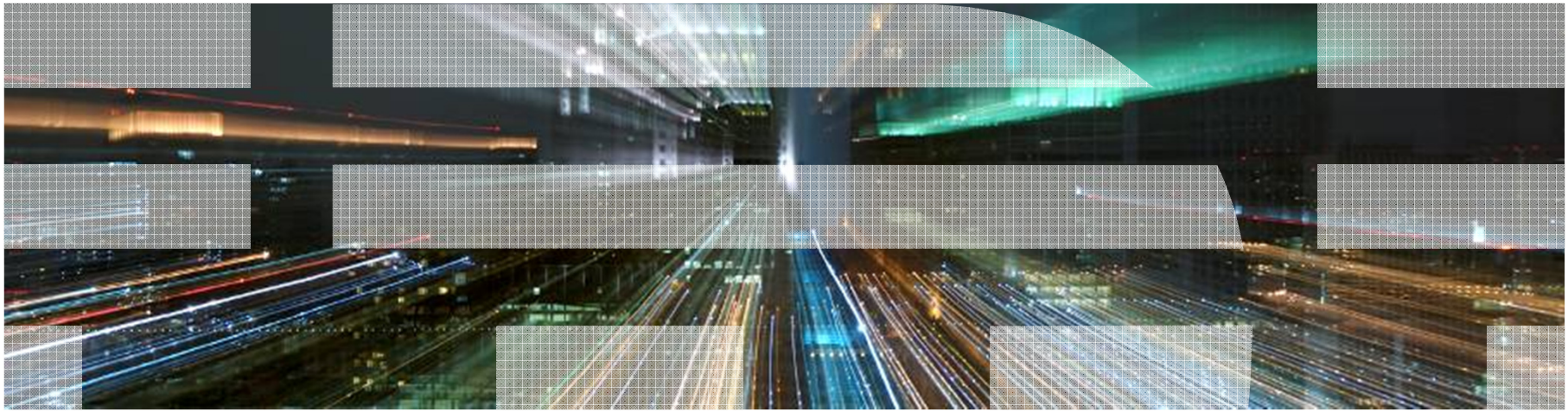
WebSphere Application Server V8.5 Technical Overview



Disclaimers

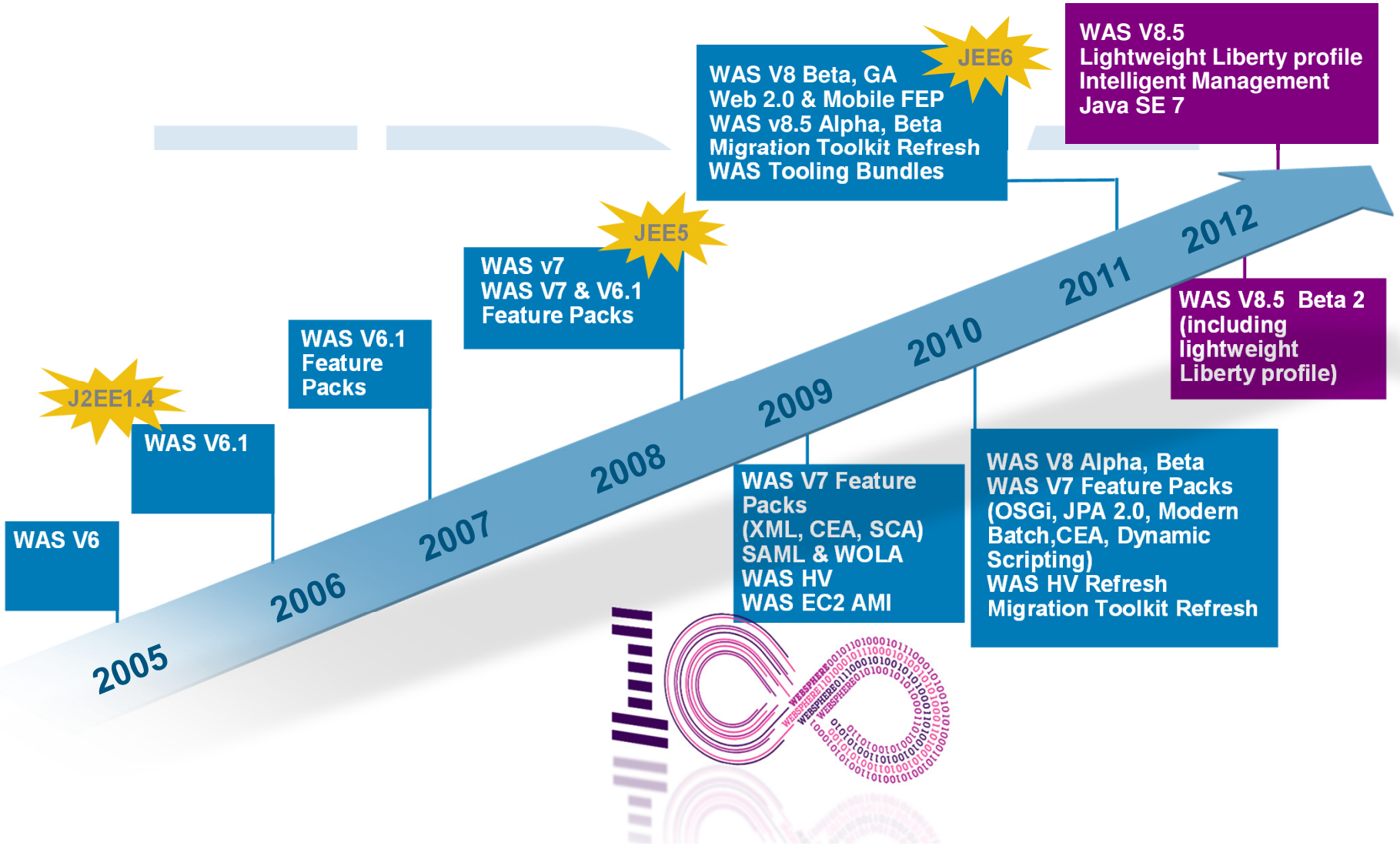
- IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision.

- The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

- **Performance**. Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

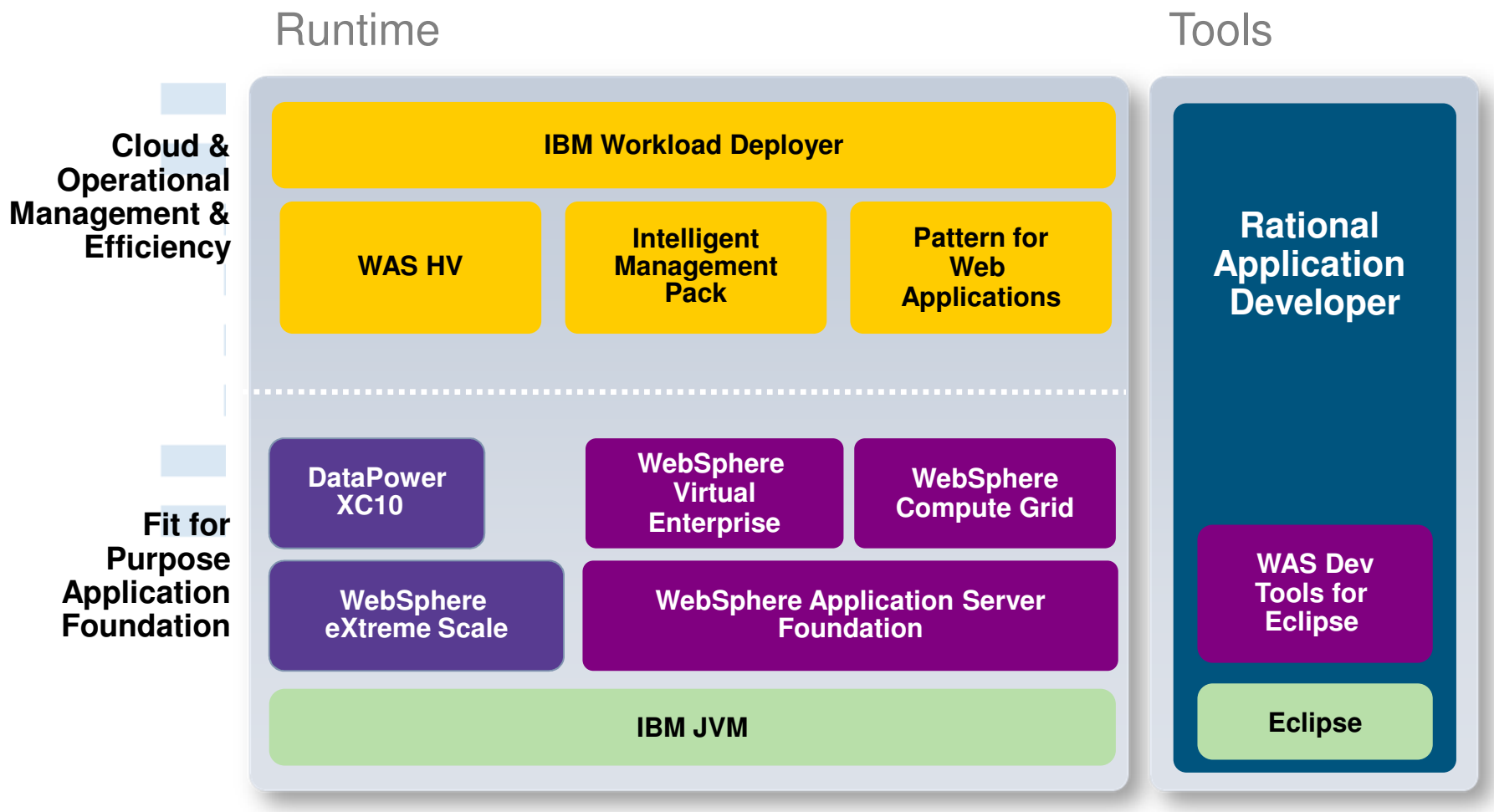
WebSphere Application Server:

Over 14 years of Leadership & Trusted Delivery



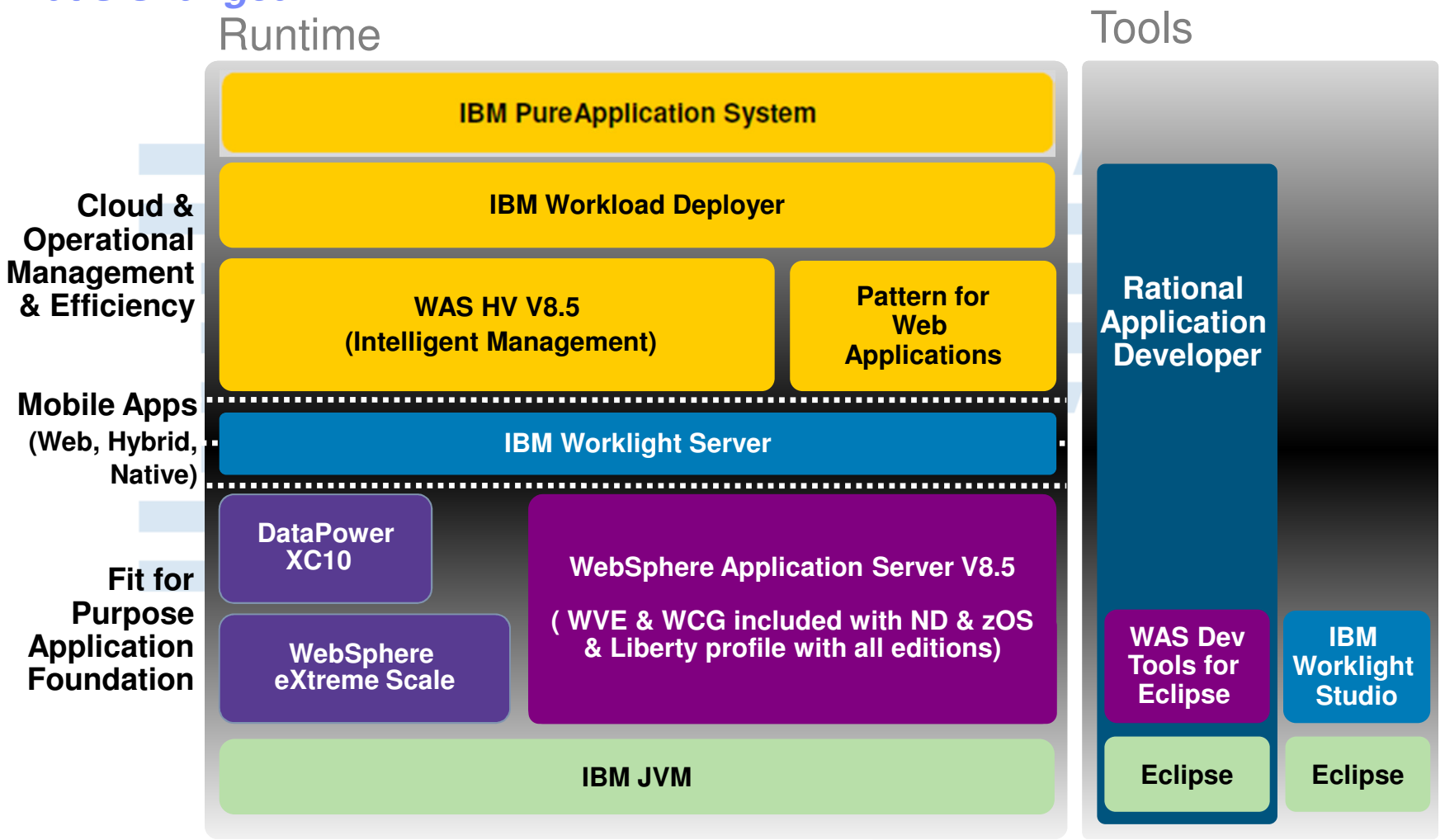
WebSphere Application Infrastructure:

Pre-V8.5 Offerings



WebSphere Application Infrastructure V8.5

What's Changed



WAS V8.5 With the Liberty Profile, Intelligent Management & CG

WAS for Developers

Tools Edition | +Liberty Profile

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

WAS Hypervisor Edition

+Liberty Profile | +Intelligent Mgmt | +Compute Grid

Optimized to instantly run in VMware and other server virtualization environments

WAS ND

Tools Edition | +Liberty Profile | +Intelligent Mgmt | +Compute Grid

Delivers near-continuous availability, with advanced performance and mgmt capabilities, for mission-critical apps

WAS for z/OS

+Liberty Profile | +Intelligent Mgmt | +Compute Grid

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

WAS

Tools Edition | +Liberty Profile

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

WAS Express

+Liberty Profile

A lower-cost, ready-to-go solution to build dynamic Web sites & apps

WAS CE

An open source-based, small footprint foundation with no up-front acquisition costs

Built on a common code base

Unparalleled Application Development and Management Environment, Rich User Experiences…Faster

Developer Experience

Fast, flexible, and simplified application development

- Java 6 EE
- Liberty Profile
- Expanded Tooling and WAS Tooling Bundles
- Web 2.0 & Mobile Toolkit; IBM Worklight Integration
- JDK7 Support
- Migration toolkit
- OSGI programming model enhancements
- EJB support in OSGi apps
- SCA OASIS programming model

Application Resiliency

Intelligent Management & Enhanced Resiliency

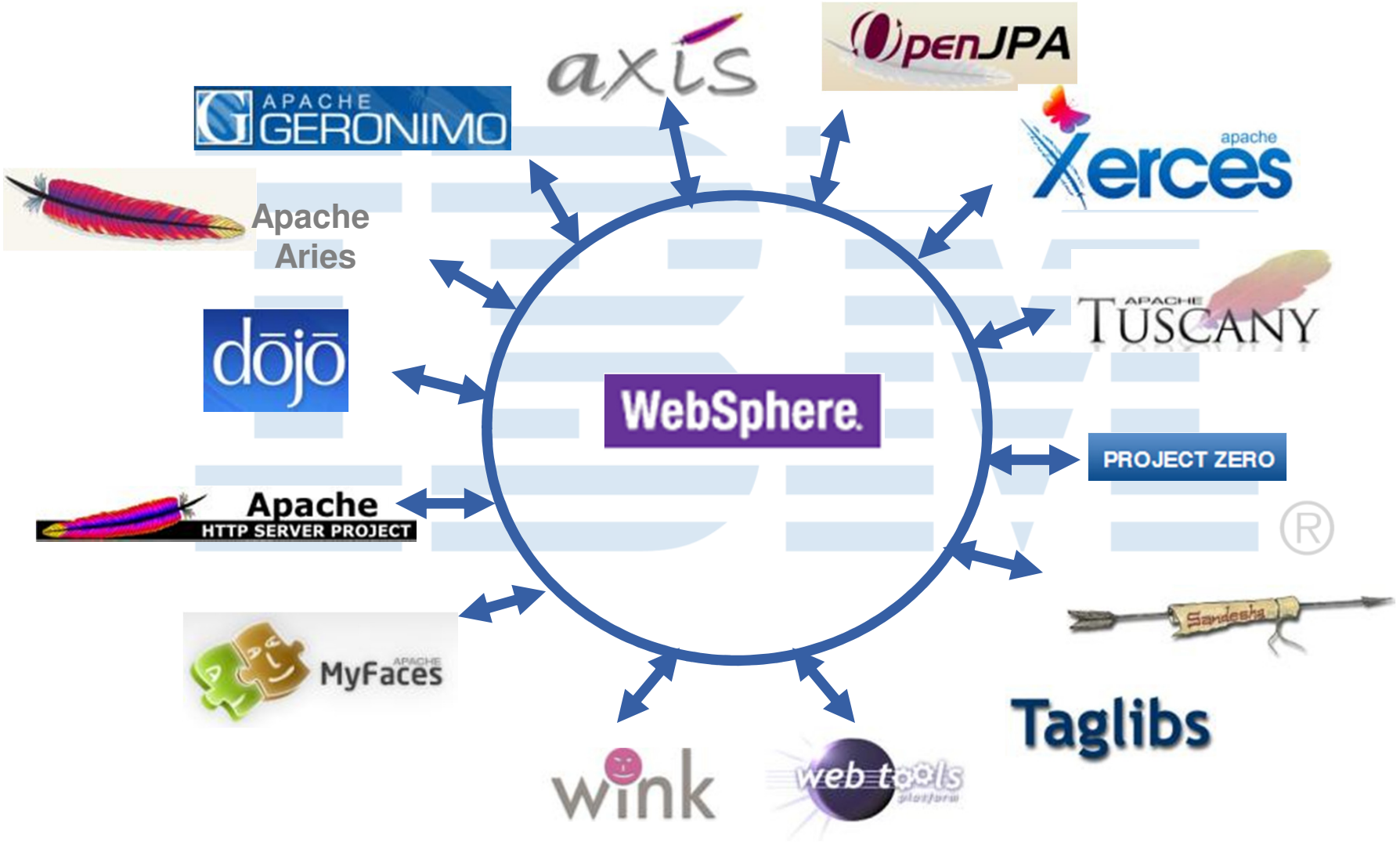
- Improved Performance
- Application Edition Management
- Application Server Health Management
- Dynamic Clustering
- New Intelligent Routing capabilities
- Installation and Maintenance
- Messaging infrastructure resiliency
- Memory leak detection & protection in WAS

Operations and Control

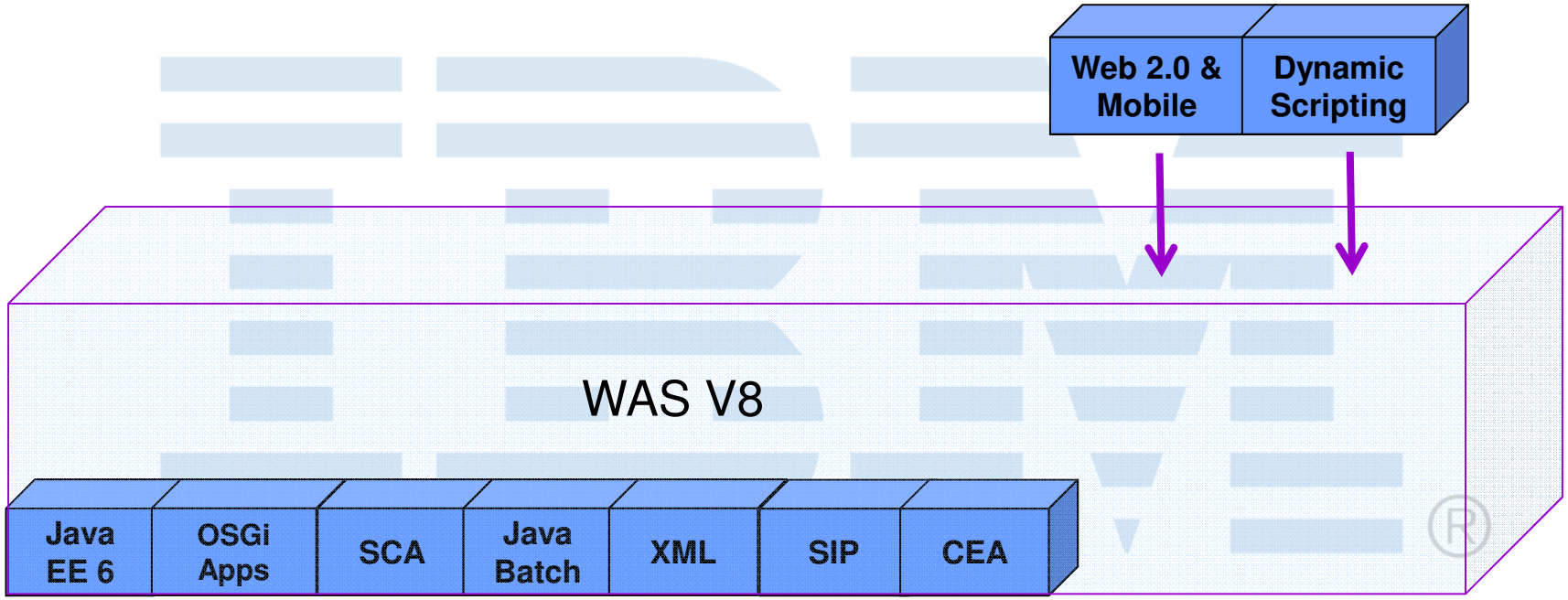
Improved Operations, Security, Control & Integration

- Selectable JDK
- WebSphere Batch enhancements
- Configuration Change Tracking
- OSGi Blueprint security improvements
- Cross Component Trace (XCT)
- Enhanced IBM Support Assistant
- Better log and trace filtering

Enabling Developers to Start With Open Source/Community Software & Benefit from IBM Value Add in Production



Broad Set of Integrated Standards-Based Programming Models



New In V8.5 !

WAS V8.5 - “Liberty” Profile

- Not a single static profile: rather a dynamic, flexible profile of the runtime to load only what the application needs
  - Memory footprint (web feature): < 60 MB
  - Profile is dynamic - switch parts of the server on & off w/out restart
- Extremely lightweight
  - Incredibly fast (re)start times: <5 seconds
- Simplified configuration for quick time to productivity; one single config file or modular config (as desired)
  - Easy to share / diff / manage in version control
  - Easy to componentize config across larger development teams
- Easy access
  - smaller download, unzip install, eclipse plugin, Mac OS support, jdk flexibility
- Tools available as Eclipse features as well as in RAD…

New In V8.0 !

Java EE 6

Simplify standards-based enterprise Java development for dept. to core business apps

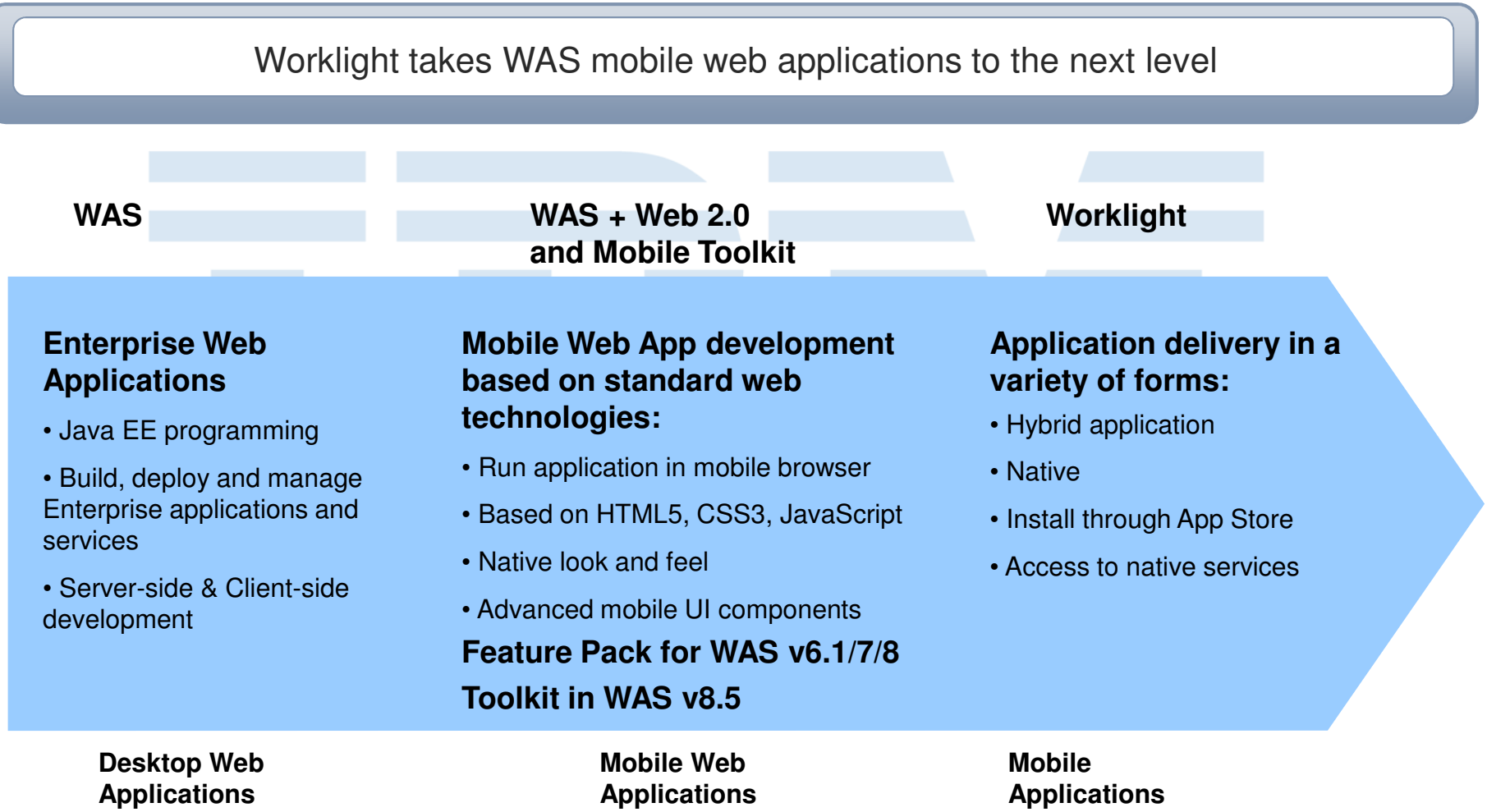
Enhanced developer productivity, user experiences, performance & integration:

- **Enterprise JavaBeans (EJB) 3.1:** Enhanced developer productivity through simplification including testing outside of the application server, new timer support & asynch enhancements
- **Contexts and Dependency Injection for Java (CDI) 1.0:** Faster time to value through tighter and simpler integration between Web & business logic tiers
- **Java Persistence API (JPA) 2.0:** Enhanced developer ease of use & app performance through improved locking, mapping support & dynamic query construction
- **Java Servlet 3.0:** Enhanced time to value through annotations and ease of integrating third party presentation frameworks
- **Java API for RESTful Web Services (JAX-RS) 1.1:** Deliver better user experiences faster through integrated Web 2.0 programming model support
- **JavaServer Faces (JSF) 2.0:** Enhanced developer productivity & end user experience through annotations & Facelets support
- **Bean Validation 1.0:** Improved developer productivity through declarative means for describing validation constraints for data
- **Java Architecture for XML Binding (JAXB) 2.2:** Improved performance via new default marshalling optimizations
- **Enterprise Web Services 1.3:** Improved integration and reuse support
- **Java API for XML-Based Web Services (JAX-WS) 2.2**: Developer productivity and security enhancements

Enhanced In V8.5 !

Mobile Application Development

Worklight takes WAS mobile web applications to the next level



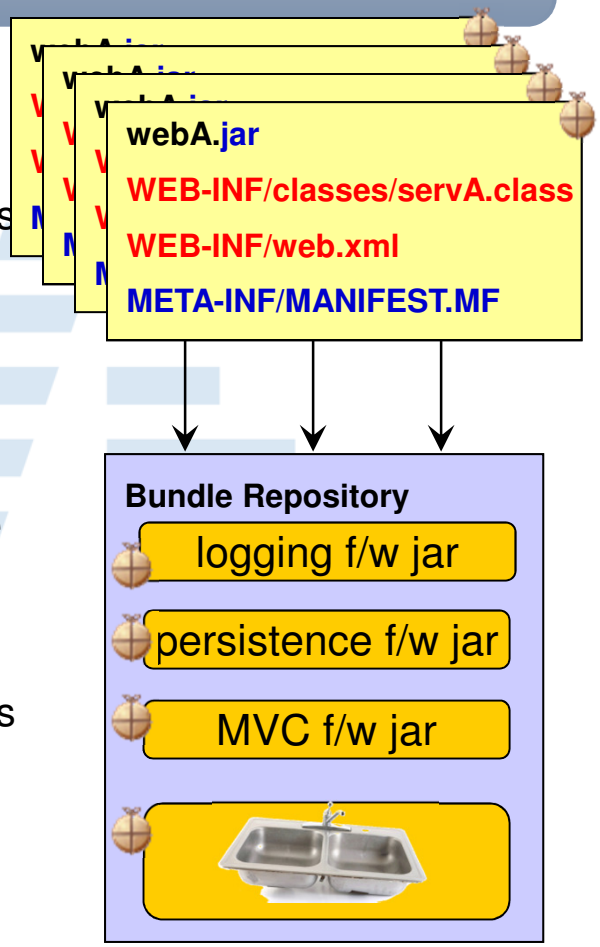
Integrated In V8.0!

OSGi Applications

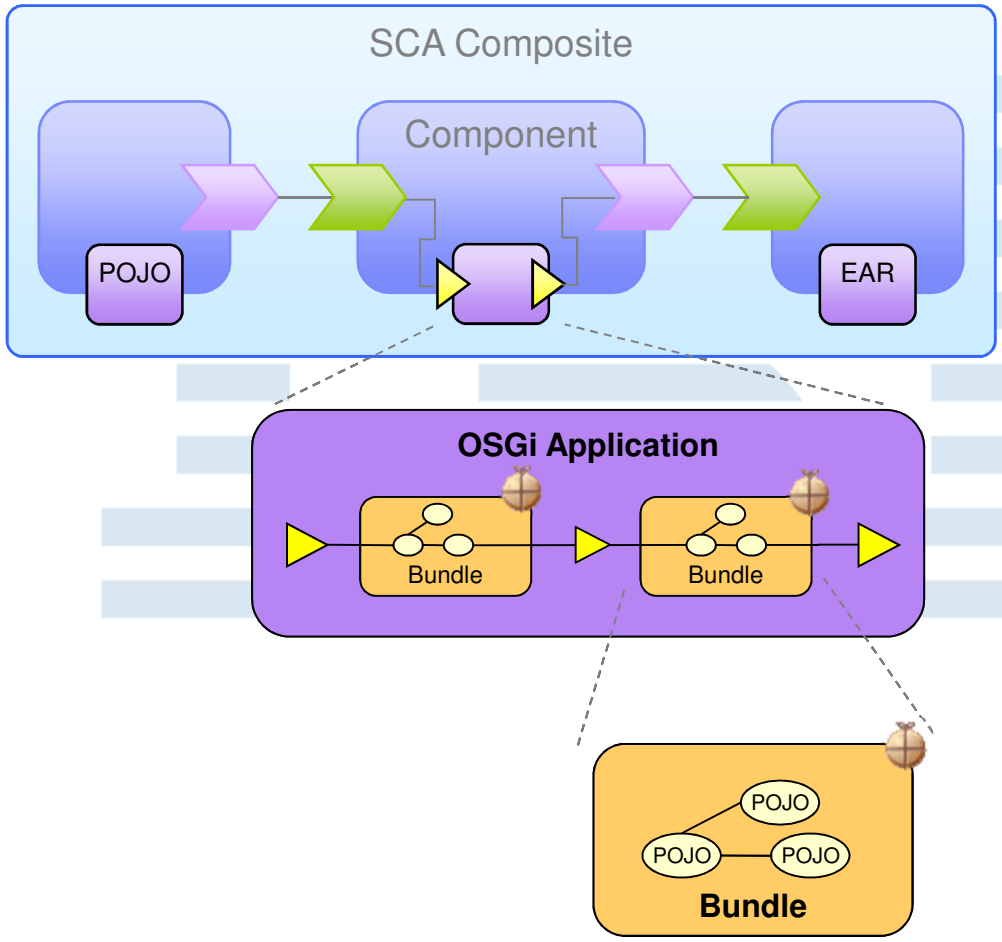
Speed development, increase ease of use and reuse through the modularity, dynamism, and versioning capabilities of OSGi applied to web & enterprise applications

Key Features:

- **Modular deployment and management:** Separate common libraries from application archives; manage them centrally and across many versions, concurrently
- **Standards Based DI Framework:** POJO development model, with a container that manages injection of configuration, and controls activation & deactivation, integrated with the server
- **In-place update:** Update applications modules without restarting the application
- **Java Standards Layering:** Java standards such as transaction, security, & persistence can be mixed into the componentized apps as services
- **SCA Integration:** Components can be decorated as SCA components to provide coarse grain SOA services



OSGi and SCA: the assembly food chain



SCA Composite assembled from heterogeneous components including an **OSGi Application** component, and integrated through SCA services with configurable bindings (JMS, web services…).

OSGi Bundles assembled in an **OSGi Application** and integrated through services in the OSGi service registry

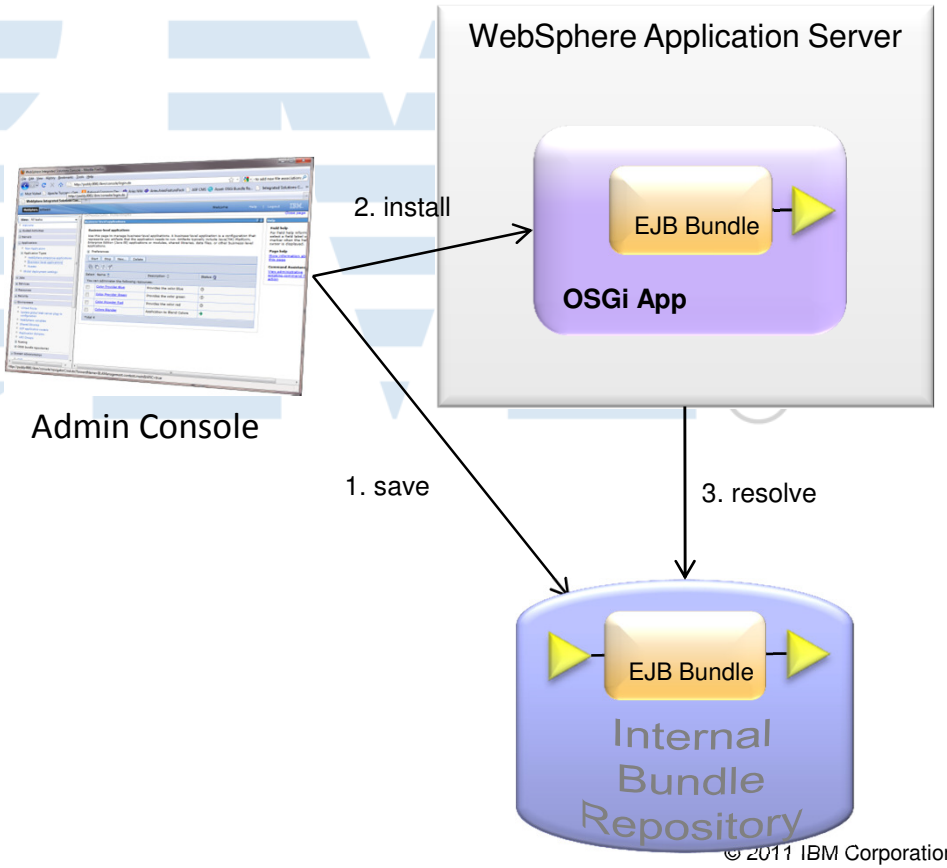
POJOs assembled using a Blueprint context and scoped by an **OSGi Bundle**.

New In V8.5 !

V8.5 OSGi Application Enhancements – EJBs

Include EJB bundles in OSGi applications to simplify the development, deployment and administration of modular enterprise applications

- OSGi bundles can now contain version 3.x EJBs
  - Local & Remote
  - Asynchronous beans, Session beans & Singleton beans
- Stateless Session Beans can be exported as services to the OSGi Service Registry
- Provisioner and Internal Bundle Repository extended to understand EJB Bundles
  - Services provided by EJBs
  - Services required by EJBs

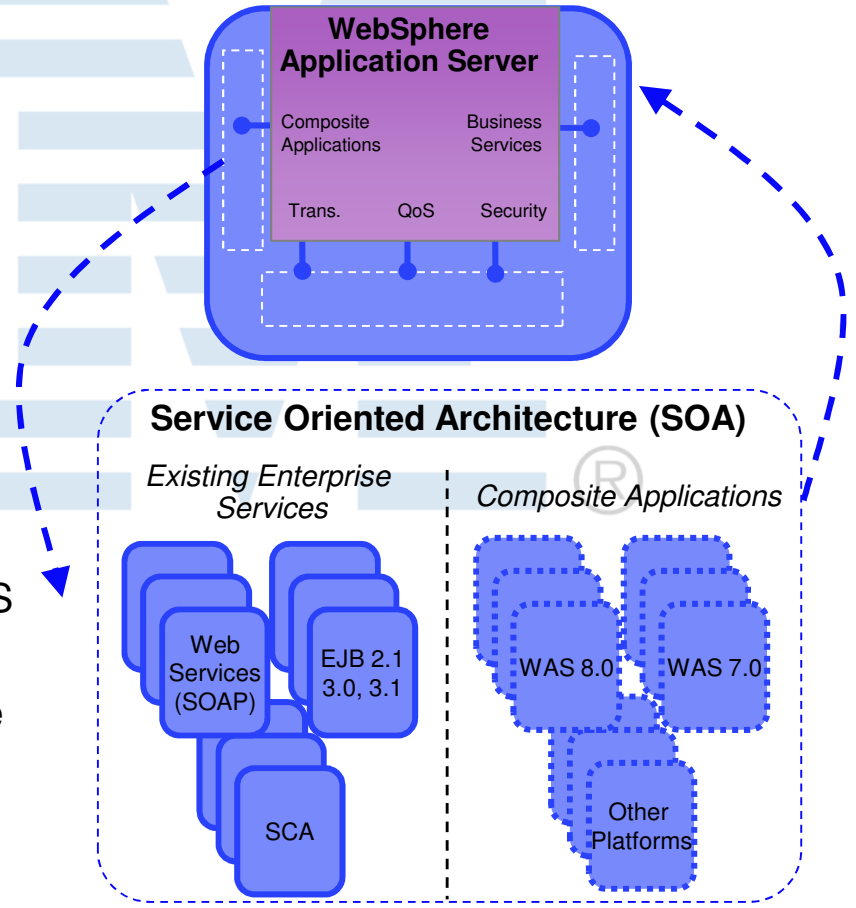


Service Component Architecture (SCA)

Speed SOA application delivery and customization by separating business logic from implementation considerations

Key Features:

- **Compose:** Create SCA service compositions using POJOs, EJB 3.1, 3.0 or 2.1 components, Java Servlets, OSGi bundles & AJAX/JavaScript
- **Wire Services:** Bindings for Web Services, JMS, SCA and EJB 3.1, 3.0, 2.1 & 2.0
- **Spring Support:** Expose EJB 3.x & Spring components for composition re-use
- **RIA/Web 2.0 Support:** Expose business logic to Web 2.0 apps via JSON-RPC & ATOM feeds
- **SCA Domains:** Services interoperability across WAS V8 & V7 over all supported bindings
- **Data Support:** Support for data as Java Architecture for XML Binding (JAXB) or SDO 2.1
- **Simplified Deployment:** Flexible service deployment as a JAR

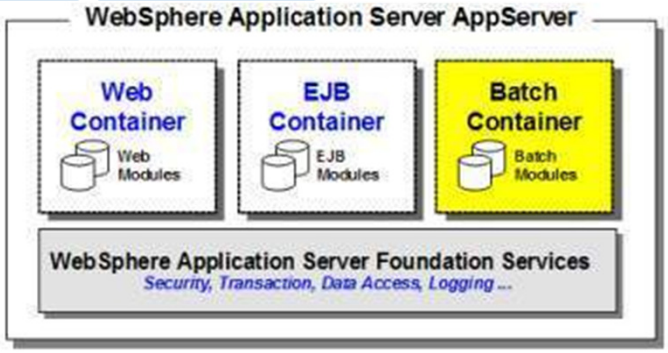


Enhanced In V8.5 !

V8.5 Java Batch Enhancements

Quickly develop and deploy batch applications and dramatically reduce infrastructure and operational costs

- **Parallel Job Manager**
  - Controls parallel job execution including splitting and merging of jobs.
- **Enterprise Scheduler Connectors**
  - Enables integration to external products for scheduling (i.e. Tivoli Workload Scheduler) and monitoring (i.e. ITCAM) batch workloads.
- **Advanced Operations Pack**
  - Provides enhanced operations support, including integration for goal-oriented SLA management, job classes, and usage accounting (including SMF on z/OS).



- **In Addition to V8.0**
  - **Batch Container**
    - Provides the batch execution environment, including services such as checkpoint/restart and job-logging.
  - **Batch Scheduler**
    - Job management control point for determining when/where jobs run.
    - Supports operational commands and provides a visual job console.
  - **Batch Toolkit**
    - Provides tooling for the creating, packaging, and testing batch jobs.

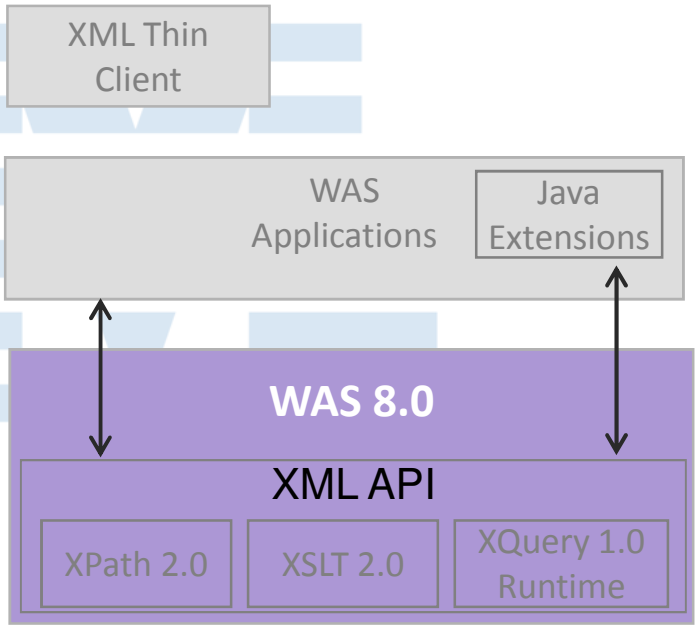
Integrated In V8.0!

XML

Reuse Java skills & improve ease of use while developing applications to process structured data

Key Features:

- **Speed & Simplicity:** Work with structured data using high performance tools optimized for XML data processing and querying
- **Standards Based:** Support for the XPath 2.0, XSLT 2.0, and XQuery 1.0 W3C standards
- **Consistency:** XML runtime API that offers consistent execution and data navigation API while allowing access to existing Java logic
- **Enterprise grade:** Enterprise class multi-threaded scalability & serviceability with IBM support
- **Samples:** 40+ samples including 4 end to end scenarios
- **Ease of Access & Use:** Integrated with WAS V8



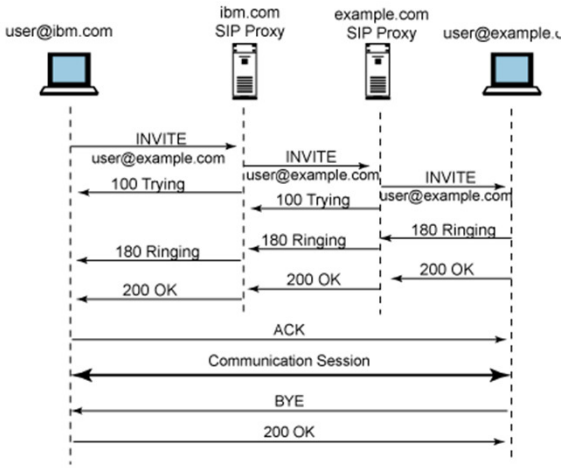
Integrated In V8.0!

Session Initiation Protocol (SIP)

Develop, deliver and manage powerful large-scale mission-critical converged communications services and applications

Key Features:

- **Carrier Grade:** High availability, reliability, and scalability to meet the needs real time converged communications apps
- **Standards Based:** SIP Servlet 1.1 (JSR 289) including annotation support to reduce complexity & improve productivity
- **Converged Container:** HTTP, SIP and now with web services support to integrate Web services into a SIP-based applications
- **Ease of use:**
  - Simplified routing of SIP requests between multiple applications
  - Simplified use of back-to-back user agents (B2BUA) through new B2BUAHelper class
- **Security & Flexibility:**
  - Multihome support to send/receive requests over multiple NW interfaces for increased security without sacrificing productivity
  - Improved firewall support to simplify development & config. of SIP apps that consume/provide services through a firewall



Integrated In V8.0!

Communications Enabled Applications (CEA)

Simply and rapidly add communications capabilities, like Click to Call and Cobrowsing, to any Web application leveraging existing skills and an SOA approach

Key Features:

- **Simplicity:** 3 lines of code to add CEA into web app
- **Existing Skills:** Java & JavaScript
- **Mobile Browser Widgets:** Enable native look & feel
- **Telephony Access:** REST & Web service interfaces to Make call, disconnect call & incoming call notifications
- **Web 2.0 Widgets:** Customizable & extensible with iWidget support
  - Click to Call
  - Call Notifications
  - Collaboration Dialog
  - Contact Center Cobrowsing
  - Peer to Peer Cobrowsing
  - Two-way Synchronized Forms
- **PoC Friendly:** Unit test environment & pre-tested with Avaya, Cisco & Nortel unified communications products
- **Ease of Access & Use:** Integrated with WAS V8

Dynamic Scripting

Leverage existing platform investment to rapidly address situational application requirements using PHP or Groovy

Key Features:

- **Time to Value:** Rapid development with PHP, Groovy, and a Web 2.0 oriented programming model based on WebSphere sMash

- **Reuse:** Develop and deploy application components supporting the iWidget specification that can be incorporated into WebSphere Portal and IBM Mashup Center-based applications

Web 2.0

REST, RSS / ATOM

http://www.projectzero.org/

Available as a Feature Pack supporting WAS v8, v7 & v6.1

New In V8.0 !

Monitored Directory Support

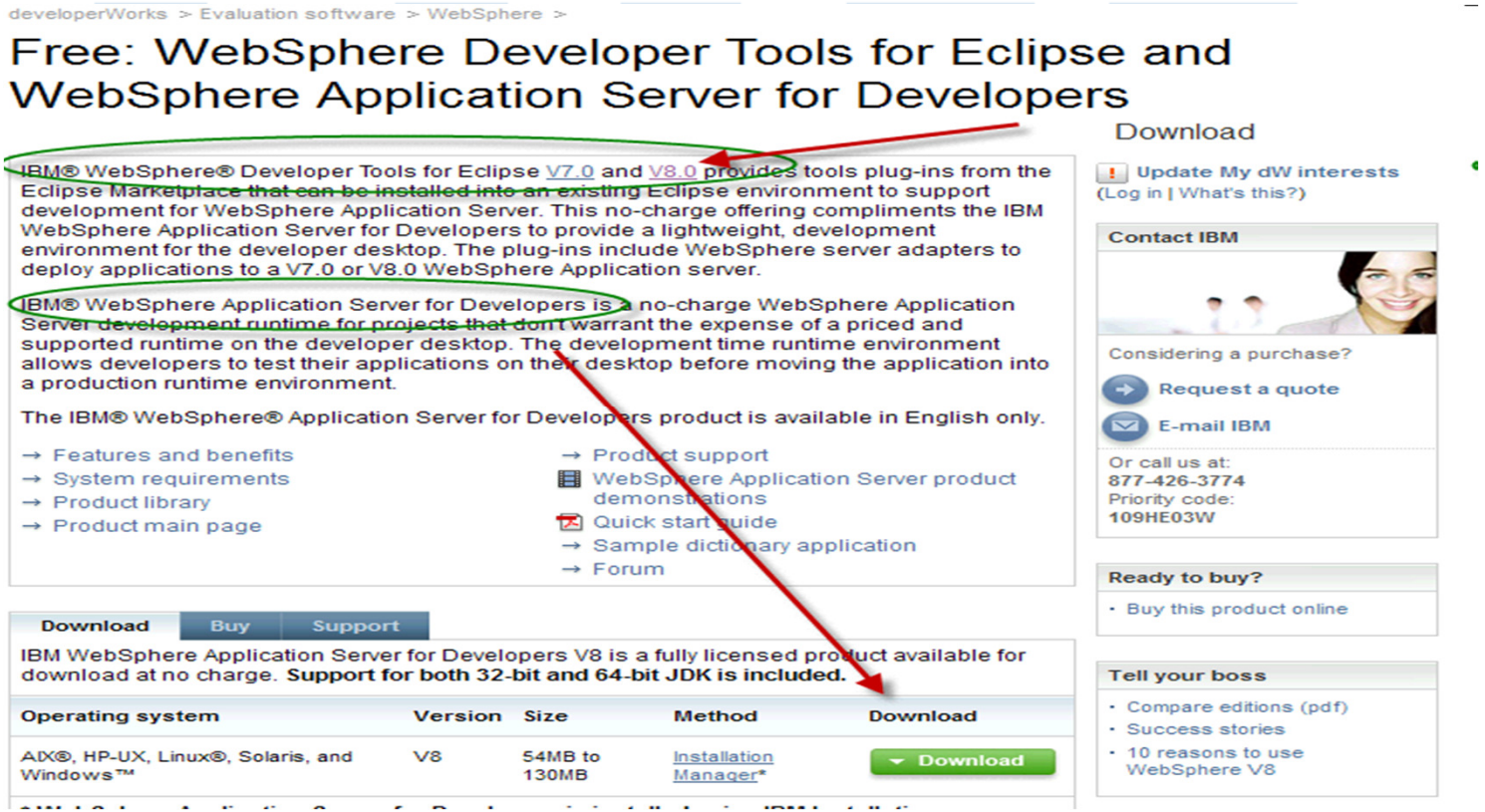
Accelerate edit-compile-debug tasks during the ***development*** lifecycle

- Enhanced ***developer*** productivity through new monitored directory-based application install, update and uninstall of Java EE applications
- Drag & drop and command line support
- Supported with WAS Express, Base, ND & z/OS
- Java 5 EE and Java 6 EE Supported file types:
  - EAR (Enterprise Archive)
  - WAR (Web Application Archive)
  - JAR (Java Archive)
  - SAR (SIP Application Resource)

Lowering Barriers to Developer Adoption

- No charge WebSphere Developer Tools for Eclipse Announced Q4/2011 !
- No charge WebSphere Application Server for Developers
  - For use on developer desktop at no charge

→ Download http://bit.ly/bq49yq



developerWorks > Evaluation software > WebSphere >

Free: WebSphere Developer Tools for Eclipse and WebSphere Application Server for Developers

IBM® WebSphere® Developer Tools for Eclipse V7.0 and V8.0 provides tools plug-ins from the Eclipse Marketplace that can be installed into an existing Eclipse environment to support development for WebSphere Application Server. This no-charge offering compliments the IBM WebSphere Application Server for Developers to provide a lightweight, development environment for the developer desktop. The plug-ins include WebSphere server adapters to deploy applications to a V7.0 or V8.0 WebSphere Application server.

IBM® WebSphere Application Server for Developers is a no-charge WebSphere Application Server development runtime for projects that don't warrant the expense of a priced and supported runtime on the developer desktop. The development time runtime environment allows developers to test their applications on their desktop before moving the application into a production runtime environment.

The IBM® WebSphere® Application Server for Developers product is available in English only.

- → Features and benefits
- → System requirements
- → Product library
- → Product main page
- → Product support
- WebSphere Application Server product demonstrations
- Quick start guide
- → Sample dictionary application
- → Forum

Download | Buy | Support

IBM WebSphere Application Server for Developers V8 is a fully licensed product available for download at no charge. **Support for both 32-bit and 64-bit JDK is included.**

Operating system	Version	Size	Method	Download
AIX®, HP-UX, Linux®, Solaris, and Windows™	V8	54MB to 130MB	Installation Manager*	Download

Download

Update My dW interests
(Log in | What's this?)

Contact IBM

Considering a purchase?
Request a quote
E-mail IBM
Or call us at:
877-426-3774
Priority code:
109HE03W

Ready to buy?
- Buy this product online

Tell your boss
- Compare editions (pdf)
- Success stories
- 10 reasons to use WebSphere V8

Enhanced In V8.5 !

WebSphere Developer Tools and Rational Application Developer

RAD

Install: IM

WebSphere Integration
- Support for WAS v6.0, v6.1
- Test Environments for WAS v6.1, 7.0, v8.0
- Portal Tools & Portal Server support
- Profile applications on WAS
- Cloud: Deploy to IWD, or WebSphere/Portal instances on SCE

Problem Determination
- Code visualization - class, sequence and topic diagrams
- Static analysis (code review)
- Code coverage: optimize unit testing
- Profiling

Enterprise Connectivity
- J2C (EIS) tools
- CICS, and IMS Adapters
- Adapters for SAP, Siebel, JDE, Oracle, PeopleSoft

Team Productivity
- RTC integration
- Collaborative debug
- Collaborative code analysis

Programming Model Support
- SCA
- Java (WAS) Batch
- SIP/CEA
- XML (feature pack)

Extended Programming Model Support
- Advanced support for J2EE 1.4 and earlier:
  - EJB & Web Services deploy
  - DD editors
  - JAX-RPC
- Web:
  - Page & site designer
  - Web diagram Editor
  - Struts, JSF support
  - iWidget support

WDT

Install: Eclipse update site or IM

JEE Tools
- Advanced support for JEE 5+
- DD editors, enhanced project explorer, additional validation

Web Tools
- Advanced web development tools
- Rich page (WYSIWYG) editor for HTML, JSP
- Web 2.0 and Mobile support

WebSphere Integration
- Support for WAS v7.0, v8.0
- Publish, start/stop the server
- Debug Jython/wsadmin scripts

WAS Extensions Support
- Binding and extension editors
- Support for non-spec extensions

OSGi Tools
- Full creation and editing support
- Blueprint editor and validation
- Visual Bundle Explorer

Liberty Profile Integration
- Publish, start/stop the server
- Edit & manage server configuration

Eclipse (WTP, DTP)

Programming Model Support
- Basic creation, editing, and validation support for JEE applications:
  - Web, XML, JPA, EJB, EAR
- Database tools

WDT adds support for Mac for dev/test with WAS Liberty Profile

WAS Tools Edition Bundles

Team

Individual

WAS ND – Tools Edition

- Like “WA4D – Tools Edition” but for WAS ND production use

WAS – Tools Edition

- Solution: Production WAS + unlimited tools (RAD or WAS Developer Tools)
- Terms (runtime): Production use
- Terms (tools): Unlimited use of tools for developing applications to be deployed on WAS included with this bundle.

WAS for Developers – Tools Edition for Eclipse

- Solution: WAS for Developers + WAS Developer Tools
- Terms: Single user. Development use only
- Freely available, supported for a fee
- Easily obtained for rapid development to WAS v7, v8, v8.5 and Liberty

New In V8.0 !

IBM Assembly and Deploy Tools for WebSphere Administration (IADT)

Rapidly assemble & deploy applications to WebSphere Application Server environments

Key Capabilities:

- Import and validate applications
- Edit deployment descriptors and binding files
- Edit EAR-level configuration (Enhanced EAR)
- Create and debug Jython and wsadmin scripts
- Deploy EJB and web services
- Deploy applications to local or remote WAS v8.x servers
- Debug applications on WAS v8.x

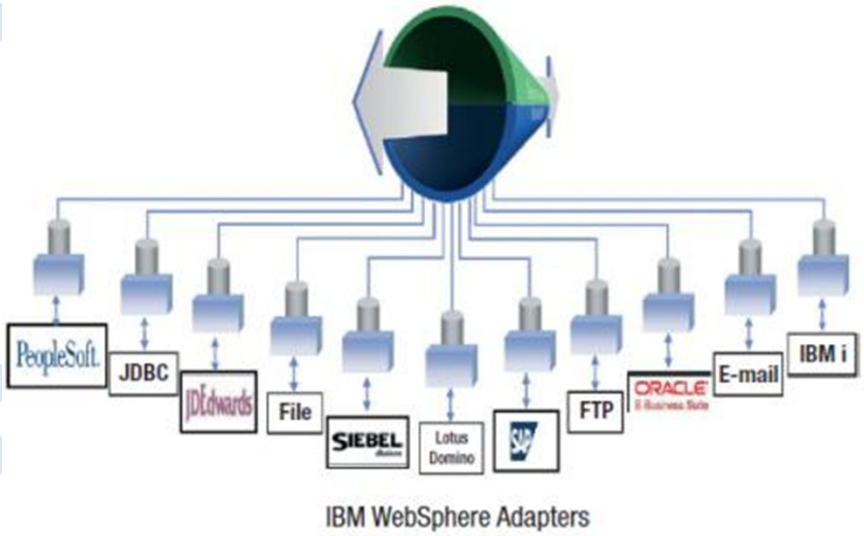
- IADT tools replace the previously available IBM Rational Application Developer Assembly and Deploy function
- Restricted to assembly and deployment usage only

New In V8.0 !

Application Adapters

Enhance reuse and extend application asset life

- IBM WebSphere Adapters 7.5 included with WAS V8:
  - SAP Software
  - Siebel Business Applications
  - Oracle E-Business Suite
  - JD Edwards EnterpriseOne
  - PeopleSoft Enterprise
- Supported for development & test with WebSphere Application Server as part of WAS V8 license
- Production usage requires separate WebSphere Adapters license



IBM WebSphere Adapters

Unparalleled Application Development and Management Environment, Rich User Experiences…Faster

Developer Experience

Fast, flexible, and simplified application development

- Java 6 EE
- Liberty Profile
- Expanded Tooling and WAS Tooling Bundles
- Web 2.0 & Mobile Toolkit; IBM Worklight Integration
- JDK7 Support
- Migration toolkit
- OSGI programming model enhancements
- EJB support in OSGi apps
- WebSphere Batch enhancements

Application Resiliency

Intelligent Management & Enhanced Resiliency

- Improved Performance
- Application Edition Management
- Application Server Health Management
- Dynamic Clustering
- New Intelligent Routing capabilities
- Installation and Maintenance
- Messaging infrastructure resiliency
- Memory leak detection & protection in WAS

Operations and Control

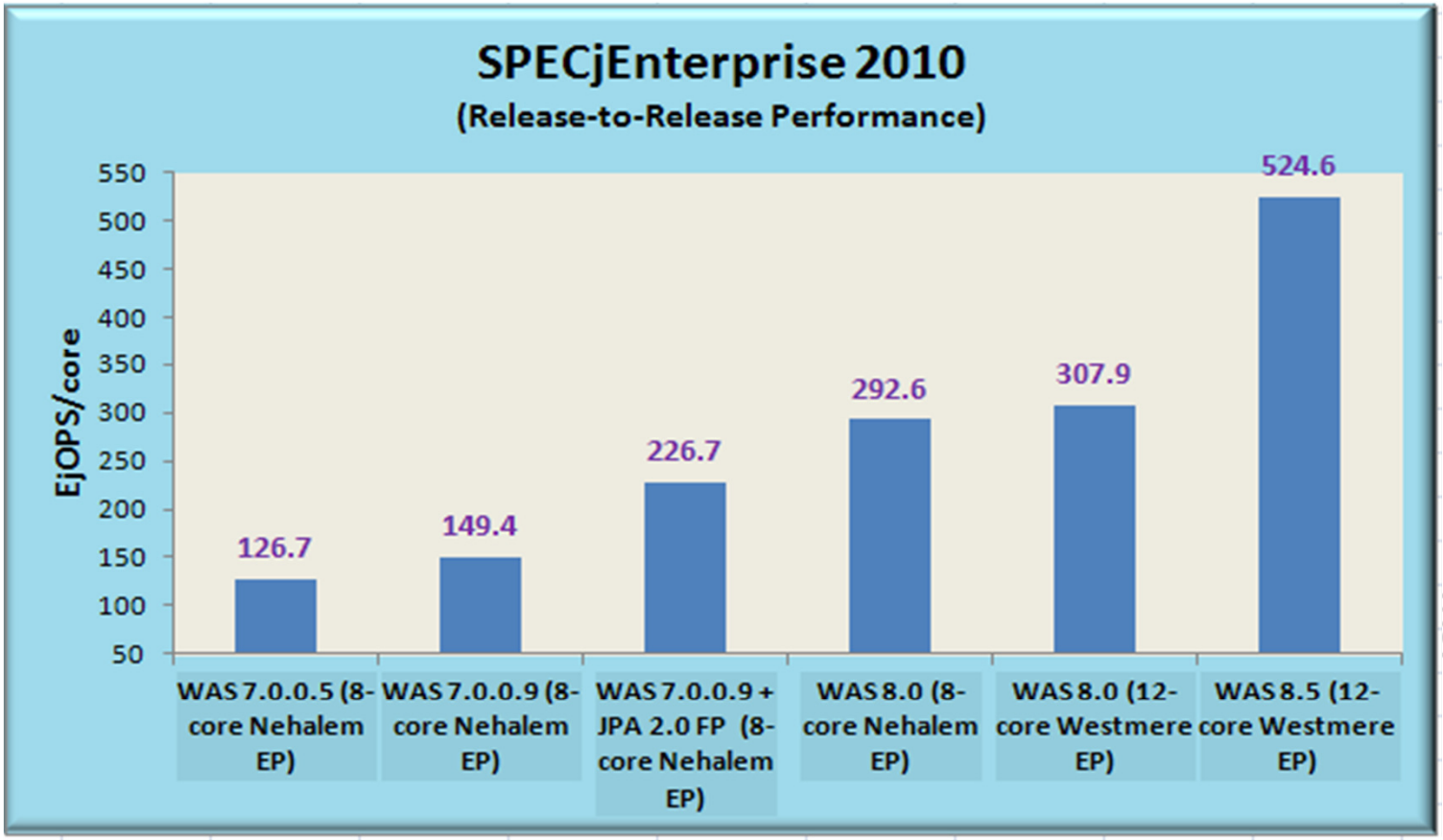
Improved Operations, Security, Control & Integration

- Selectable JDK
- Configuration Change Tracking
- OSGi Blueprint security improvements
- Cross Component Trace (XCT)
- Enhanced IBM Support Assistant
- Better log and trace filtering

WAS V8.5 Performance Enhancements

- Significant Performance Improvements across many components through Engineering Efforts
- Performance Improvements can be seen in
  - JDK 7.0
  - JPA 2.0 Persistence Layer
  - WebContainer
  - JSP Engine
  - EJBContainer
  - J2C/RRA and Connection Management
  - Messaging Optimizations

WAS V8.5 Performance Improvements



Consistent Performance gains across WAS Releases

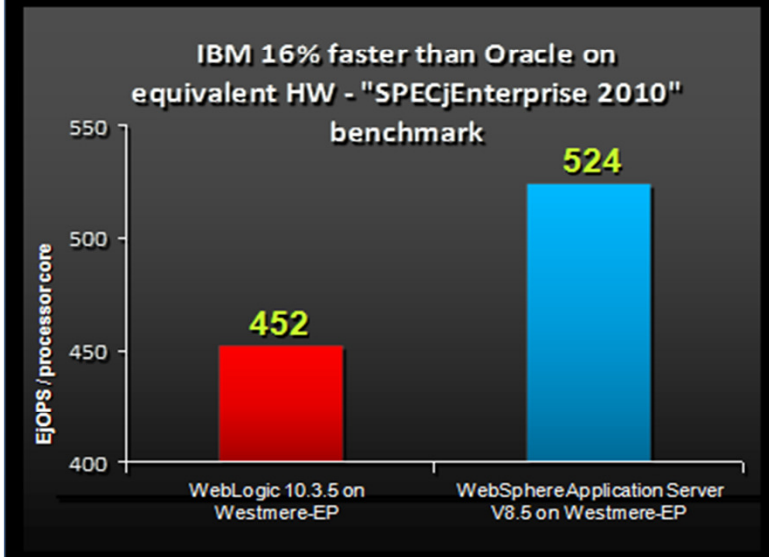
As per SPEC Published Data as of 4/26/2012
http://www.spec.org/jEnterprise2010/results/jEnterprise2010.html

WebSphere V8.5 Middleware Performance Leadership

Smarter choices for improved IT economics

WebSphere outperforms Oracle WebLogic

IBM is the world leader in middleware performance



- IBM 16% better than Oracle on same HW
- Improve performance and efficiency leveraging current HW investments
- Improve transaction availability of your SOA infrastructure by getting more out of your Hardware
- IBM #1 even if Oracle uses latest HW
- IBM middleware makes the best use of all HW Platforms – Intel, Power and/or z
- Get the best bang for your buck – run the most transactions at the lowest cost

(1) SPEC and SPECjEnterprise 2010 are registered trademarks of the Standard Performance Evaluation Corporation.
Results from www.spec.org as of 04/29/2012 Oracle SUN Blade Server X6270 M2 452.285 EjOPS/core SPECjEnterprise2010, Oracle Sun Fire X4170 M3 – 519.386 SPECjEnterprise2010 EjOPS (Oracle's best SPECjEnterprise2010 EjOPS/core result so far). IBM HS 22 Blade 524.621 EjOPS/core (World Record SPECjEnterprise2010 EJOPS/core result)

1

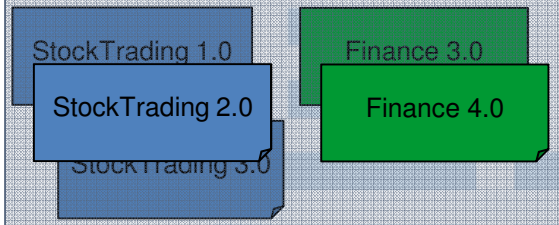
New In V8.5 !

WAS V8.5 Intelligent Management

Extending QoS through autonomic computing

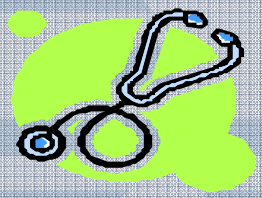
Application Edition Management

Self-Managing



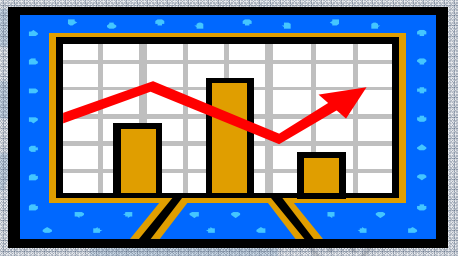
Health Management

Self-Protecting
Self-Healing

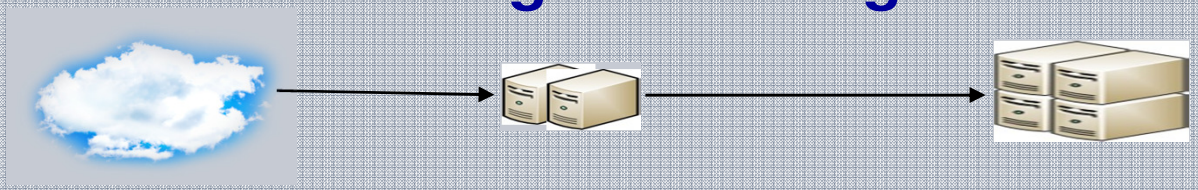


Dynamic Clustering

Self-Optimizing



Intelligent Routing



New In V8.0 !

High Availability Improvements

Reduce unexpected and expected operational down time

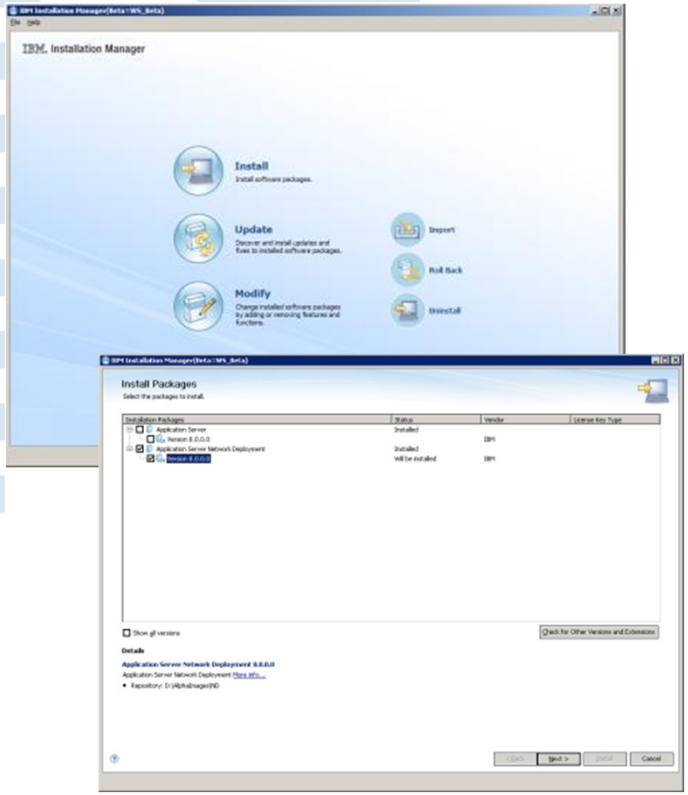
- Improved HA support for messaging applications
  - Reconnect to a standby gateway queue manager when an active queue manage fails or becomes available
- Resource failover and retry logic for relational data sources and JCA connection factories
  - Simplifies application development
    - Minimizes the application code required to handle failure of connections to relational databases and other JCA resources
    - Provides a common mechanism for applications to uniformly respond to planned or unplanned outages
  - Typically Employed with Database Replication (e.g DB2 HADR, Oracle RAC)
  - Administrator can tailor data sources and connection factory configuration based on application needs:
    - Alternate/failover resource reference on primary data source
    - Optionally
      - Number of connection retries
      - Pre-population of alternate/failover resource connection pool
      - Auto failback
  - Full control of functionality available to scripts and programs via management MBean
- Improved reliability & performance with DB2
  - Support for client affinity & client reroute for apps that use IBM DB2
  - New location transparency for EJBs using DB2 connections
- Improved transactional integrity
  - Support for shared DB locks between transaction branches and integration of new programming models with WAS proven transaction engine

New In V8.0 !

IBM Installation Manager

Faster time to value & lower operational costs through new install & maintenance tech.

- Full local & centralized product lifecycle management:
  - Install/Uninstall
  - Update/Rollback (Fixpacks and iFixes)
  - Modify (Add/Remove features)
- Installs exactly the desired level of service in one pass
  - No need to install GA product first and then apply a fixpack and/or ifixes as a separate step
- Lays down binaries relevant to user selections and system environment
- GUI & response file modes of operation
  - GUI to perform individual operations
  - Response files can be recorded from the GUI or created by specifying the appropriate xml
  - Silent mode support for invoking multiple operations
- Single user experience across WAS, WAS components & various IBM products
  - A single instance of IIM can manage the product lifecycle for any IM based products, from WebSphere, Rational, etc.
  - Support for WAS, IHS, WCT, etc.

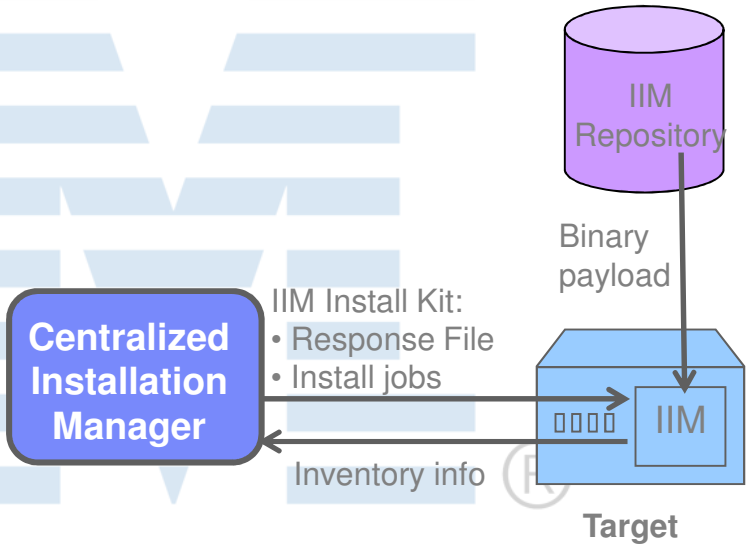


Centralized Installation Manager (CIM)

Enhanced In V8.0 !

Faster time to value & lower operational costs through new install & maintenance tech.

- CIM V8 is available from Job Manager & DManager
  - Job Manager based solution spans the boundaries of the cell
  - Install targets are specified in agentless fashion
  - Install and config job scheduling is supported
- CIM V8 is able to remotely install WebSphere Application Server, IBM HTTP Server, Application Clients, DMZ Security Proxy Server, and Web Server Plug-ins
- Better scalability due to more distributed architecture
- Distributed & z/OS scenarios supported
- "CIM V7" function is still available with Deployment Manager along with new "CIM V8" function



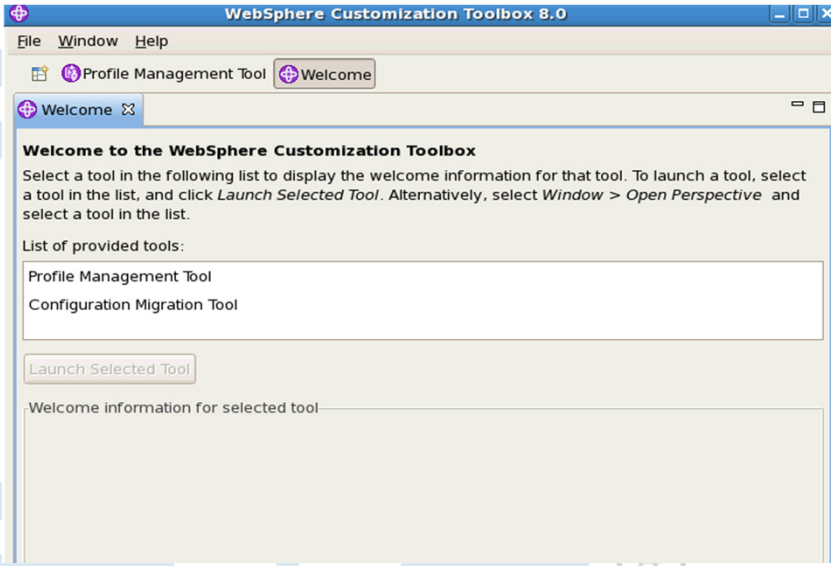
Separation between Job Manager, Target Hosts and IIM repositories

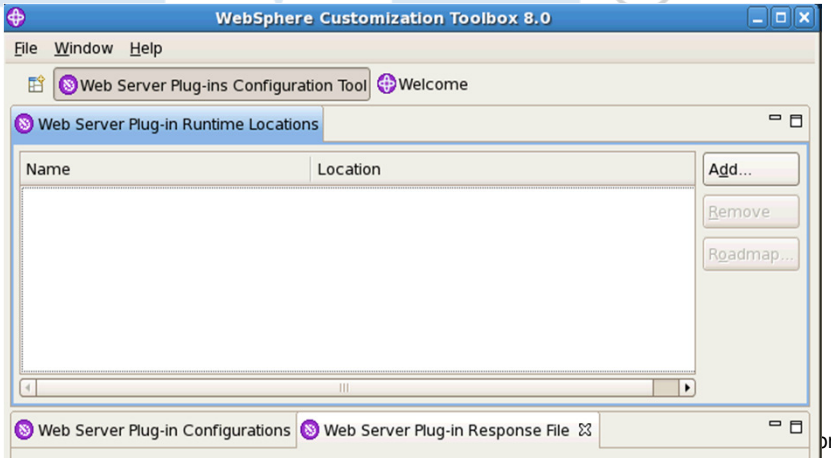
New In V8.0 !

WebSphere Customization Toolbox (WCT)

Consolidates Multiple Stand-alone Tools

- Replacement for Profile Management Tool
  - Manages Profiles
  - Migration
  - Web Server Plug-in Configuration





New In V8.5 !

V8.5 Default Messaging Provider Infrastructure Improvements

- Restrict *long running* Database Locks
  - Active ME now holds only *short locks* on the SIBOWNER table while revalidating its ownership at regular intervals
- Ability for SIBus to detect a hang in the "*active*" ME and switch over to the "*standby*" ME
  - Adds ME Last Update Time to SIBOWNER Table
  - Backup ME Can Safely Take Ownership and avoid Split Brain
- ME able to *gracefully stop* from database failures instead of *killing* the entire JVM
  - Other Applications In JVM Hosting ME Continue to Run
- Automatically "*re-enable*" a ME if it enters a "*disabled*" state
  - In a Large Cluster It Can Be Difficult to Administratively Determine "disabled" ME
- Configure a new ME to *recover data* from a orphaned persistence store
  - Reads and Updated ME UUID from Persistent Records
- *Persist* JMS re-delivery count value
  - Avoids Reprocessing of Message That May Cause Outage
- Utilization of multi-cores for *quicker ME start-up* when large number of messages and destinations are present

New In V8.5 !

Memory Leak Detection and Protection in WAS V8.5

Reduce possibilities of memory leak in your applications

Get enough info. if leak is detected to help fix my app

List stopped apps that have memory leaks

WebSphere Application Server V8.5:

- Ability to mitigate memory leak when stopping apps
- Ability to prevent leaks, receive leak warnings and get heap/system dumps
- MBean to list stopped apps that have memory leaks

Unparalleled Application Development and Management Environment, Rich User Experiences…Faster

Developer Experience

Fast, flexible, and simplified application development

- Java 6 EE
- Liberty Profile
- Expanded Tooling and WAS Tooling Bundles
- Web 2.0 & Mobile Toolkit; IBM Worklight Integration
- JDK7 Support
- Migration toolkit
- OSGI programming model enhancements
- EJB support in OSGi apps
- SCA OASIS programming model

Application Resiliency

Intelligent Management & Enhanced Resiliency

- Improved Performance
- Application Edition Management
- Application Server Health Management
- Dynamic Clustering
- New Intelligent Routing capabilities
- Installation and Maintenance
- Messaging infrastructure resiliency
- Memory leak detection & protection in WAS

Operations and Control

Improved Operations, Security, Control & Integration

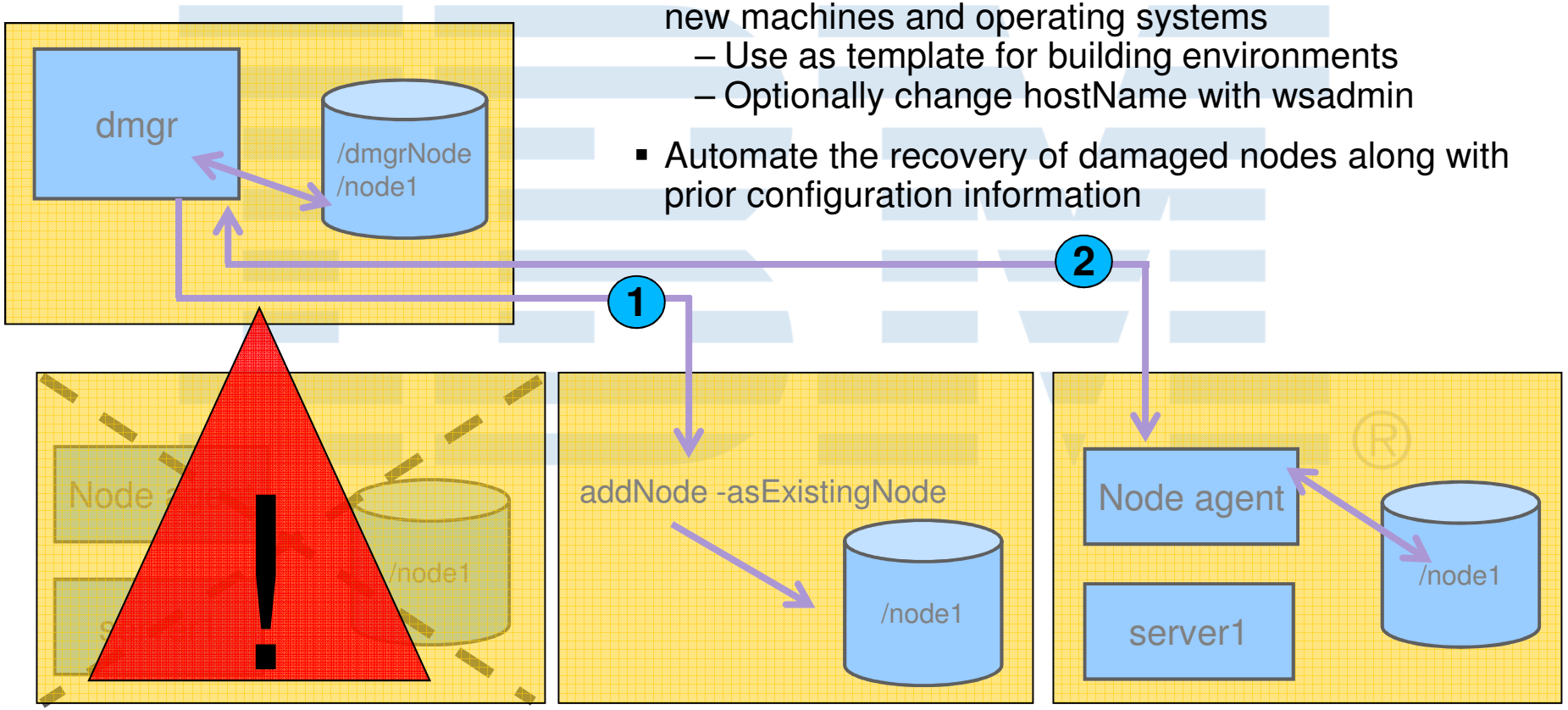
- Selectable JDK
- WebSphere Batch enhancements
- Configuration Change Tracking
- OSGi Blueprint security improvements
- Cross Component Trace (XCT)
- Enhanced IBM Support Assistant
- Better log and trace filtering

New In V8.0 !

Move and Recover Nodes with Ease

Improve administrator productivity and minimize down time

- Automate the movement of existing deployments to new machines and operating systems
  - Use as template for building environments
  - Optionally change hostName with wsadmin
- Automate the recovery of damaged nodes along with prior configuration information



Original Machine: host1

Damaged Node

New Machine: host2

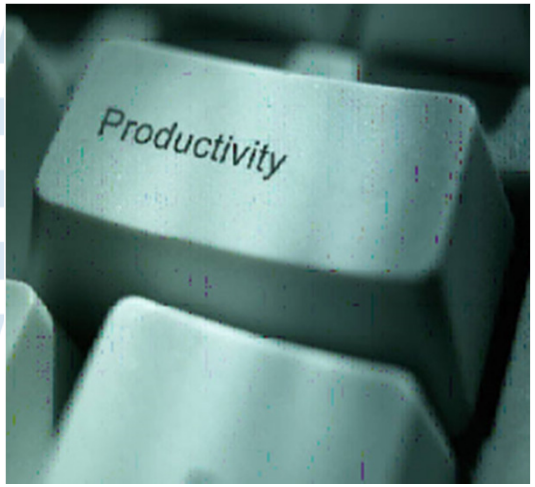
Recovered Node

Enhanced In V8.0 !

WAS V8 Additional Administrator Productivity Enhancements

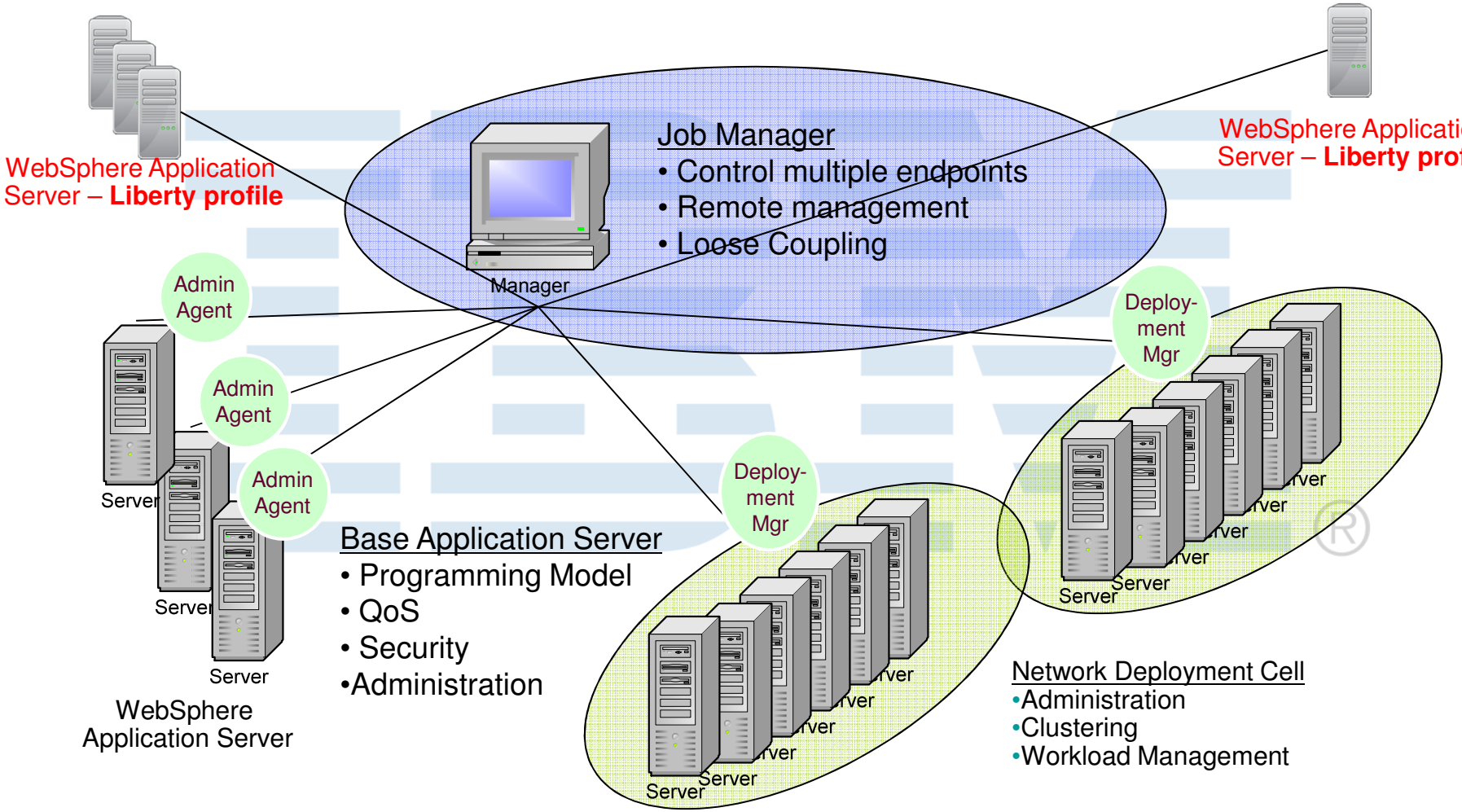
Improve administrator productivity and minimize down time

- Job Manager enhancements
  - Simplify the creation, augmenting and deletion of profiles on remote nodes
- Enhanced portability of Properties File Based Configuration
  - Speed and standardize customizations across different cells
- Enhanced Properties File Based Configuration format
  - Easier editing of application deployment options
- Administrative option for all platforms to list all SDKs in use and select SDK to use from among supported Java SDKs
  - manageSDK command replaces enableJVM command
  - Typically used on z/OS and iSeries for 31/32 bit and 64 bit SDK selection



Enhanced In V8.5 !

WAS V8.5 Job Manager Improvements



New In V8.5 !

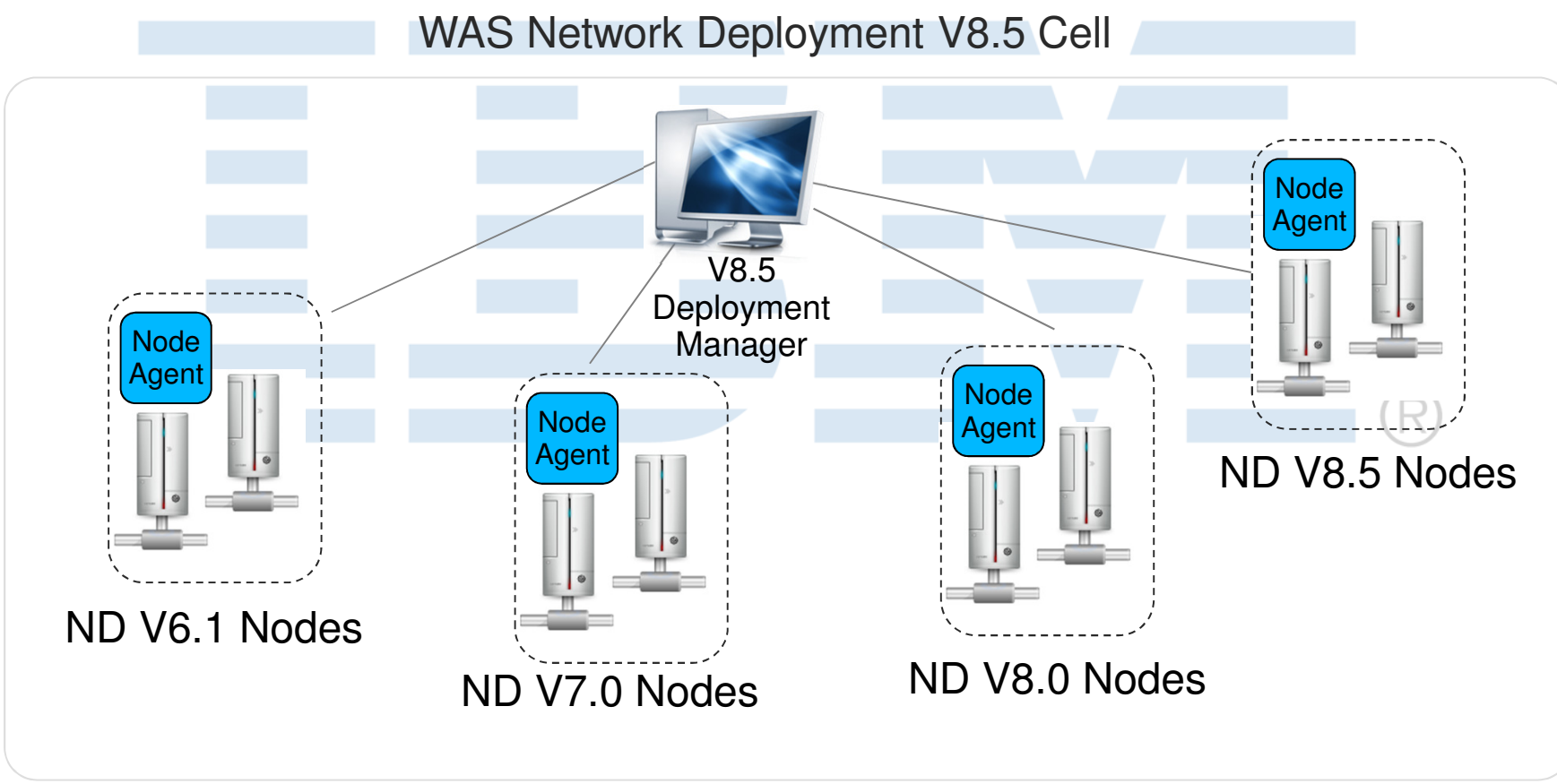
WAS V8.5 Selectable SDK

Allow development and production environments to select the most appropriate JDK for the situation (JDK 6 or 7)

- WAS v8.5 introduces “selectable” JDK:
  - Some of the environment can use Java 7 while the rest continues to use Java 6
  - Use Java 7 in a small subset of your topology & keep the rest on Java 6
  - Switch back and forth between Java 7 and Java 6 as necessary
- Install as feature extension to new or existing WAS v8.5 installation
  - Use with either full WAS profile or Liberty profile
- Create WAS admin profiles for developer use
  - Use managesdk to set WAS new profile and command defaults to Java 7
  - Create admin profile and start server
- Build and test Java 7 applications
  - Use ant or maven to build Java 7 applications
    - See PlantsByWebSphere sample docs for information
  - Use RAD to develop, deploy, and test Java 7 applications

Mixed Version Cell Support

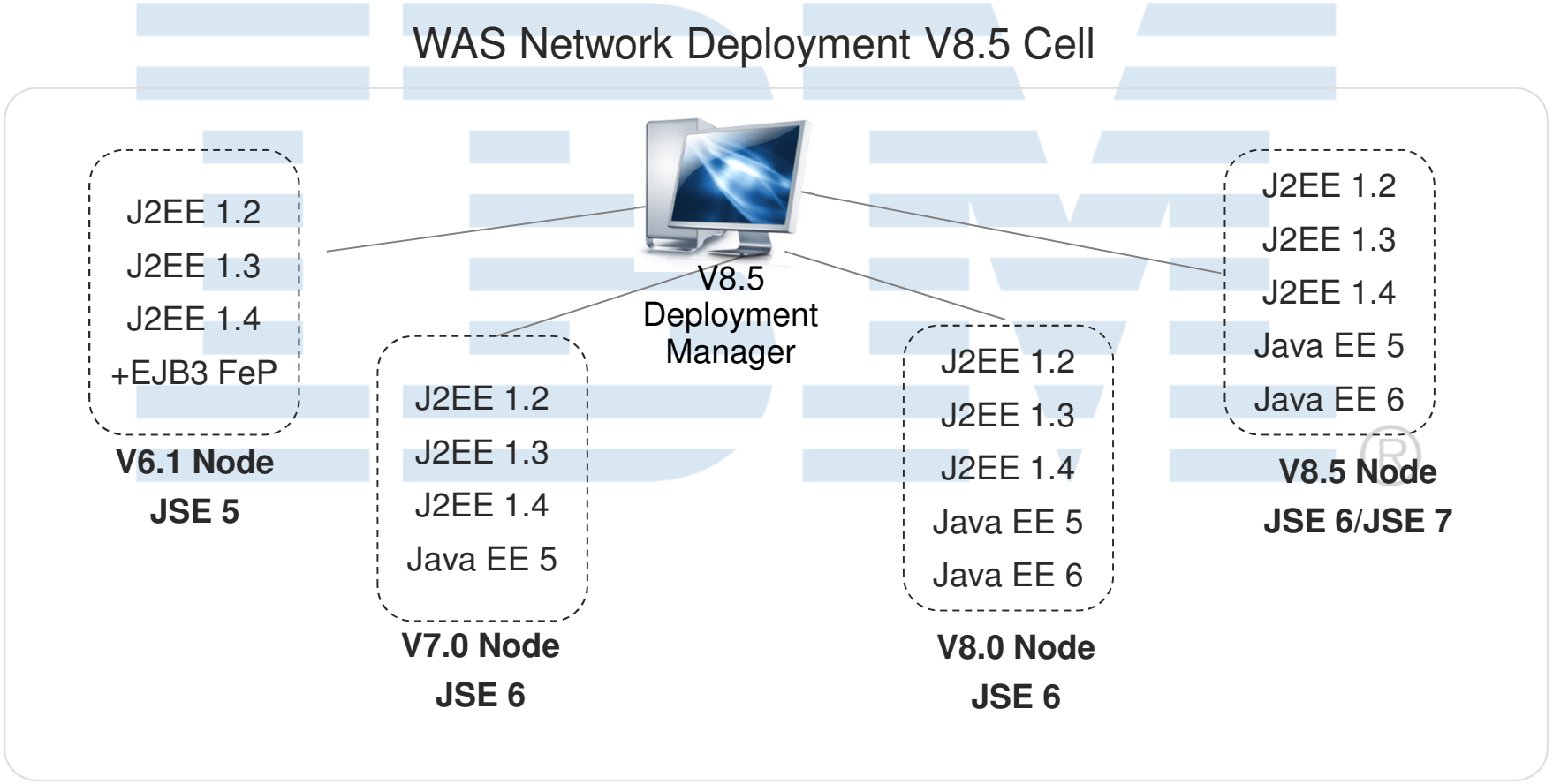
Support for existing infrastructure in new V8.5 deployments to save time, money and reduce risk



V8 Cell can contain 6.1. 7.0 & 8.0 nodes

Support for Existing Applications

Support for existing Java EE applications in new V8.5 deployments to continue achieving value from existing investments

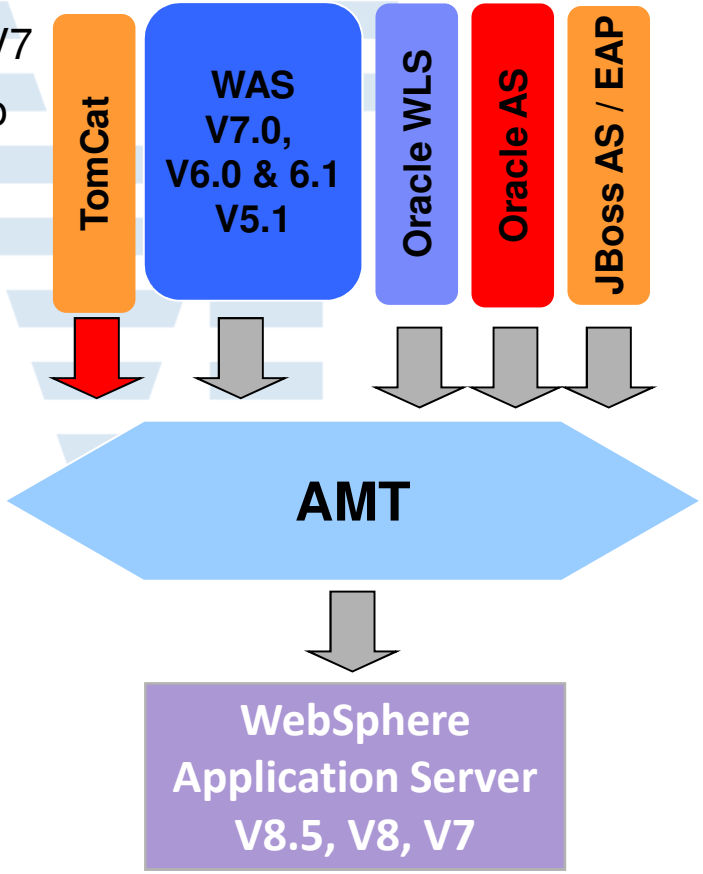


V8.x Cell can contain 6.1. 7.0 & 8.x nodes

Application Migration Toolkit V3.0

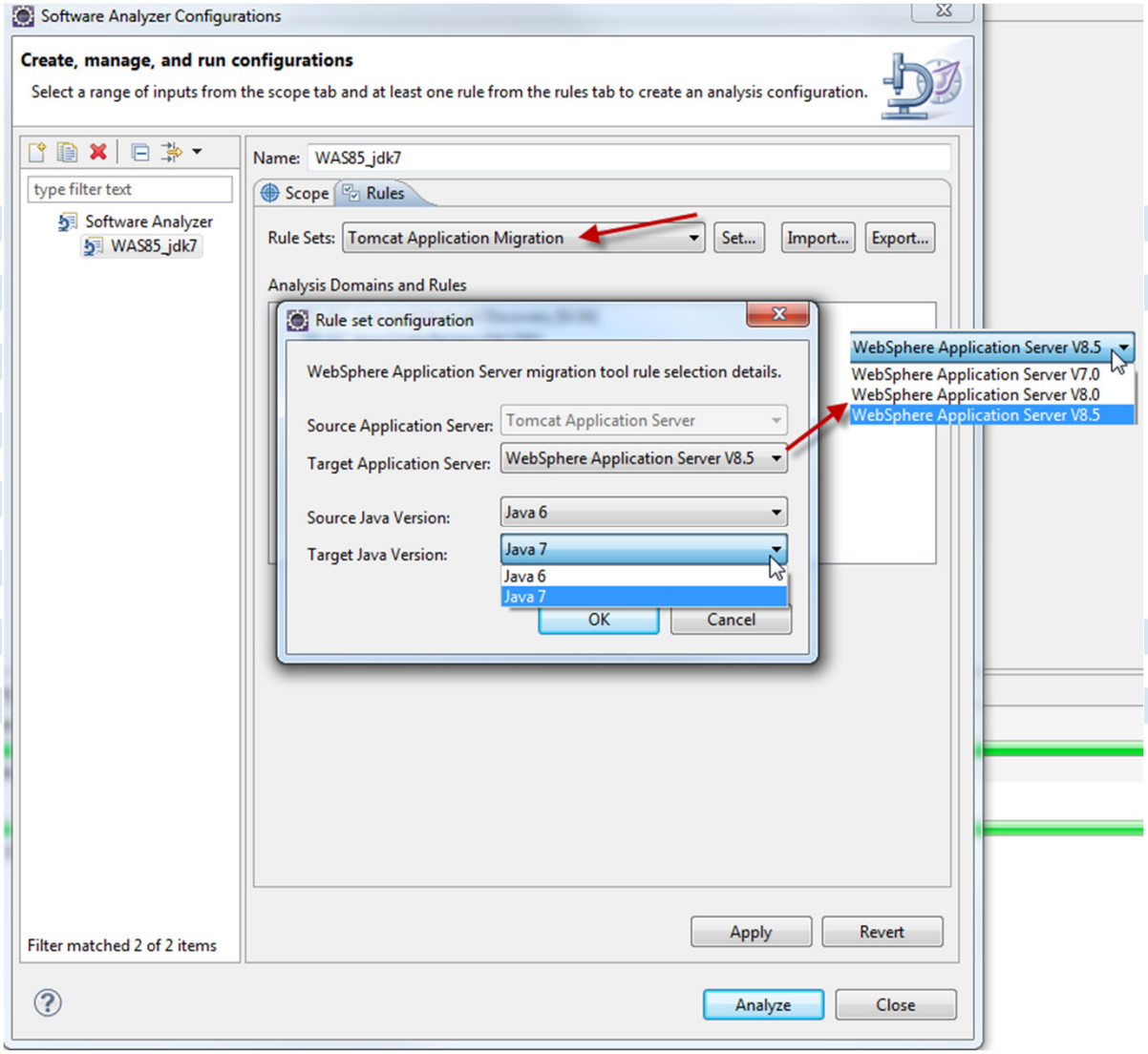
Migrate applications from WebSphere & other Java EE application servers to WebSphere faster with minimized risk

- Migrate applications from older releases to WAS V8.x or V7
- Migrate from Tomcat, Oracle or JBoss faster and easier to WAS V8.x or V7
  - Migrate applications up to 2x as fast
  - Migrate web services up to 3x as fast
- Application Migration Tool
  - Analyzes source code to find potential migration problems:
    - Removed features
    - Deprecated features
    - Behavior changes
    - JRE 5 & JRE 6 differences
    - Java EE specification changes or enforcements
  - Capable of making some application changes
  - Provides guidance on how to make required changes
  - Works with Eclipse or Rational Application Developer (RAD)



Get the Tool at No Charge: http://ibm.co/hqfkdj

Application Migration Tooling v3.0



Configuration Migration Tooling

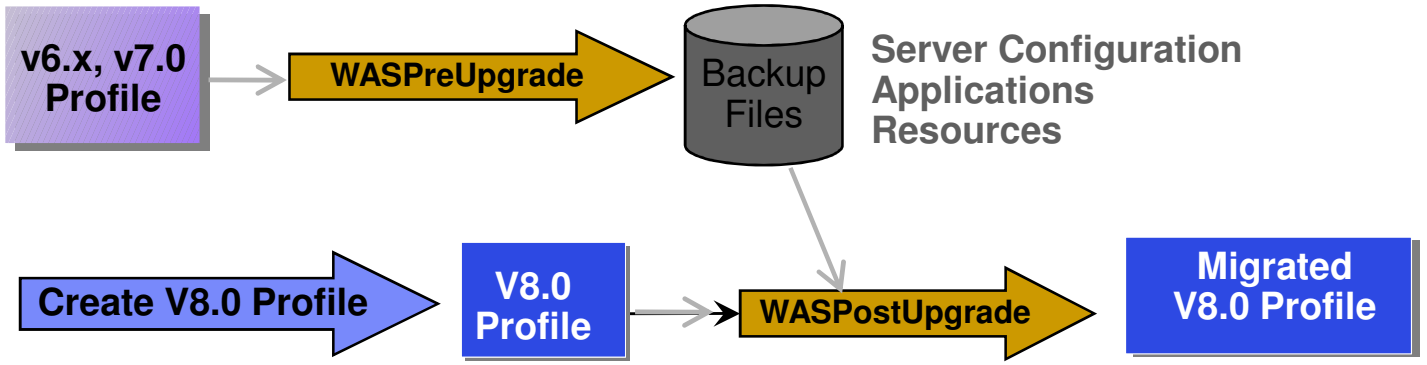
Migrate WebSphere environments faster with minimized risk

Assists administrators in moving their configuration when migrating

- Merges old configuration with new configuration
- Provides deep functionality, e.g. “Lights-on” WAS migration
- Especially useful for customers that have large topologies
  - Large telecom customer recently used the tool when migrating a 500+ JVM environment

Provides a framework for Stack product migration

- Already in use by Commerce, Portal, WPS and Virtual Enterprise



New In V8.0 !

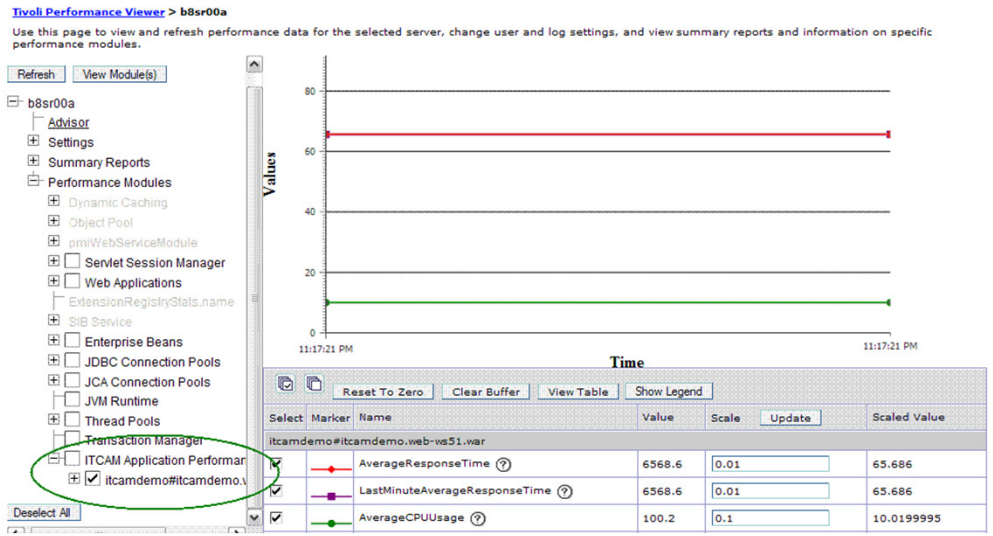
ITCAM for WebSphere Application Server for WAS 8

Lower TCO and minimize down time through integrated monitoring tools

IBM Tivoli Composite Application Manager (ITCAM)

- Data Collector available in WebSphere Application Server v8.0 as an extension offering (optional install)
- V8.5 Download and Install
  - https://www-304.ibm.com/software/brandcatalog/ismlibrary/
- ITCAM for WebSphere Application Server provides additional request-based response time and CPU metrics
  - 90%CPUUsage
  - 90%ResponseTime
  - AverageCPUUsage
  - AverageResponseTime
  - LastMinuteAverageCPUUsage
  - LastMinuteAverageResponseTime
  - MaximumCPUUsage
  - MaximumResponseTime
  - MinimumCPUUsage
  - MinimumResponseTime
  - RequestCount

- Customer application code is not instrumented in any way
- Simple upgrade from ITCAM for WebSphere Application Server to ITCAM for Application Diagnostics – no rip and replace
- After upgrade ITCAM data still visible in Tivoli Performance Viewer as well



New In V8.5 !

V8.5 Security Enhancements

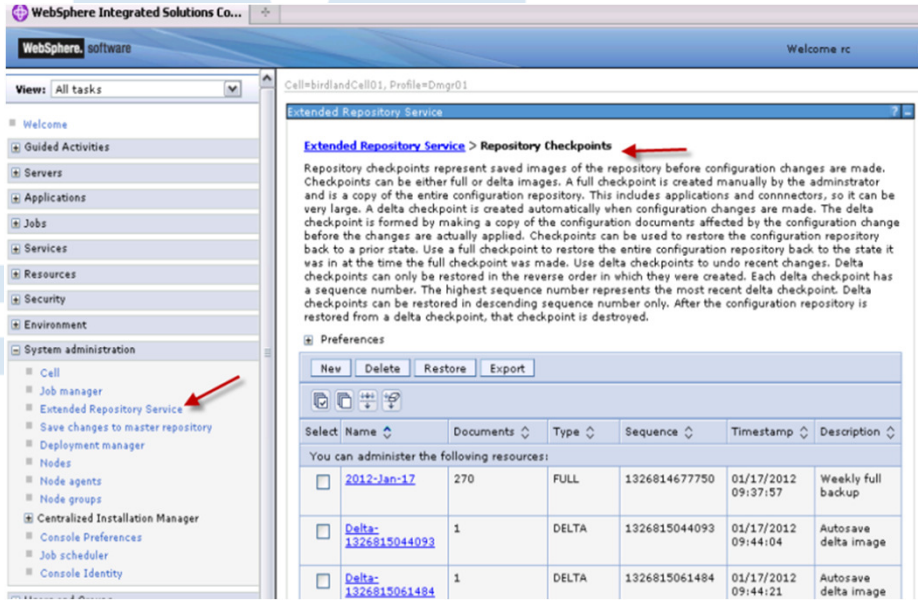
Ensure app server environment complies with OSGi security improvements and improve the ability to audit and track changes

- OSGi Blueprint security improvements:
  - Configure bean security in the Blueprint xml file
  - Configure bean-level security in OSGI apps
  - Configure method level security in OSGI apps
- Checkpoint Repository:
  - Audit and track any changes anybody makes to the WebSphere application Server configuration
    - Leverages Extended Repository from WVE

Repository Checkpoint and Admin Audit

Simplify restoration of earlier configuration checkpoints and record all configuration updates is security audit log.

- The Repository Service is consolidated from WVE
- Provides “full” and “delta” checkpoints of the master configuration repository.
- Simplifies restoration to a previous configuration state.
- Full checkpoint created manually
- Delta checkpoints, when enabled, are created automatically in checkpoint repository on every configuration-save
- New Security Audit event - ADMIN_REPOSITORY_SAVED refers to corresponding delta checkpoint records.
  - The delta checkpoint can be exported to review configuration changes when needed



Sample Audit Record

Seq = 42
Event Type = ADMIN_REPOSITORY_SAVE
Outcome = SUCCESSFUL
OutcomeReason = SUCCESS
OutcomeReasonCode = 109
ProgName = adminRepositorySave
Action = createDeltaCheckpoint
AppUserName = user1
ResourceName = Delta-1328459402156
ResourceType = delta checkpoint
CreationTime = Sun Feb 05 10:30:21 CST 2012
FirstCaller = user1 | Realm = defaultWIMFileBasedRealm
RegistryType = WIMUserRegistry

New In V8.5 !

IBM Support Assistant Data Collector

Resolve software issues as well as locate and collect key data in a timely manner

- Quickly collect diagnostic files or run traces that are predefined for WAS components
- View files and optionally send to IBM swiftly
- Shorten time to resolution

Customization

Automated data collections are specific to products and symptoms

Automated version of many MustGathers

Efficiency

Less time spent between a support analyst and the system operator

Reduces the effort to send the collected data to IBM support

Repeatability

Repeatable process with similar inputs without fear of human error

Simplicity

Executable by operators not familiar with the nature of the working product

New In V8.5 !

V8.5 Cross Component Trace (XCT) for Problem Determination

Improve your ability to diagnose & debug SW problems in order to minimize and eliminate application downtime

- XCT log viewer - available for the IBM Support Assistant, can render log and trace content from multiple log / trace files grouped by request
  - View that detailed information on HTTP and JMS requests and responses to easily debug complicated application problems.
- High Performance Extensible Logging (HPEL) now has log / trace entry extensions
  - Filter entries by application name, by request ID or by other custom fields

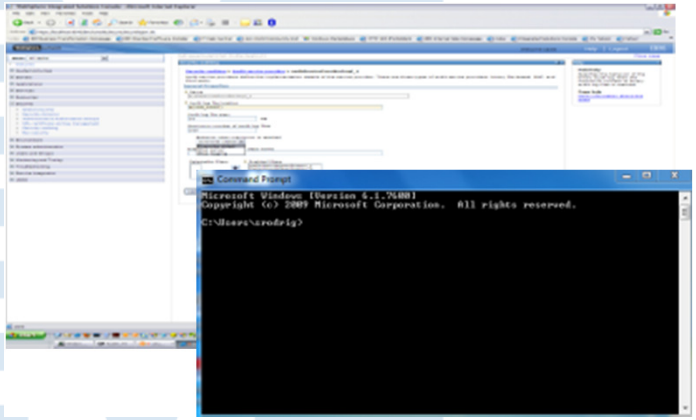
New In V8.0 !

V8.0 High Performance Extensible Logging (HPEL)

Improve performance & ease of use of log & trace to improve problem determination

Key Features:

- Speeds up logging and tracing
  - Log primitive over 6x faster than WAS v7
  - Trace primitive 3.8x faster than WAS v7
- Provides more flexible access to log and trace data
  - Command-line access to filter and format
  - Administrative console GUI to filter and format local or remote logs and trace, even when the remote server is down
  - Programmatic access to filter, format, and merge local or remote logs and trace
- Works with existing application log and trace instrumentation
- Provides a common solution for z/OS and distributed platforms



Examples:

View only warning and higher msgs for this one application:
logViewer.sh -minLevel warning -includeLoggers "com.acme.app1.*"

View msgs from 07/11/2010 onward beginning with SEC on thread 0x0000000c:
logViewer.sh -startDate 07/11/2010 -message "SEC*" -thread 0c

Enhanced in V8.5 !

V8.5 HPEL Extensions and Improvements

- HPEL log / trace entries can now be extended with name value pair 'extensions'
  - JEE application name has been added as an extension (called 'appName') to all log / trace entries created on threads associated with an application
  - XCT requestID has been added as an extension (called 'requestID') to all log/trace entries known to be created on threads associated with a request
- When viewing HPEL log / trace, entries can be filtered by appName, requestID, or any other extension via the HPEL logViewer command

```
logViewer.sh -includeExtensions appName=ACMEShovels –format advanced
…
[12/10/11 10:52:01:500 EST] 000001c6  1 UOW= source=com.acme.SomeLogger thread=[WebContainer : 6] org= prod= component= appName=[ACMEShovels]
        This is a trace entry from the MyShovels application

...
```

- Developers can add their own extensions to HPEL log / trace entries via the new **LogRecordContext** API

Copyright and Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at “Copyright and trademark information” at www.ibm.com/legal/copytrade.shtml.

Backup

Maximize the Value of your WebSphere Investment

The technology you need, when you need it

Access to WebSphere Feature Packs

Award-winning IBM Support Portal

Renewing your IBM Software Subscription and Support is the best way to ensure you get continuous and maximum value

- Protect your investment
- Leap ahead of competitors
- Get up and running faster

Download the latest enhancements of entitled WebSphere software

Enhance your business. Renew your software subscription today.

Flexible Delivery & Pricing Models for WebSphere Software

Extending Value and Function

- No-cost WAS for Developers
- No-cost WAS Feature Packs
- Rational Application Developer for WebSphere Standard Edition
- No-cost Version to Version Application Migration Tool
- No-cost Open Source WAS-CE with optional support
  - Socket based pricing for optional support
- Socket based pricing for WAS Base
- Simple Load Balancing (Web-tier) in WAS Base
- Flexible licensing

Traditional

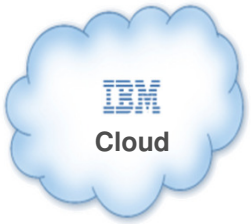
- WebSphere Application Server
- WebSphere Virtual Enterprise
- WebSphere eXtreme Scale
- Sub-capacity licensing

Private clouds

- IBM Workload Deployer
  - WAS Hypervisor Editions
  - WebApp Workload Pattern
- Intelligent Management Pack
- Sub-capacity licensing

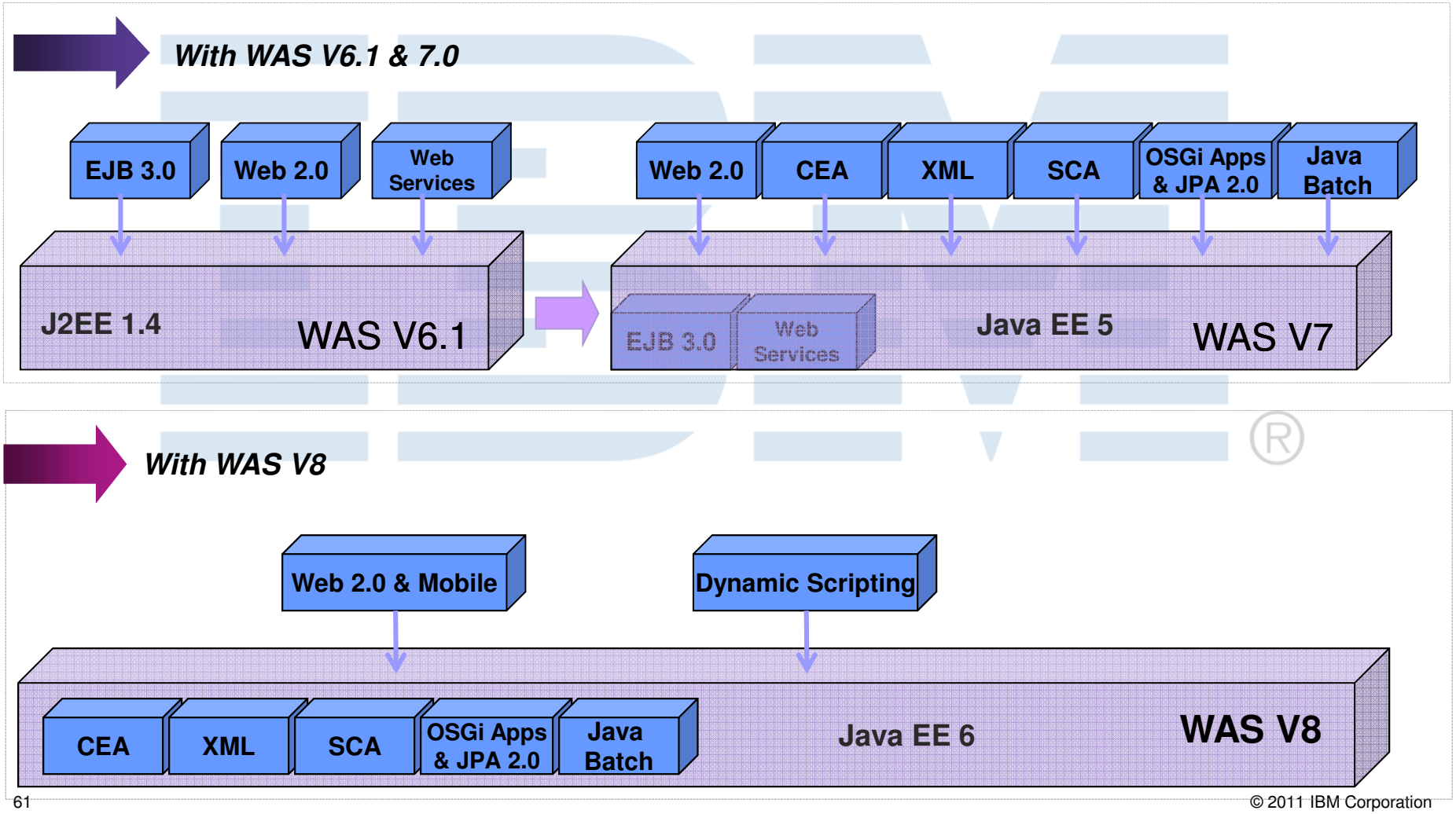
Public Clouds

- WAS on IBM Public Cloud
- WAS Amazon Machine Image (AMI)
- Pay per SW use or bring your SW
- Bring your license (on IBM Cloud)
- IBM Sandbox



WebSphere Application Server Feature Packs

Access innovative standards and programming models faster on a stable foundation



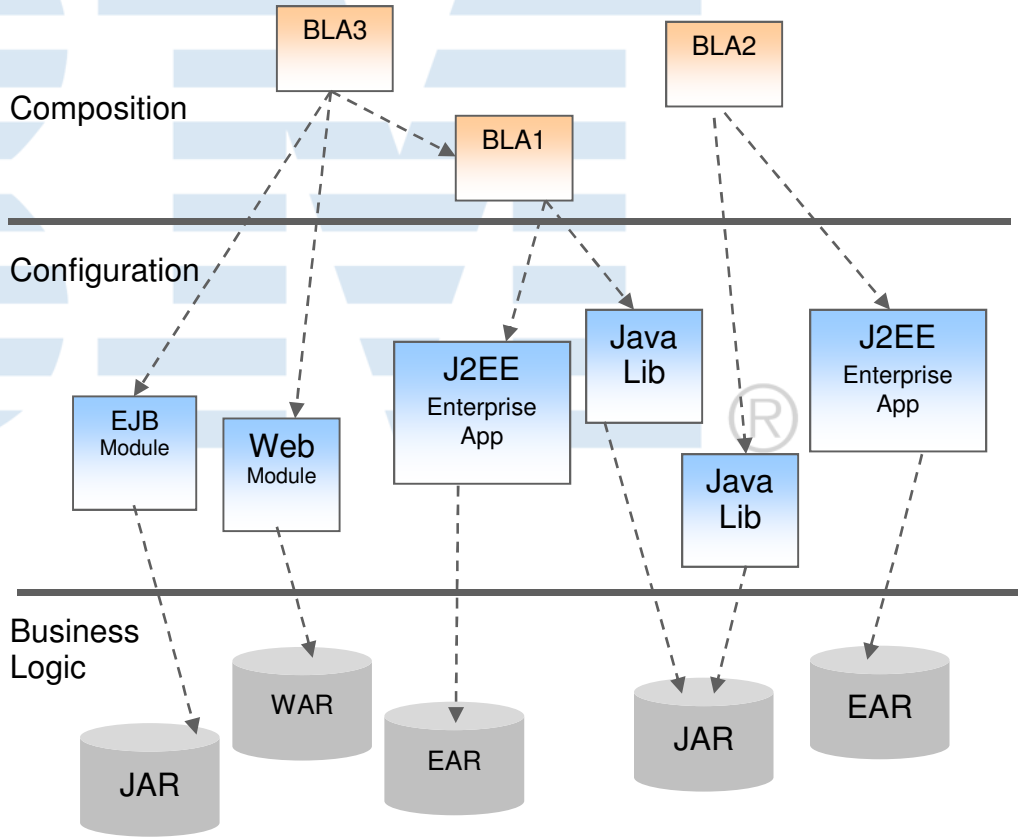
WebSphere Application Server support for OSGi projects

		Supported in WebSphere Application Server version 7.0	Supported in WebSphere Application Server version 8.0
OSGi Applications containing:	OSGi Bundles	✓	✓
	OSGi Fragments	✓	✓
	OSGi Composite bundles		✓
	Java EE WAR Modules	✓	✓
	PDE plug-ins	✓	✓
	PDE fragments	✓	✓
OSGi Composite bundles containing:	OSGi Bundles		✓
	OSGi Fragments		✓
	PDE plug-ins		✓
	PDE fragments		✓

WebSphere Business Level Applications (BLA)

Simplify admin tasks and management of multi-component applications

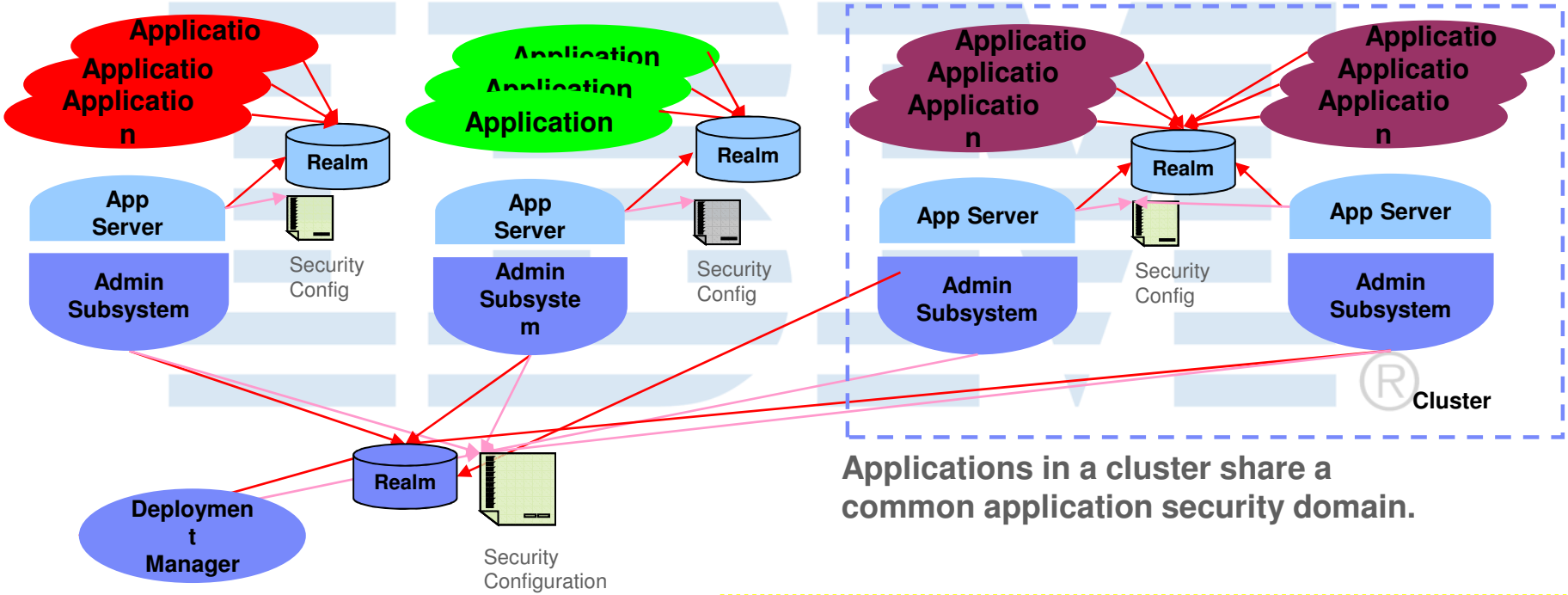
- A composition model that extends the notion of “Application”
  - Manages JEE and non-JEE artifacts like SCA packages, libraries, proxy filters etc.
  - Performs dependency management by tracking relationships between application components
  - Supports Application Service Provider (ASP) scenarios by allowing single application binaries to be shared between multiple deployments
- Supports full lifecycle management of business level applications
  - create, start, stop, edit, delete
- Aligns WebSphere Applications better with business as opposed to IT configuration



Multiple Security Domains

Separate applications, users and infrastructure to increase flexibility and control

Applications can have their own application security domain. Own user population



Applications in a cluster share a common application security domain.

Deployment Manager, Node Agent, and the Admin Subsystem common administrative security domain.

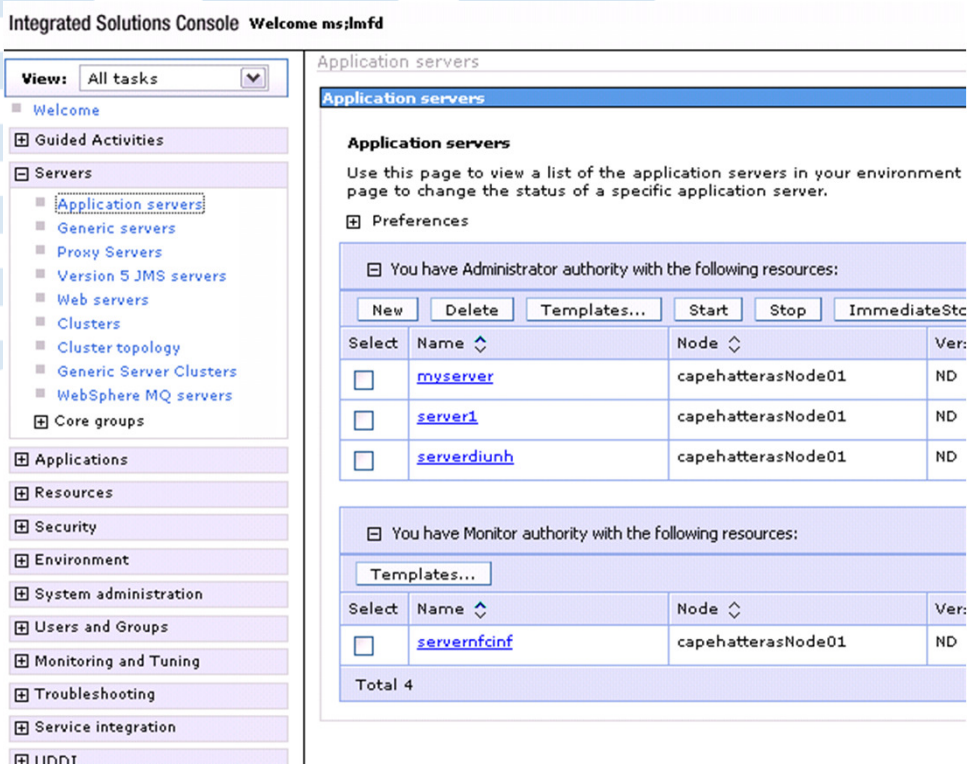
- Multiple security domains provide flexible security configuration under centralized management
- Ability to separate User security domain from administrative security domain

Fine-grained Administrative Security

Isolate administrators from each other and according to access levels to improve security and governance

Key Features:

- Users can be defined with administrative roles on specific resources:
  - Cells, node groups, nodes, clusters, servers, and applications
- Administrative Console will be filtered by user's administrative role
- User cannot access any other resources outside assigned resources

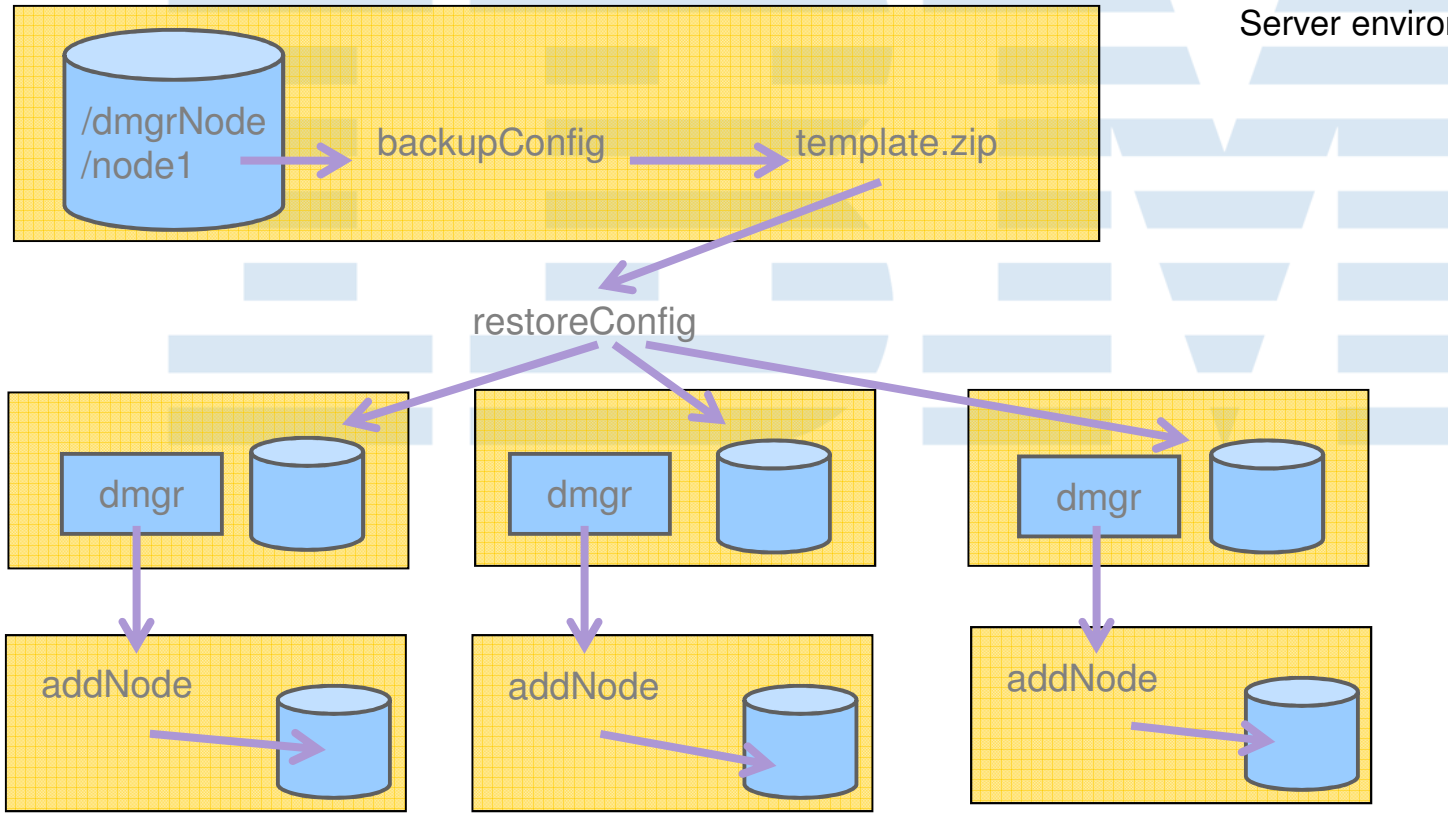


New In V8.0 !

Create Cells from a Template

Improve administrator productivity and repeatability and minimize errors

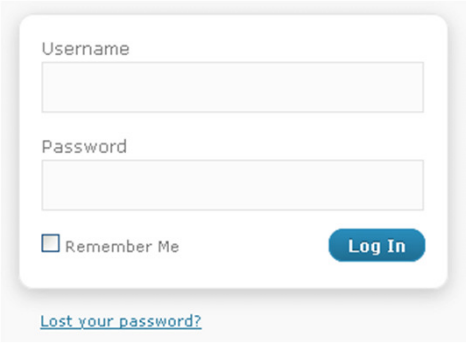
- Automate and improve repeatability of deploying consistent WebSphere Application Server environments



Single Sign On Improvements

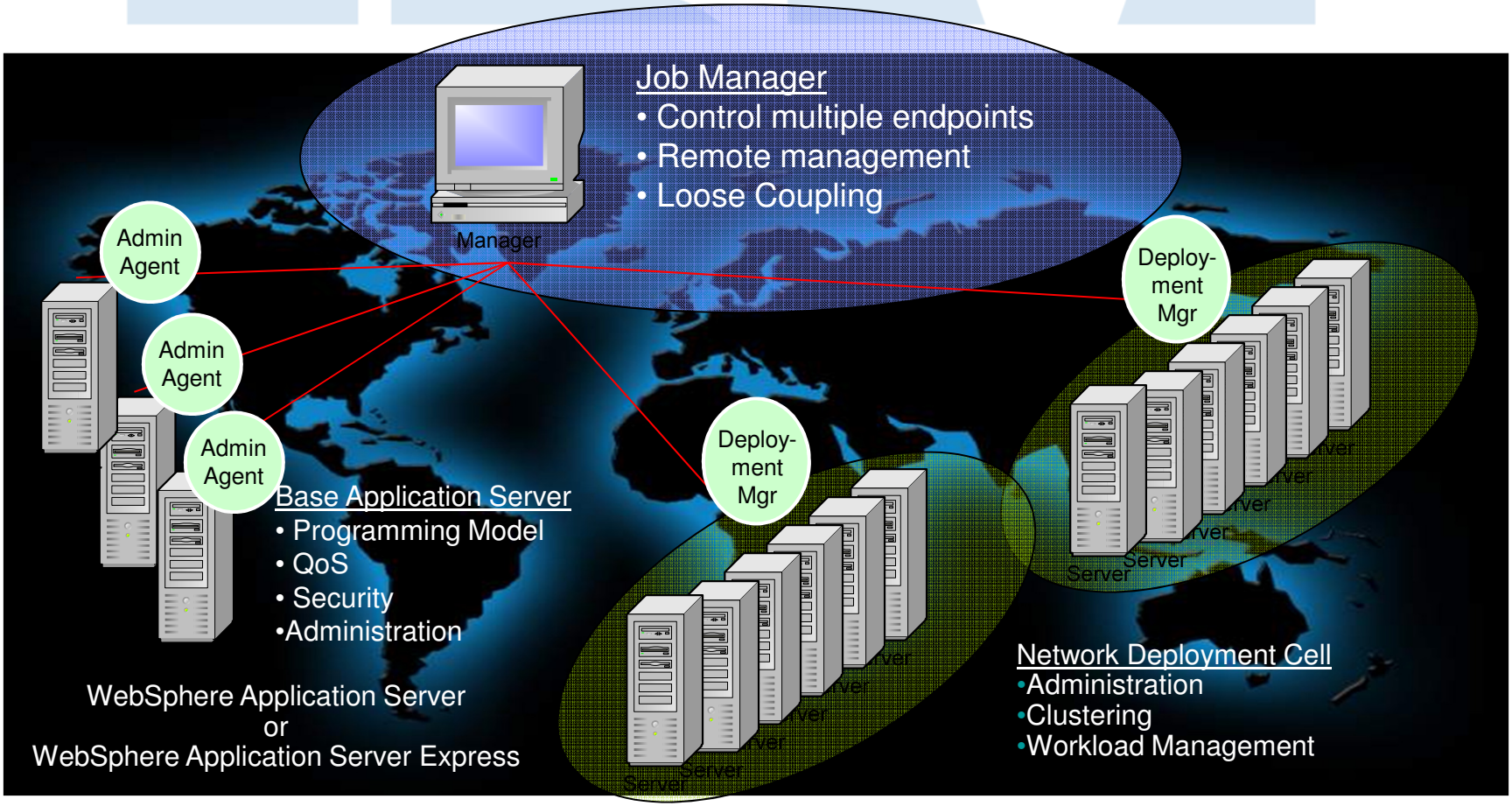
Improve end user ease of use while maintaining security controls

- Enhanced security in SSO web applications to reduce cross-site scripting vulnerabilities
- Support for using SAML Token through WS-Security SAML Token Profile 1.1
- Generate SAML tokens, request SAML tokens from an external Security Token Service (STS) & propagate SAML tokens in SOAP messages using the Web Services Security application programming interfaces (WSS API)
- Generate and consume tokens using WS-Trust Issue and WS-Trust Validate requests for JAX-WS Web services that use Web Services Security

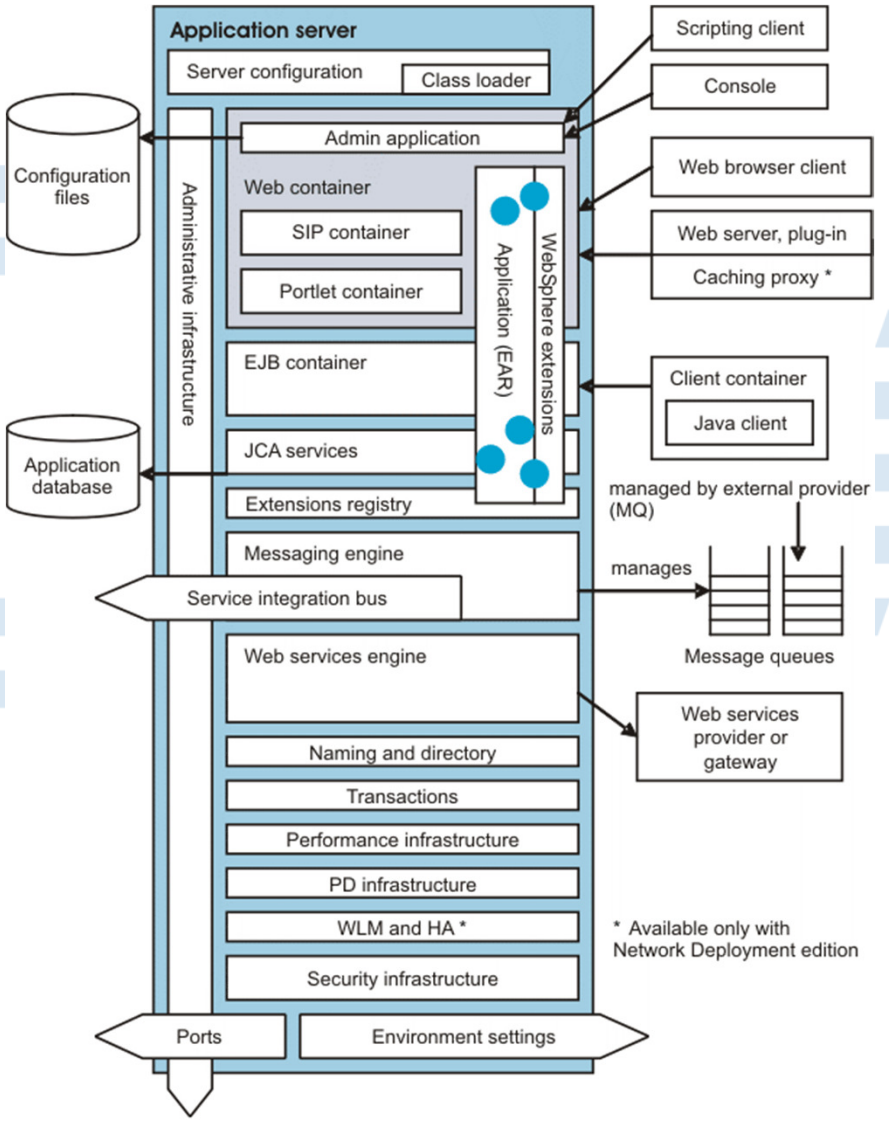


Flexible Management

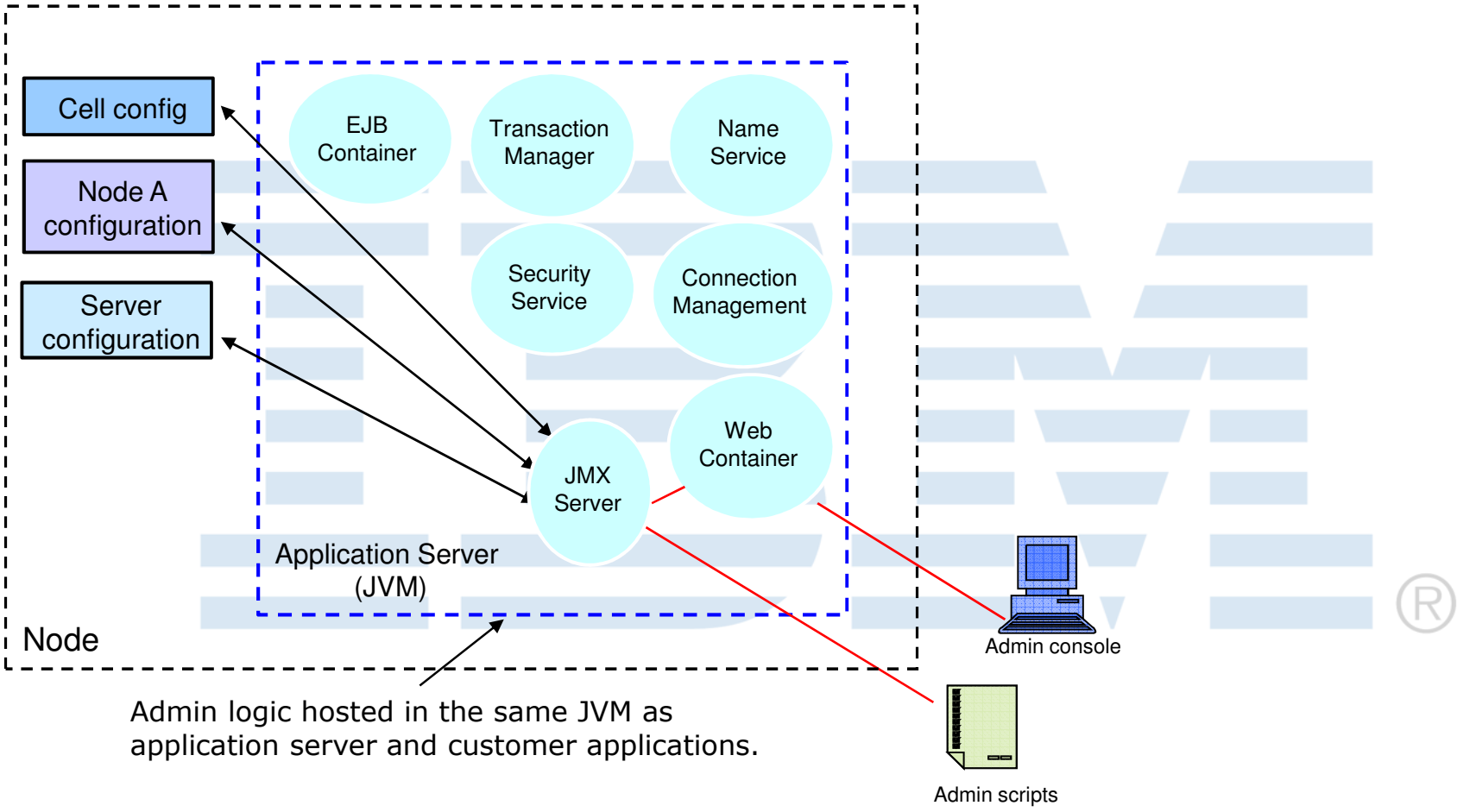
Utilize a flexible, scalable and asynchronous administrative topology for highly productive global administration and management



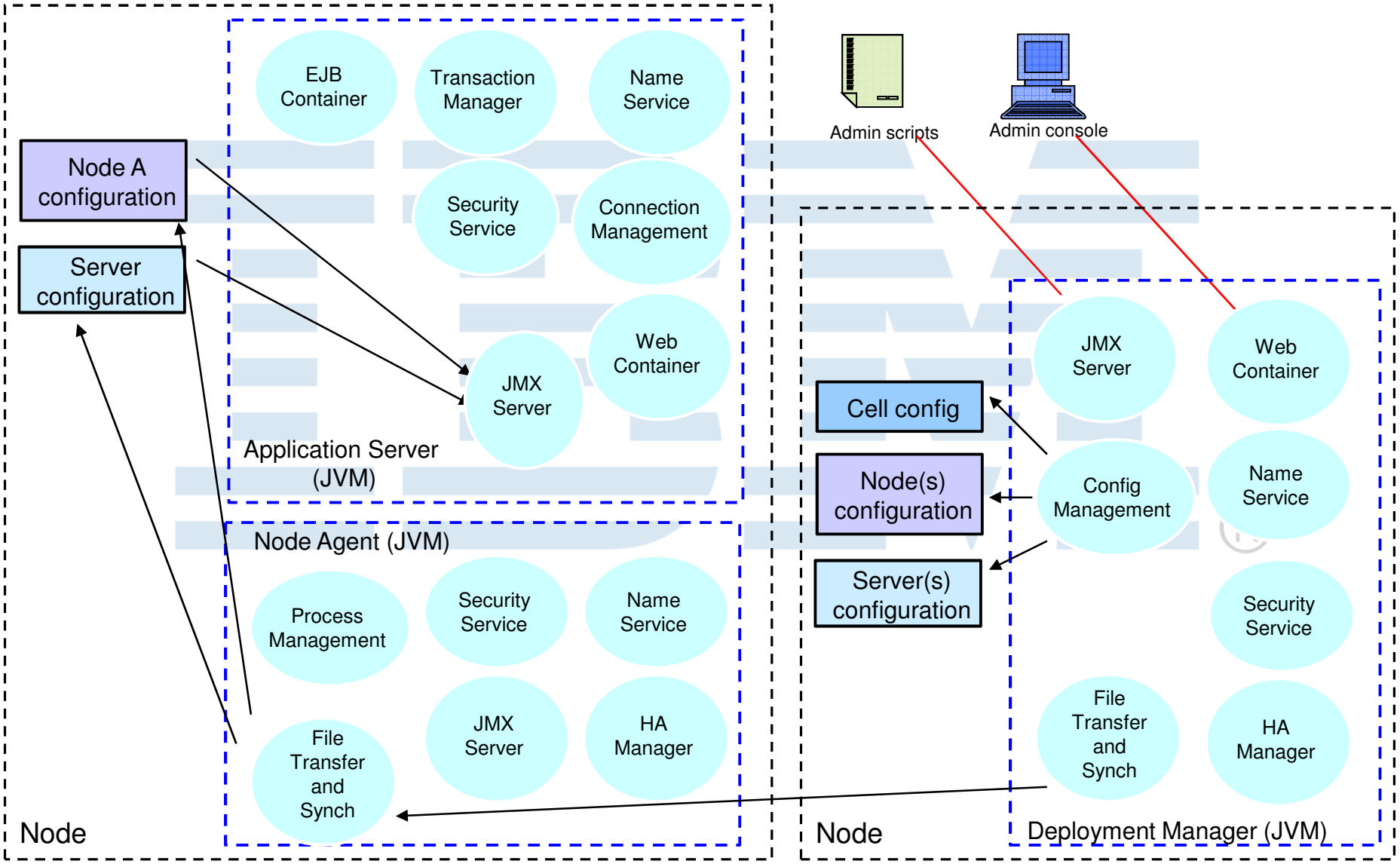
WebSphere Application Server Components



WebSphere Application Server Architecture



WebSphere Application Server Network Deployment Architecture



WebSphere Application Server Vocabulary

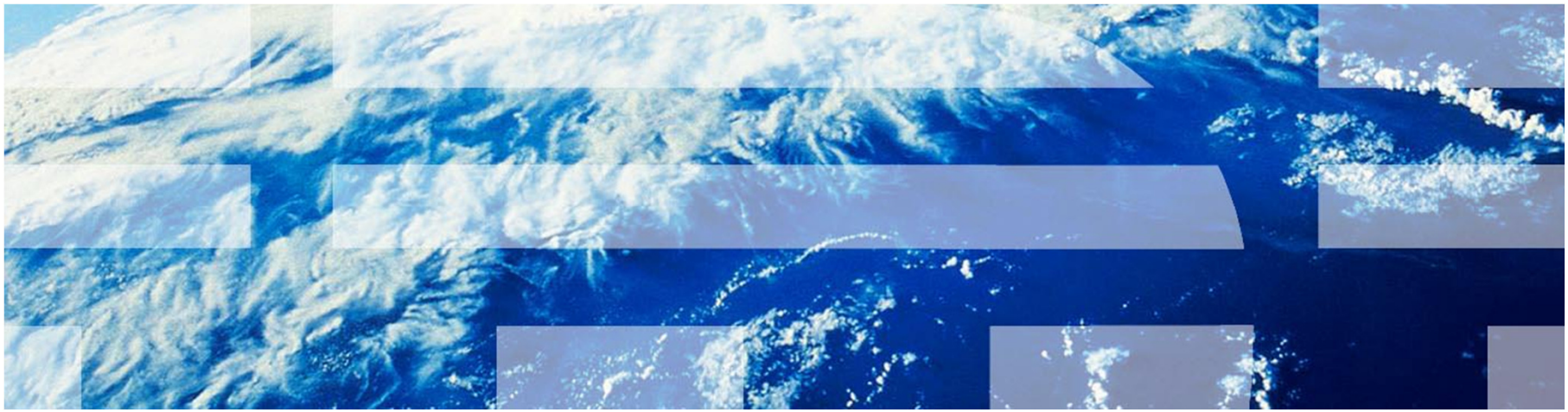
- Application Server
  - JVM hosting applications
    - Hosts administration in WAS
- Node Agent
  - WAS-ND JVM Providing Node Configuration and Process Management
- Deployment Manager
  - WAS-ND JVM Providing Centralized Administration and Monitoring
- WAS Cell
  - All Nodes Managed by Single Administrative Process
    - Multiple Nodes in WAS-ND Managed by Deployment Manger
    - Single Node/Application Server in WAS **
- WAS-ND Cluster
  - Application Servers running same application(s)
    - Provides Request Distribution and Scalability
- WAS-ND Core Group
  - HA Domain
    - One or more per cell

** Admin Agent optional in WAS

Discovering the value of IBM WebSphere Application Server v8.5

For Administrators

Introduction to Intelligent Management



Agenda

- Intelligent Management Overview
- Application Edition Management
- Health Management
- Dynamic Clusters
- On Demand Router
- New Intelligent management Features in WAS-ND V8.5

WAS V8.5 Delivers

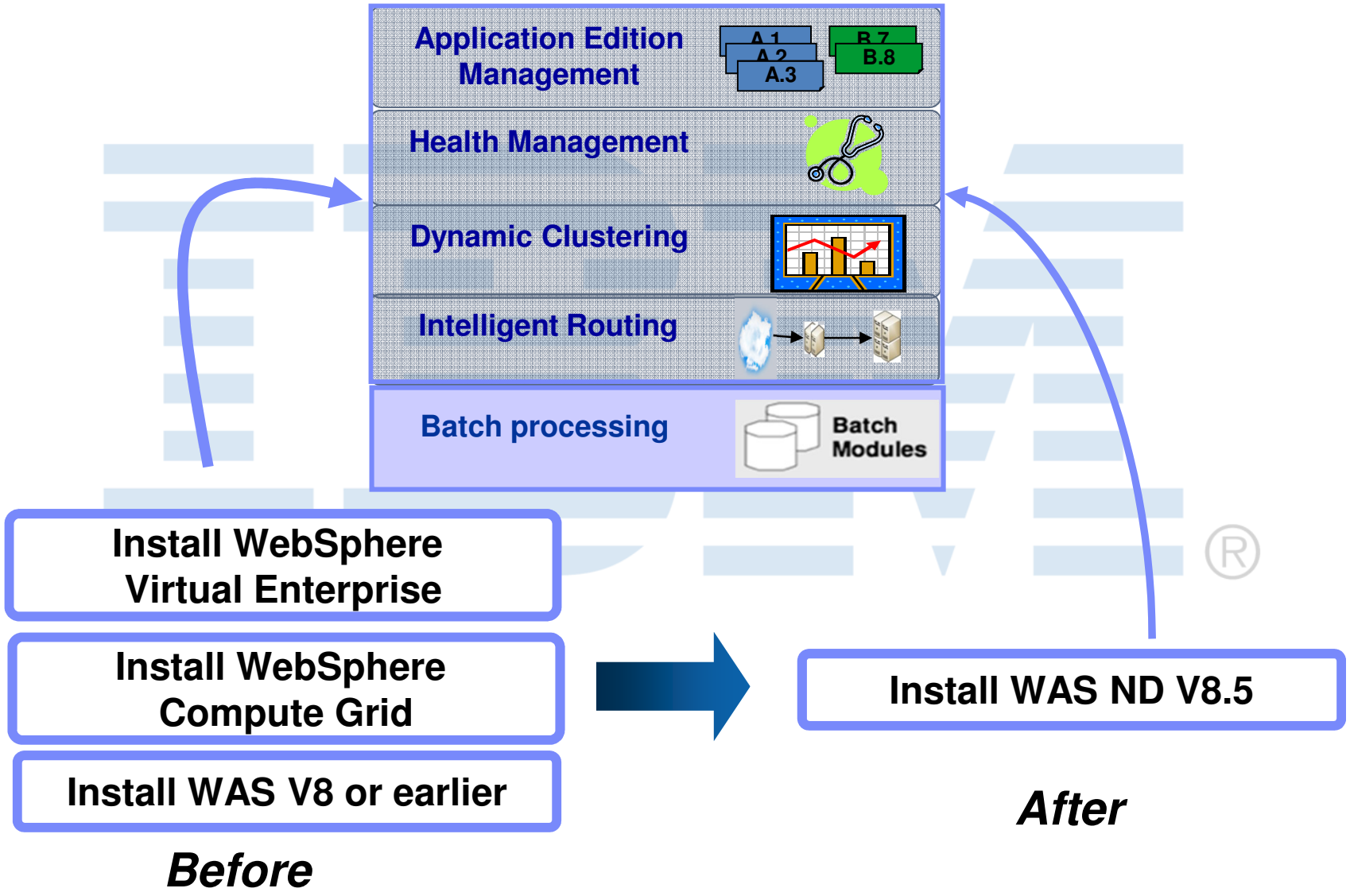
Improved Application Resiliency with Intelligent Management

Application Resiliency

Intelligent Management & Enhanced Resiliency

- Application Edition Management
- Application Server Health Management
- Dynamic Clustering
- New Intelligent Routing capabilities
- Messaging infrastructure resiliency
- Memory leak detection & protection in WAS

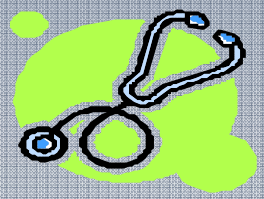
WAS ND V8.5 Resiliency enhancements – WebSphere Virtual Enterprise & WebSphere Batch



Extending QoS through autonomic computing

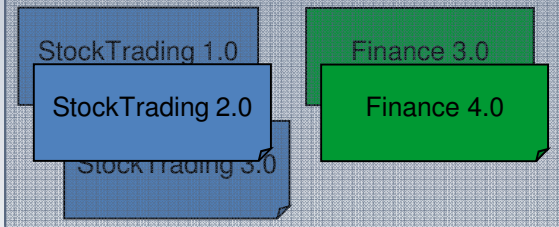
Health Management

Self-Protecting
Self-Healing



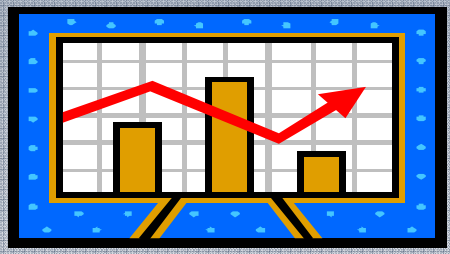
Application Edition Management

Self-Managing



Performance Management

Self-Optimizing



Intelligent Routing

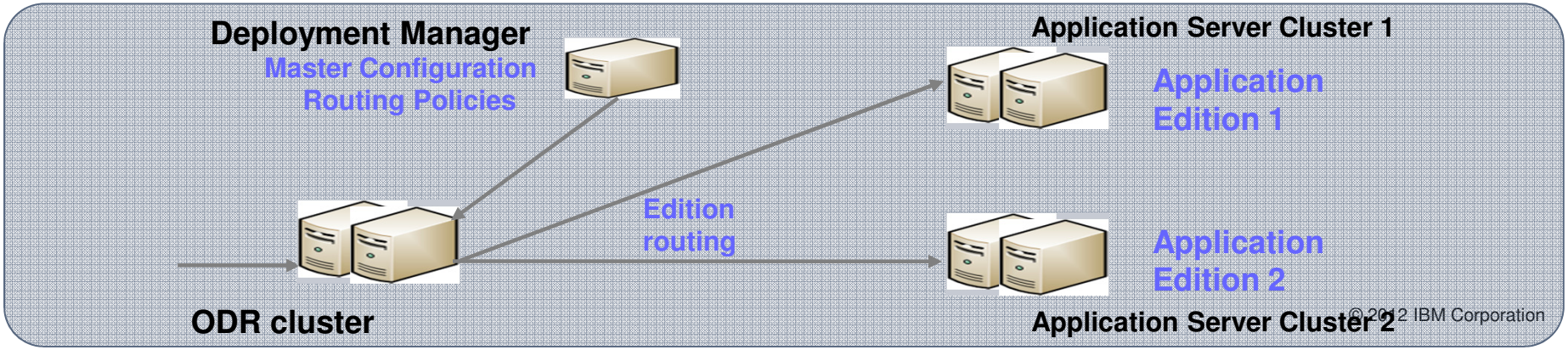
Self-Configuring

On Demand Router **AppServers**

Application Edition Management

Applications can be upgraded without incurring outages

- Upgrade Applications without interruption to end users
- Run multiple editions of an application concurrently
  - Automatically route users to a specific application
- Verify a new version of your application works in production before sending real customer traffic to it
- Rollout policies to switch from one edition to another without service loss
- Easily update OS or WebSphere without incurring down time
- Easy-to-use edition control center in admin console, plus full scripting support



Application Edition Management

Administrative Console - Edition Control Center

Edition Control Center

Edition Control Center > BeenThere

Manage editions of an application. The deployment targets for each edition were specified during the application install process. After install, an edition is initially in the inactive state. Inactive editions cannot be started. Activating an edition makes it eligible to be started. Validating an edition puts it into a special "validation mode" that configures the edition to run on a clone of its original deployment target. Validation mode requires assignment of a routing policy to the edition to control who may access it. Rolling out an edition performs an interruption-free upgrade of one edition to another on the same deployment target. Rolling out an edition that is in validation mode performs an interruption-free upgrade of the edition on the deployment target from which the validation mode target was cloned. After the rollout, the clone is deleted. Deactivation makes an edition ineligible to be started. Deactivating an edition will cause it to stop. The status column indicates whether an active or validation mode edition is running or stopped.

⊞ Preferences

Activate | Validate | Rollout | Deactivate

Select	Edition	Description	Target	State	Status
☐	Base	Base Edition	ProductionDC1	Inactive	⊘
☐	1.0	Generation 2 prototype	StaticTestCluster+Server1	Inactive	⊘
☐	2.0	Generation 2	ProductionDC1	Active	➔
☐	3.0	Project "Blue Diamond"	ProductionDC1-Validation	Validation	➔

Total 4

Sense and respond to problems before end users suffer an outage

- Automatically detect and handle application health problems
  - Without requiring administrator time, expertise, or intervention
- Intelligently handle health issues in a way that will maintain continuous availability
- Each health policy consists of a condition, one or more actions, and a target set of processes
- Includes health policies for common application problems
- Customizable health conditions and health actions

Comprehensive Health Policies

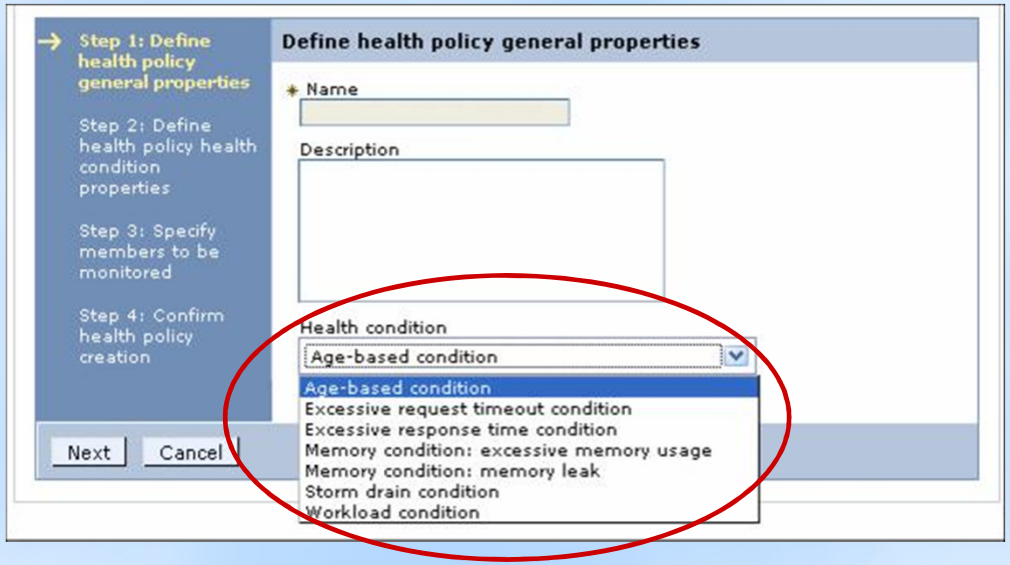
Customizable Health Conditions

Customizable Health Actions

Health Management – Health Policies

Helps mitigate common health problems before outages occur

- Health policies can be defined for common server health conditions
- When a health policy's condition is true, corrective action execute automatically or require approval
  - Notify administrator (send email or SNMP trap)
  - Capture diagnostics (generate heap dump, java core)
  - Restart server
- Excessive response time means you are monitoring what matters most: your customer's experience!
- Application server restarts are done in a way that prevent outages and service policy violations
- Each health policy can be in supervise or automatic mode. Supervise mode is like training wheels to allow you to verify that a health policy does what you want before making it automatic.



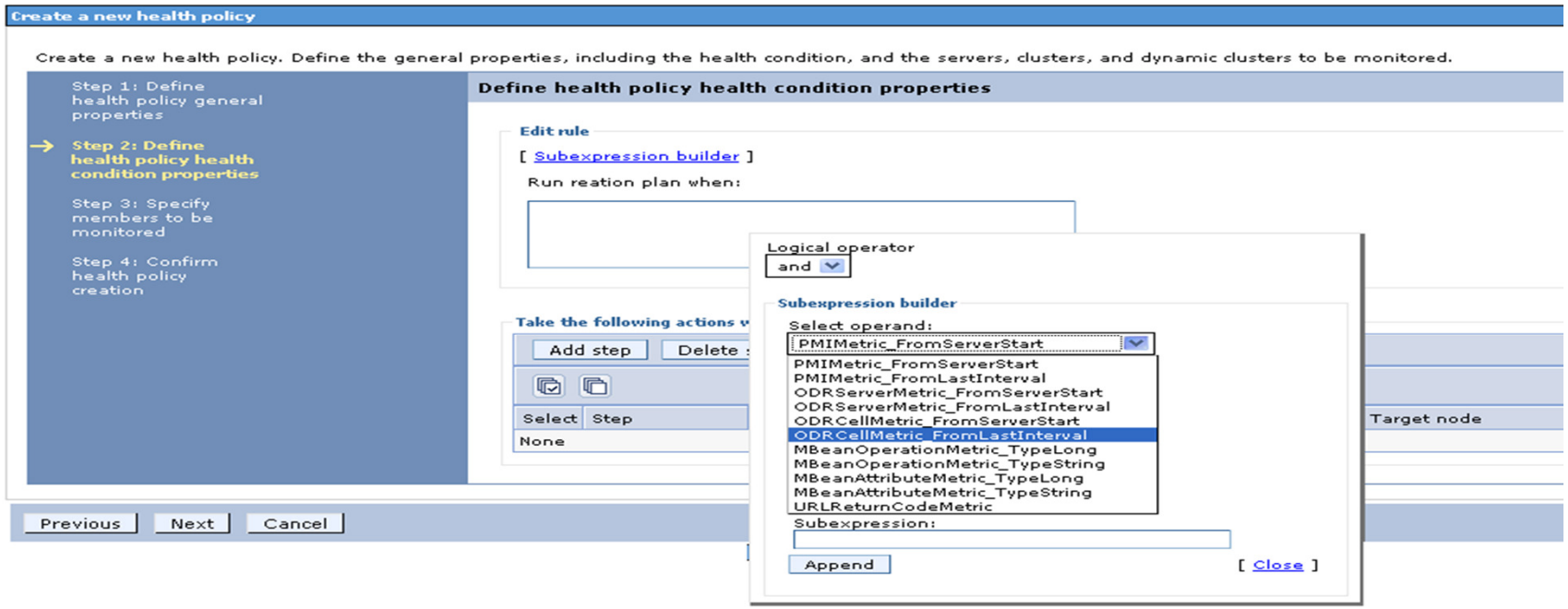
Health Conditions

- **Excessive request timeouts:** *% of timed out requests*
- **Excessive response time:** *average response time*
- **Excessive garbage collection:** *% of time spent in GCs*
- **Excessive memory:** *% of maximum JVM heap size*
- **Age-based:** *amount of time server has been running*
- **Memory leak:** *JVM heap size after garbage collection*
- **Storm drain:** *significant drop in response time*
- **Workload:** *total number of requests*

Health Management – Custom Health Conditions

Flexibility to determine what an "unhealthy" condition is…

- Custom expressions can be built which use metrics from:
  - The On Demand Router, URI return codes
  - PMI metrics, MBean operations and attributes
  - Examples: hung thread detection, DB connection pool exhaustion or slow down
- Complex boolean expressions using a mix of operands is supported (AND, OR, NOT)

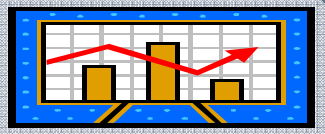


Dynamic Cluster

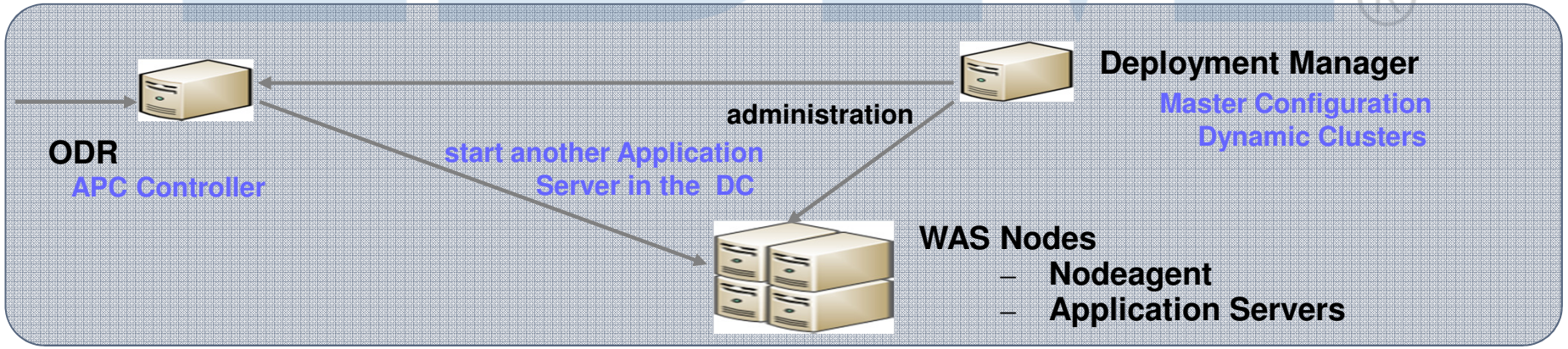
- A Dynamic Cluster (DC) is a virtual cluster of servers (typically, WebSphere Application Servers)
- Application server definitions are dynamically created or deleted based upon DC membership rules
- Application server definitions are automatically updated when the server template associated with the DC is updated
- Application servers are started/stopped based upon current application demand and **service policies**

Example

Dynamic Cluster

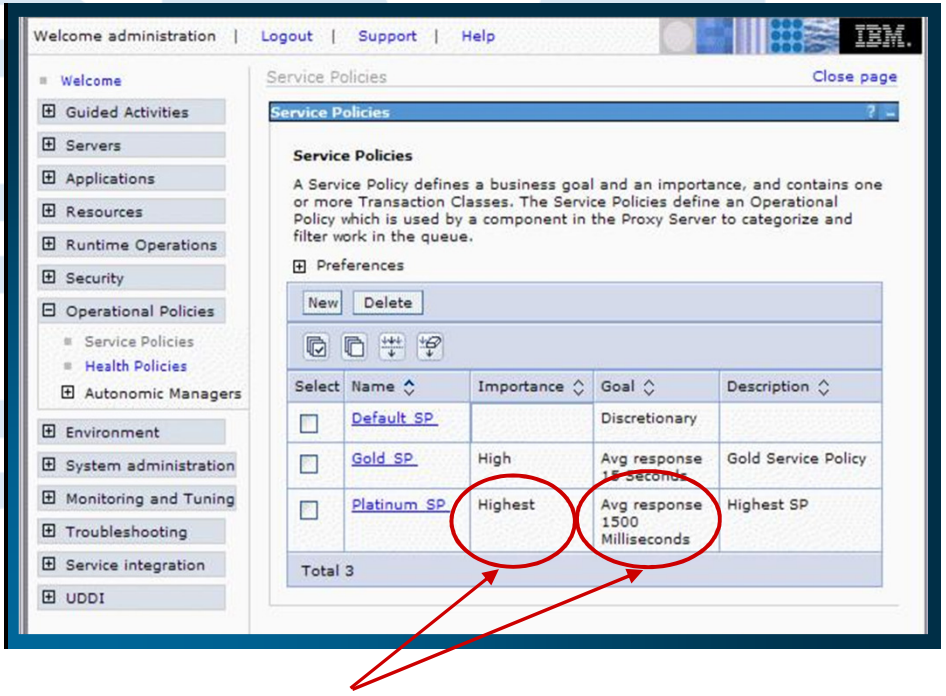


- Keep at least one server running at all times
- Don't start more than 4 servers
- Don't start more than 2 servers on the same Node



What is a Service Policy?

- Easily allows an administrator to specify the relative importance of applications and optionally a response time goal. WebSphere then manages your applications according to this policy.
  - Service policies are used to define application service level goals
  - Allow workloads to be classified, prioritized and intelligently routed
  - Enables application performance monitoring
  - Resource adjustments are made if needed to consistently achieve service policies

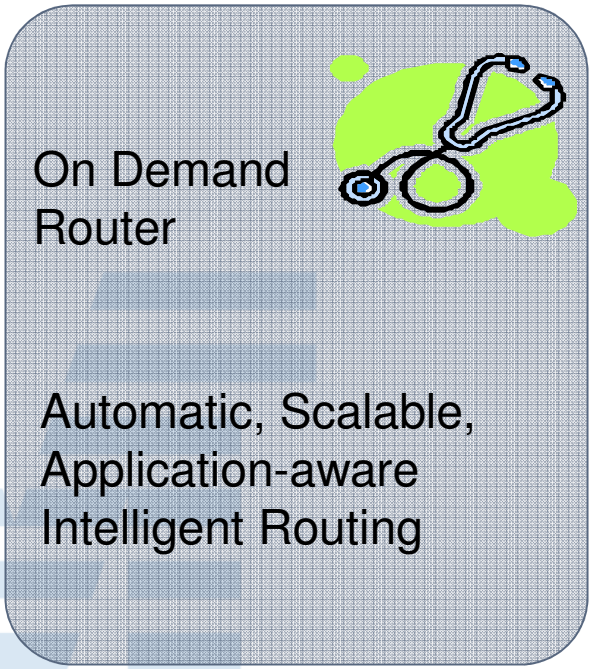


Service Policies define the relative importance and response time goals of application services; defined in terms the end user result the customer wishes to achieve

On Demand Router

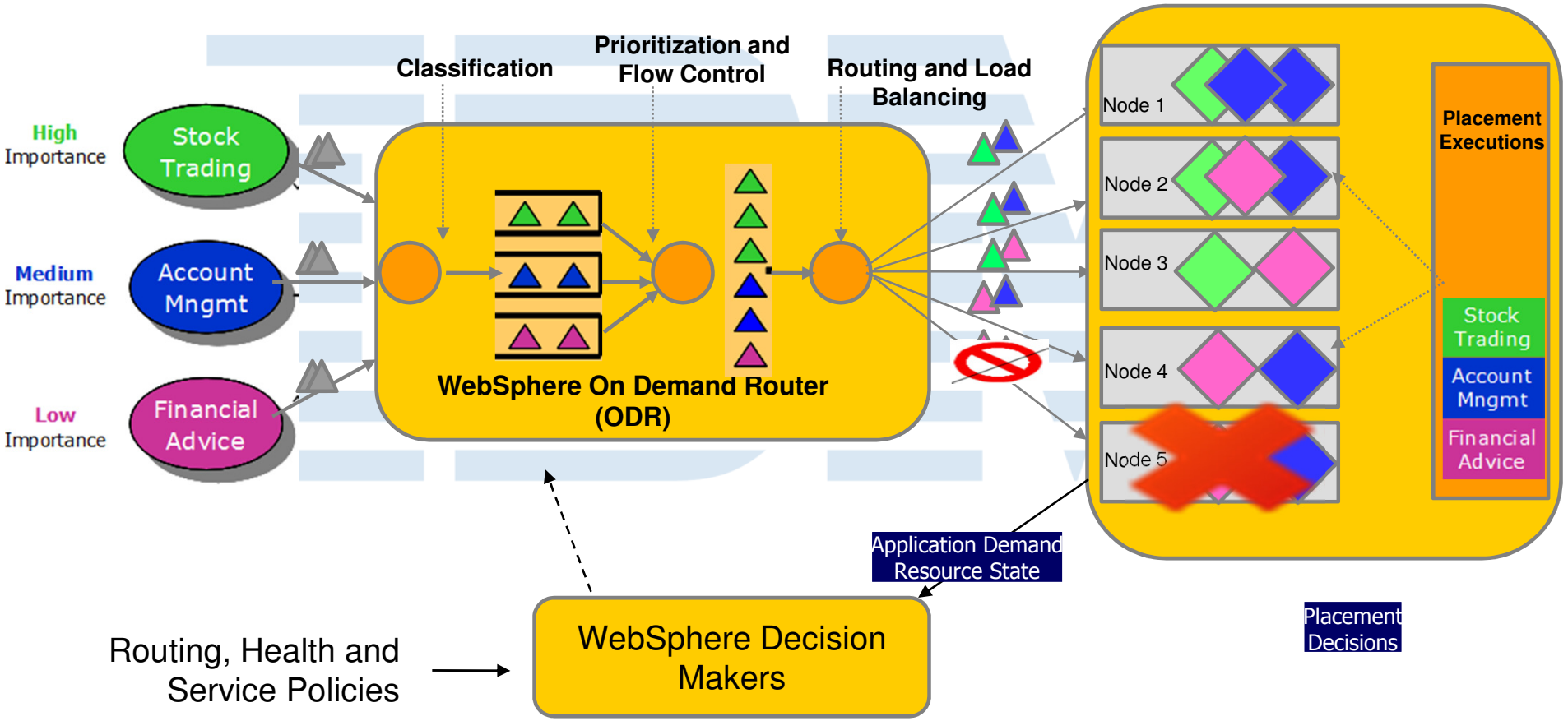
Goals

- The **ODR** works with the health management and dynamic clustering features as the underpinnings for intelligent routing
- Automatic routing without having to update configuration files when you change something in your environment (application, server, node, etc)
- A highly scalable routing tier
- Ease of management
- A routing tier that is aware of what is happening on the application server tier and reacts accordingly
- Flexible policy-based routing to control if, when, and where requests are routed
- A highly available deployment manager



Intelligent Management Scenario

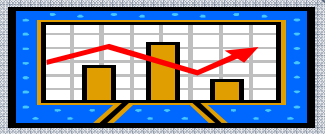
The On Demand Router applies sophisticated classification and flow control algorithms to intelligently manage workload



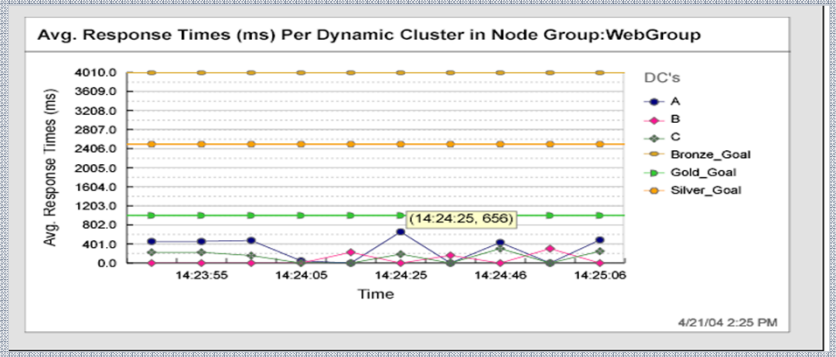
Monitoring

- Real-time performance data visualization
- Advanced charting and graphing
- Rich set of data views (application, cluster, etc)
- Rich set of metrics (CPU utilization, average response time, etc)
- Customizable reports
- Performance data can be logged for subsequent analysis

Example Report



- Graph a service policy goal
- Graph average response time for a service policy
- Graph average throughput for a service policy



Deployment Manager

Master Configuration

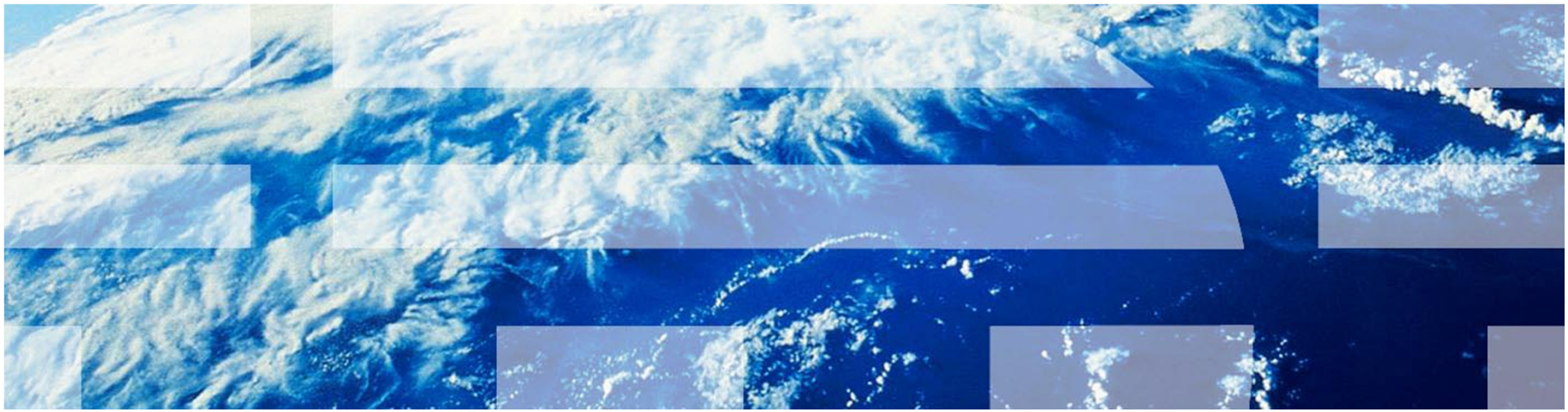
Performance Reports

New intelligent management features in V8.5

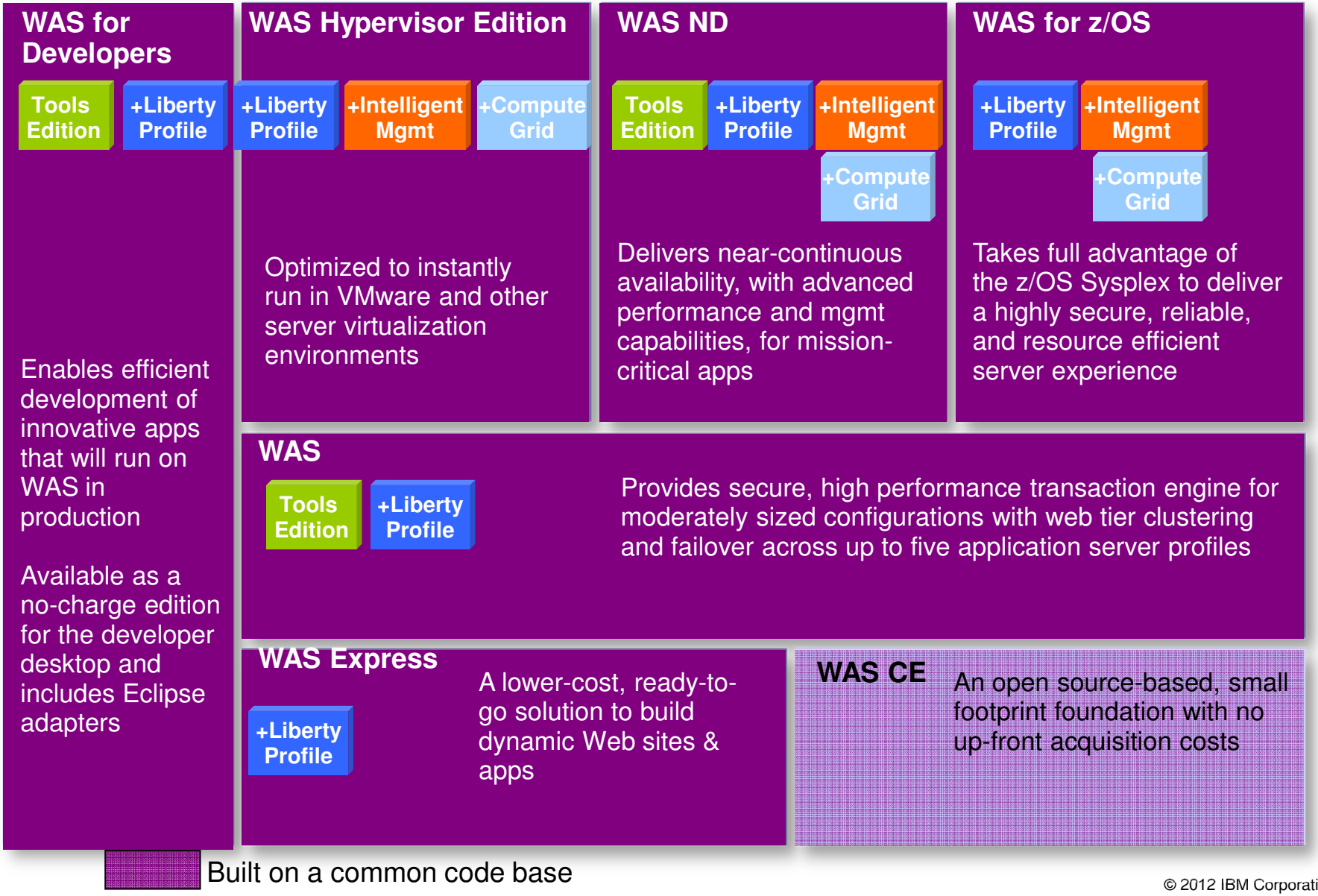
- Transitioning from WebSphere Virtual Enterprise?
- Here are new functional improvements that have been added in V8.5
  - Dynamic cluster support for MDBs when used with MQ
    - You can use dynamic clusters for MDBs loaded by the MQ messaging provider
  - New Health policy condition
    - Triggers when the percentage of time spent performing garbage collections exceeds a configurable threshold
  - Application edition rename support
    - Ability to rename the edition of all applications deployed to a cluster
  - Intelligent Management components and services attempt to be as dormant as possible, until related components are enabled (ODR created, health policies configured, etc)

Questions

WebSphere Application Server V8.5
Liberty Profile

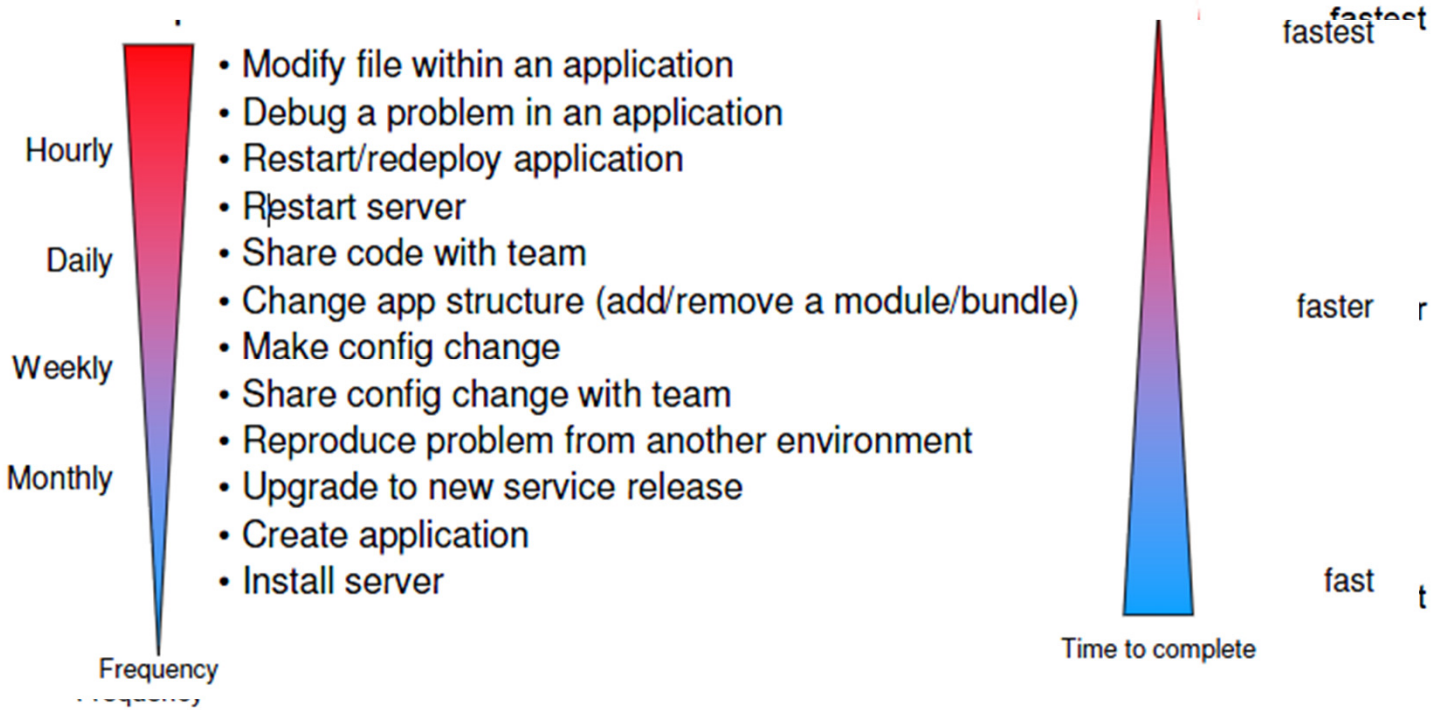


WAS V8.I5 with the Liberty Profile, Intelligent Management, and IBM CG



What do developers care about?

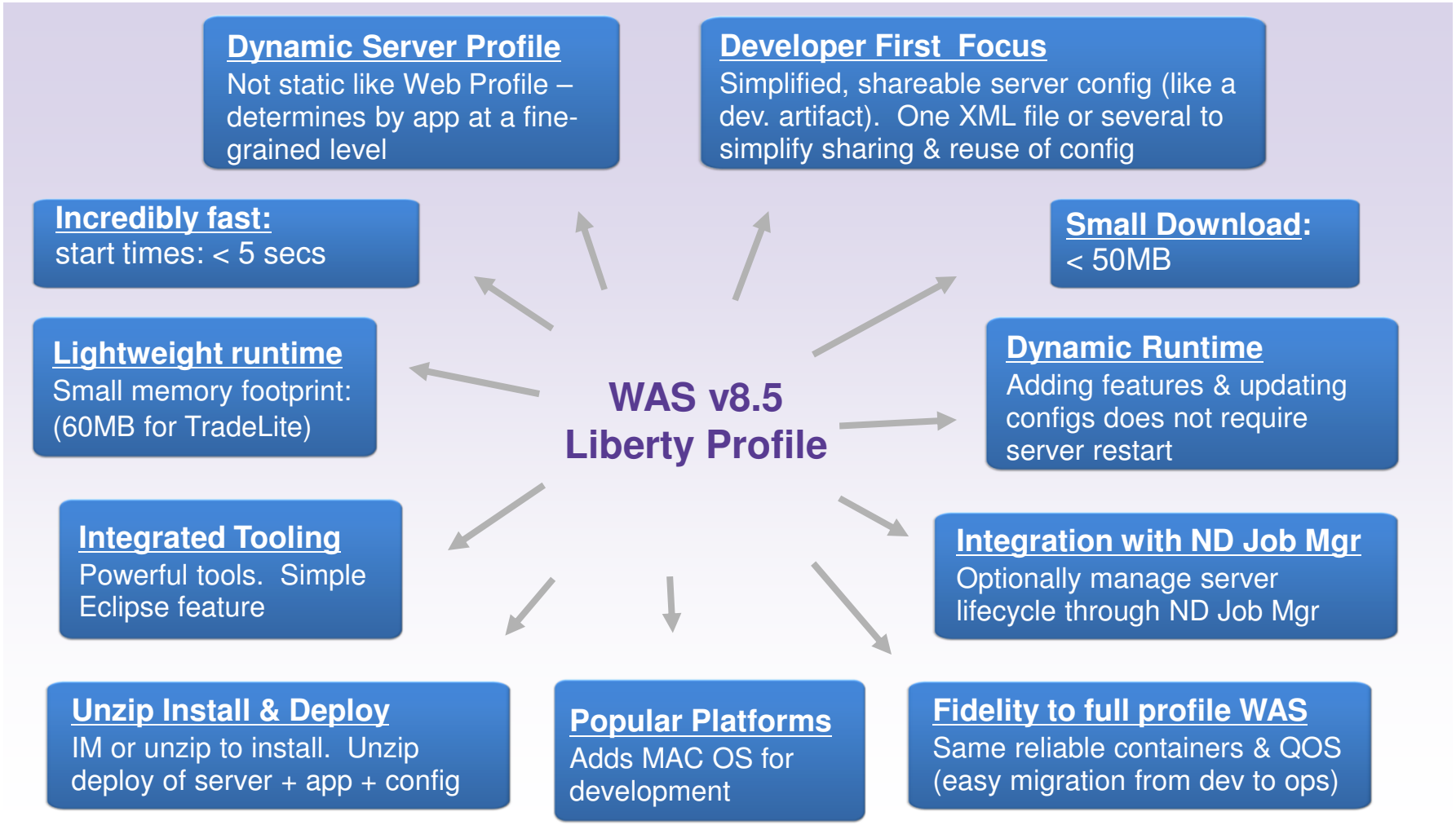
- Common Development tasks include:



- All frequent tasks should be as painless as passible as not to hinder productivity
- These kinds of capabilities reflect on the Application Server runtime as well as the development tools.

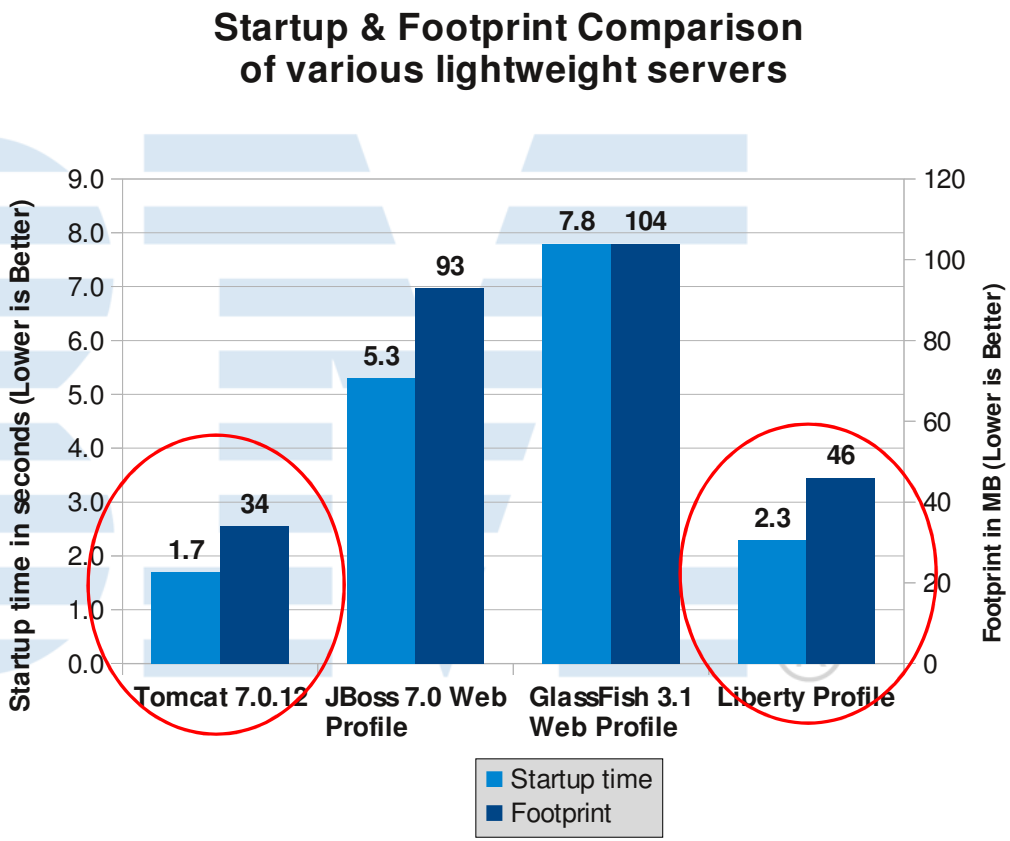
Value propositions: Lightweight “Liberty” Profile – For Web, OSGi and Mobile Applications

A highly composable, dynamic Server profile



Liberty Profile – Startup & Footprint

- **The problem of a lightweight development environment in WebSphere has been solved!**
  - Liberty Profile startup & footprint are on par with Tomcat.
  - Liberty Profile starts up in less than half the time of JBoss Web profile.

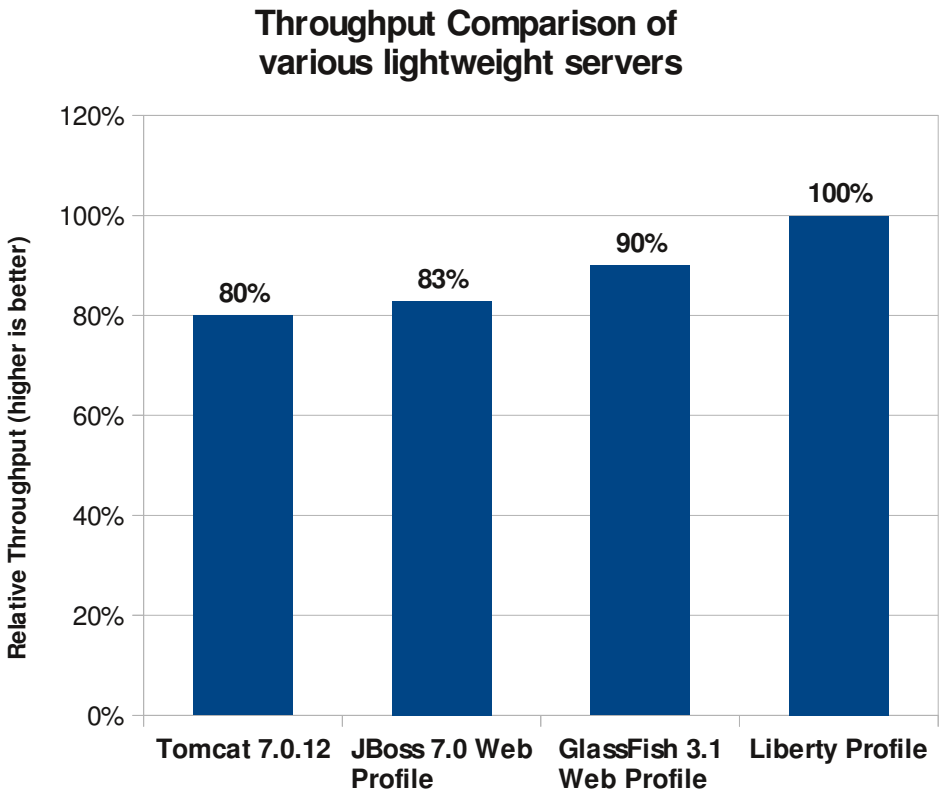


System Info:
Lenovo T60p - 2 x 2.16 GHz Intel Core Duo T2600
2GB RAM, Windows XP 32-bit
Apache Tomcat 7.0.12
JBoss Community Edition 7.0 Web Profile server
GlassFish Server 3.1 Open Source Edition Web Profile
WAS V8.5 Liberty Profile
(All servers had the TradeLite benchmark application installed)

Note: Tomcat , JBoss, and GlassFish were measured with the HotSpot JDK, while Liberty was measured with the IBM JDK.

Liberty Profile - Throughput

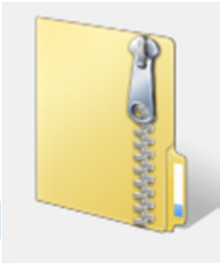
- **A lightweight server that can service requests with the speed of a full production server!**
  - Liberty Profile provides up to 20% better runtime performance than JBoss and 25% better than Tomcat.



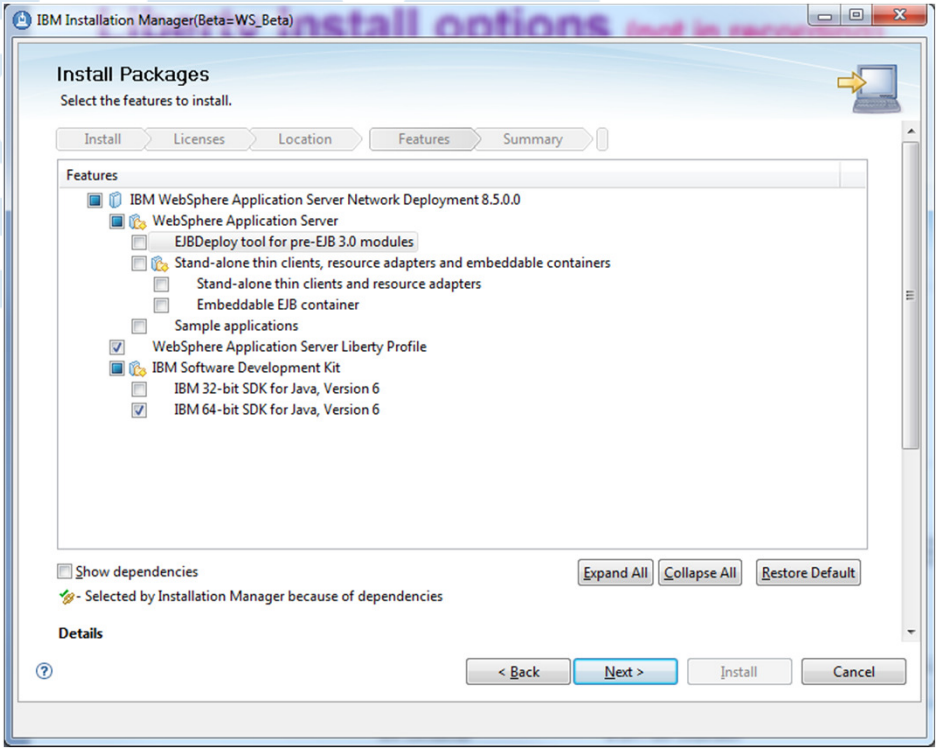
System Info:
IBM x3550 – 4 x 1.86 GHz Intel Xeon E5320, 8 GB RAM
RedHat Linux 5.3 32-bit
Apache Tomcat 7.0.12
JBoss Community Edition 7.0 Web Profile server
GlassFish Server 3.1 Open Source Edition Web Profile
WAS V8.5 Liberty Profile
(All servers had the TradeLite benchmark application installed)

Note: Tomcat , JBoss, and GlassFish were measured with the HotSpot JDK, while Liberty was measured with the IBM JDK.

Installing the Liberty profile



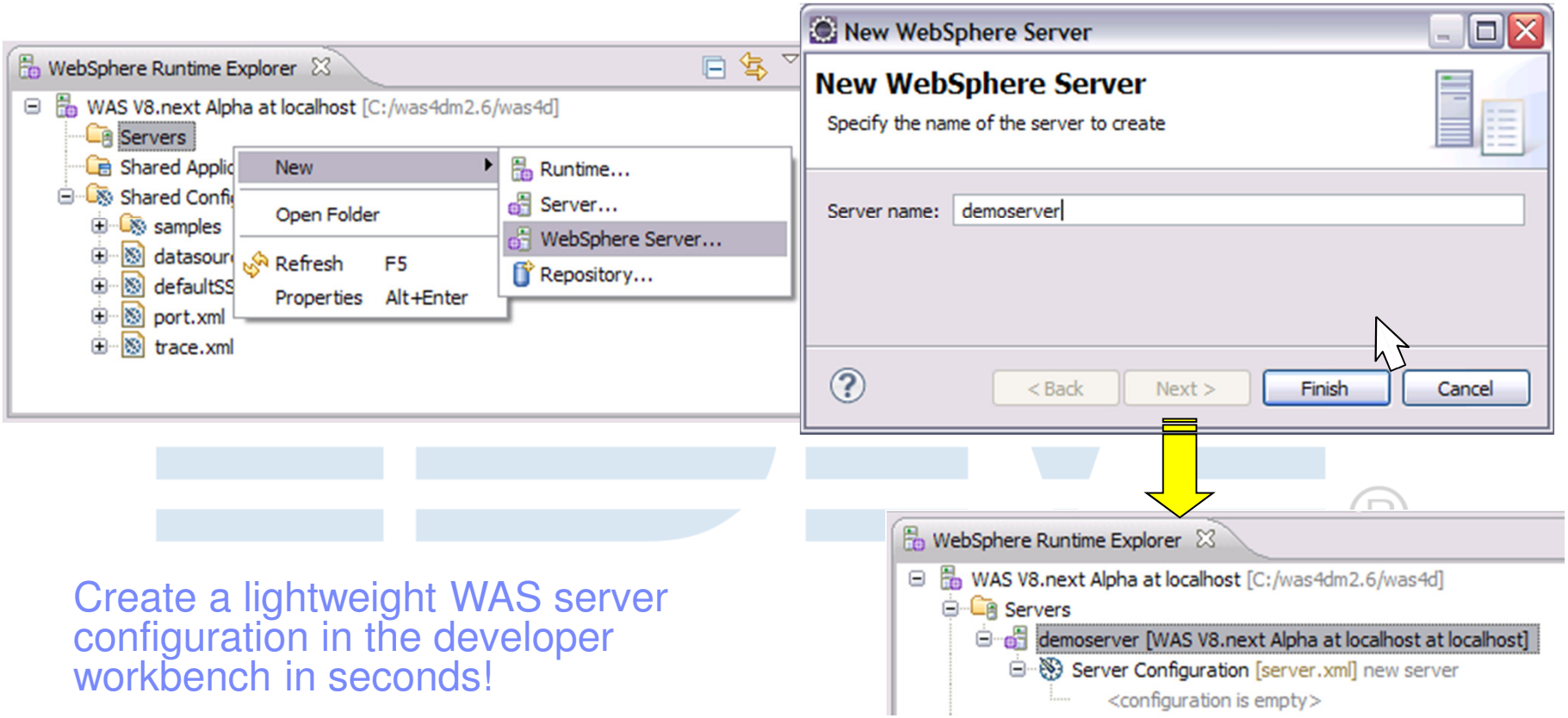
- Option (1), Using zip installation
  - Download the small (< 50 MB) ZIP archive, decompress it
  - No additional installation / configuration action needed
  - Download, install, get your server running in under three minutes!
- Option (2), Using the IDE
  - Install WebSphere Development Tools for Eclipse
  - Follow links for quick ZIP install
- Option (3), Using Installation Manager
  - The Liberty profile is an optionally installable package in the application server product repository
- Option (4), Using Job Manager
  - Run a remote, agentless installation of a Liberty profile embedded server
  - Requires ND license for the job manager



What does this mean for developers?

- Support for Liberty profile in Rational Application Developer
  - Enterprise development - advanced programming, cloud, collaboration, and quality tools
  - Available standalone or bundled in WAS - Tools Edition and WAS ND - Tools Edition
- Support for Liberty Profile in WebSphere Application Server Developer Tools for Eclipse (WDT)
  - Subset of RAD focused on core programming models
  - Simple Eclipse feature update for WTP 3.6 (Helios) and 3.7 (Indigo)
  - **Available unsupported at no charge**, or supported for a fee
    - WAS for Developers – Tools Edition for Eclipse
- Support for Liberty profile on OS X – use your Mac to develop WebSphere apps!
- Accelerate development time to value
  - Develop / test with RAD or WDT and WAS V8.5 Liberty server type
  - Deploy applications unchanged to full profile WAS for production

Create a lightweight WAS server in WDT

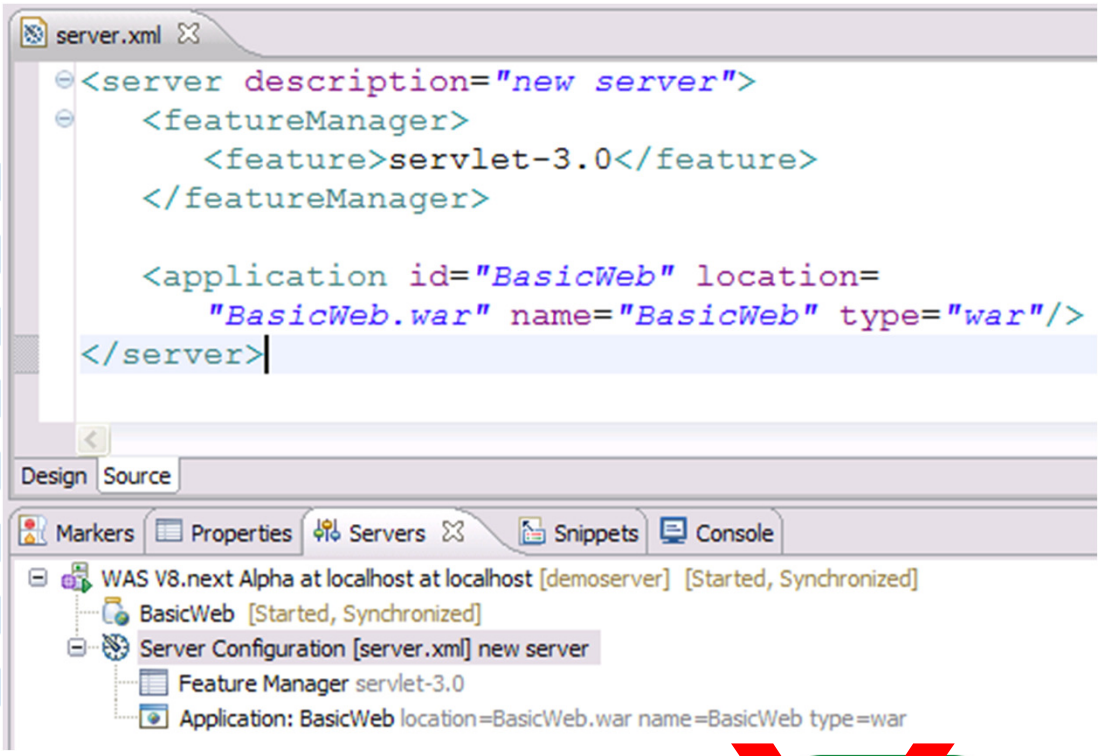


Create a lightweight WAS server configuration in the developer workbench in seconds!

Simplified sever configuration

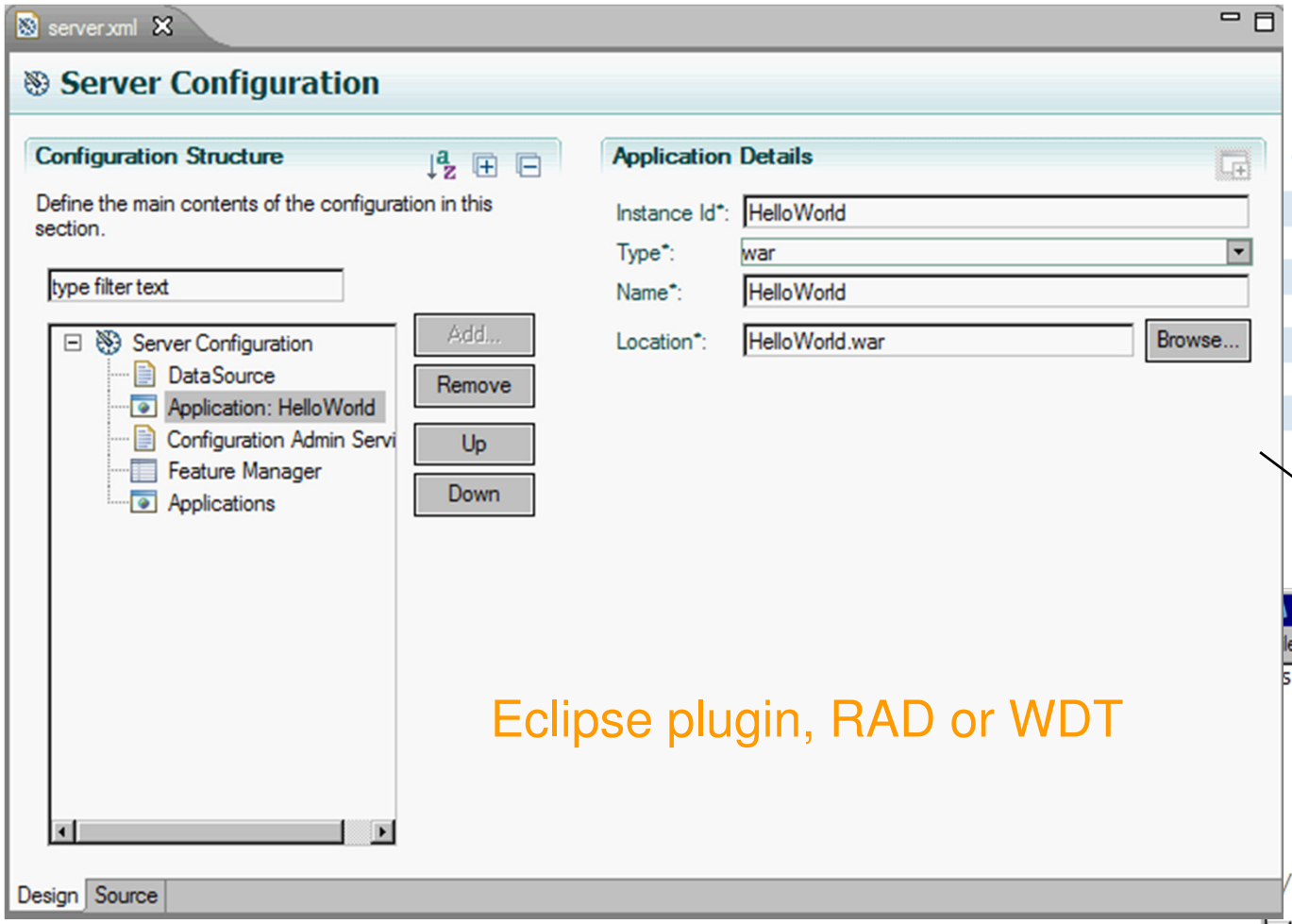
New!

- Simplest case: one XML file for all server config (server.xml)
- Editable within the workspace
- Exportable, shareable, versionable



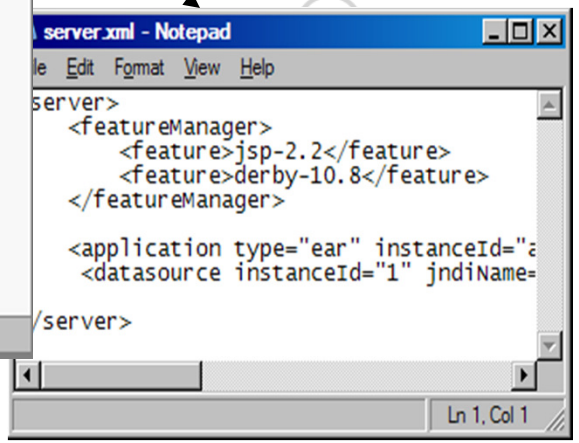
No need for admin console, wsadmin, or extended EARs

Setup development server or master image using eclipse tools

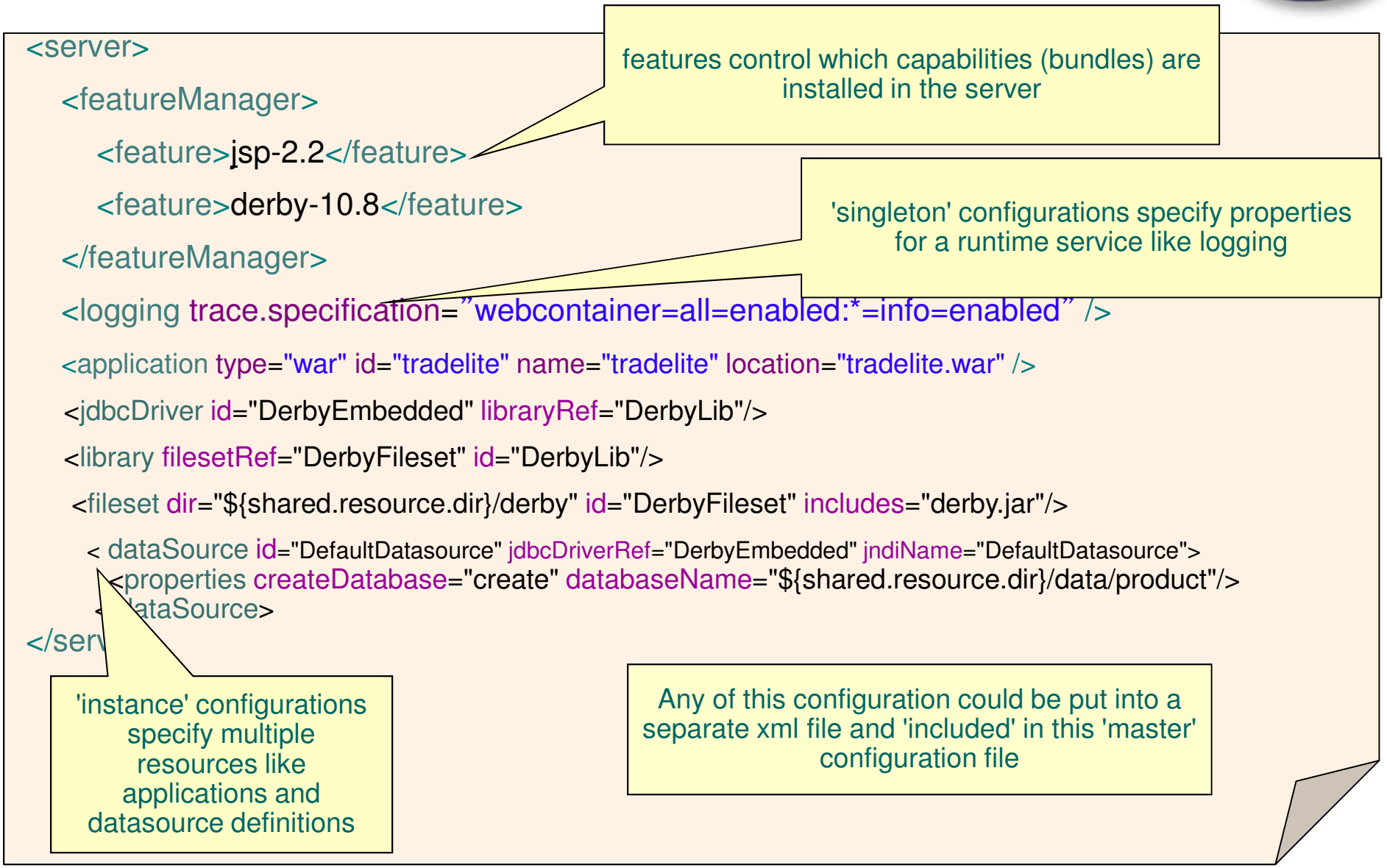


Eclipse plugin, RAD or WDT

Create and edit server directory and xml configuration file(s)



Simplified configuration



Flexible configuration

- Shareable config snippets

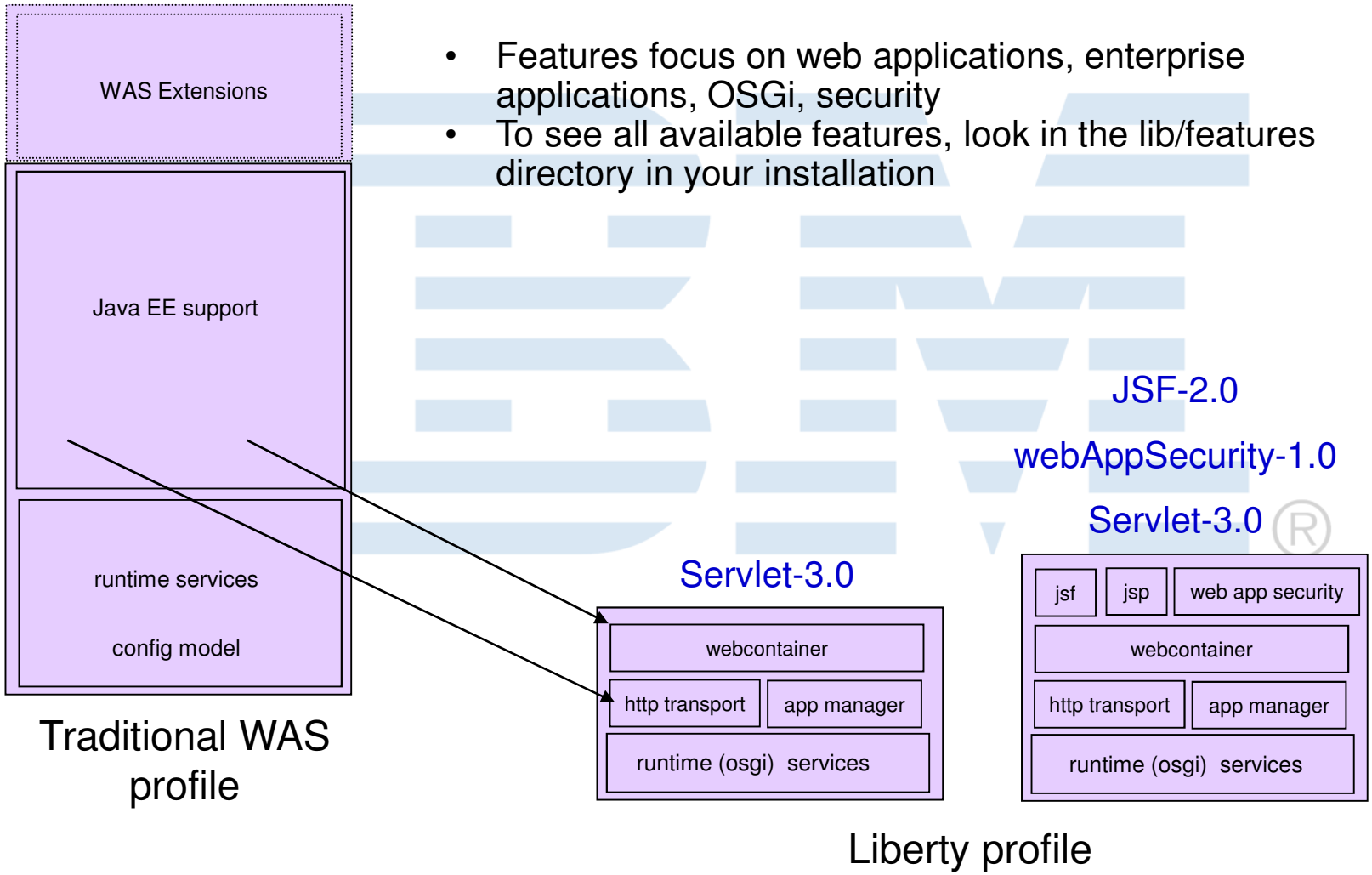
```
<server>
    ...
    <include location="http://cfgserver/global.xml" />
    <include location="${shared.config.dir}\global.xml" />
<server>
```

server.xml

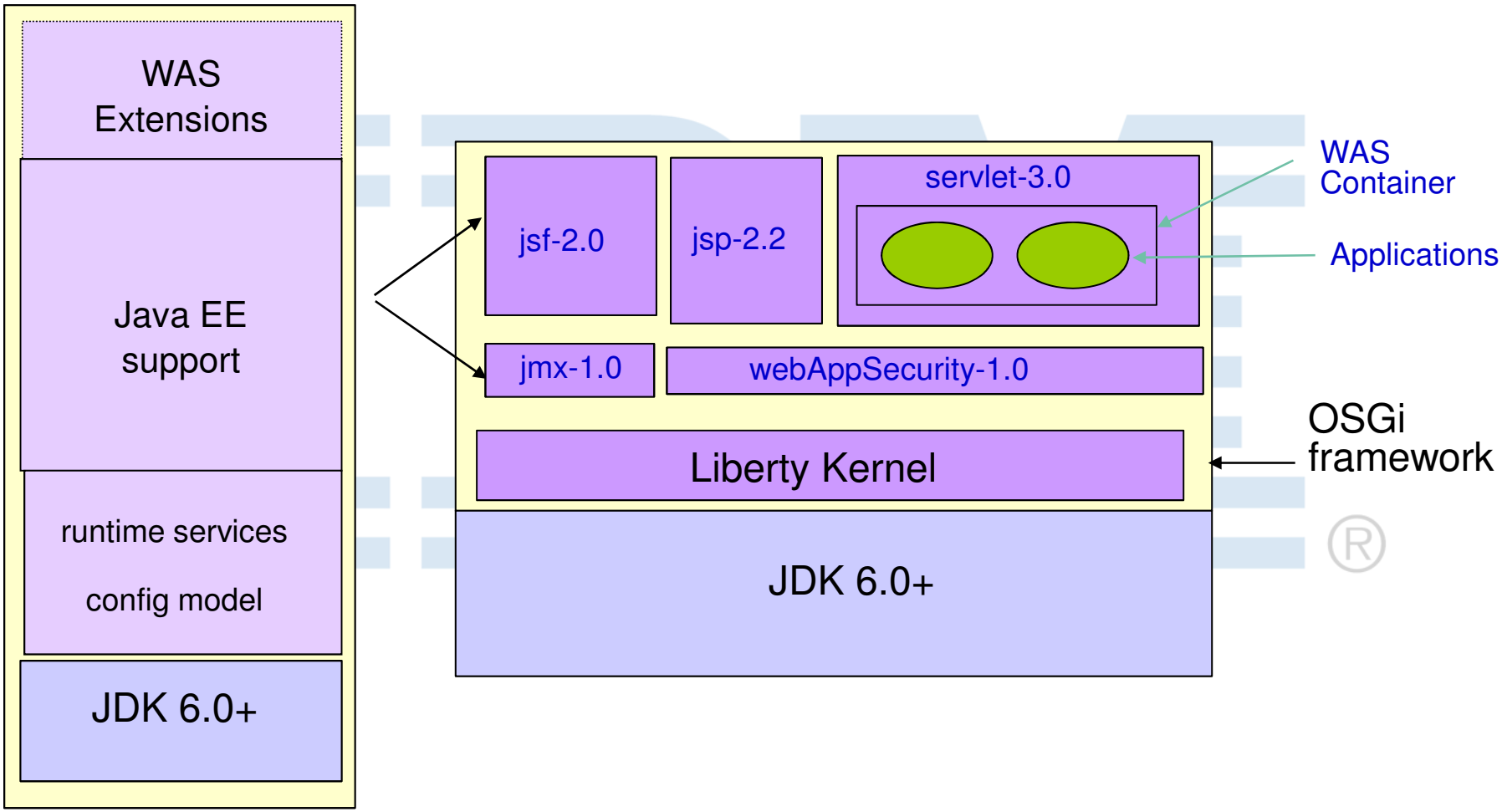
- Config can be componentized at any level of granularity, from 1 file to many (update config for thousands of servers by one xml file change)
  - Can use WDT to associate config snippets with a server config
- Visualization through WDT tools as a single logical view
- Team development: keep the application and configuration components together.

Highly composable runtime based on features

- Features focus on web applications, enterprise applications, OSGi, security
- To see all available features, look in the lib/features directory in your installation



Under the Hood



Liberty Features

- **Bean validation -** beanvalidation-1.0
  - Provides validation to Java Beans in all layers to maintain data integrity in an integrated and standard environment
- **Blueprint (OSGi applications) -** blueprint-1.0
  - Provides support for deploying OSGi applications that make use of the OSGi blueprint container specification.
- **Java API for Restful services (JAX-RS) -** jaxrs-1.1
  - provides support for Java API for Restful Web Services
- **JDBC database connectivity -** jdbc-4.0
  - provides support for applications that access a database
- **JNDI -** jndi-1.0
  - provides support for a single JNDI entry definition in the server configuration
- **Java persistence API (JPA) -** jpa-2.0
  - provides support for applications that use application-managed and container-managed JPA written to the JPA 2.0 specification.

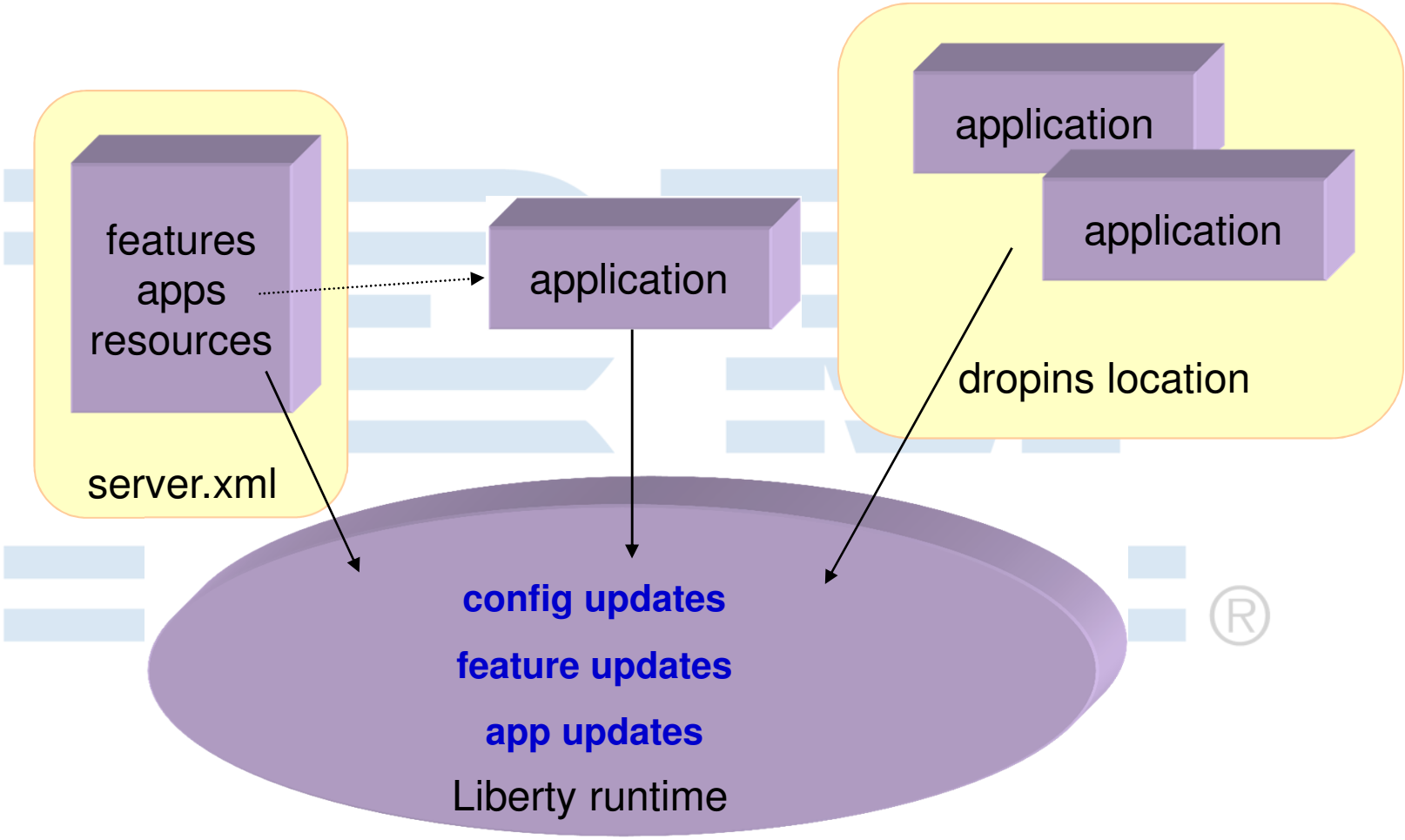
Liberty Features

- **Java Server Faces (JSF) -** jsf-2.0
- **Java Server pages (JSP) -** jsp-2.2
- **Javascript Object Notation (JSON4) -** json-1.0
  - JSON4J library provides a simple Java model for constructing and manipulating data to be rendered as JSON data.
- **Local JMX connector -** localConnector-1.0
  - Enables local access by JMX clients such as **jConsole**, or other JMX client that use the Attach API.
- **Monitoring -** monitor-1.0
  - provides Performance Monitoring Infrastructure (PMI)
- **OSGI JPA -** osgi.jpa-1.0
  - provides JPA support for OSGi applications
- **Remote JMX Connector -** restConnector-1.0
  - enables remote access by JMX clients via a REST based connector and requires SSL and basic user security configuration.
- **SSL -** ssl-1.0
  - provides support for Secure Sockets Layer (SSL) connections.

Liberty Features

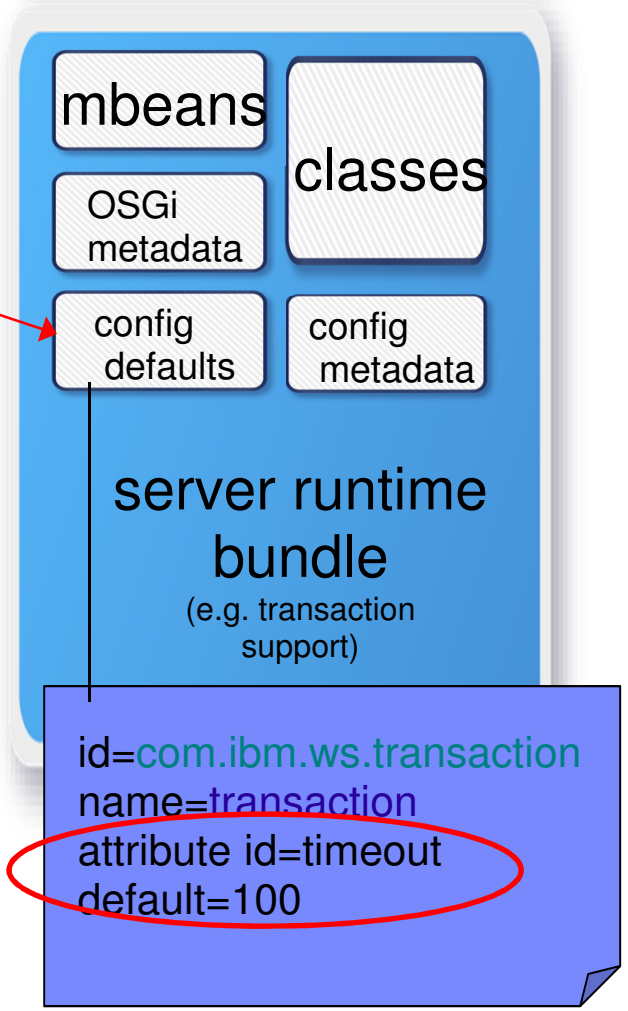
- **Security** - appSecurity-1.0
  - provides support for securing the server runtime environment and applications.
- **Server Status** - serverStatus-1.0
  - enables Liberty profile servers to automatically publish their status to WebSphere Application Server Deployment Managers and Job Managers that are aware of the server as a resource in their Job configuration.
- **Servlet** - servlet-3.0
- **Database Session Persistence** - sessionDatabase-1.0
  - provides session affinity and failover support on the Liberty profile.
- **z/OS Security** - zosSecurity-1.0
  - provides support on the z/OS platform for basic interactions with the SAF Registry
- **z/OS Transaction Management** - zosTransaction-1.0
  - enables the application server to manage transactional activity between the Resource Recovery Services (RRS), the application server's transaction manager, and the resource manager
- **z/OS Workload Manager** - zosWlm-1.0
  - provides access to z/OS native workload management (WLM) services.

Dynamic runtime



Dynamic configuration

1) Configuration defaults are specified by contributing feature
2) Configuration by exception – any property can be overridden in user-specified server config
3) Config can be changed dynamically, changes are "observed" and are injected back into the contributing feature immediately




```
<server>
 <feature>
   <featuresets>servlet_3.0</featuresets>
   <featuresets>txn</featuresets>
 </feature>
 <transaction timeout="30" />
<server>
```

server.xml

Features not in the Liberty Profile - V8.5

- There are functional differences between traditional WAS and the Liberty profile
- Liberty provides a useful subset of traditional WAS

Liberty profile

Bean validation
Blueprint
Java API for RESTful Web Services
Java Database Connectivity (JDBC)
Java Naming and Directory Interface (JNDI)
Java Persistence API (JPA)
Java Server Faces (JSF)
Java Server Pages (JSP)
JMX
Monitoring
OSGi JPA
Remote connector
Secure Sockets Layer (SSL)
Security
Servlet
Session Persistence
Transaction
Web application bundle (WAB)
z/OS Security (SAF)
z/OS Transactions (RRS)
z/OS Workload Management

Traditional WAS Profile

Everything Liberty has…

Enterprise Java Beans (EJBs)
Messaging (JMS)
Web Services (JAX-WS)
Service Component Architecture (SCA)
Java Connector Architecture (JCA)
Clustering
WebSphere Optimized Local Adapters
Administrative Console
WSADMIN scripting
Multi-JVM Server Model
And much more …

Security

- Secure out of the box
- All opened ports are local host only
- Exposes no remote management by default
- Provides a simplified security configuration to make security painless
- Three key features
  - ssl-1.0
  - appSecurity-1.0
  - zosSecurity-1.0

Includes the SSL specific code

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

Includes the SAF registry and authorization code

Security User Registry

- User and Group information for authentication is stored in a user registry
- Various types of user registries are supported in the Liberty Profile
  - Quick Start (1 user setup for development)
  - Basic User Registry (Similar to file based registry on full WAS profile)
  - Standalone LDAP user registry (Supports the same user registries as the full WAS profile)
  - SAF registry for z/OS systems
- Support for the use of SSL with the Liberty profile
- Ensure that the **appSecurity-1.0** feature is defined in the server.xml
- Sample configuration files (Templates) are shipped for most security configurations
  - <WLP_INSTALL_DIR>\wlp\templates\config

LDAP Registry

- Authenticate using an LDAP server
- **Supports:** Microsoft Active Directory, IBM Lotus Domino, Novell eDirectory, IBM Tivoli Directory Server, Sun Java System Directory Server, Netscape Directory Server, IBM SecureWay Directory Server

```
<server>
   <featureManager>
      <feature>appSecurity-1.0</feature>
   </featureManager>

   <ldapRegistry host="ccwin12.austin.ibm.com"
        port="389” baseDN="o=ibm,c=us“
        ldapType="IBM Tivoli Directory Server" />

</server>
```

Liberty Administrative Security

- One “administrator” role
- One user registry for apps and admin
- Simple configuration for a single admin user

```
<quickStartSecurity userName=“bob”
                    userPassword=“{xor}Lz4sLCgwLTs”/>
<keystore id=“DefaultKeyStore”
                password=“{xor}DFoKyp=”/>
```

- ..but….still easy for multiple users

```
<administrator-role>
    <user>fred</user>
    <group>administratorsGroup</group>
</administrator-role>
```

Management Security – Differences between the Liberty profile and Full WAS Profile

- Only one management role: Administrator
- No Primary Admin ID
- No internal JMX security
  - Access to Mbeans from applications on the system are not protected
- No administrative console
- No scripting (wsadmin)

Management Security – Differences between the Liberty profile and Full WAS Profile

- Only one management role: Administrator
- No Primary Admin ID
- No internal JMX security
  - Access to Mbeans from applications on the system are not protected
- No administrative console
- No scripting (wsadmin)

Caching: Liberty and eXtreme Scale Integration Scenarios

1. Running grid servers in the Liberty Profile using Eclipse tools
   - You can use **Eclipse tools** to run WebSphere eXtreme Scale servers in the Liberty Profile
   - You can develop, configure, and deploy eXtreme Scale applications on the Liberty Profile.
     - Add the **server feature** when you want to run a catalog server you want to deploy a grid application into the Liberty Profile

       eXtremeScale.server-1.0
     - Add the **client feature** when you have an application running in the Liberty Profile that is going to use eXtreme Scale APIs..

       eXtremeScale.client-1.0
2. Configuring HTTP session failover in the Liberty profile
   - The Liberty profile does support database session persistence, just as in the full WAS profile.
   - The Liberty profile does **not** include session replication.
   - You can use WebSphere eXtreme Scale with the Liberty profile to replicate HTTP Sessions.
     - Add the **web feature** when you want to replicate HTTP session data for fault tolerance.

       eXtremeScale.web-1.0

Introduce Lab #1

WebSphere Application Server V8.5 Liberty lab

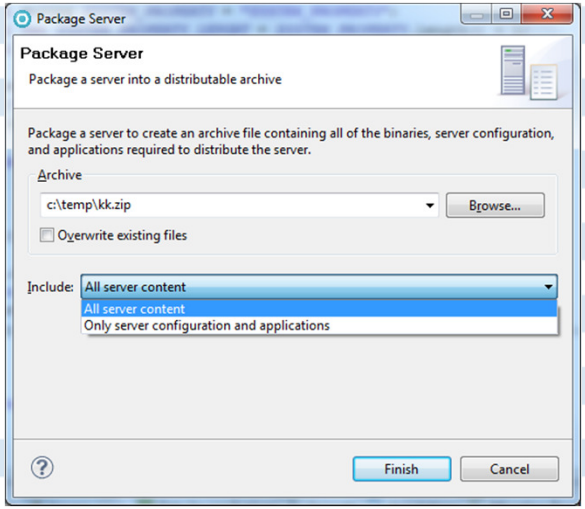
- **Lab 01:** Using the WebSphere Application Server Liberty Profile for lightweight, rapid development
  - Install the Liberty Profile
  - Install Liberty profile Development tools
  - Create a Liberty Profile server
  - Deploy an application to the Liberty profile server
  - Perform basic administrative tasks on the Liberty profile

What does the Liberty profile mean for production?

- An “Embedded Server” profile is a production instance of the configured Liberty server type
  - Think of **zipping** up the application, configuration and server type you just **tested on**
  - Application-centric – the server is pre-configured for a specific application(s)
  - Capture the embedded server configuration using development tools
    - Eclipse, WDT, RAD
- Deployment options:
  - Unmanaged unzip install
  - Managed ND deployment of standalone instances
    - “Light-touch” ND management: start and stop server
- Server configuration remains, using the same simplified XML config created in the development environment

Packaging a Liberty Profile Server

- Create a compressed file containing
  - Server runtime environment, server configuration, and applications
    - Can use the Liberty eclipse packaging wizard, OR



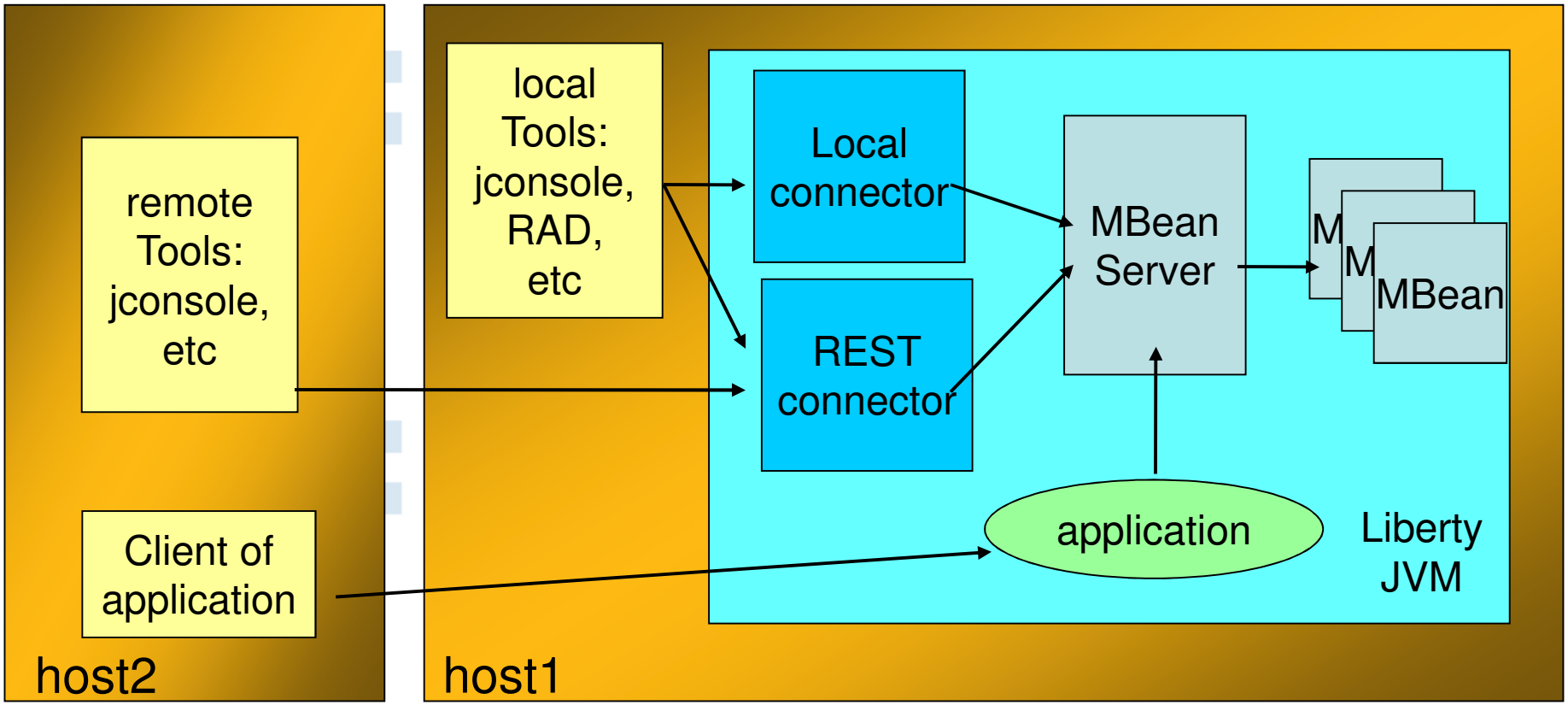
    - Use the Liberty server command line utility
      - server.bat package labServer –archive=labServer.zip

- The package can be used to:
  - Store in source code control systems
  - Distribute it to colleagues
  - Deploy the application to a different location or to another machine.
  - Embed it in your product distribution.

JMX

- Administrative activities require a JMX connector feature to be enabled on the Liberty profile server
  - Local JMX connector: localConnector-1.0
    - Client and Liberty server on same machine (good for development)
  - Remote JMX connector: restConnector-1.0
    - Enables remote access by JMX clients via a REST based connector
    - Requires a basic security configuration
      - User Registry and role mapping (User / group must be mapped to the admin role)
      - A valid SSL and keystore configuration is required
- Installed applications may:
  - Register MBeans
  - Call into MBeanServer on behalf of its clients

Liberty JMX



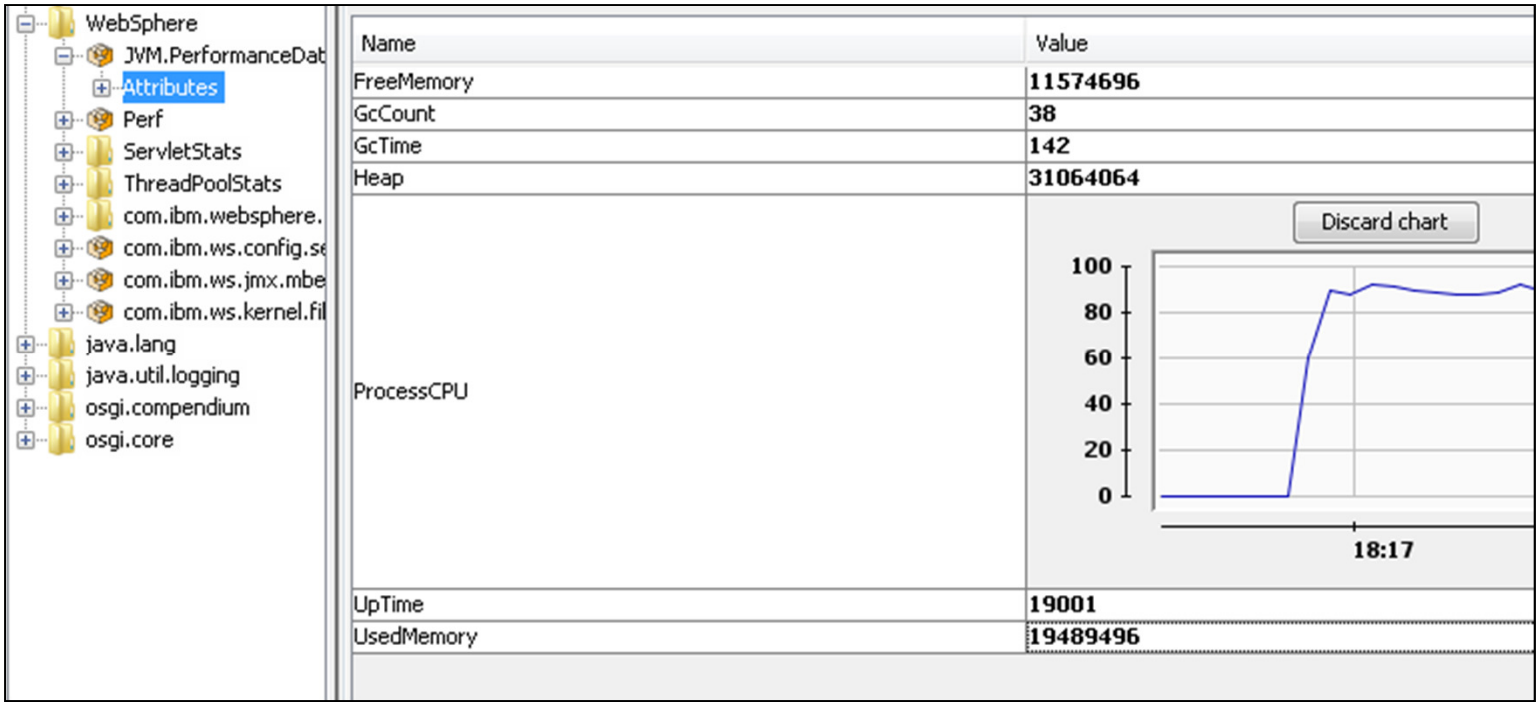
Monitor Feature Set (1.0)

Be able to appropriately monitor your WAS v8.5 – Liberty Profile instances

- Collects data from various components
  - JVM
  - ThreadPool
  - Web Applications
- Data reporting using MBeans
- Can be used with JConsole or any standard JMX client
- Support PMI Perf MBean for existing clients

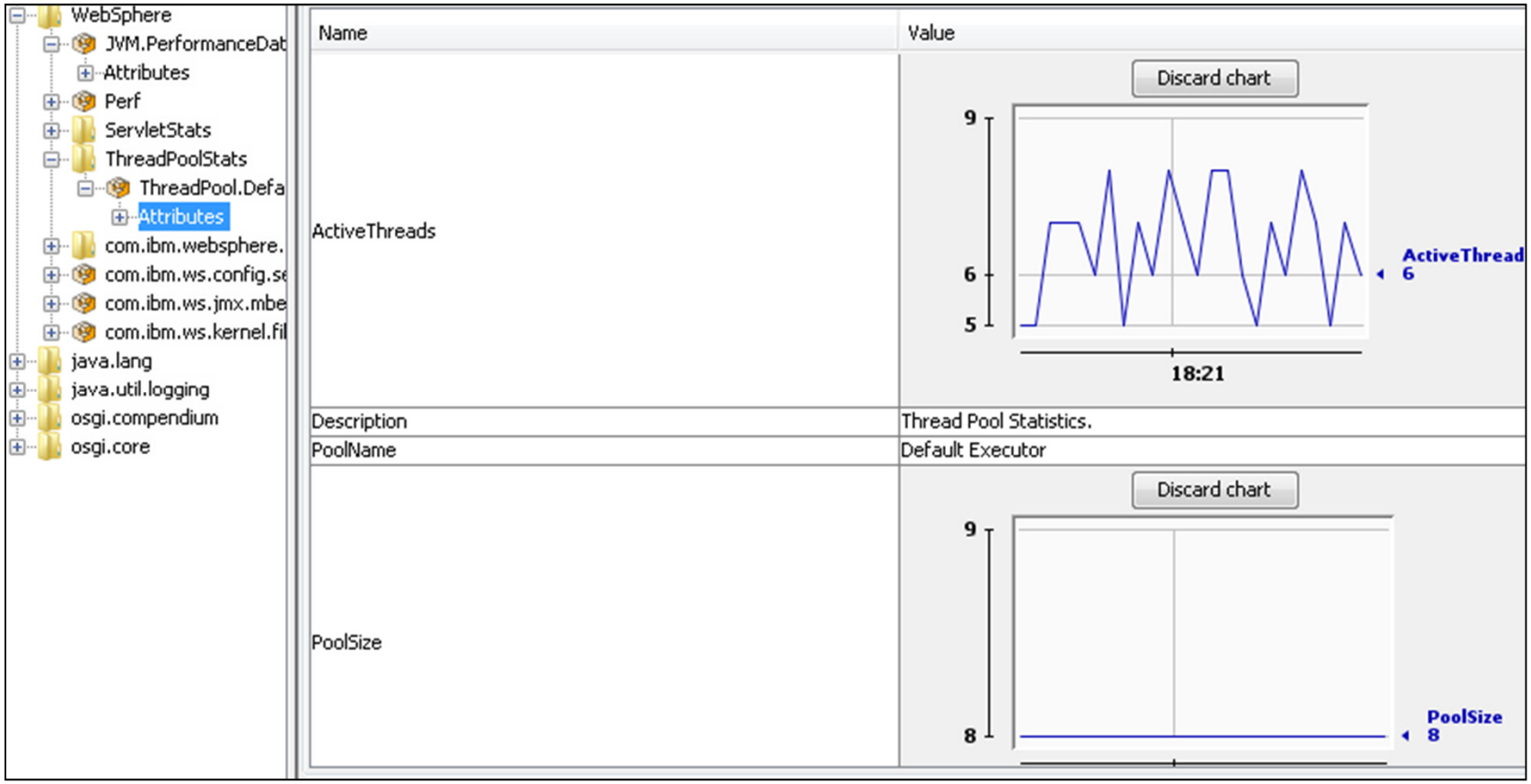
JVM Monitoring

- Free Memory
- Used Memory
- Total Heap Size
- Process CPU Utilizations
- JVM Uptime in milliseconds
- GC Count Since JVM Started
- GC Time (Total time spent in GC)



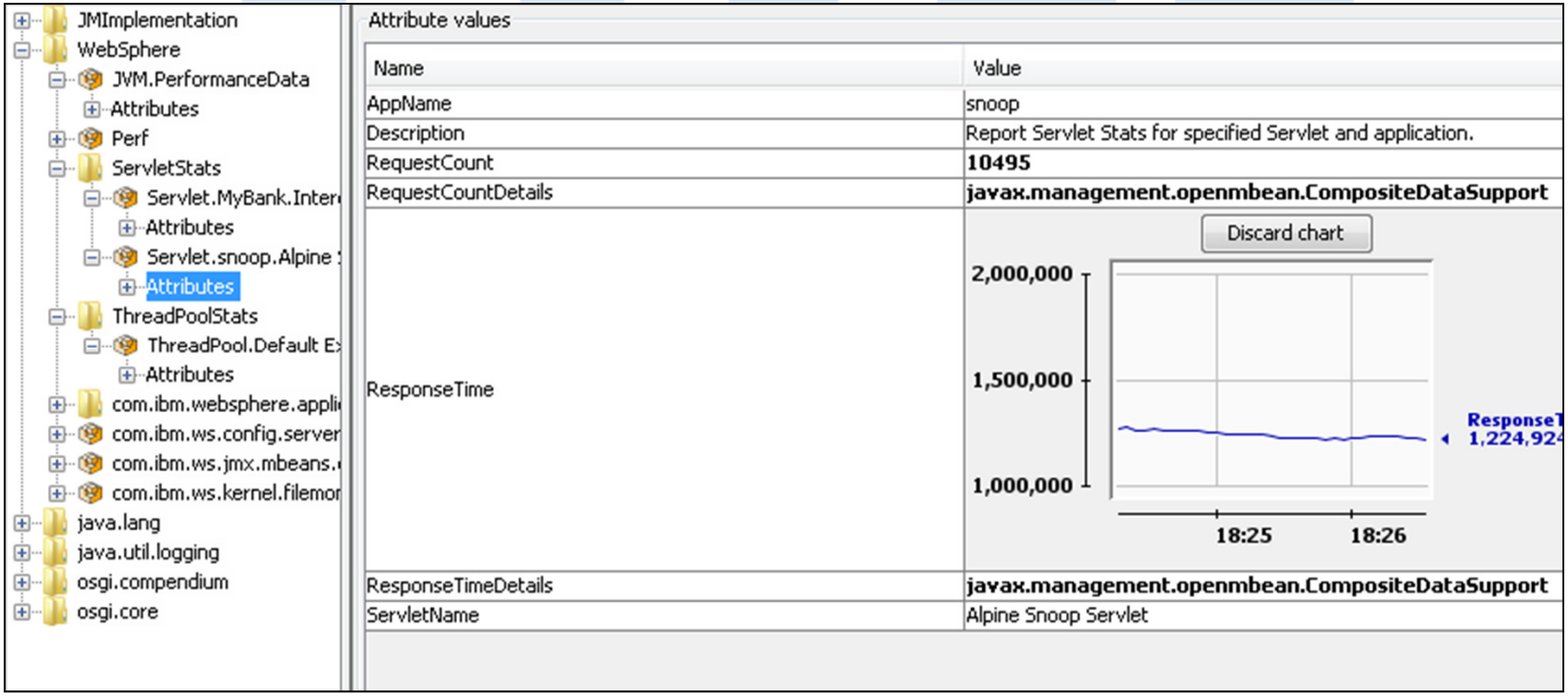
Monitoring the Thread Pool

- ThreadPoolStats
  - Active Threads
  - PoolSize
  - Name of Thread Pool (Default Executor)

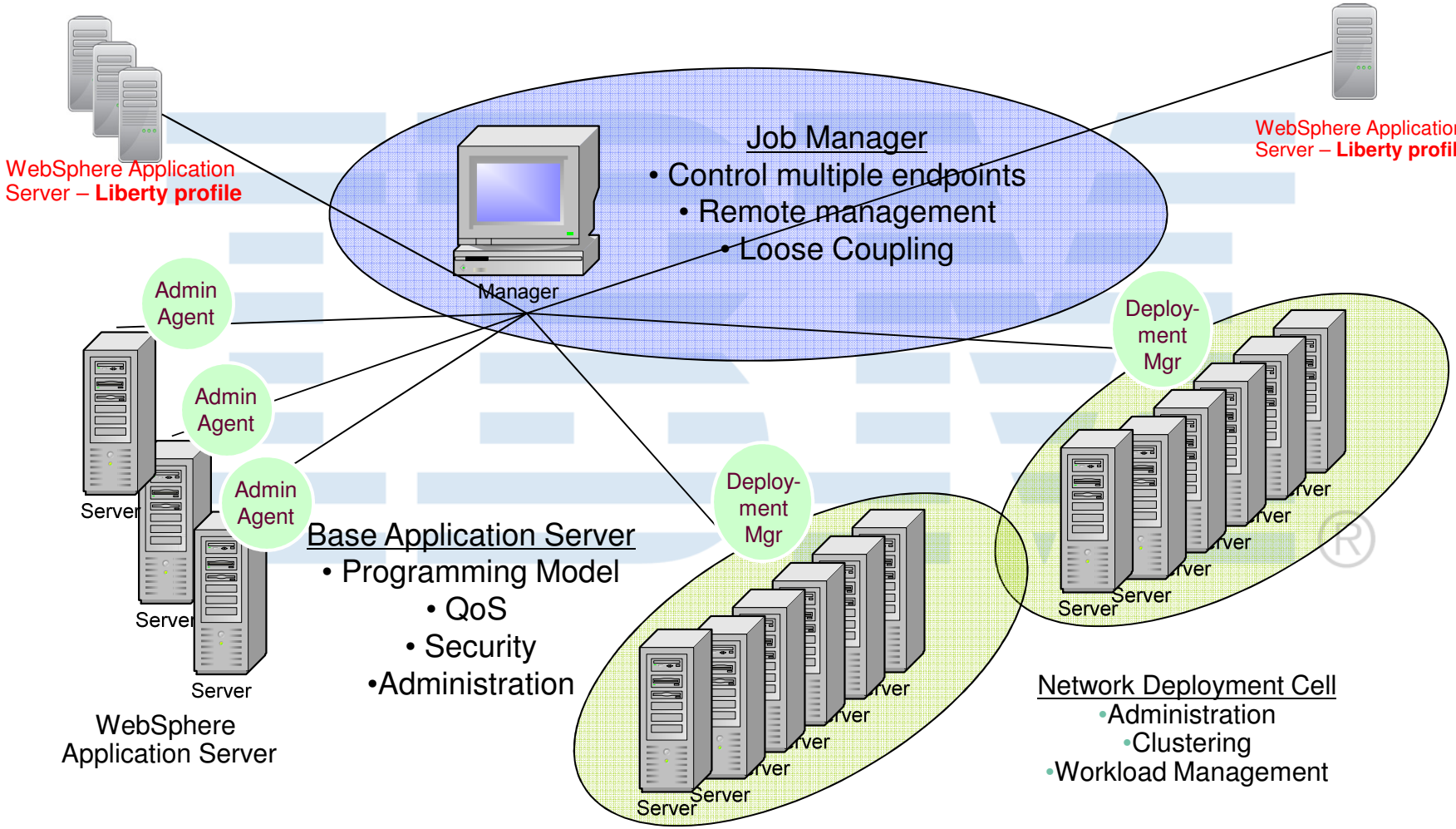


Web Applications

- Servlet Stats (For each Servlet)
  - Request Count
  - Response Time (in nanoseconds)
  - Application Name
  - Servlet Name



Centralized management through job manager



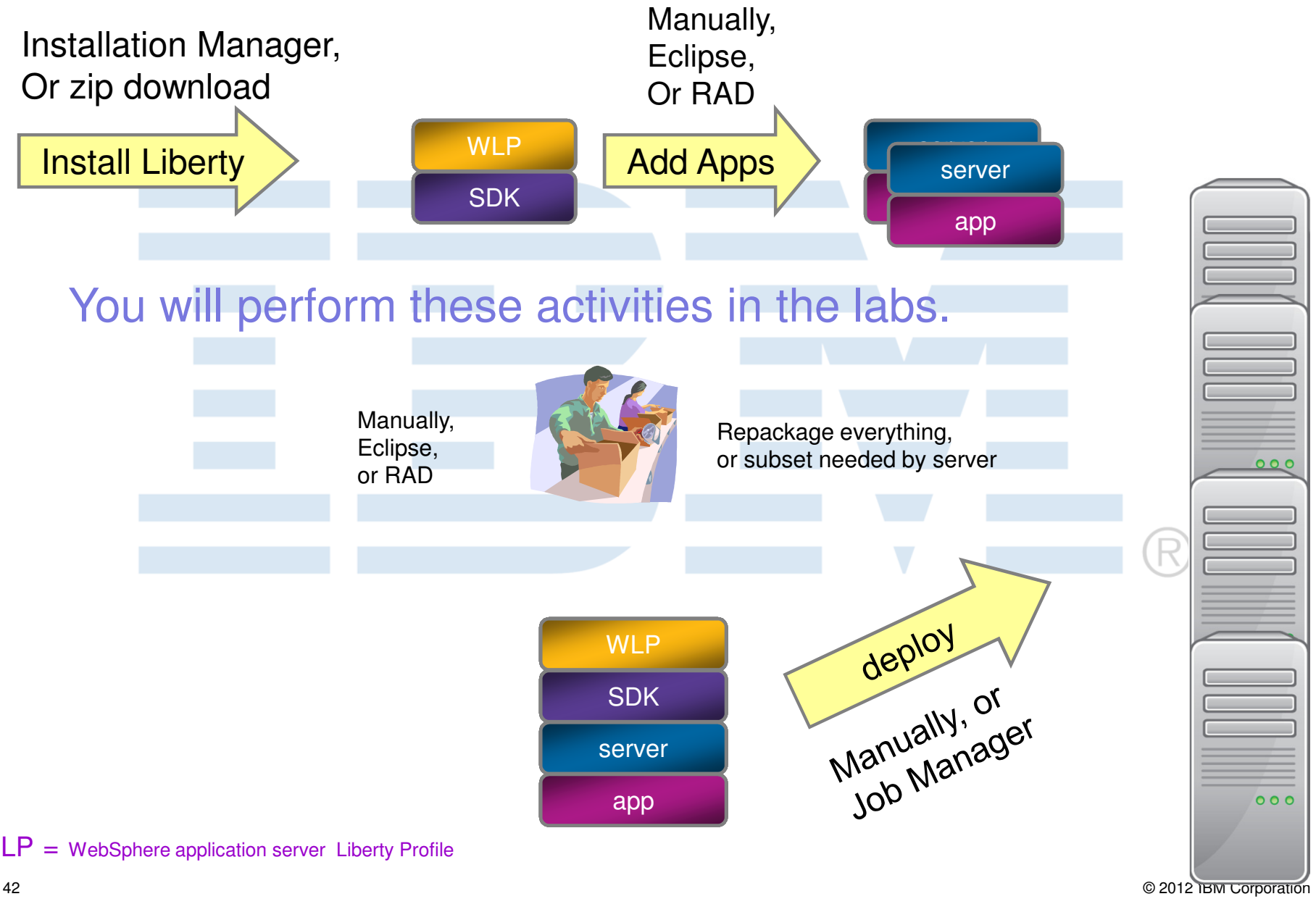
Centralized Management Using the Job Manager

- Optionally manage server lifecycle through WAS ND Job Manager
  - Requires one ND license
- Acts as a single point of management for:
  - **Agentless** install
  - Start/stop server instance
- Each instance is a “standalone” server
  - Lifecycle management can be targeted at groups
  - HTTP Session failover
    - DB persistence
    - WebSphere eXtreme Scale (WXS) session cache (replicated)

Preparing to manage Liberty profiles

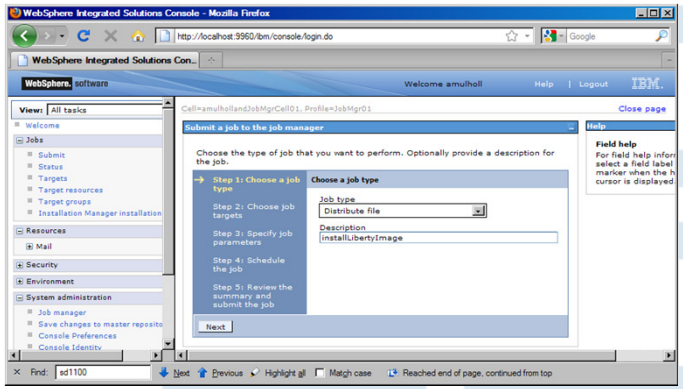
1. Create a job manager or deployment manager profile
2. Create a remote host target
3. Define variables / host properties for path names
   - WLP_WORKING_DIR
   - WLP_SHARED_DIR
   - WLP_ADDITIONAL_DIRS
4. Package Liberty profile into a zip file
   - Self-contained package
5. Use the Job Manager to:
   - Install / Uninstall Liberty profile resources
   - Start / Stop Liberty profile servers
   - Generate merged plugin configuration

Installation, development, deployment lifecycle



WLP = WebSphere application server Liberty Profile

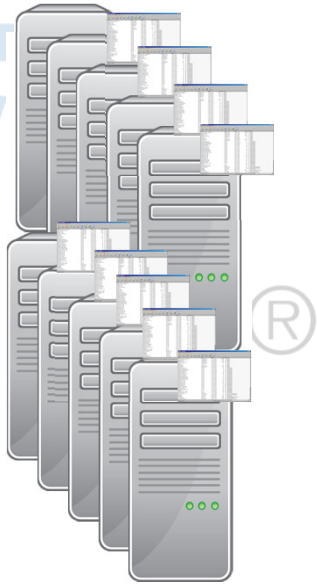
Define hosts/groups and deploy embedded server



WebSphere ND Job Manager

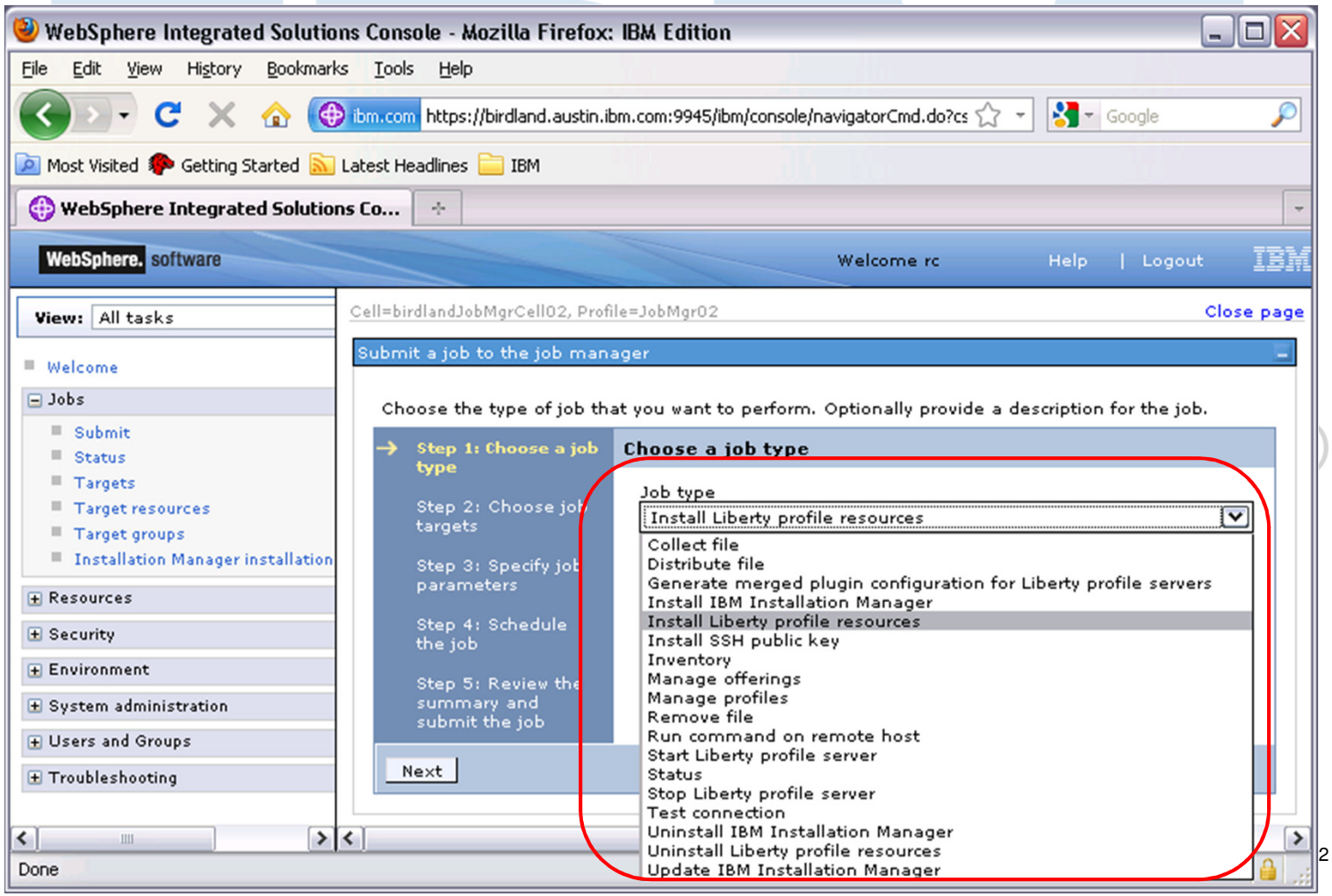
Unzip embedded server image onto remote hosts

Start, stop and view servers from central point



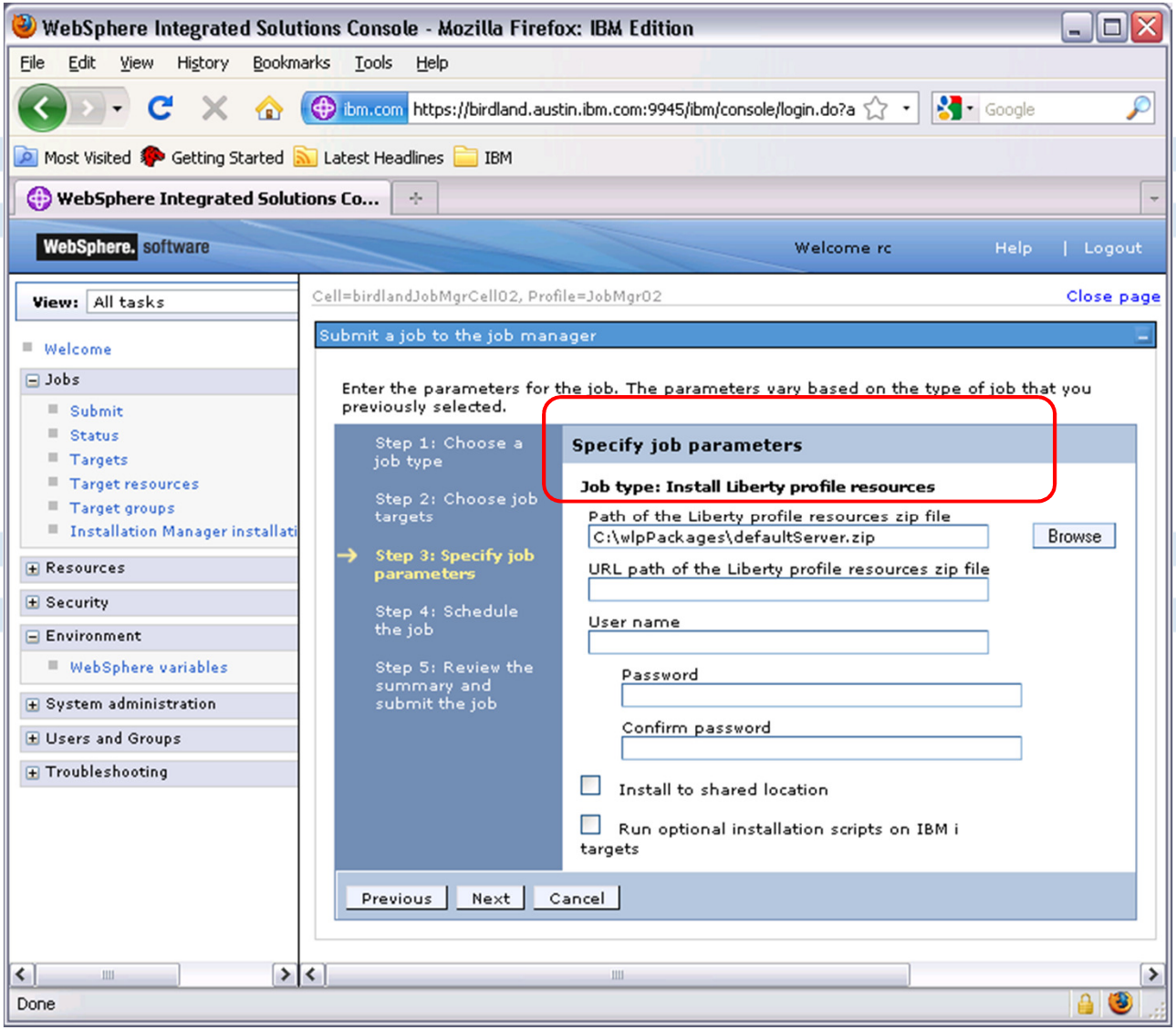
Submitting jobs

- Requires a JMX connector to be configured in the Liberty profile server
  - **Install** Liberty profile resources to remote host
  - **Start** Liberty profile server on remote host
  - **Stop** Liberty profile server on remote host
  - **Generate** merged HTTP server plug-in for Liberty profile servers



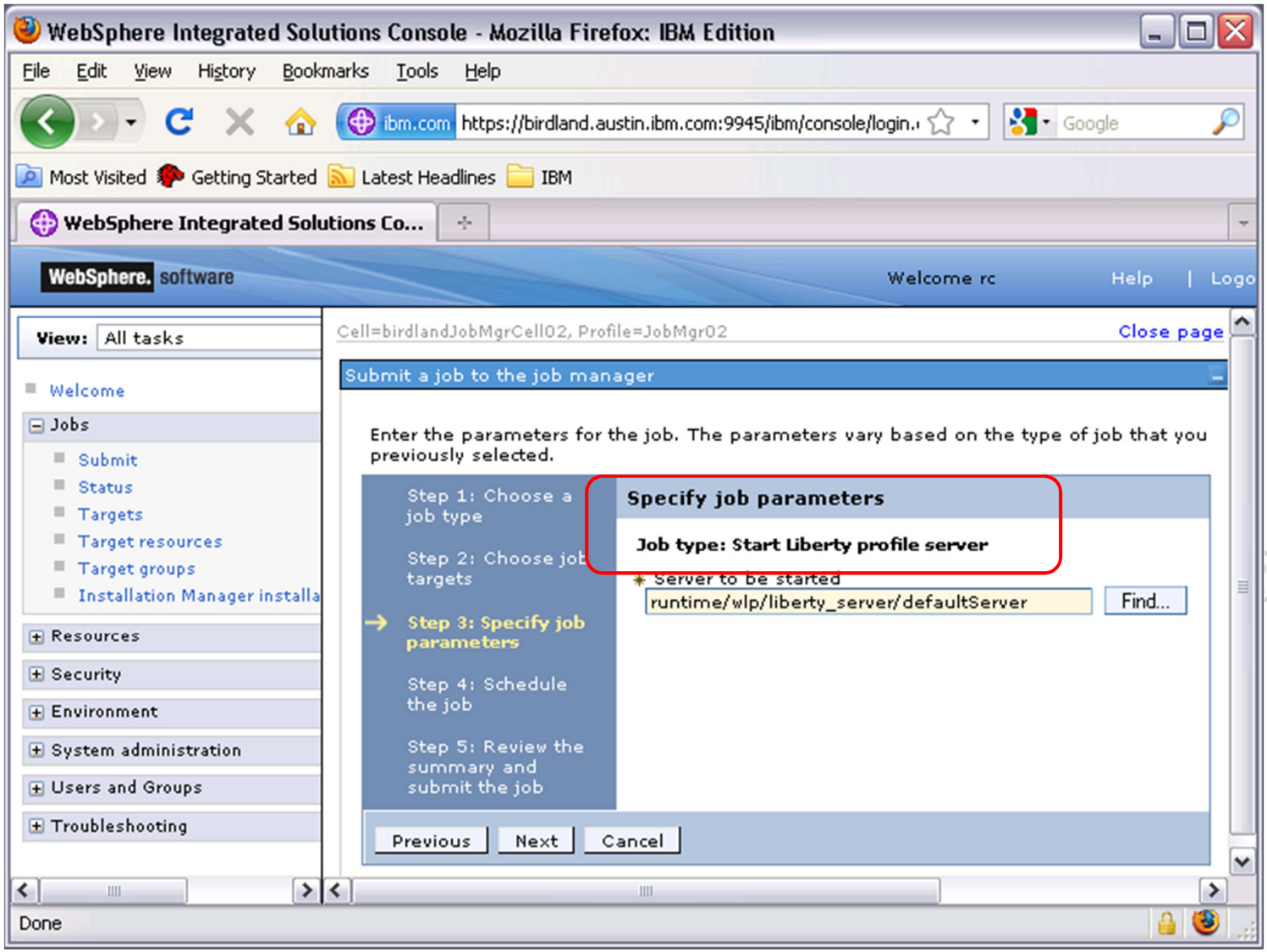
Job Type: Install Liberty profile resources

- Specify location of the Liberty Profile zip package to install
- Provide admin credentials to remote host



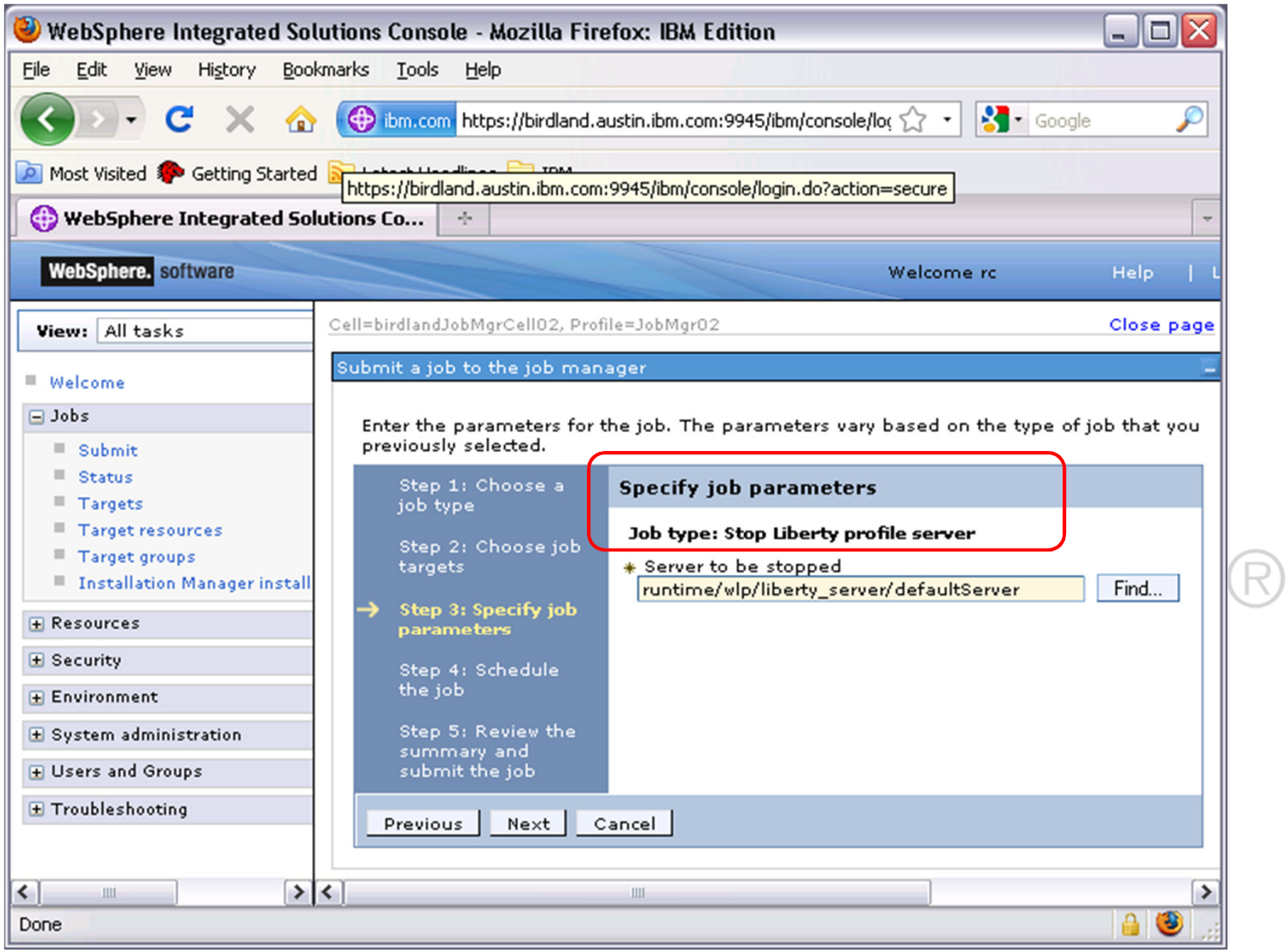
Job Type: Start Liberty profile server

- Use the **Find** button to locate the remote server you want to **start**



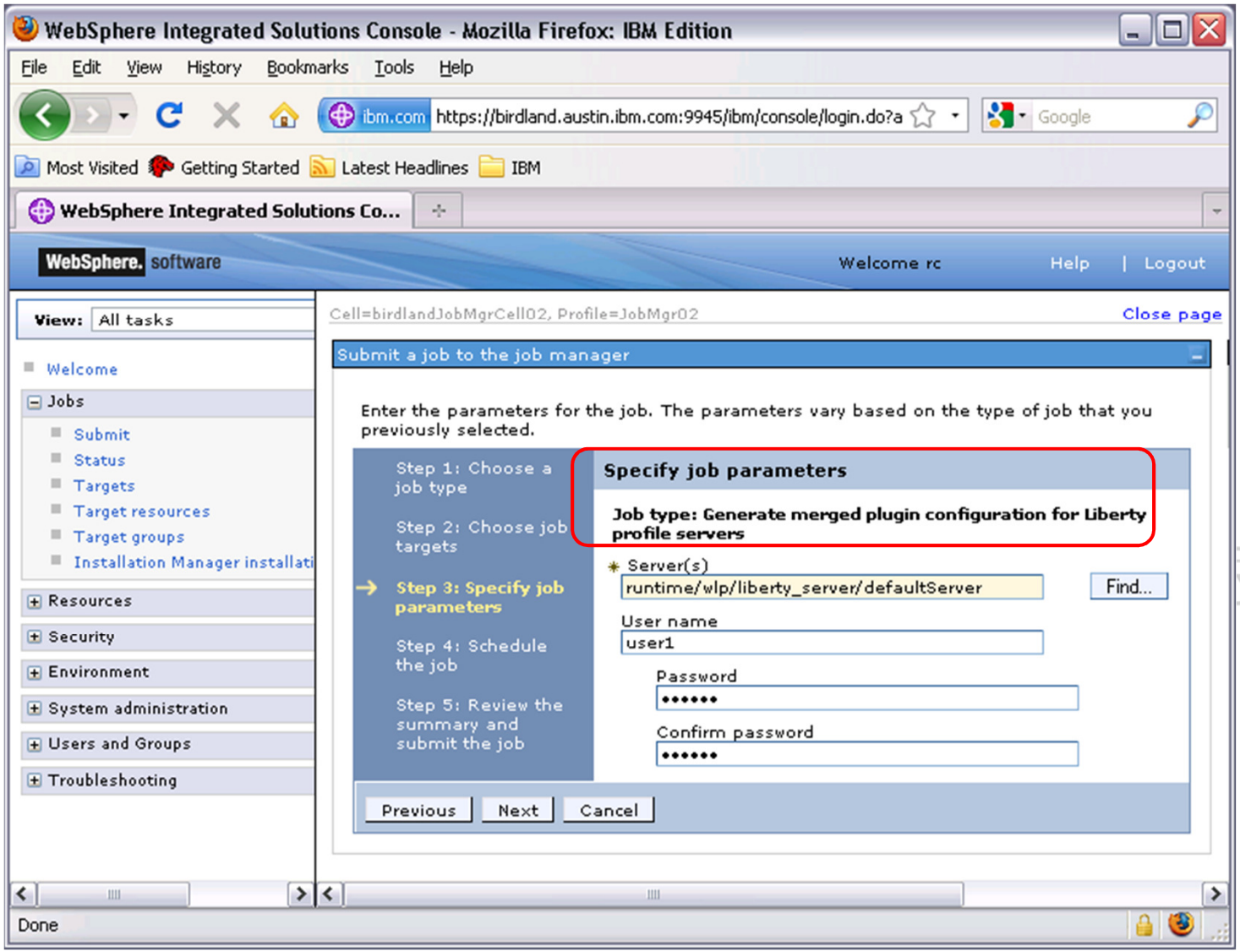
Job Type: Stop Liberty profile server

- Use the **Find** button to locate the remote server you want to **stop**

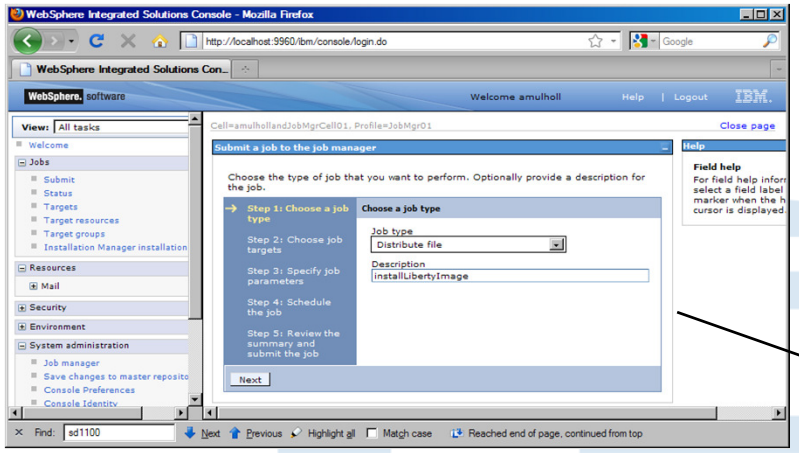


Job Type: Generate merged plugin configuration

- Use the **Find** button to locate the remote server(s) for merge job



Merge plugin config for multiple hosts



- Generate merged plugin configuration for Liberty profile servers job
  - create a single, merged plugin-cfg.xml file that instructs a web server plug-in to redirect requests to multiple application servers residing on multiple hosts.

WebSphere ND Job Manager

IHS + plugin

HTTP requests

Remote Liberty Servers

- **Lab 02:** Learn to Accelerate your Web App Development with the WebSphere Application Server Liberty Profile
  - Work with JPA application to access a database
  - Configure additional features in the Liberty Profile server
  - Configure JDBC Driver and data source
  - Configure Security
  - Package the Liberty Server, configuration, and applications for deployment to other environments
- **Lab 03:** Installation of WebSphere Application Server and perform Remote Management of Liberty Profile Servers
  - Install WebSphere Application Serve – Network Deployment using IBM Installation Manager (Use record mode)
  - Create a WAS-ND Job Manager profile
  - Configure an existing Liberty Profile for remote deployment and perform a remote install
  - Remotely manage the Liberty Profile
  - Configure and test an HTTP Server with the Liberty Profile server

Questions

Grazie
ITALIAN

धन्यवाद
HINDI

Merci
FRENCH

ありがとうございました
JAPANESE

Obrigado
BRAZILIAN PORTUGUESE

多谢
SIMPLIFIED CHINESE

Thank You

多謝
TRADITIONAL CHINESE

Gracias
SPANISH

Спасибо
RUSSIAN

நன்றி
TAMIL

ขอบคุณ
THAI

Danke
GERMAN

شكراً
ARABIC