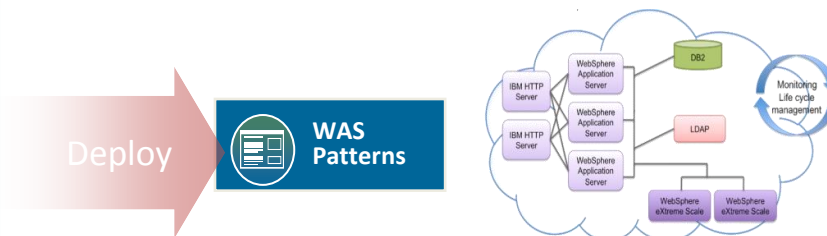
Build common topologies with fewer OS images

## WAS Hypervisor Edition

Ideal for building  
Virtual images with bundled  
**WAS and Operating System**

Highly Automated Deployments  
**Tightly coupled to bundled OS  
and WAS binaries**

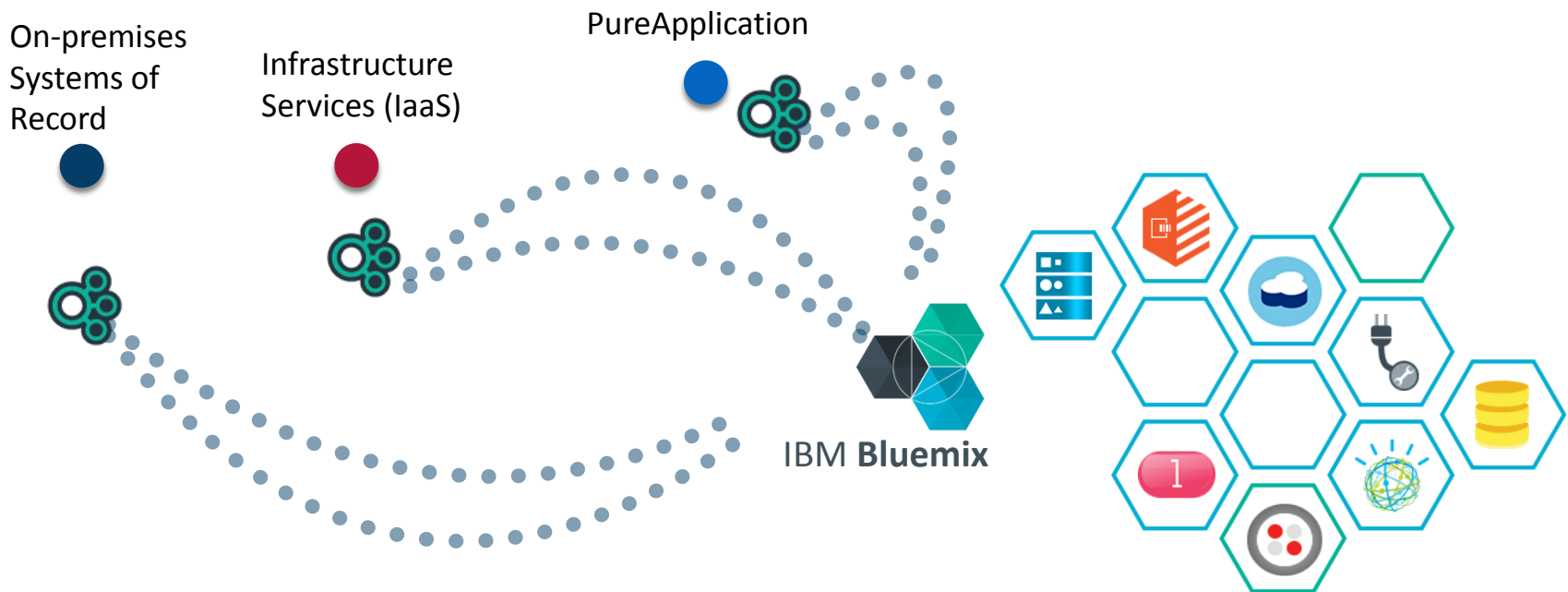
## A new approach with WAS Patterns



- ✓ Eliminates need for separate Hypervisor images
  - ✓ Highly flexible model - **decouples the WAS binaries and OS from the Patterns**
- ✓ Easily **Drag and Drop Patterns** Software Components into Pattern Builder
- ✓ Use WAS binaries from Install Manager (IM) and your normal WAS licenses directly
- ✓ **Apply WAS fixes immediately** – no waiting for a bundled WAS HV image anymore
- ✓ One Plugin – **no more discrete Platform, OS and architecture distribution of WAS HV**

# A Hybrid Cloud Brings It All Together

- Build new apps and services on or off-premises by optimizing what you already use
- Hybrid clouds strategically use public/private and on-premises/off-premises together
- DevOps across both on-premises and off-premises enables continuous delivery



# Agile Application Platform

Empowering Developers & IT with Greater Flexibility to Build, Run and Manage Apps

Collaborative Lifecycle Management



*Work together to deliver with agility; Continuous test in multi-channel environment*

WebSphere Application Server Liberty V9 Beta with JEE7

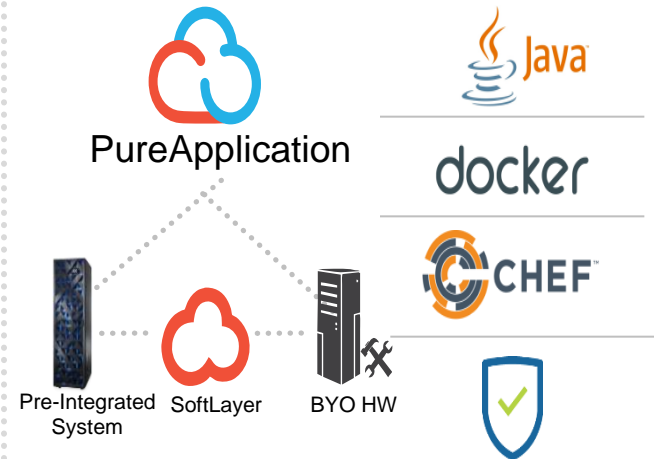


docker

SOFTLAYER  
2 for 1 Promotion

*Accelerated application delivery with full Integrity for web, cloud and mobile apps*

PureApplication v2.1



*Write applications once, deploy anywhere without change, using flexible consumption models*