

IBM Software

WebSphere Application Server Family Overview and Evolution

**Ian Robinson, WebSphere Foundation Chief Architect
IBM Distinguished Engineer**

Looking Ahead: WAS V8.5.Next



More Power to the Lightweight Profile

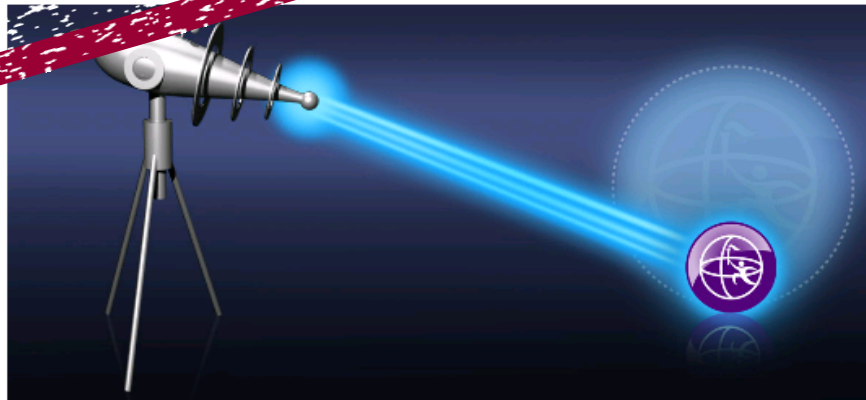


Welcome to WASdev




The WASdev community is the place for developers to discuss, share and learn about developing applications that will run on WebSphere Application Server.

★ 14

Roll up, roll up! see the amazing shrinking server - Available in the new Betas for WebSphere Application Server, Rational Application Developer, and WAS Developer Tools now!!!




Featured - New in March 2013

-  Refresh of the Betas for WebSphere Application Server, Developer Tools, and RAD!
-  New and Noteworthy in the new Beta refreshes
-  Updates to the Liberty Profile Plugin for IBM Workload Deployer!

Participate

Connect.
WASdev forum

-  Join our developers as they demonstrate new programming support features in the Beta. Click for details.

This Time Last Year

Following on from WAS V8.5, shipped in June 2012, the WAS V8.5.Next Beta looks ahead at what's currently in development.

Get the details and the downloads from <http://wasdev.net>



WebSphere Application Server runs the business - - including web, mobile, telephony support, and more ... from small businesses to the largest in the world

Fast, flexible, and simplified development

- Choice of server runtimes from lightweight and flexible to highly robust and resilient
- Broad programming model support
- JEE6 Standards based Java runtime environment
- Enhanced developer tools and no-charge dev desktops

Operational Excellence

- Secure, scalable, highly available runtime
- Intelligent Management capabilities for resiliency
- Linear scalability through in memory data grid
- Runs on all major platforms
- High performance and near-continuous availability

Ongoing Innovation

- Exploits mobile and telephony to reach new clients and markets
- Develop, test and run on one application platform
- Public and Private cloud enablement
- Optimized data access (SQL and NoSQL)

WAS for Developers



Enables efficient development of innovative apps that will run on WAS in production

Available as a no-charge edition for the developer desktop and includes Eclipse adapters



Provide WAS and WDT editions as freely available for dev desktops and supported under production runtime licenses

WAS Hypervisor Edition



The WAS ND server optimized to instantly run in Pure Application System, VMware, PowerVM, zVM and other server virtualization environments.

WAS ND



Delivers near-continuous availability, with advanced performance and intelligent management capabilities, for mission-critical apps. Full entitlement to WXS.

WAS for z/OS



Takes full advantage of the z/OS Sysplex to deliver a highly secure, reliable, and resource efficient server experience. Entitlement to WXS z/OS client.

WAS



Provides secure, high performance transaction engine for moderately sized configurations with web tier clustering and failover across application server profiles.

Includes entitlement to eXtreme Scale for HTTP session caching and DynaCache on the entitled WebSphere Application Server.

WAS Liberty Core



Liberty Profile
(Web Profile only)

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.

WAS Express

Liberty
and Full
Profiles

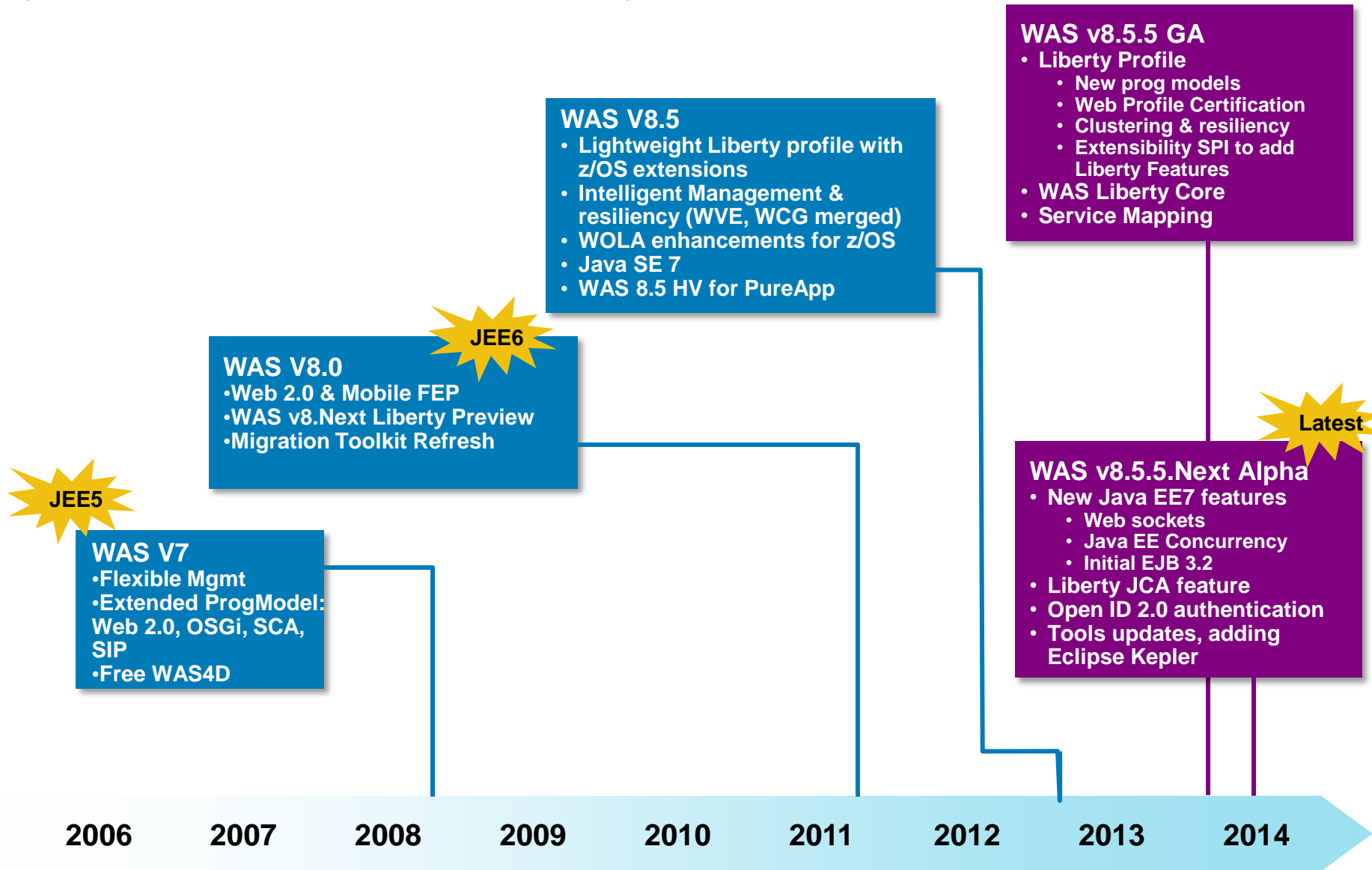
A low-cost, ready-to-go solution to build dynamic Web sites & apps, including both Liberty and full-profile WAS. Restricted to a set amount of PVUs.

- ✓ **New WebSphere Application Server Liberty Core edition**
- ✓ **Entitlement to WebSphere eXtreme Scale (WXS) for some editions**
- ✓ **Developer install/support for WAS & WDT with active production server S&S**

WebSphere Application Server

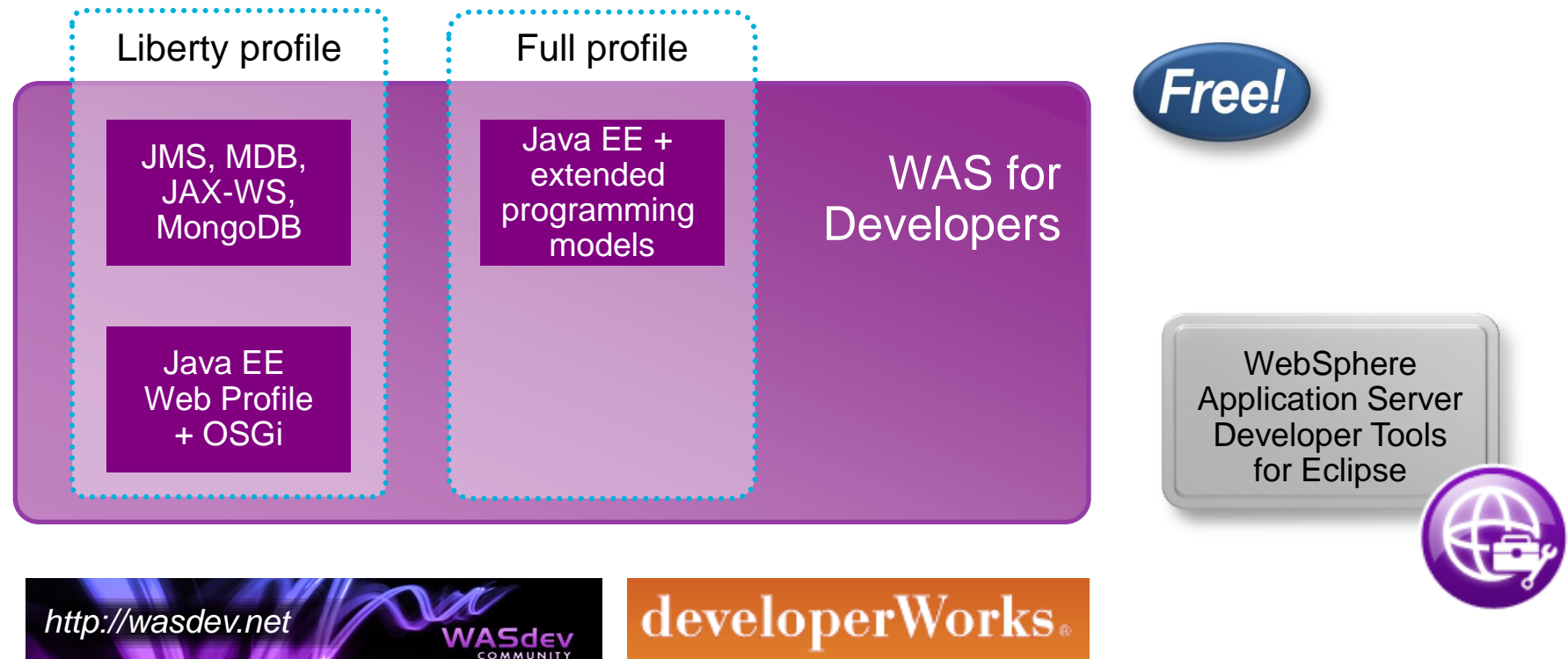


15 years of Leadership & Trusted Delivery

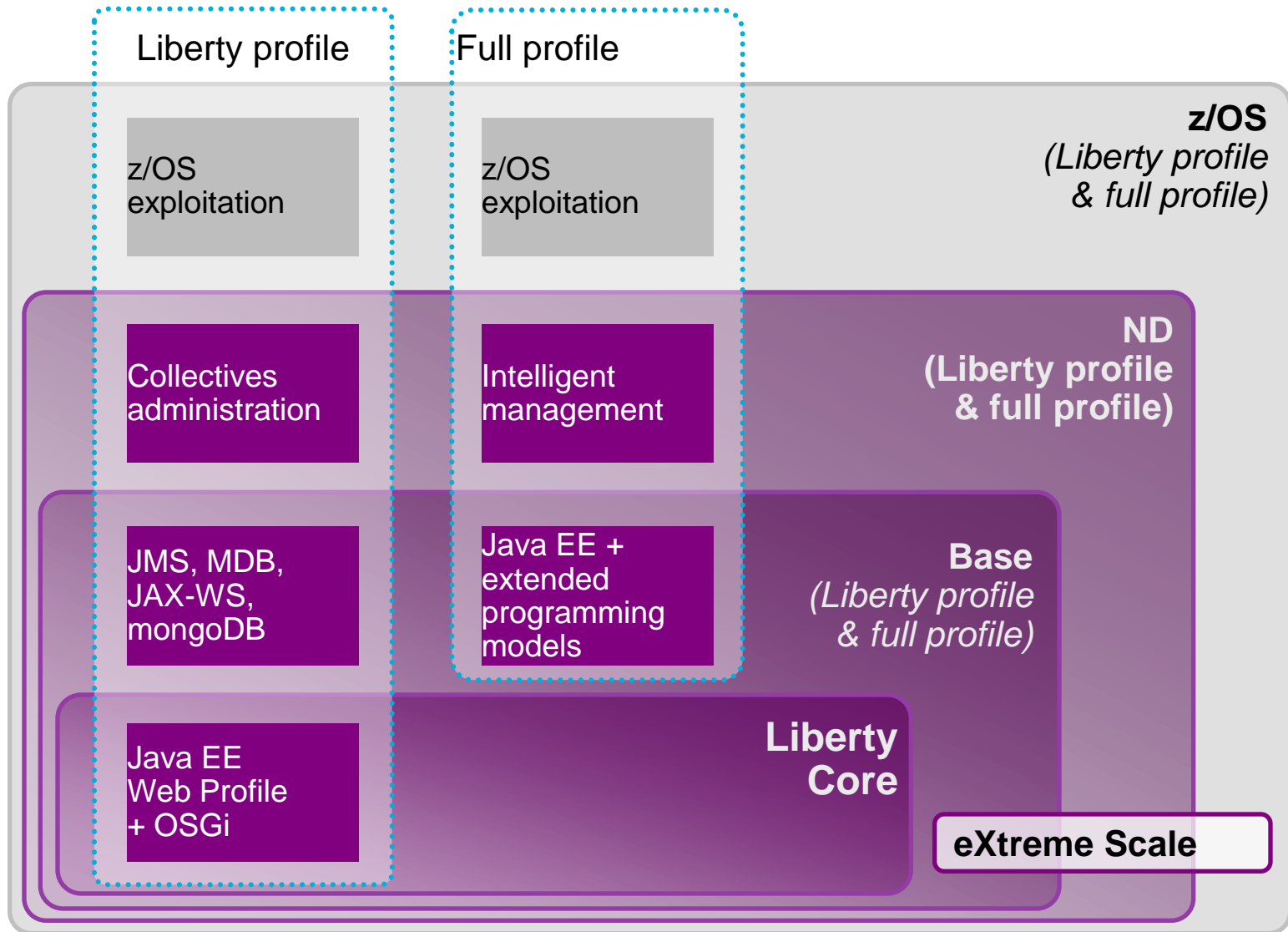


For developers who don't have WAS licenses in production
No charge download of *FULL* and *Liberty* profiles of WAS, and Eclipse tools, from <http://wasdev.net>

Can also use production installs on the developer desktop **for free**, with support, as part of separate production S&S



Fit for Purpose Servers – Production Servers



WAS Liberty Profile (Since V8.5.0)



WAS v8.5.5 delivers significant enhancements to Liberty profile, including new programming models, administration, qualities of service and development tools

Dynamic Server Profile

Not static like Web Profile; configured by app at a fine-grained level

“Developer First” Focus

Simplified, shareable XML server config. New integrated messaging server, DynaCache support, new prog. models, such as Web Services, JMS & EJB-Lite.

Enhanced!

Start fast, run efficiently

Starts in <3s; Mem footprint <50MB; (TradeLite benchmark)



Small Download

50MB for Web Profile features

Integrated tools

Powerful tools in WDT Eclipse feature. Enhanced for v8.5.5 prog models, Maven integration, ++

Enhanced!

Dynamically Extensible

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

New!

Web Profile Certified

Create web apps for the Java EE Web Profile standard.

New!

WAS v8.5.5 Liberty Profile & WAS Developer Tools for Eclipse (WDT)

Lightweight cluster Mgmt

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

New!

Unzip install and deploy

IM or unzip to install. New option to deploy “server package” of app + config + required subset of server runtime for highest density deploy

Enhanced!

Liberty Extensions

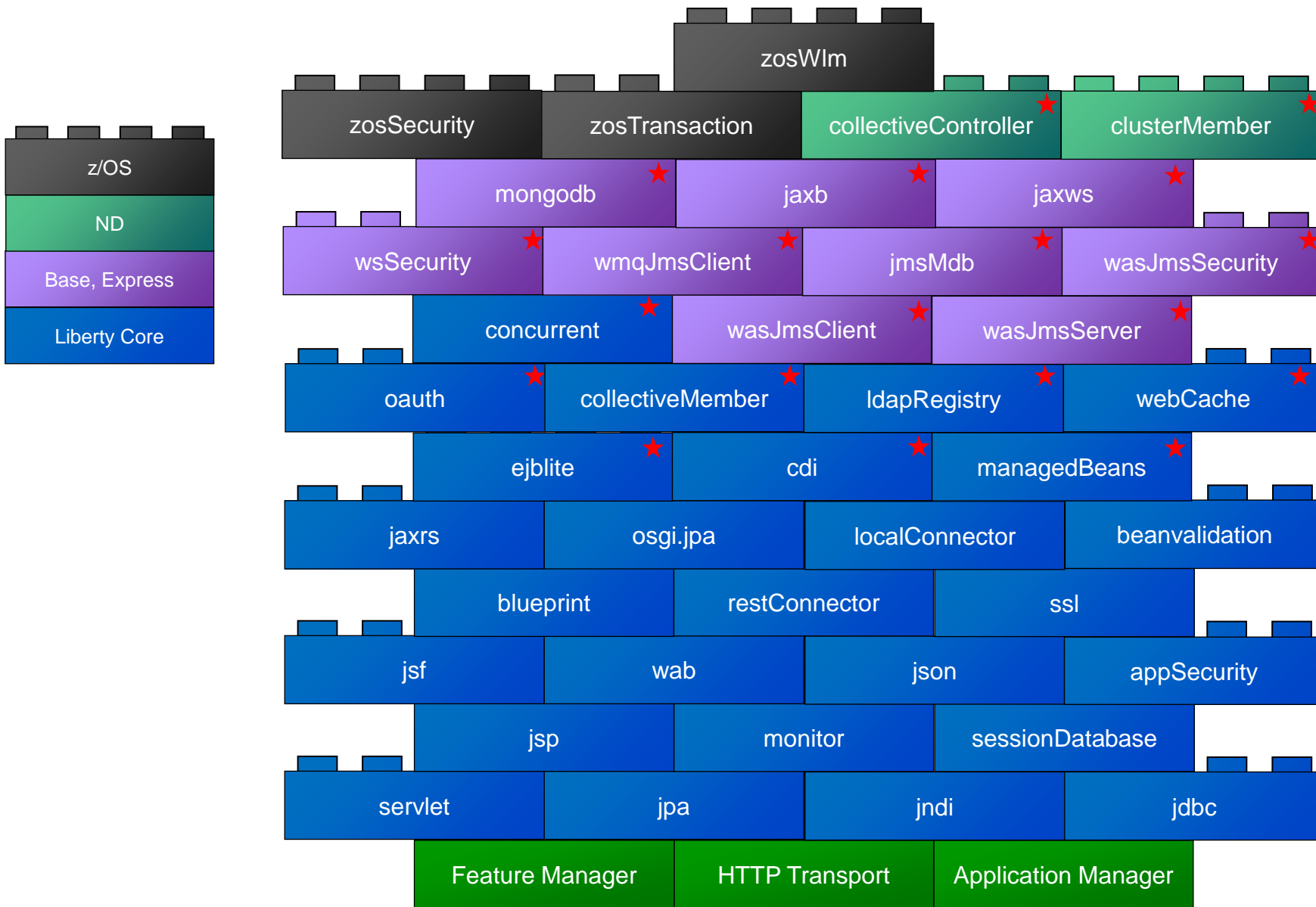
Add custom features and integrate 3rd party components via Liberty extensions interface

New!

Fidelity to full profile WAS

Same reliable containers & QOS. Develop on Liberty profile and deploy to Liberty or full-profile WAS

Dynamically Composable, Integrated Features



WAS - Intelligent Management



Part of WAS ND V8.5.0+ and WAS for z
Added Liberty Profile (assisted lifecycle subset) in V8.5.5.1

Application Edition Management

StockTrading 1.0

StockTrading 2.0

StockTrading 3.0

Server Health Management



SLA based Dynamic Clustering



Intelligent Routing and SLA Enforcement



Costs

Up to **45%** less hardware

Up to **60%** less administration

Up to **45%** less software

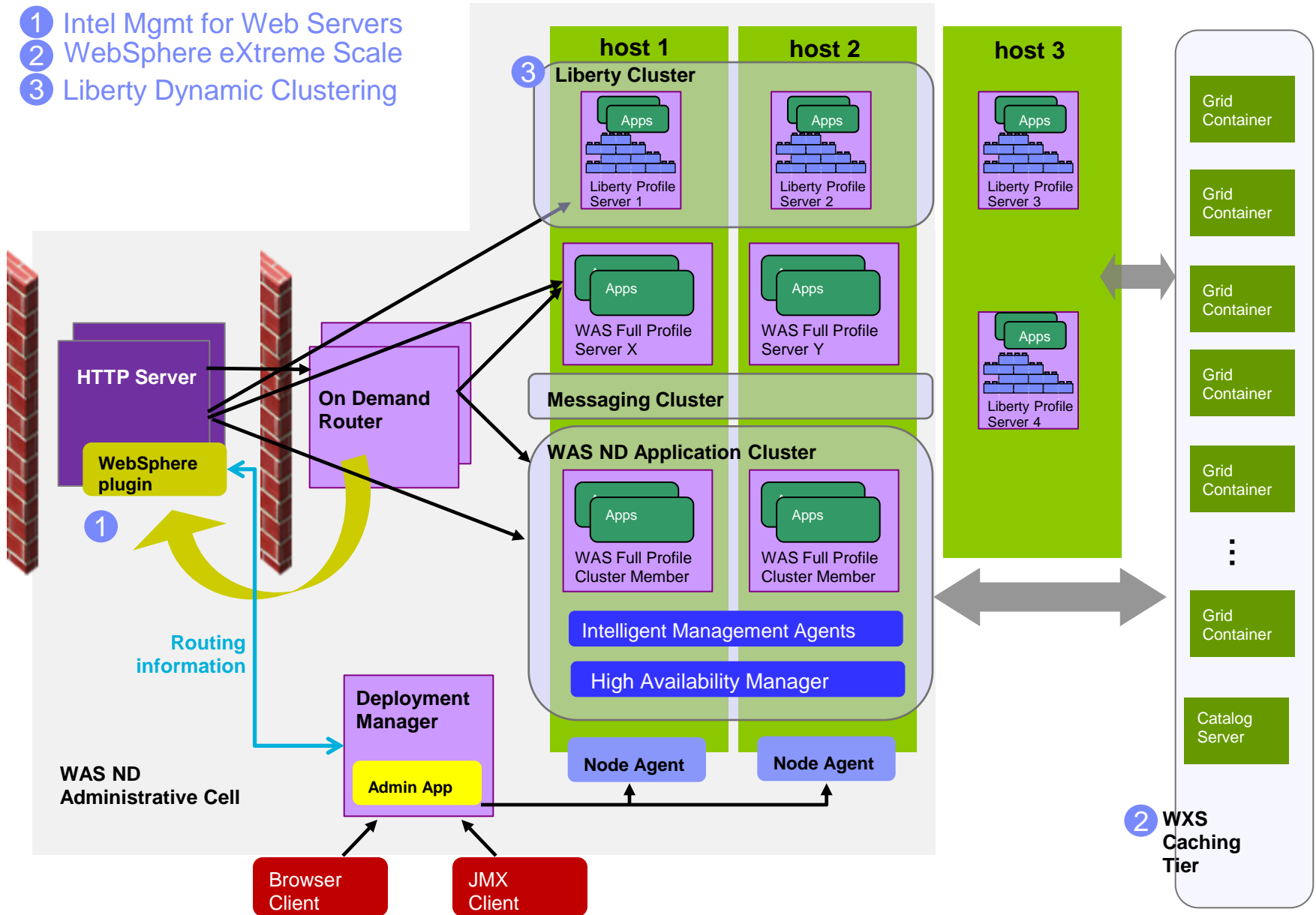
Up to **90%** fewer outages

Source: Based on 60+ WebsSphere Virtual Enterprise Value Assessments done to date by IBM for real customers

WAS V8.5.5 Operational Views



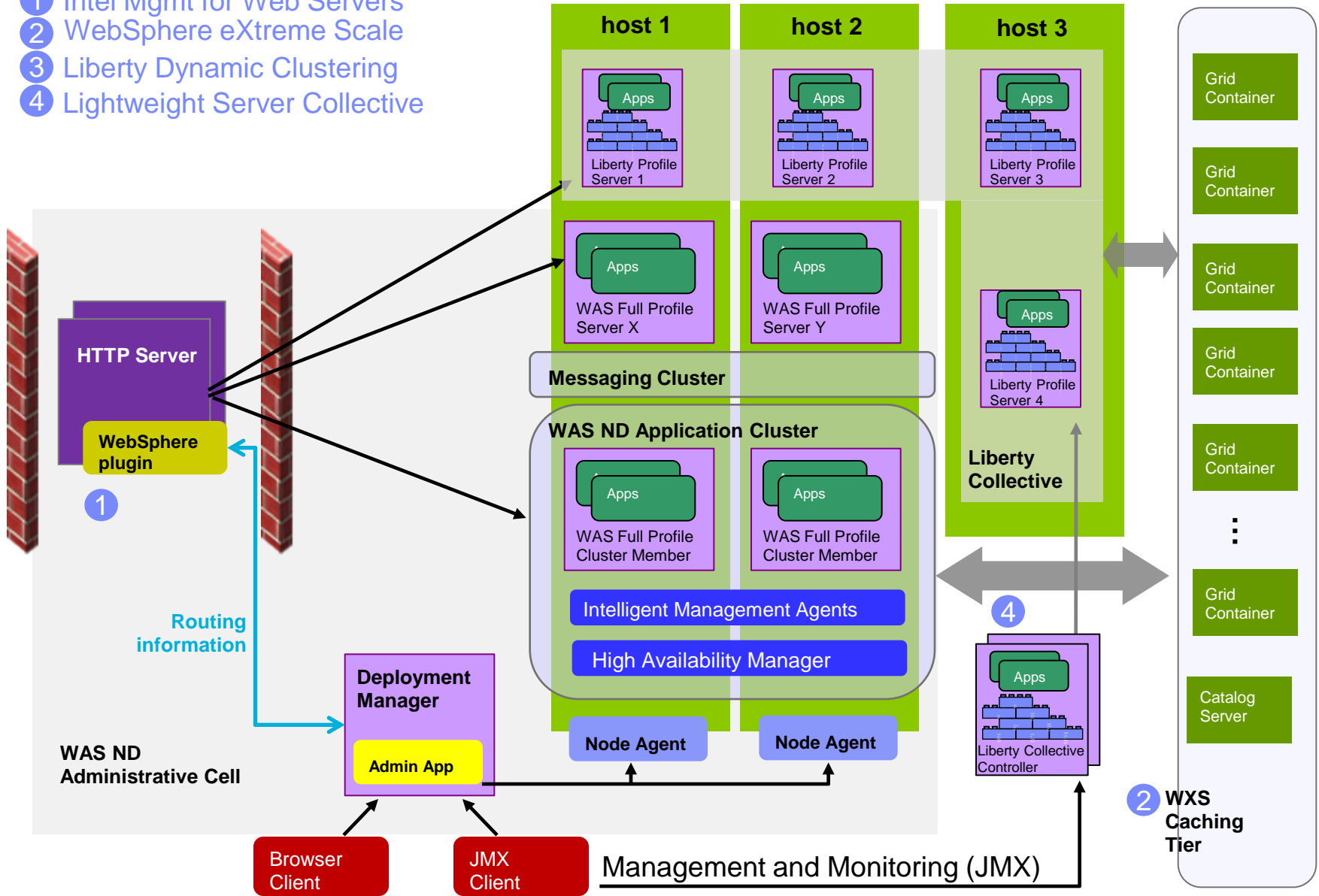
- 1 Intel Mgmt for Web Servers
- 2 WebSphere eXtreme Scale
- 3 Liberty Dynamic Clustering



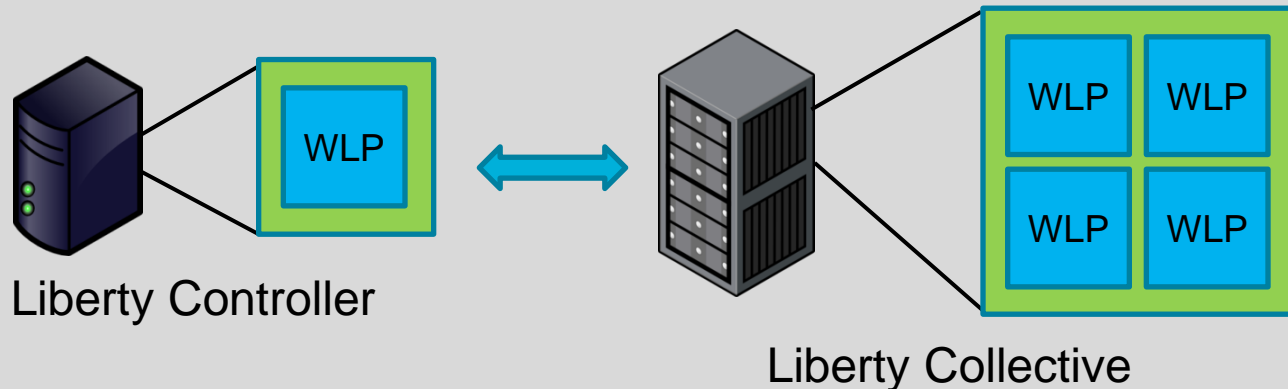
WAS V8.5.5 Operational Views



- 1 Intel Mgmt for Web Servers
- 2 WebSphere eXtreme Scale
- 3 Liberty Dynamic Clustering
- 4 Lightweight Server Collective



v8.5.5: Liberty Collective

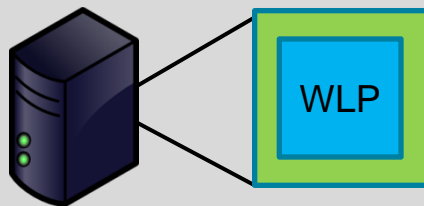


- **AUTOMATED**
Less input required to establish a secure configuration.
- **FASTER**
No Profile Management tool.
- **EASIER**
Easier to script sparse config; many languages available.
- **SELF-CONTAINED**
Servers can be zipped up, moved to new location, and joined quickly.
- **AGENT-LESS**
No Node Agents. Less cost on system resources.
- **DECENTRALIZED**
Master copy of a server's configuration is owned by each server



blank slate

Liberty Collective



Liberty Controller

Three basic actions:

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

`wlp/usr/servers/{controller}/server.xml`

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

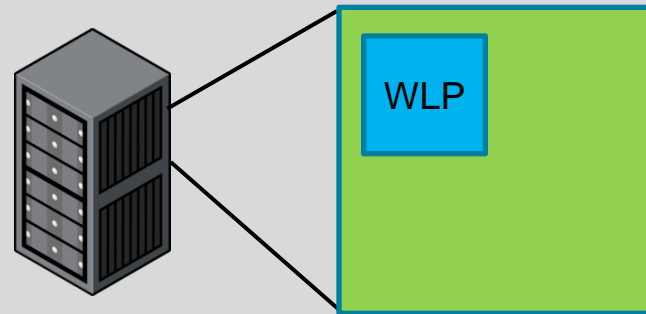


optional feature added

Liberty Collective

Two basic actions:

1. `wlp/bin/server create {member}`
2. `wlp/bin/collective join {member} ...`



Liberty
Collective

`wlp/usr/servers/{member}/server.xml`

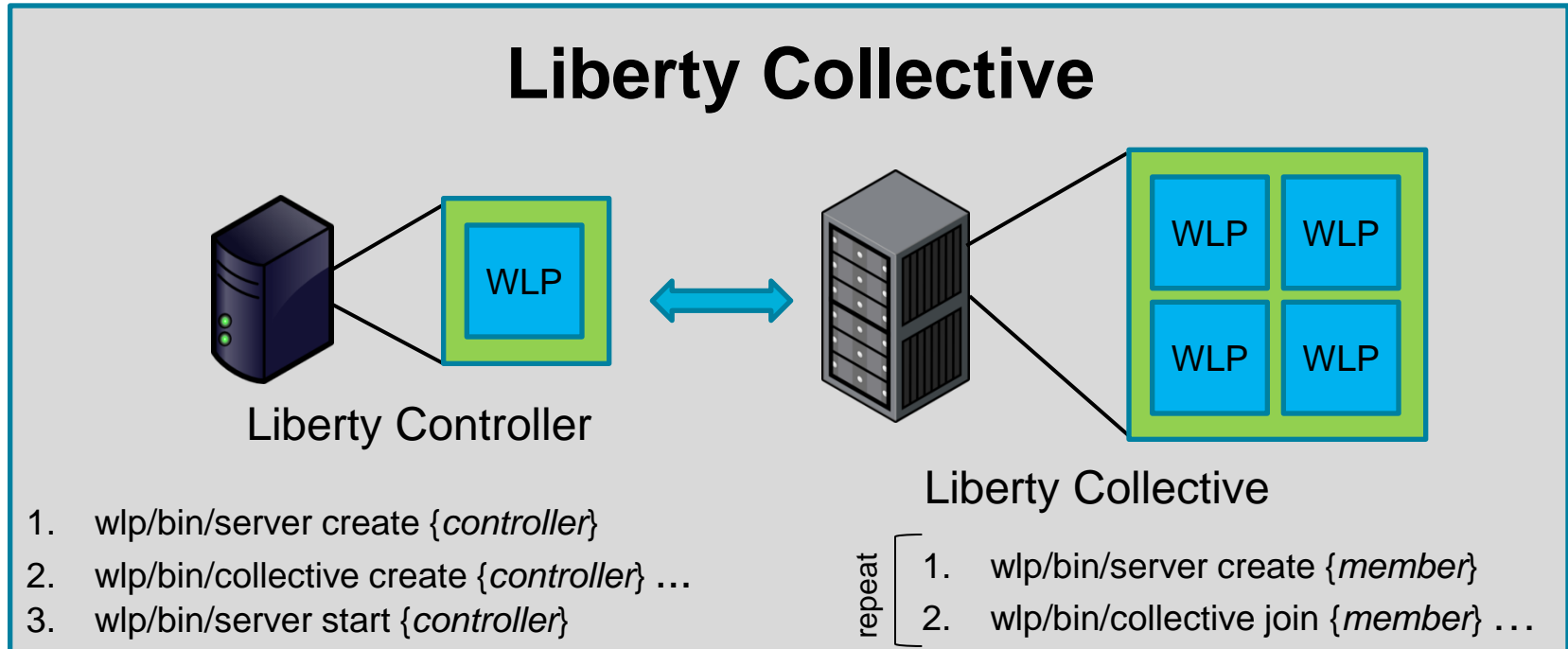
optional feature(s) added



```
<featureManager>
```

```
  <feature>collectiveMember-1.0</feature>  
  [ <feature>clusterMember-1.0</feature> ]
```

```
</featureManager>
```

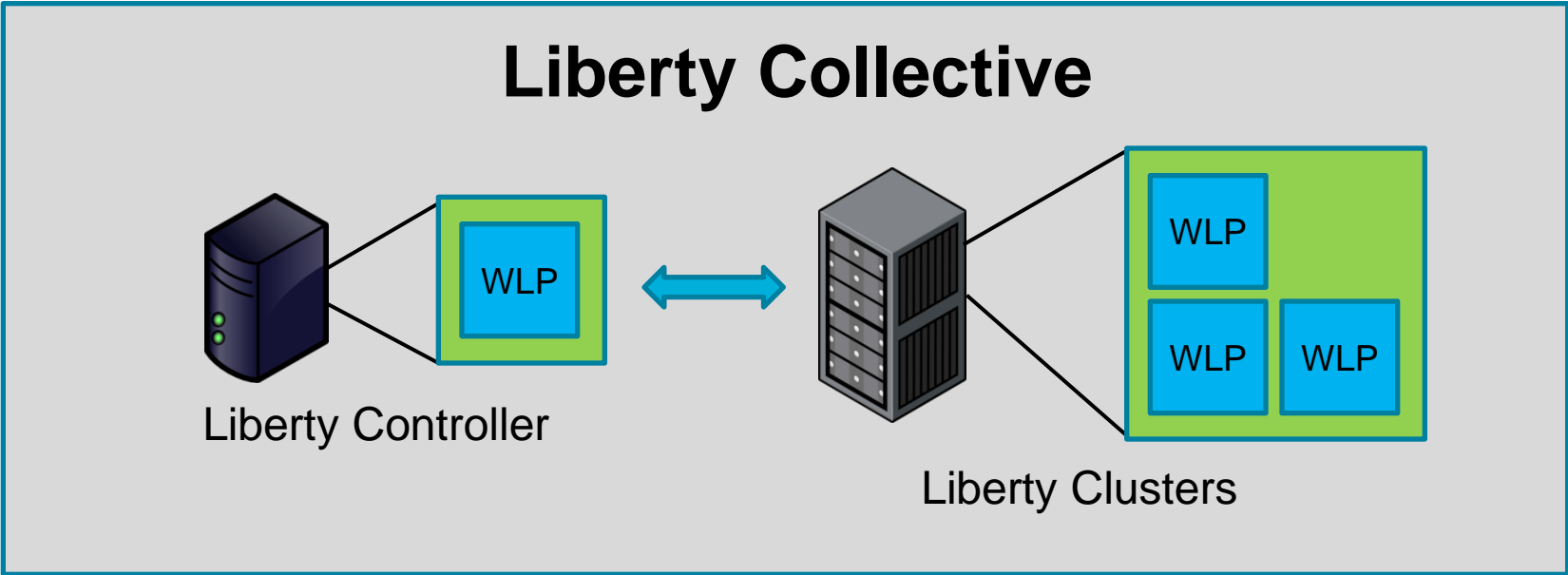



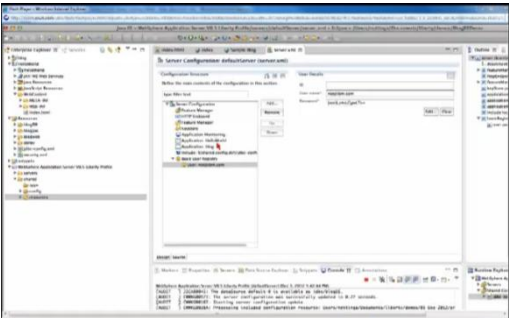
server.xml

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

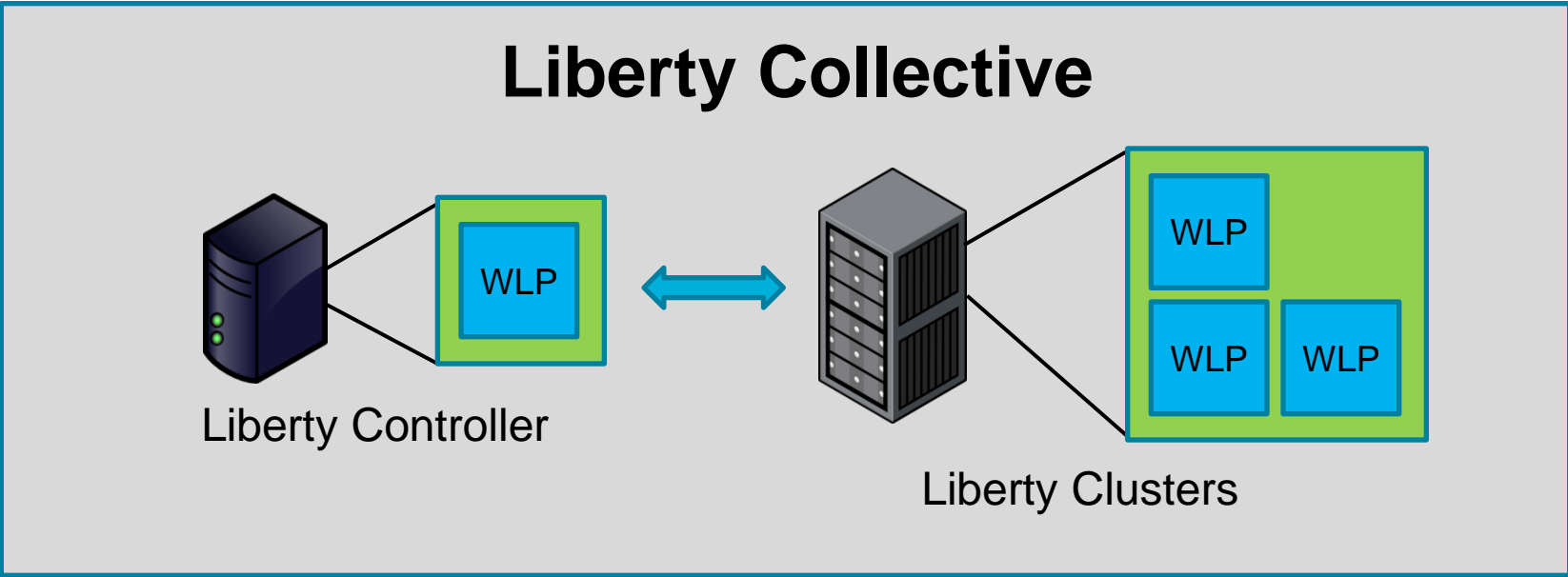
server.xml

```
<featureManager>  
  <feature>collectiveMember-1.0</feature>  
  [ <feature>clusterMember-1.0</feature> ]  
</featureManager>
```





WebSphere Developer Tools



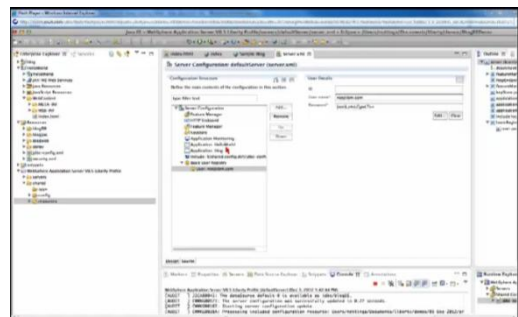
Liberty Collective – Push Out Members with File Transfer MBean



admin client
(e.g. Jython)

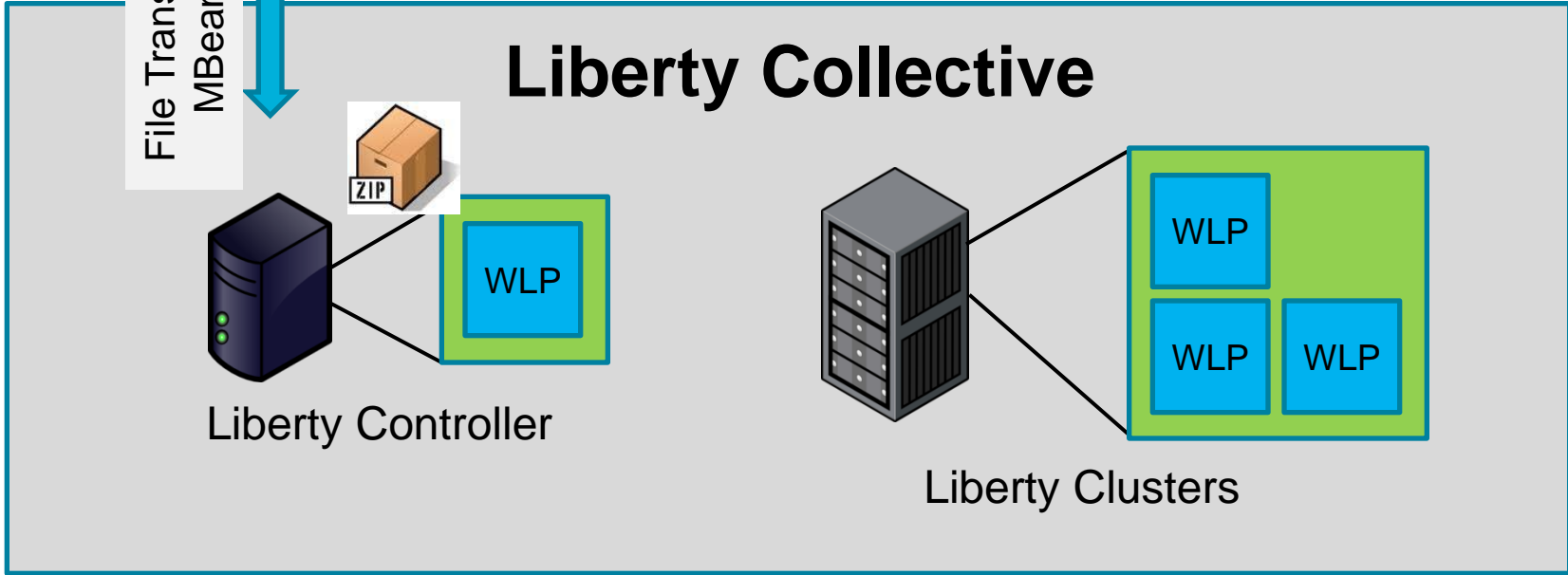
```
Administrator Command Prompt - jython
Microsoft Windows [Version 6.0.6002]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\IBM_ADMIN>jython
C:\Users\IBM_ADMIN>set JYTHON="C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3"
C:\Users\IBM_ADMIN>set CLASSPATH="C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3\realconnector.jar"
C:\Users\IBM_ADMIN>cd "C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3"
C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3>jython
jython 2.5.3 (2.5.c5690f0d34+, Aug 13 2012, 14:48:36)
[IBM] on [IBM Corporation] on Java 5.0
Type "help", "copyright", "credits" or "license" for more information
>>>
```



WebSphere Developer Tools

File Transfer MBean



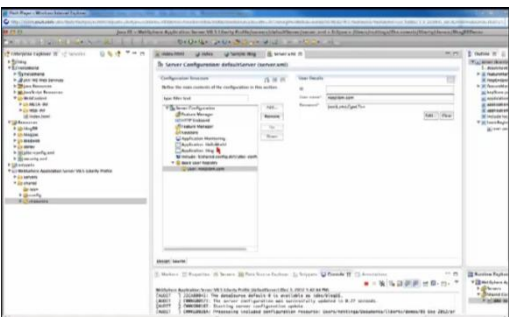
Liberty Collective – Push Out Members with File Transfer MBean



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(e.g. Jython)

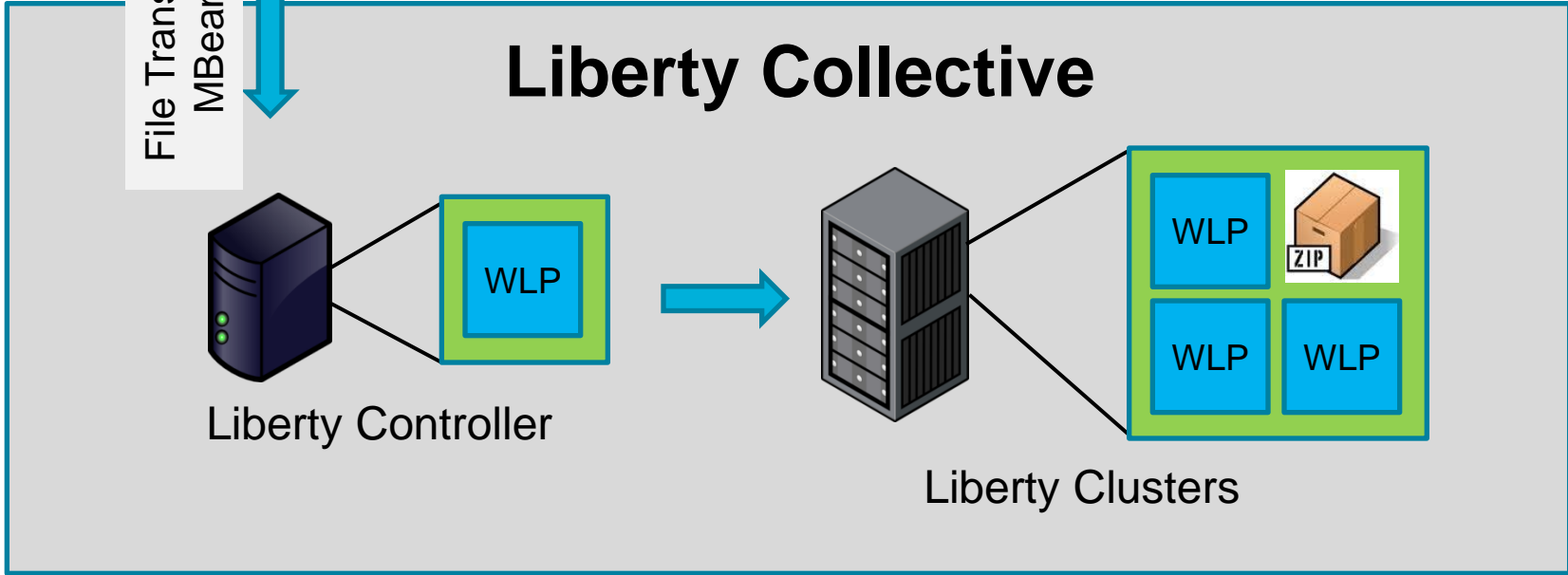
```
Administrator: Command Prompt [jython]
Microsoft Windows [Version 6.0.6002]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\IBM_ADMIN>jython
C:\Users\IBM_ADMIN>set jython"C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3"
C:\Users\IBM_ADMIN>set CLASSPATH=C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3\realConnector.jar
C:\Users\IBM_ADMIN>cd "C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3"
C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3>jython
Jython 2.5.3 (2.5.c5609f0d64+, Aug 13 2012, 14:48:36)
[IBM] 08 Jul 2014 [IBM Corporation] on Java 5.0
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```



WebSphere Developer Tools

File Transfer
MBean



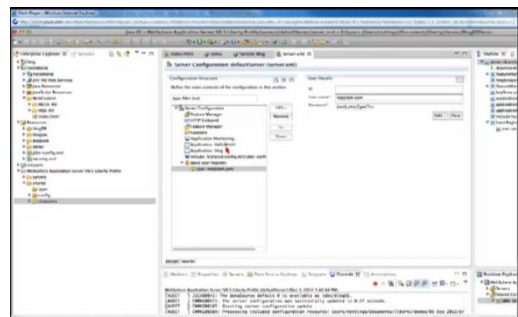
Liberty Collective – Push Out Members with File Transfer MBean



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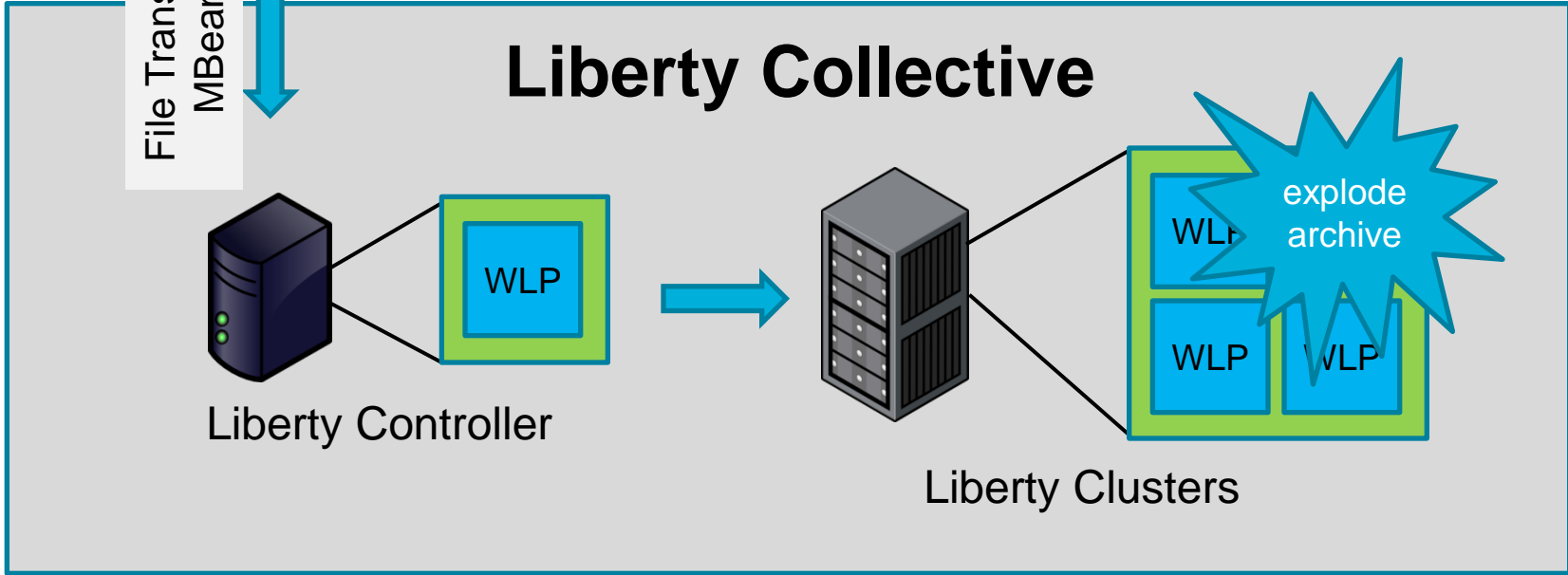
```
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[IBM] 08 Jul 2014 [IBM Corporation] on Java 5.0
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```



WebSphere Developer Tools

File Transfer MBean



Liberty Collective – Push Out Members with File Transfer MBean



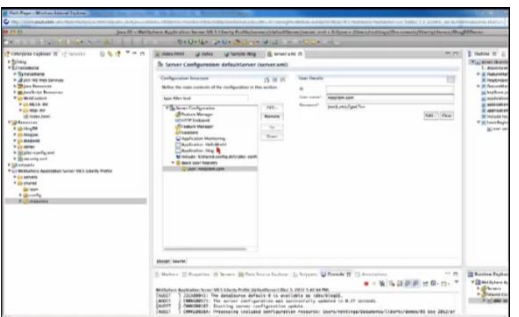
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Copyright (c) 2009 Microsoft Corporation. All rights reserved.

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```

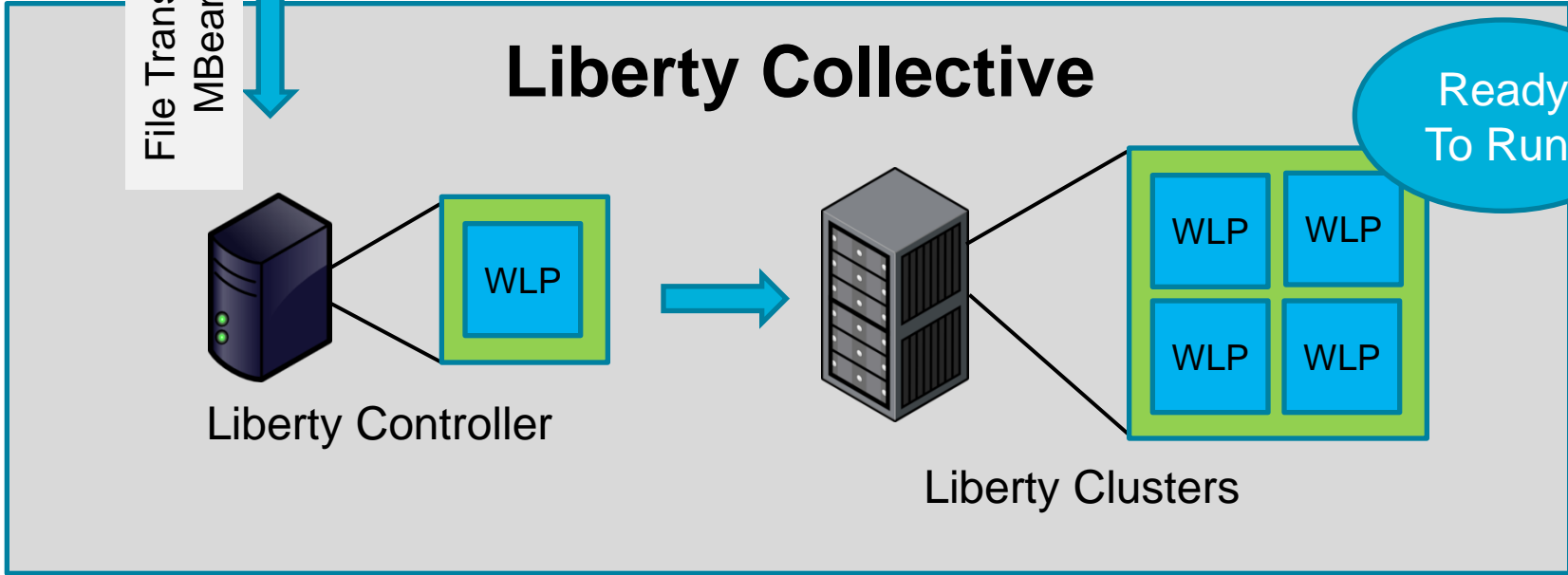


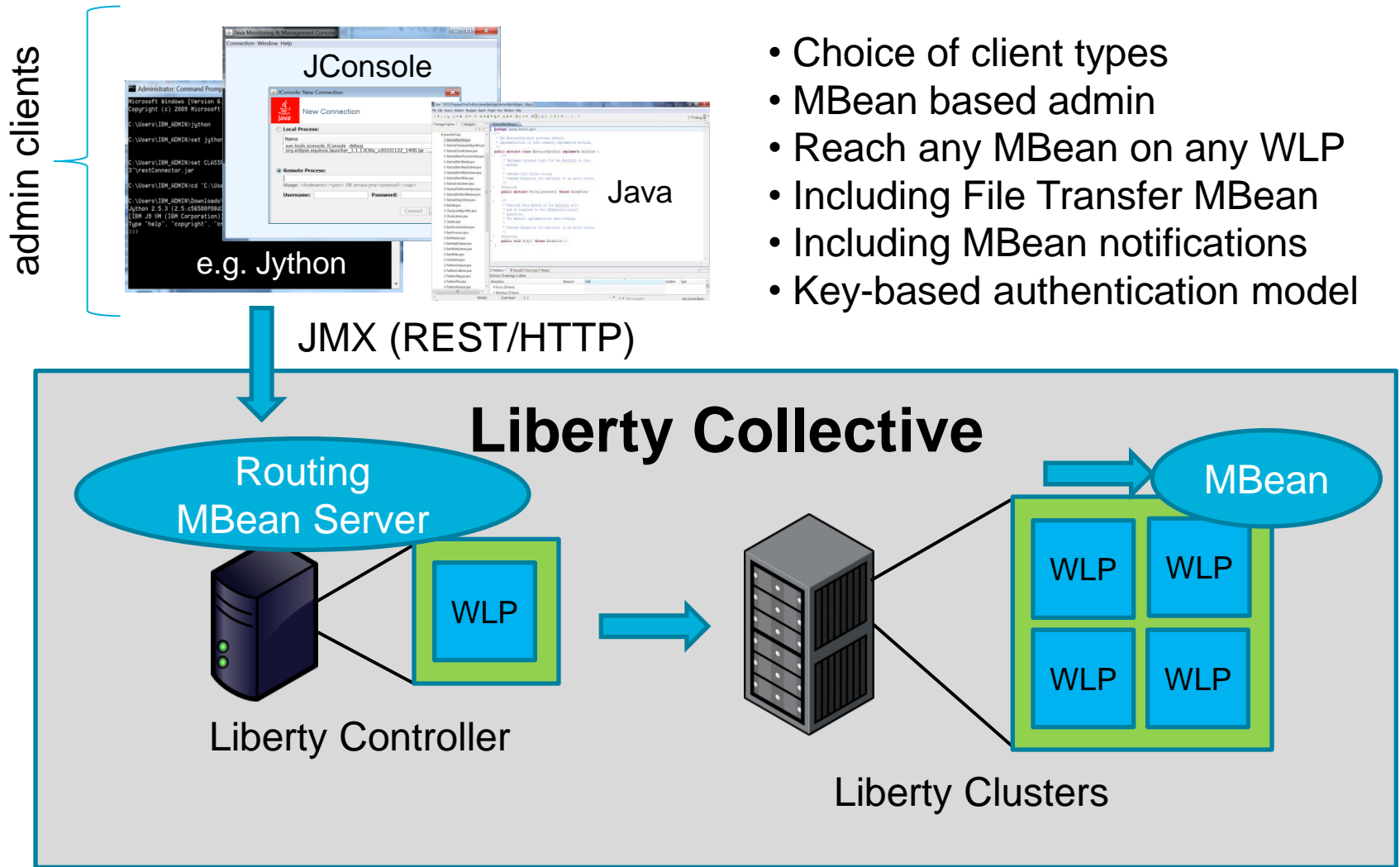
Liberty Server
Package



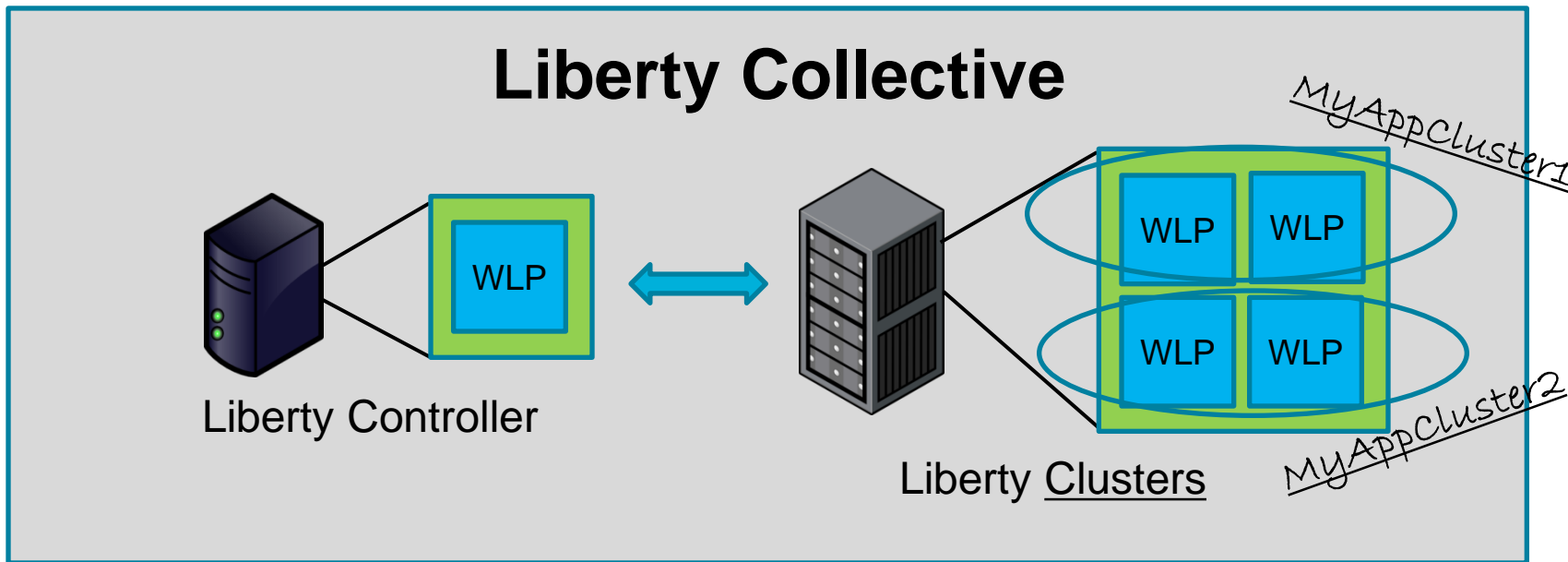
WebSphere Developer Tools

File Transfer
MBean





- Collaborating Liberty Profiles by intent
- Homogenous by best practice
 - Common Configuration
 - Installed Applications
- Part of a Liberty Collective by design
- Accessible by “Group” Operations
 - Start/stop cluster
 - List clusters/list members
 - Get cluster status
 - Generated merged HTTP plug-in config
- Comprised of independent members
 - Members can *STILL* be managed individually .
 - Members can *EASILY* be moved into or out of cluster.



Add cluster feature:

Name the cluster:

server.xml

```
<featureManager>  
  <feature>collectiveMember-1.0</feature>  
  <feature>clusterMember-1.0</feature>  
</featureManager>  
<clusterMember name="MyAppCluster1"/>
```

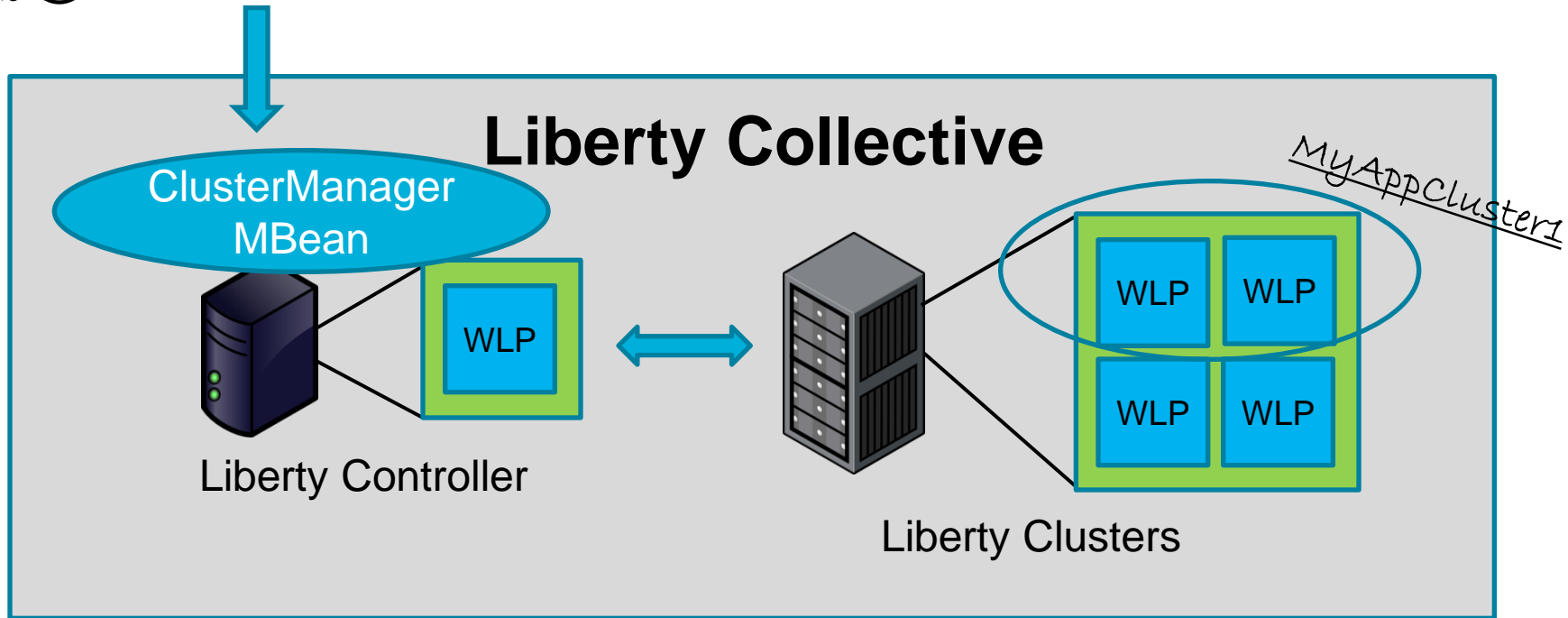
admin client
(e.g. Jython)

```
Administrator: Command Prompt - jython
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Copyright (c) 2009 Microsoft Corporation. All rights reserved.

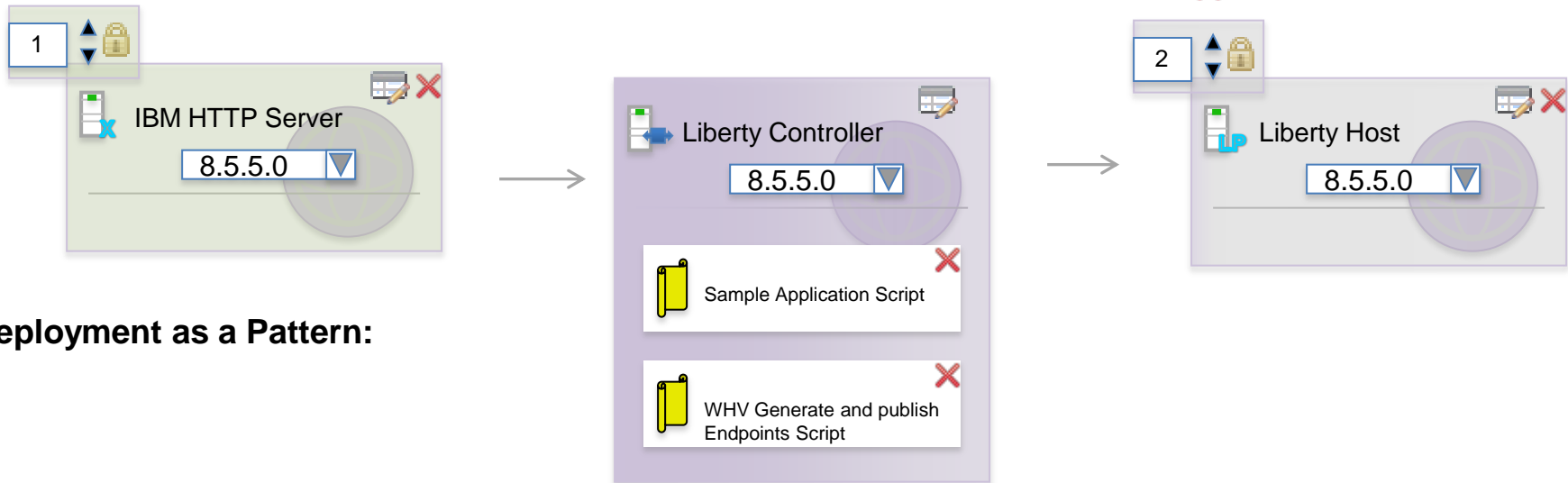
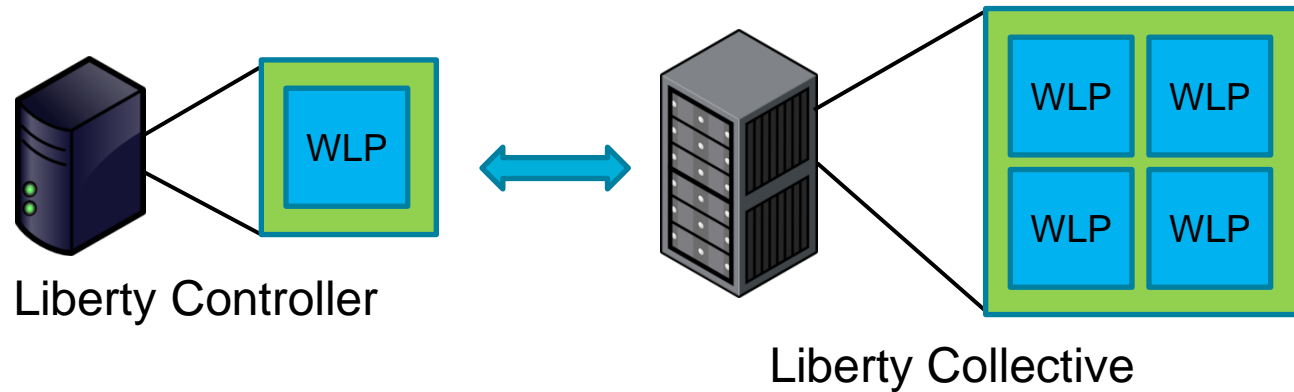
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C:\Users\IBM_ADMIN\Downloads\jython\jython2.5.3>jython
Jython 2.5.3 (2.5.c5609f0d34*, Aug 13 2012, 14:48:36)
IBM or all IBM Corporation) on Java 5.0
Type "help", "copyright", "credits" or "license" for more information
>>>
```

Operations:

1. Start/stop cluster (e.g. start MyAppCluster1)
2. List clusters/list members
3. Get cluster status
4. Generated merged HTTP plug-in config



WAS Liberty Collective Patterns



Deployment as a Pattern:

- Quickly create and deploy high-density virtual system patterns:
 - Liberty Controller
 - Scalable number of Liberty Hosts
- Can be tuned and managed in exactly the same way as a non-patterned deployment.



Codename: BlueMix



www.bluemix.net

Develop,
Build, Test,
Deploy,
Repeat

 Codename: BlueMix

[DOCS](#)

[LOGIN](#)

Codename: BlueMix is now open.

A platform where developers can act like kids in a sandbox - except this box is enterprise-grade.

[Join us in beta](#)



Boilerplates

JAVA Web Starter

Mobile Backend Starter

NODE JS
WEB STARTER

JAVA+DB
Web Starter

- IBM Created
- IBM Certified
- Community

Runtimes

.java
liberty

Liberty for Java™
IBM Created

.js

Node.js
IBM Created

.rb
on rails

Ruby on Rails
Community

.rb
sinatra

Ruby Sinatra
Community

Services

BLUAcceleration
IBM Created

Cloud Integration
IBM Created

Cloudant
IBM Created

CloudCode
IBM Created

DataCache
IBM Created

Cloud Foundry



IBM BlueMix



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 runtime
- Integrated into IBM BlueMix
- Includes IBM Java 7
- Uses Cloud Foundry extensible buildpack architecture
- Free for development use on Cloud Foundry V2 based PaaS
- 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://www.ibm.com/bluemix.net](http://www.ibm.com/bluemix)



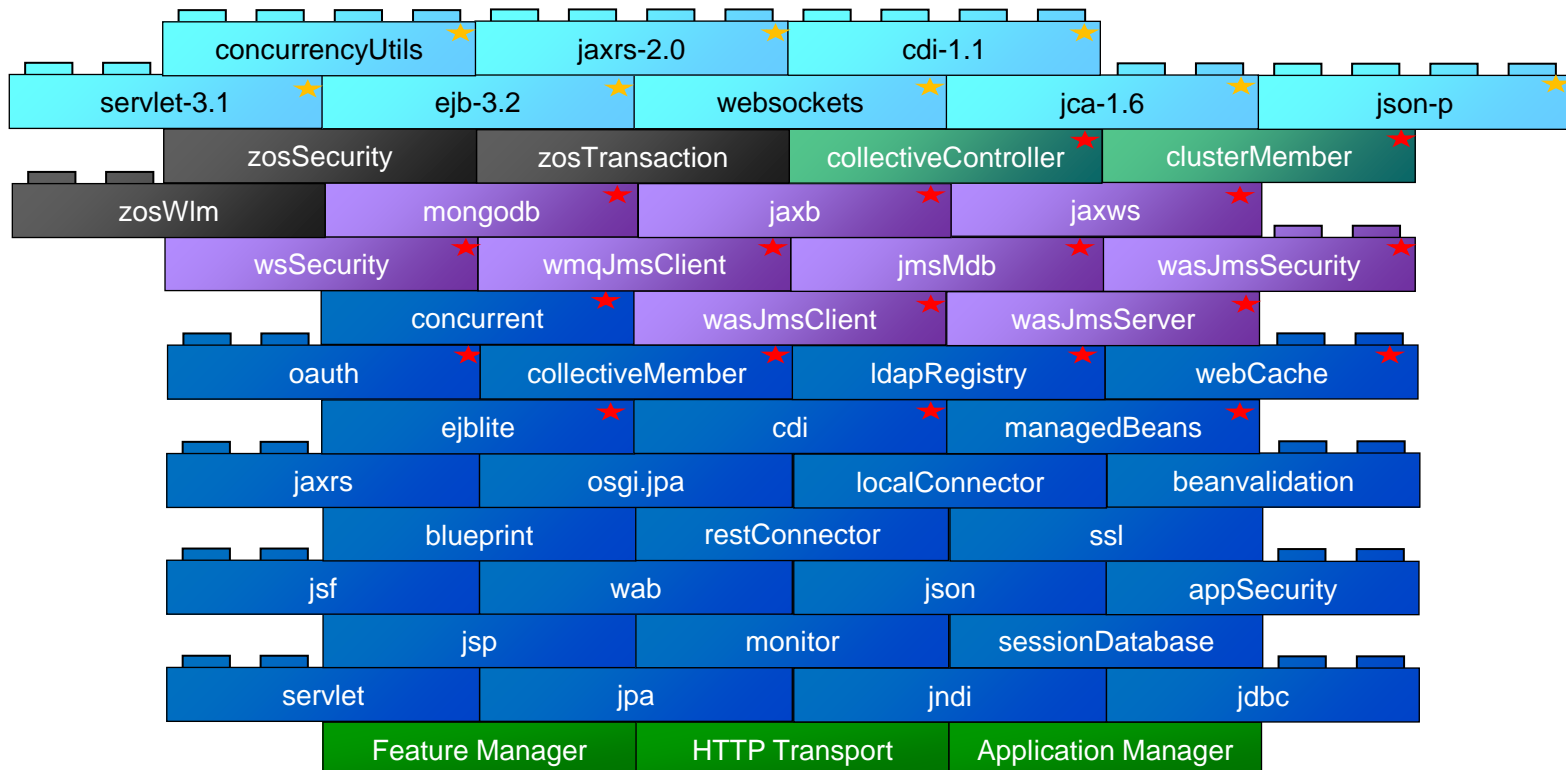
Looking Ahead



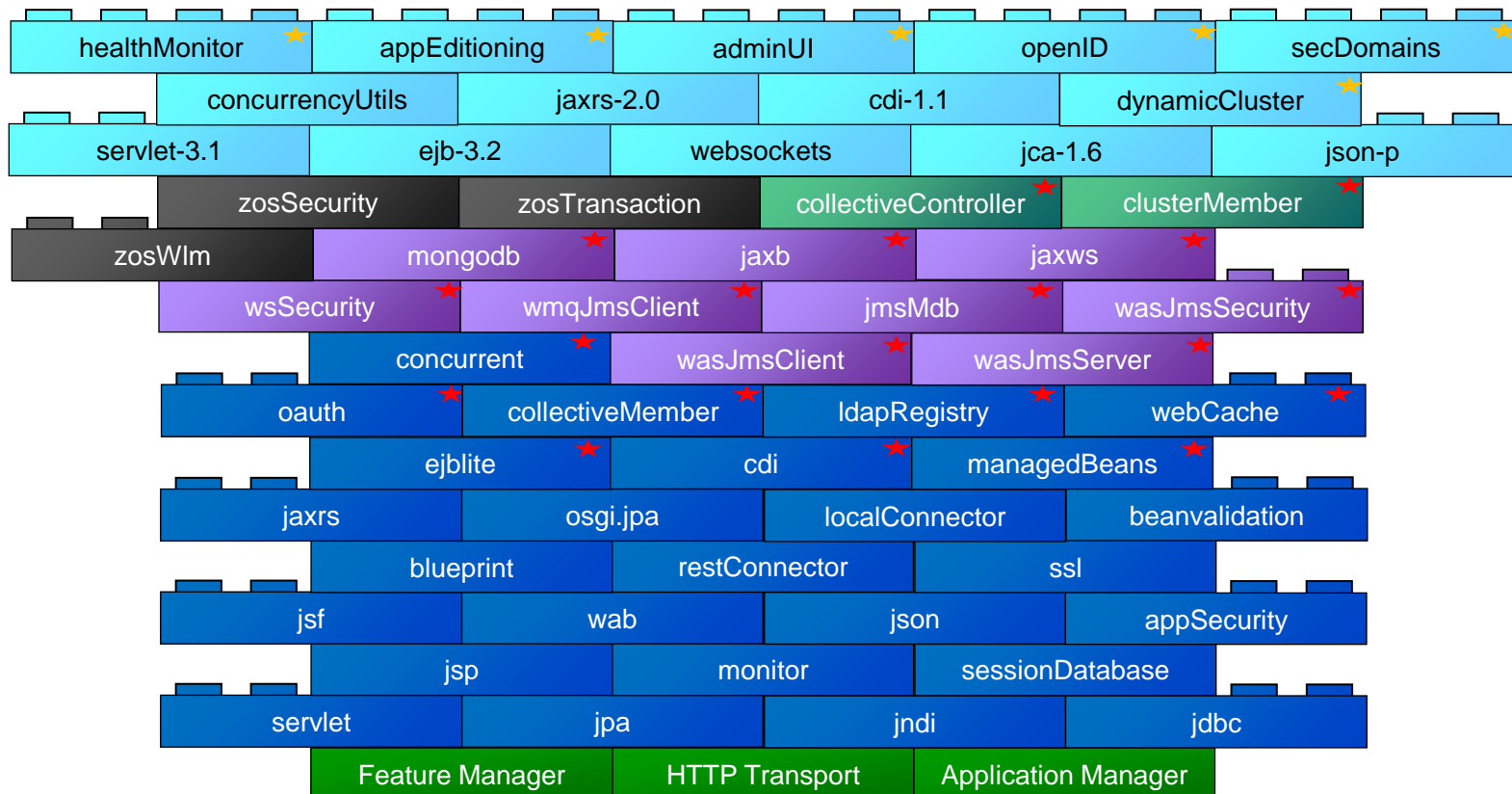
We continue to move forward and look for early feedback.

- Java EE7 features
 - Java EE7 capabilities are being introduced through monthly updates to the WAS Beta, starting with:
 - Web Sockets
 - Java EE 7 Concurrency API – configure managed contexts to be available on asynchronous threads
 - Non-persistent timers for EJB 3.2
- New Liberty profile feature for Java EE Connector Architecture (JCA) 1.6
 - Install and configure JCA resource adapters for connectivity to back-end systems
- Open ID 2.0 authentication
 - Configure the server to act as an Relying Party to an Open ID Provider in web single-sign on
- WebSphere Application Server Developer Tools updates which provide full integration with the WAS Beta runtime and Eclipse Kepler support
- Visit WASdev for more details and to download the new runtime features and tools:
<https://www.wasdev.net>

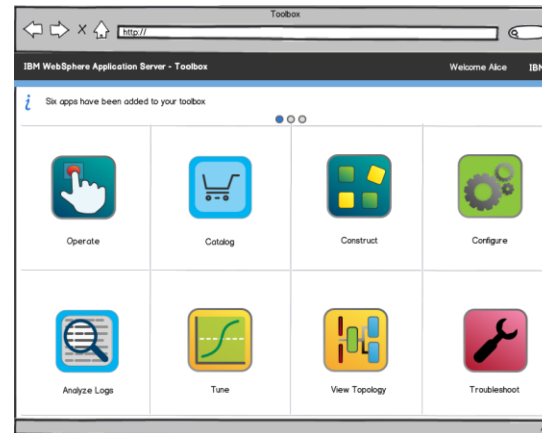
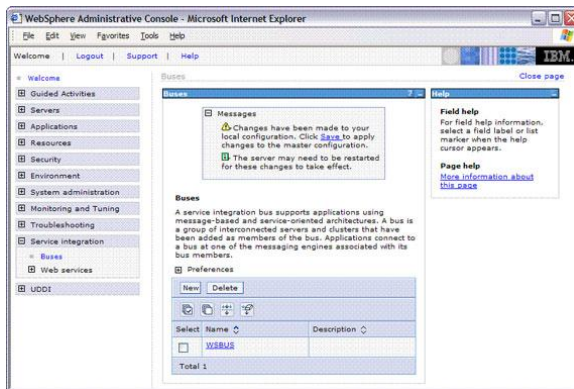
- The composable WAS Liberty Profile enables us to deliver new Java EE 7 features into the WAS Beta as soon as they are ready
 - Look out next for:



- Additional administrative capabilities under consideration:



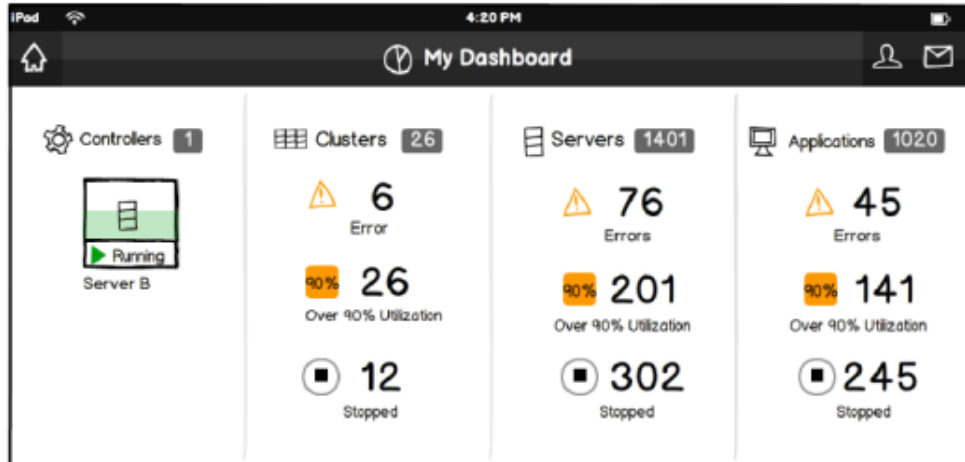
- Evolve from one-size-fits-all console
- Lightweight, task-oriented applications / app store approach with customizable toolbox for “right-sized” UI per user / device
- Tech Preview GUI function
 - view/start/stop WAS Liberty Profile servers and applications



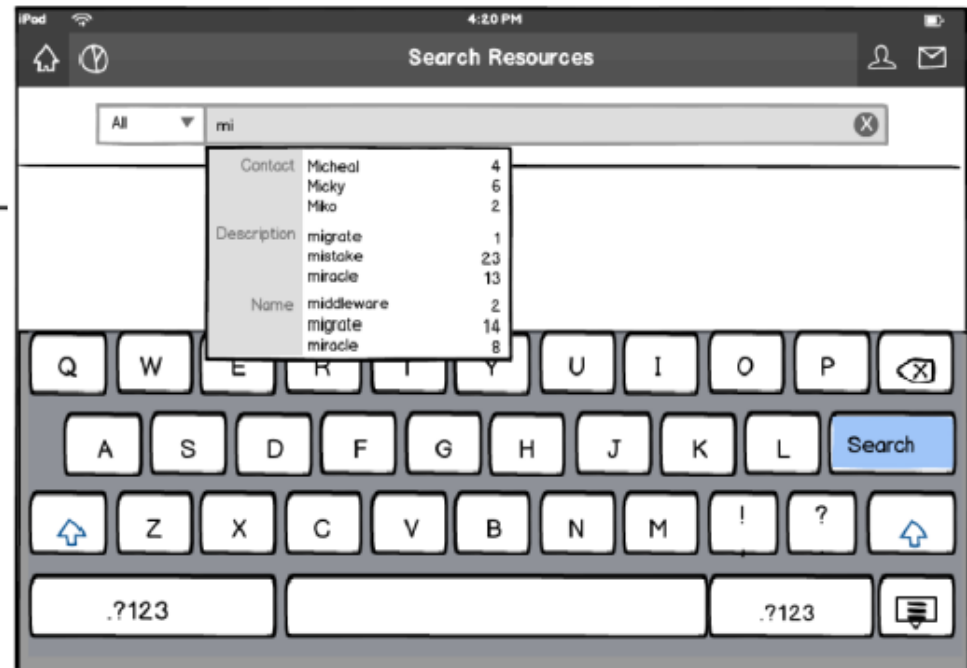
<http://wasdev.net> → Downloads → Liberty Profile Admin UI Tech Preview

<https://www.ibm.com/ibmdw.net/wasdev/downloads/liberty-profile-admin-ui-tech-preview/>

Resource Exploring & Searching



Pull down to search resources and add more widgets



Resource Details



4:20 PM
All Clusters

26 Total 3 Warning 1 Error 15 Stopped 11 Running

Cluster A 90% utilization

Cluster A
Running
Description
ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip

Cluster A Utilization

Servers 100 90 Running 2 Warning

Applications 65 64 Running 2 Warning

Contacts

Amy amy@bm.com 1234567890

Miko miko@bm.com 1234567890

4:20 PM
All Clusters

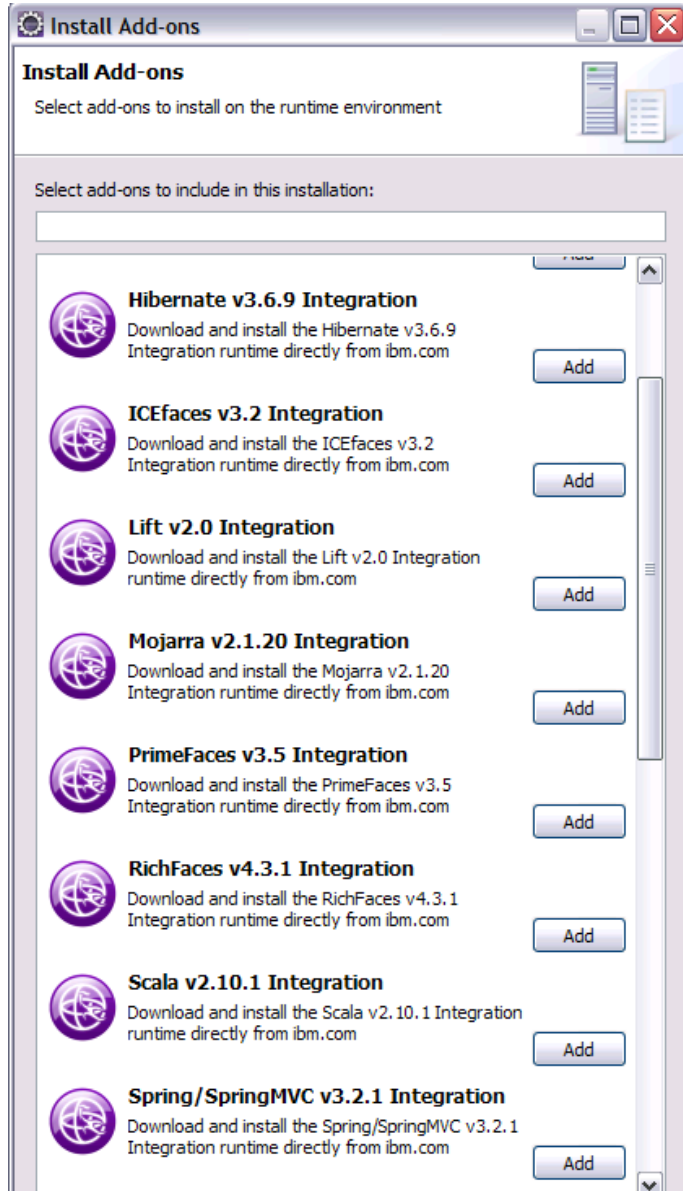
26 Total 3 Warning 1 Error 15 Stopped 11 Running

2 Selected Select All Select None

Cluster A Cluster B Cluster C

Stop selected clusters

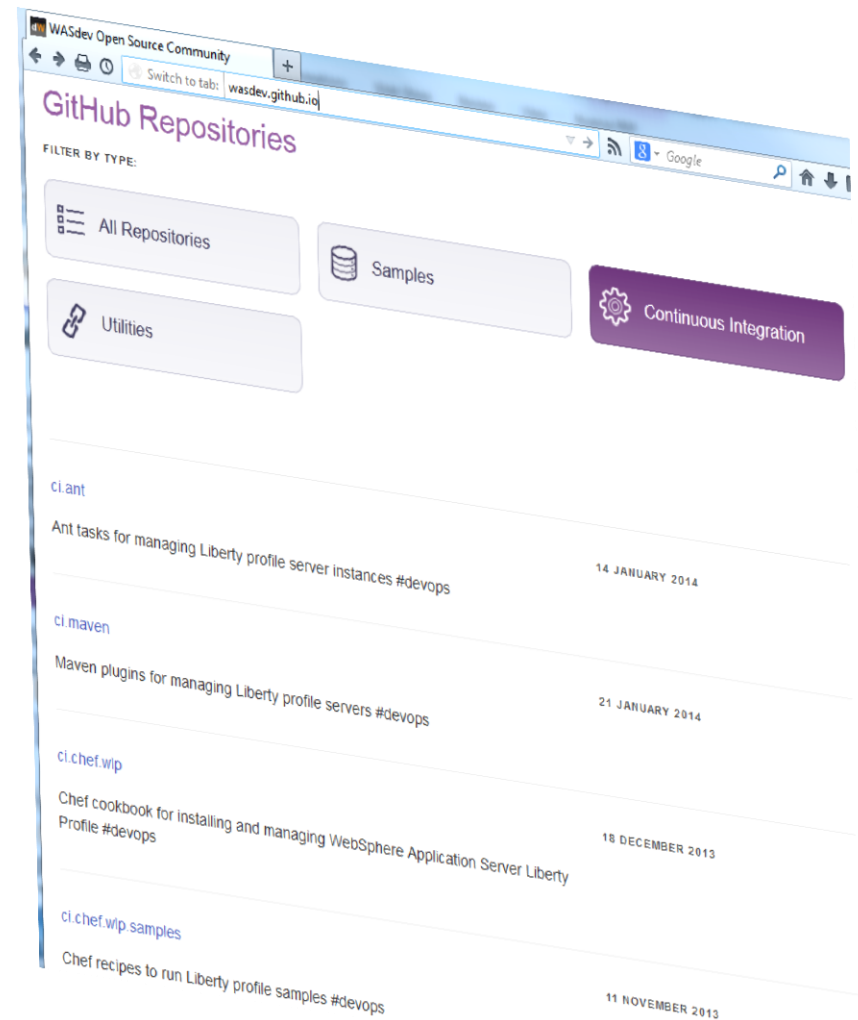
Stop



- An **online repository** to deliver **Liberty platform extensions**
- Content includes:
 - Open source project integration
 - Individual Liberty features
 - Samples
- Enables more **fine-grained**, early access content, simplest possible **integration with external open source**
- Install using Liberty command-line tools or WDT/RAD



- WASdev Open Source community extension to the WASdev developer community
 - <http://wasdev.github.io>
 - <https://github.com/wasdev>
- GitHub - 3.5M users, 6M repos
- Apache License, Version 2.0
- Resulting binaries hosted on Liberty Repository
 - <https://www.ibmmdw.net/wasdev/repo>



Business value delivered with “fit for purpose” application servers, flexible and extensible platforms, leading edge features & developer focus



Developers – Lightweight developer friendly tools

- **Fast and free download** of WAS runtime for testing on developer’s desktop along with developer’s tools
- Simple configuration and rapid server restart for testing



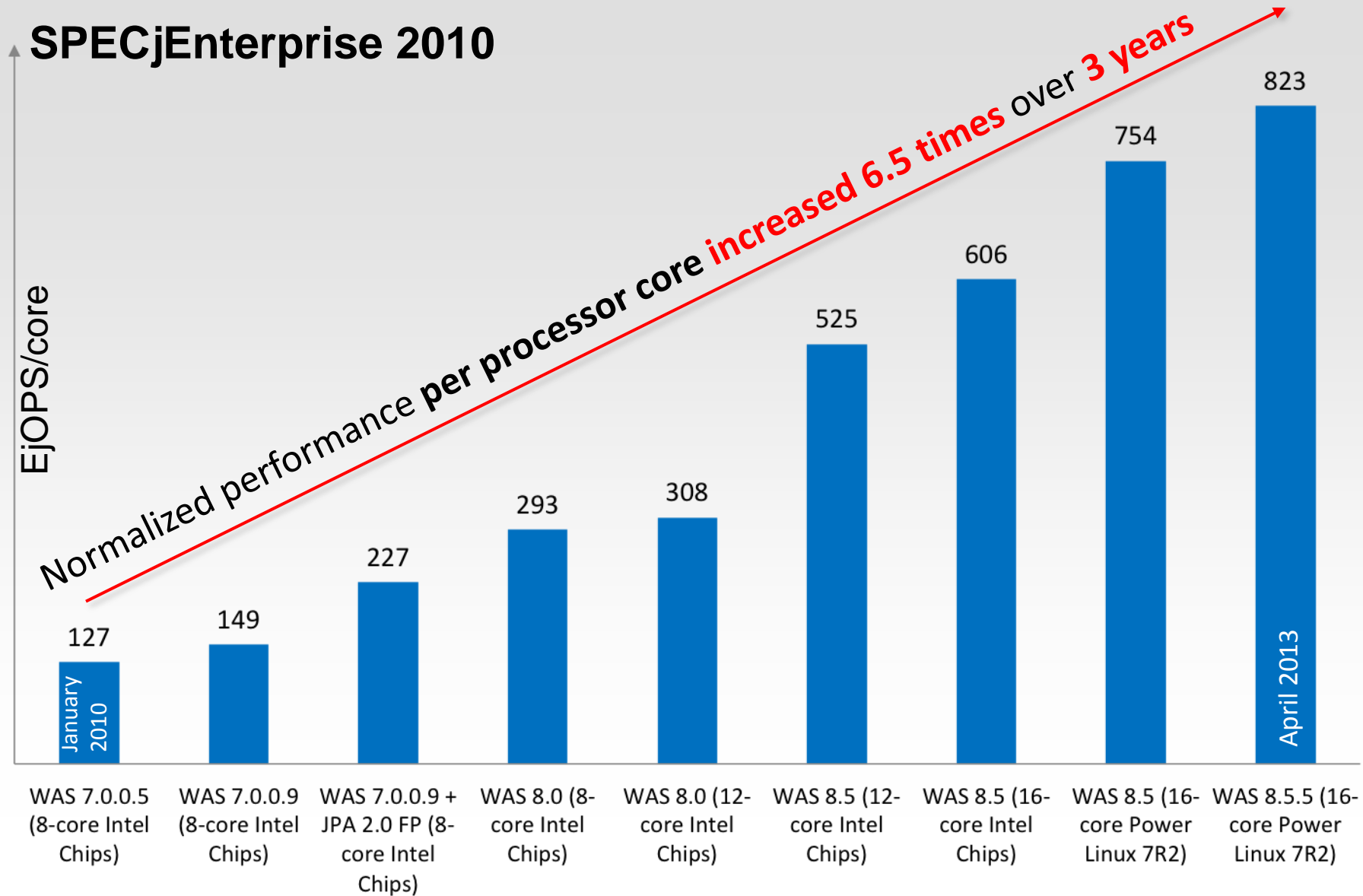
Enterprises – “Fit for purpose” application servers

- Develop, test, and run on one common application platform
- Highly resilient application environments to meet peak demands
- Leverage elastic caching to improve performance and QoS

Lightweight profile for fast development and non-critical apps. Resiliency and scaling when your apps need it !

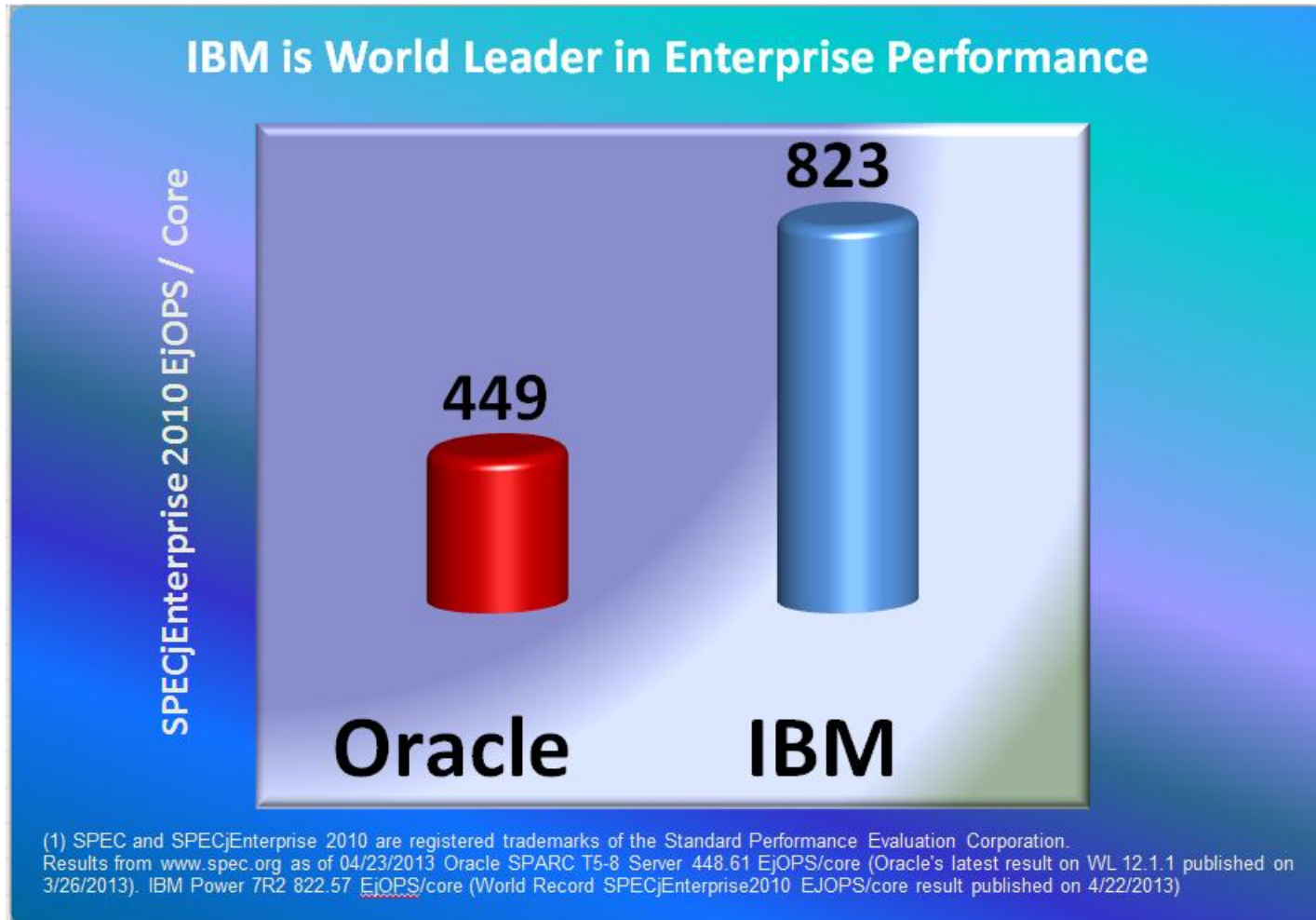


WebSphere release-to-release performance increases



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IBM is World Leader in Enterprise Performance



- IBM Middleware running on Power 7 beats Oracle Middleware running on SPARC T5 Servers by almost 2x on a per core level
- Comparison is based on latest WL 12.1.1 and WAS 8.5.5 SPECj Results

Liberty Startup and Footprint (TradeLite)



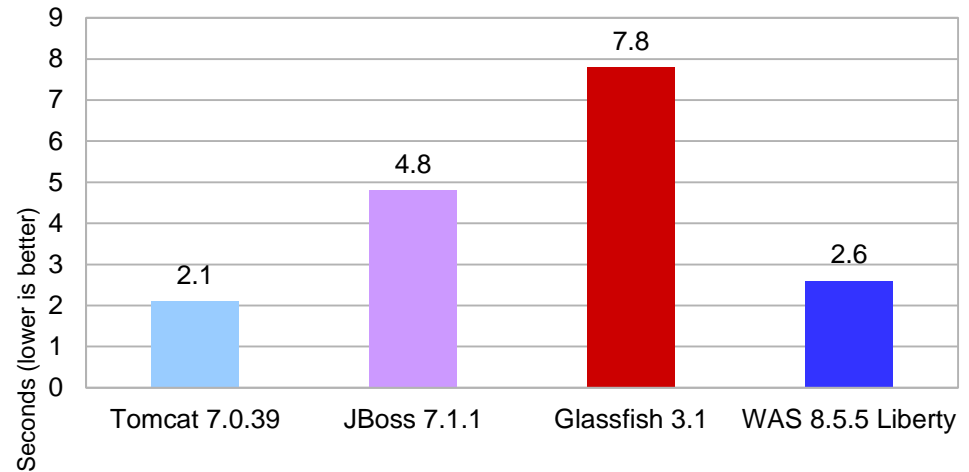
- ✓ WAS 8.5.5 Liberty Server startup and memory footprint is comparable to or faster than other lightweight App Servers
- ✓ TradeLite is a very simple benchmark...as the workload gets more complex the advantages with Liberty increase further...

System Configuration:

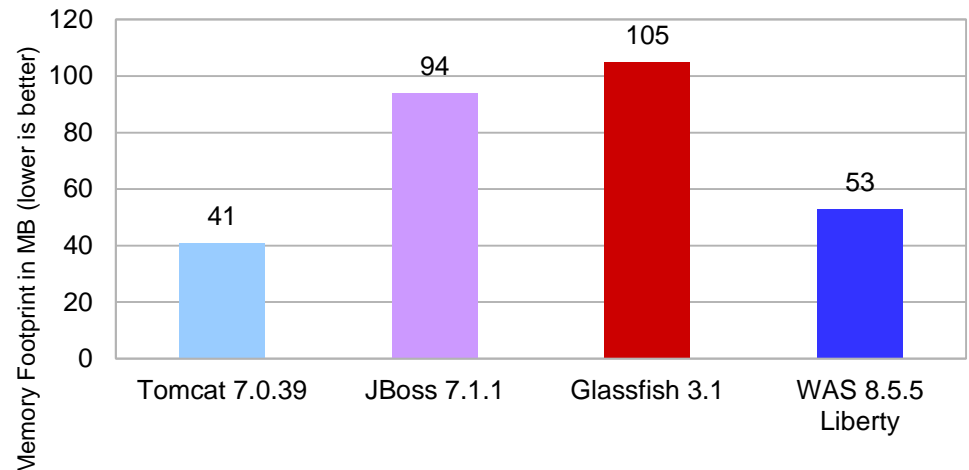
SUT: T60p Thinkpad Windows XP 32-bit Intel Core 2 Duo CPU @ 2.16 GHz [2 cores] 2MB L2, 2GB RAM
IBM JDK 7 sr4fp1ifix-20130404 used with Liberty
Oracle JDK 7 su21 used for other products

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Startup Time Comparison of Lightweight Servers (TradeLite)



Memory Footprint Comparison of Lightweight Servers (TradeLite)



Liberty Startup and Footprint (DayTrader3)



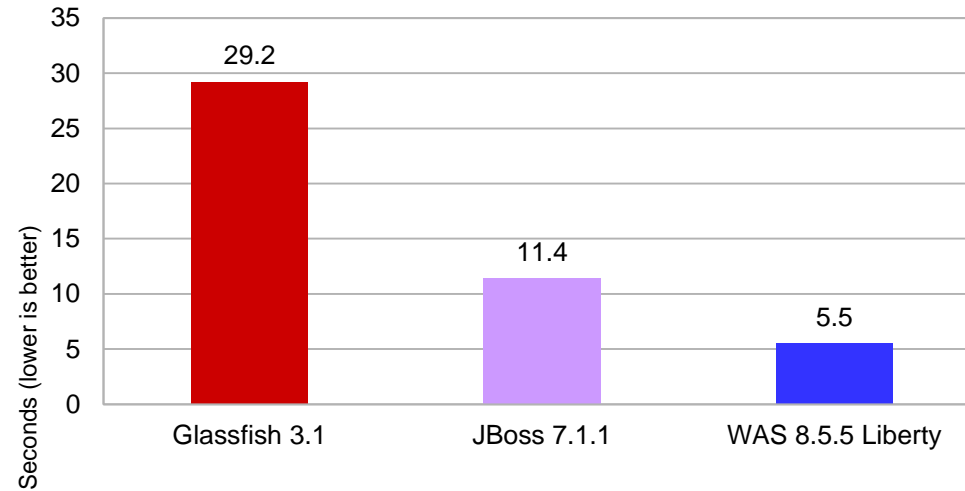
- ✓ DayTrader3 is an update of the Apache DayTrader benchmark for Java EE 6 using Web and EJB technologies, JPA and JMS.
- ✓ Liberty starts in half the time of JBoss and Glassfish is way behind.

Note: Note that Tomcat was excluded from this comparison because it does not have J2EE features needed to run the DayTrader3 application.

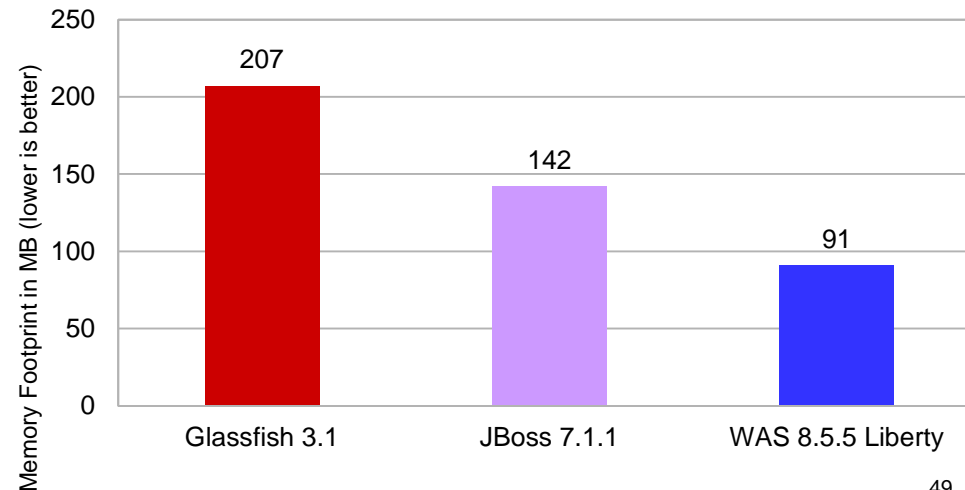
System Configuration:

SUT: T60p Thinkpad Windows XP 32-bit Intel Core 2 Duo CPU @ 2.16 GHz [2 cores] 2MB L2, 2GB RAM
IBM JDK 7 sr4fp1ifix-20130404 used with Liberty
Oracle JDK 7 su21 used for other products

Startup Time Comparison of Lightweight Servers (DayTrader3)



Memory Footprint Comparison of Lightweight Servers (DayTrader3)



Runtime Performance Comparison



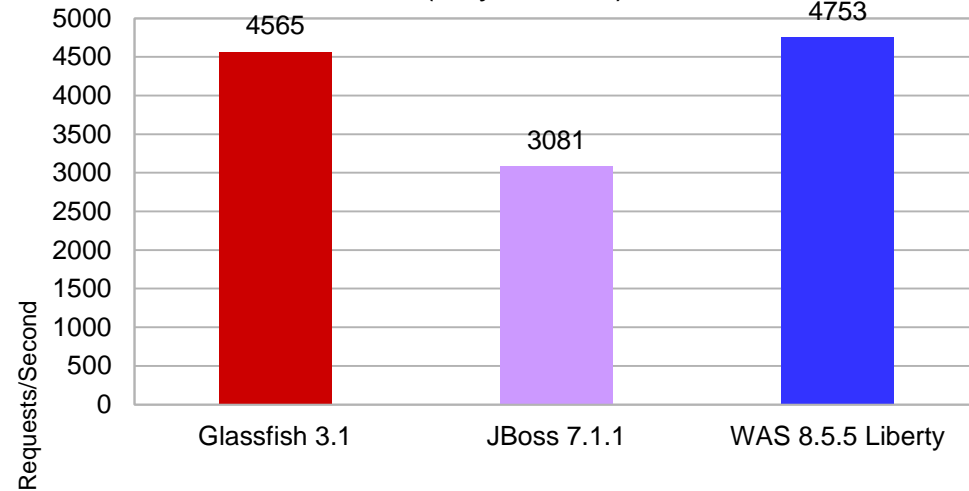
✓ Its not just about development environments – in production, WAS V8.5.5 Liberty outperforms the other servers too.

Note: Tomcat is compared using TradeLite since it does not provide the features to run the DayTrader3 workload.

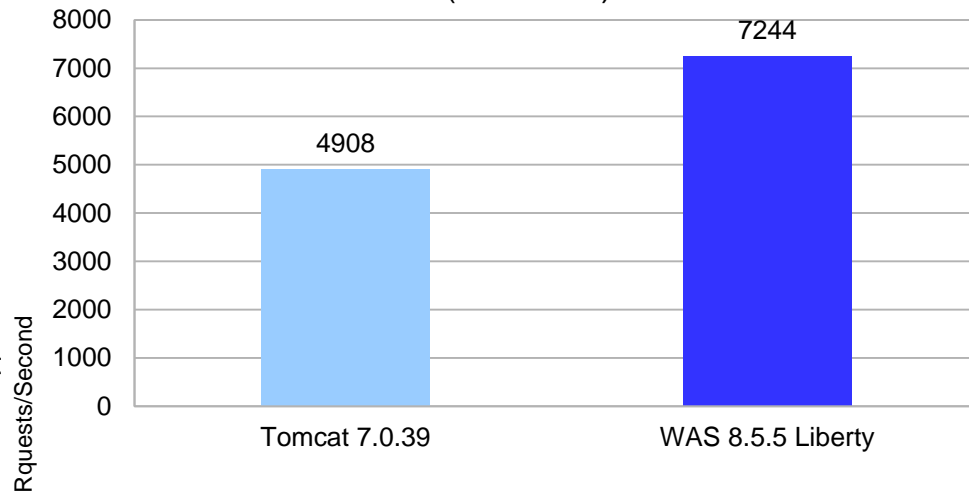
System Configuration:

SUT: Intel Westmere with 4 cores enabled, Linux 64-bit
IBM JDK 7 sr4 used with Liberty
Oracle JDK 7 su17 used for other products

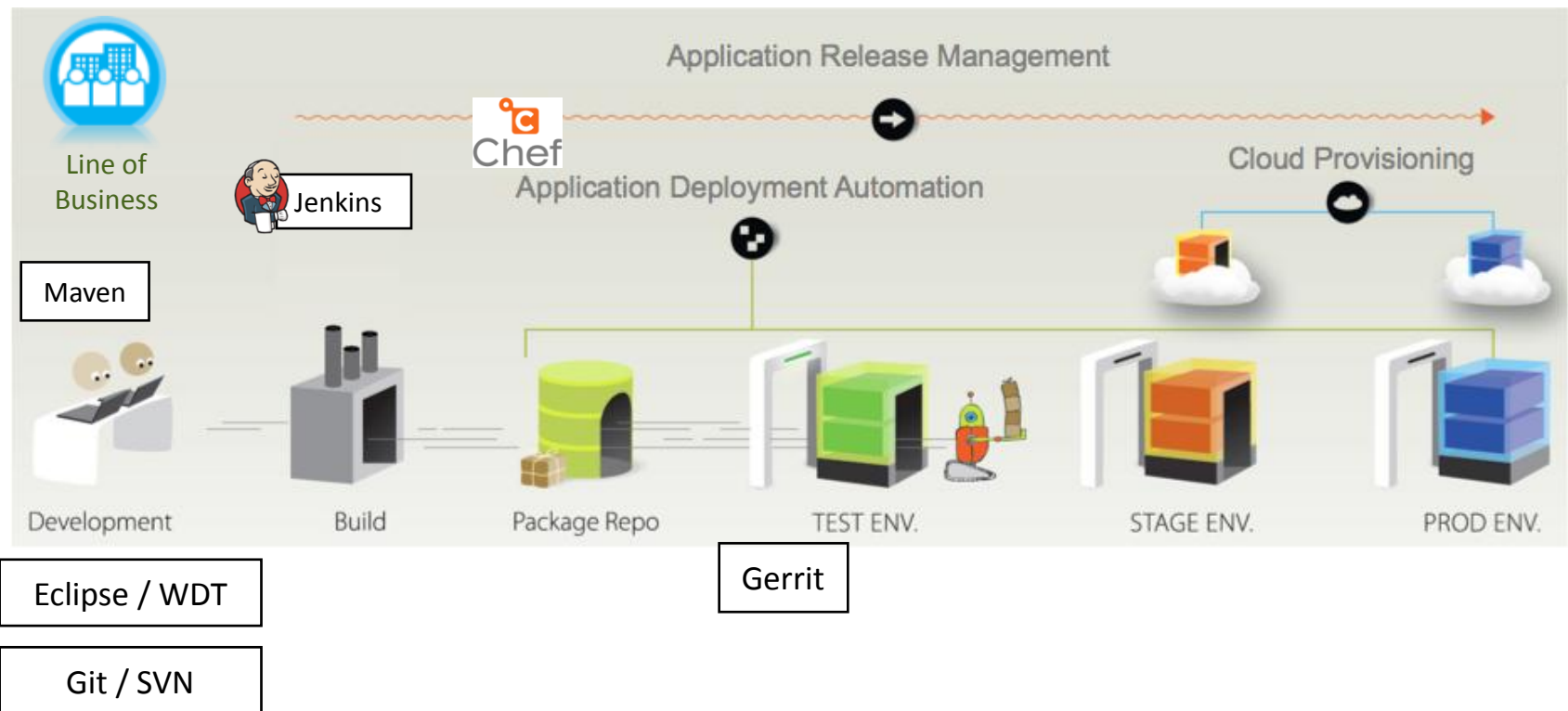
Throughput Comparison of Lightweight Servers (DayTrader3)



Throughput Comparison of Lightweight Servers (TradeLite)



- Chef automation: ‘converged’ DevOps approach
 - Good for infrastructure configuration management
 - Harder to coordinate multi-tiered applications
- Liberty Chef ‘Cookbooks’ available in Opscode Community
 - install Liberty, add features, create and configure servers, deploy applications

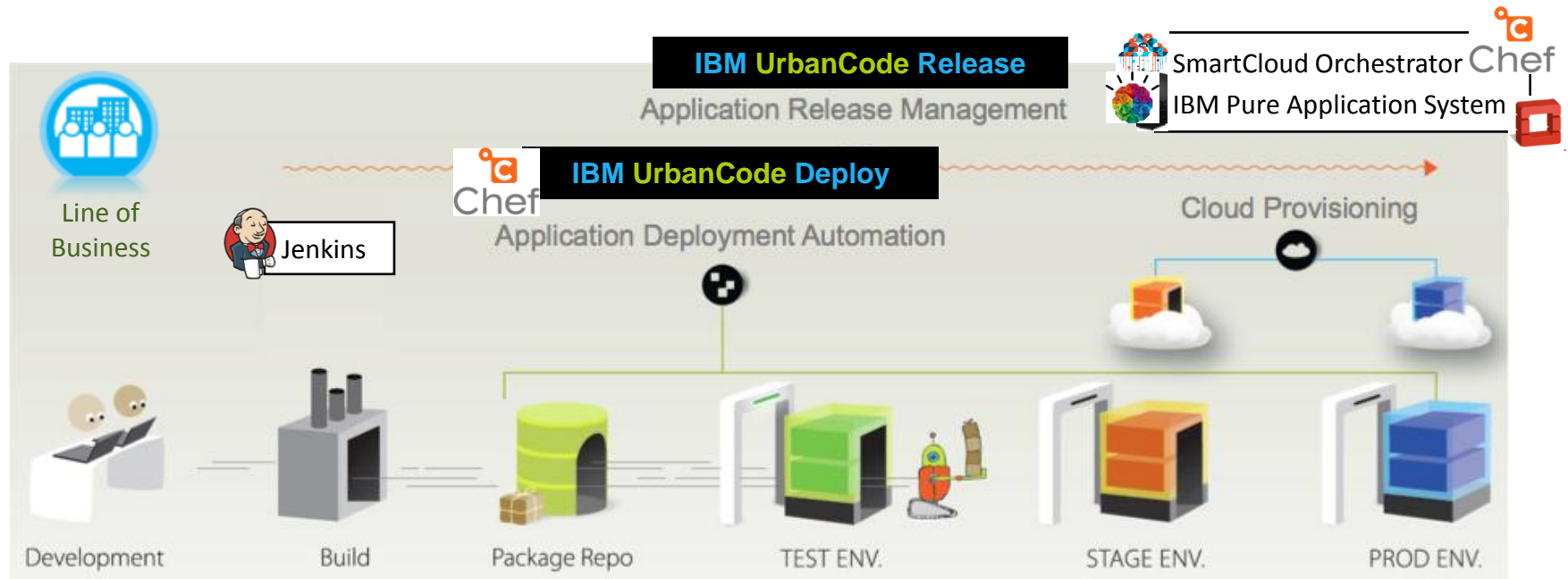


DevOps Tools – incrementally adopt



Add IBM UrbanCode

- UrbanCode Deploy automation: ‘directed’ DevOps approach
 - Co-ordinated deployments (e.g. application after database)
 - Deployment monitoring and visibility into non-compliance



Rational Team Concert

Rational Focal Point
Rational Requirements Composer

Se ✓
Rational Quality Manager
Rational Test Workbench
Rational Test Virtualization Server

InfoSphere Optim Test Data Management

SmartCloud Application Performance Management

