Take advantage of the WebSphere 9.0 Cloud ready, Innovation Platform

October 25, 2016

Key reasons for upgrading to WAS 9

- **Innovation Platform -** Take advantage of an additional development and new capabilities driven into WAS including being the first commercial software vendor to certify to Java EE7
- **Cloud ready -** Take advantage of the WebSphere Java runtime on Bluemix, various vendor clouds or in a mix of hybrid cloud environments using instant runtimes, Docker images or virtual machines
- **Fit for Purpose server -** WAS 9 allows you choose the right fit server for your application with the Family Edition licensing option . WebSphere Liberty provides micro service capability to full qualities of service and Java EE7 compliance – choose the server that fits your application
- **Security -** stay current on Java versions for currency with security fixes. Use the latest security protocols in your applications
- **Performance and Operational efficiency -** WAS 9 provides significant performance benefits with throughput over previous releases. Enhanced dynamic clustering, polygot administrative management and health management policies
- **DevOps ready -** Ease-of-integrating WebSphere runtimes in the DevOps workflows for continuous integration and continuous delivery
- **Cost effective License options -** WAS Family Edition – mix and match the server editions that you need. New Virtual Processor Core (VPC) - a simplified license metric that is sold as a monthly license charge and is offered for WebSphere Application Server for on-premise deployments and on-cloud deployments.

Our news on September 13th

WAS Release	WAS EOM	WAS EOS	WAS EOES
7.0 - all editions including z/OS	Dec 16, 2016 (2)	Apr 30, 2018	Apr 30, 2021 (1)
8.0 - all editions including z/OS	Dec 16, 2016 (2)	Apr 30, 2018	Apr 30, 2021 (1)

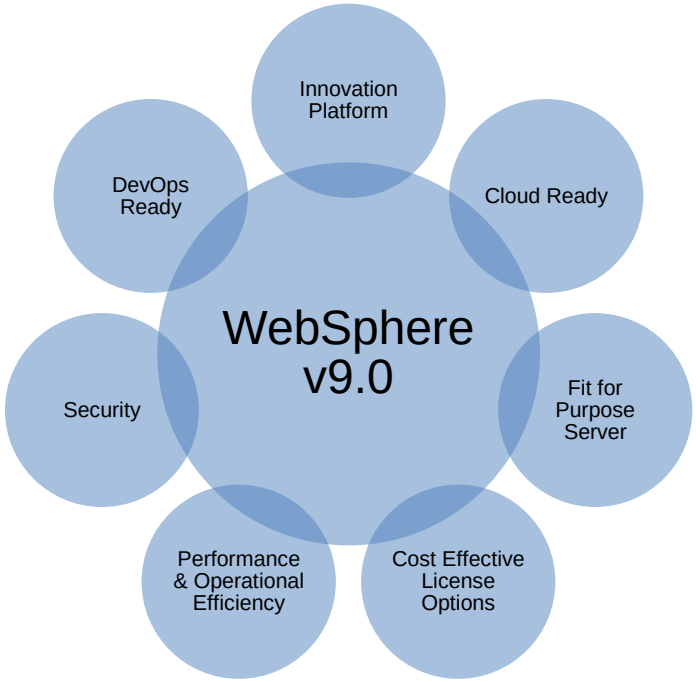
WAS Release	Java 6 EOS in WAS
7.0	April 2018
8.0	April 2018
8.5	April 2018(1)(3)

WAS Release	Java 7 EOS in WAS
8.5	Sept 2019

EOM – End of Marketing
EOS – End of Service
EOES – End of Extended Support

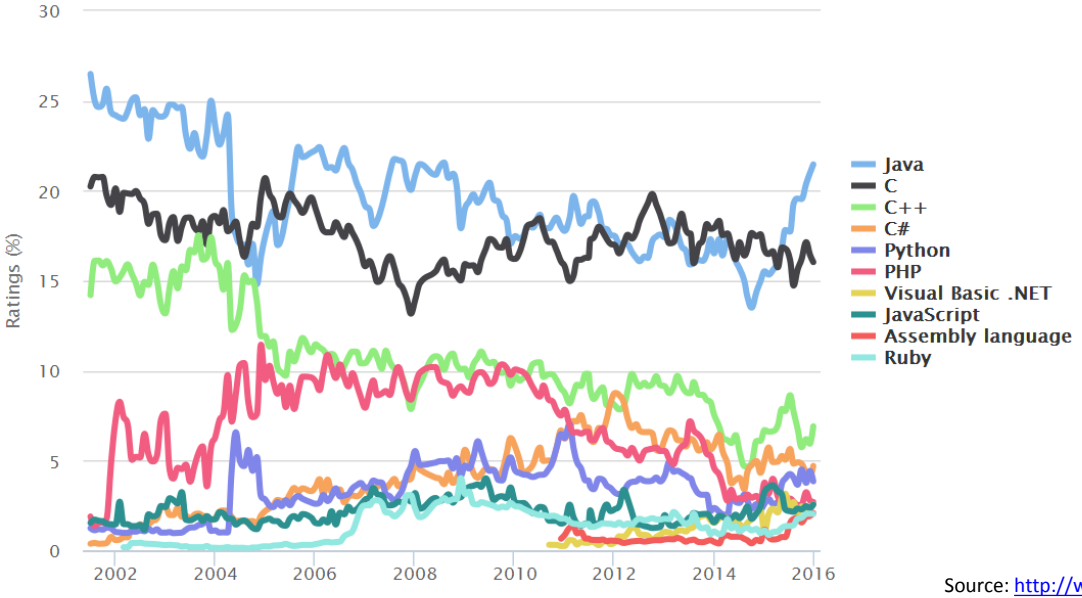
(1) After December 2018, Java SDK 6 support is limited to 'usage & known defects'
(2) WAS on z/OS EOM will be Feb 2017. Announcement occurred in June 2016.
(3) WebSphere Application Server Liberty has a single support stream for all product versions. Support for Java SE 6 with Liberty will end in September 2017 to allow the Liberty code and included open source packages to move forward.

WebSphere v9 – Catalyst for Innovation



TIOBE Programming Community Index

Java is in the lead and appears to be gaining momentum



The TIOBE Programming Community index is an indicator of the popularity of programming languages. The index is updated once a month. The ratings are based on the number of skilled engineers world-wide, courses and third party vendors. Popular search engines such as Google, Bing, Yahoo!, Wikipedia, Amazon, YouTube and Baidu are used to calculate the ratings. It is important to note that the TIOBE index is not about the *best* programming language or the language in which *most lines of code* have been written.

Source: http://www.tiobe.com/index.php/content/paperinfo/tpci/index.html

Why use Java?

- Why would we want to use Java? Isn't that so last decade?
- Yes, it's a big, complex language that's not incredibly easy to master and a lot of really bad code has been written in in over the last 15 years.
- However…
  - It has one of the most complete sets of libraries available for commercial, enterprise-level programming on the planet in JEE
  - It has been brought up to speed with most of the newest and most modern language features like Lambda expressions.
  - It fully integrates with cool JVM-based languages like Clojure, Groovy and Scala for the really freaky use cases
  - It has AWESOME tool support in open source with Eclipse
  - It's better documented through books, courses, videos and websites than nearly any other language available
  - It's actually possible to FIND good Java programmers
- It has full support in Bluemix in both raw form, and in the IBM Liberty profile

Innovation Platform

- Java EE 7 Web Profile and Full Platform certified runtime for WebSphere Application Server.
- WebSphere Connect gives you the power to connect your existing WebSphere apps and data to the cloud without needing to rewrite the apps or acquire new data.
- Liberty App Accelerator gives users a starting point to build java microservices applications by using WebSphere Liberty with technology types such as Spring Boot, JAX-RS and Watson using Apache Maven as the build system.
- Provides scalable infrastructure that facilitates building HTML5 applications for improved responsiveness through low-latency, bidirectional communication with WebSockets.

Microservices + Java

Production ready, EE7 compliant app server for microservices strategy

- Large Developer base using Java Framework (including Spring based on Java EE)
- WAS V9 brings traditional WAS deployments up to the same level of EE7 and Java 8 as WebSphere Liberty - WebSphere's architecture + Java EE7 = proven, enterprise development platform for Microservices
- WebSphere Connect – add new microservices or modernize current apps with microservices - Seamless connectivity to cloud based data and cognitive services
- Allows for easy integration with DevOps workflows and Docker container strategies
- IBM provides best practices and methodologies for creating a brand new microservices application. Game On! is an exemplar application that helps users explore basic and advanced microservices concepts.

Java EE

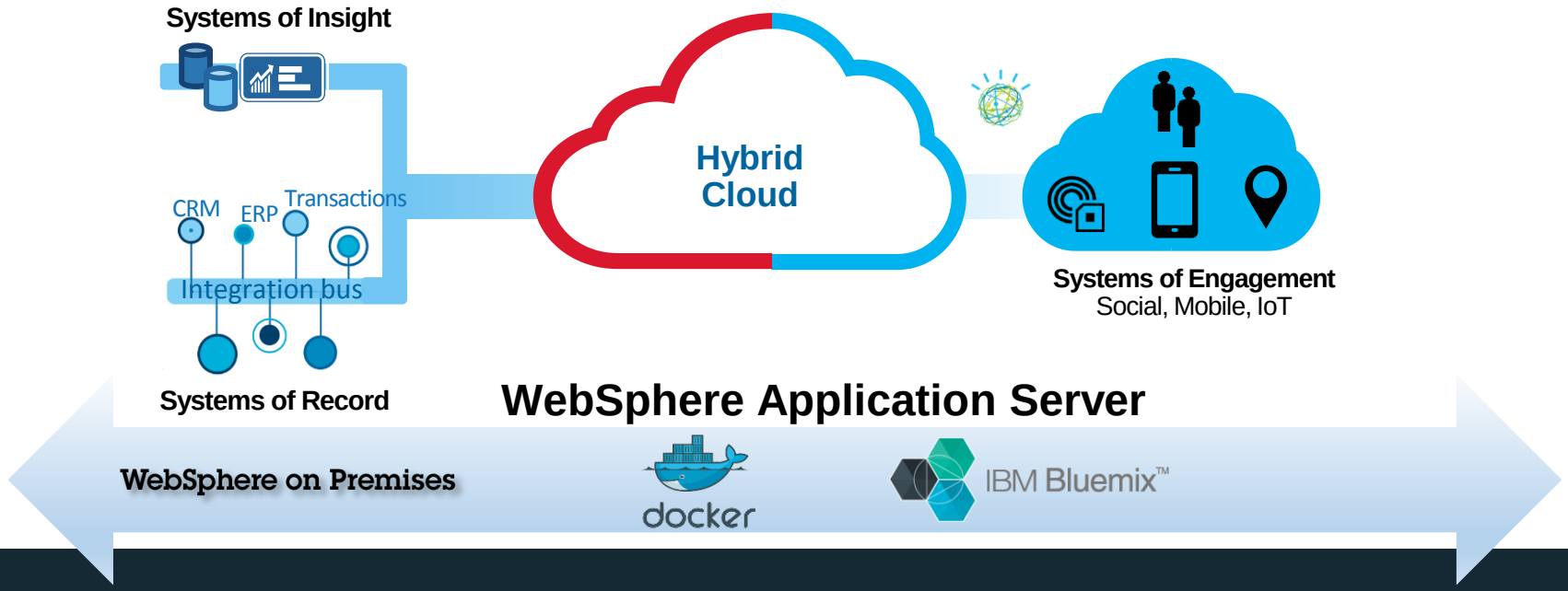
docker

IBM Bluemix

WebSphere Application Server

WebSphere supports the entire hybrid cloud landscape

✓ Integrate seamlessly across anything ✓ Innovation across enterprise IT and new ecosystems



WebSphere Application Server – Basis of Hybrid Cloud Options

WAS Liberty Core
WAS Base
WAS ND
WAS Family Edition

Price: Perpetual (PVU)

Traditional

PureApplication On Bluemix Local System (x86)
PureApplication System (Power8)
PureApplication Software

BYO - Docker

IBM Bluemix™
Local – Instant runtime,
Local - IBM containers

On Premises

WAS as a service
(Multi-Tenant and Single Tenant)

Liberty Container
(Public/Dedicated)

.java liberty
(Public/Dedicated)

IBM Bluemix™

SOFTLAYER

WAS as a Service

BYOL

vm

PureApp Service

3rd Party Clouds

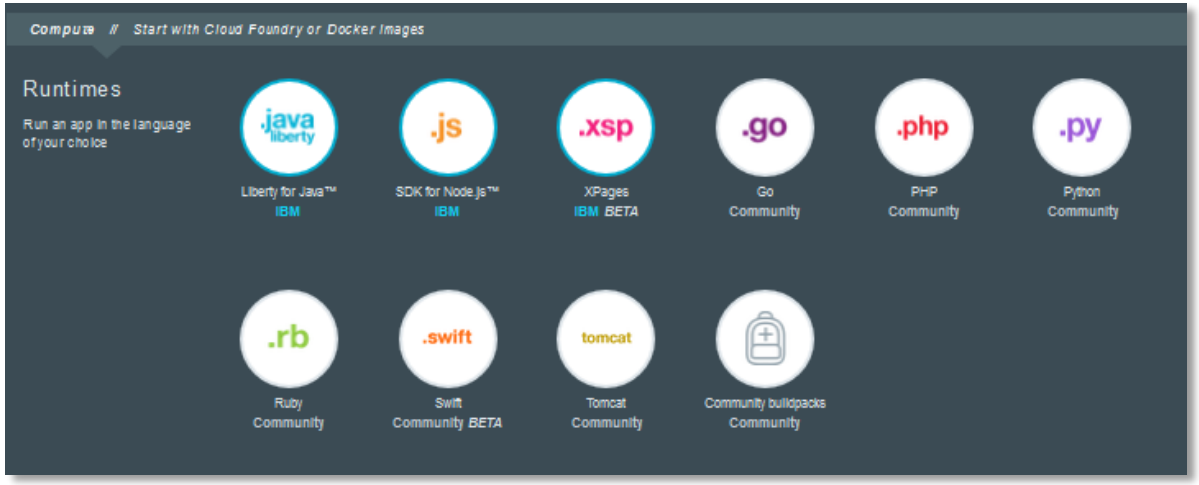
Amazon EC2

Azure

Open Shift

Pivotal Cloud Foundry

Why are customers interested in Java instant runtimes?



- The Instant Runtimes environment is focused towards rapid development.
- The Bluemix Catalog offers 100+ services for you to quickly consume and build your application.
- There are many starter applications to get you up and running in seconds.
- If you are writing a new application, you will likely want to start with the Instant Runtimes.

Instant Runtimes

Why are customers interested in WAS and Docker?

Security and resilience of virtualization but without the cost and overheads

- Microservices in particular provides a push towards isolated service instances rather than multi-tenant application servers

Application portability across environments

- Allows the application development team to take ownership of the application server and configuration
- Liberty packaged server already does this, but requires JRE and OS as a prerequisite

WebSphere Application Server

- 24 x7 availability
- Rock solid security
- Deployment flexibility

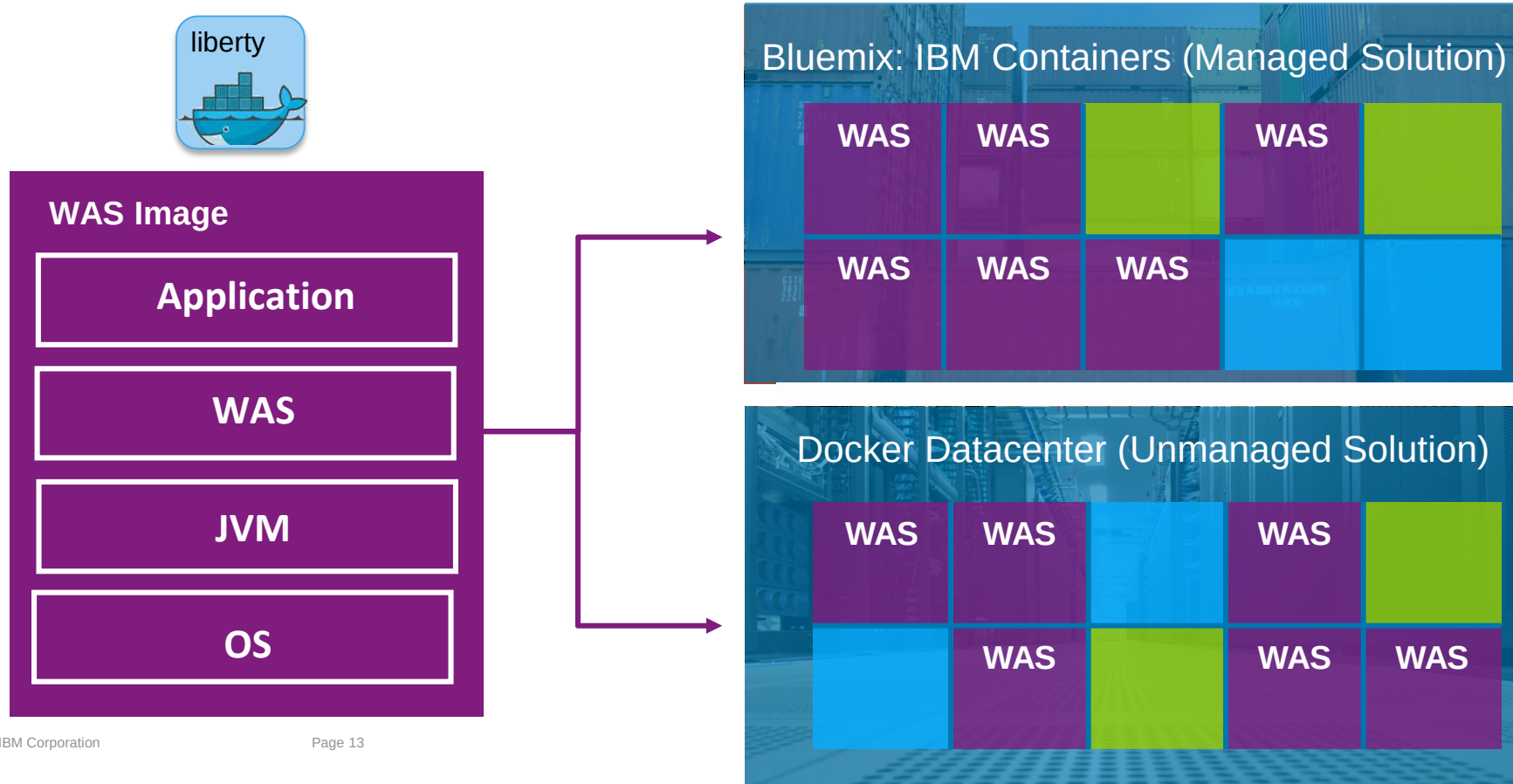
Speed of deployment

- With WAS, a Docker image avoids the installation overhead
- Potential for delta deployments due to registry and layered file system

Consistent deployment / management / monitoring model extending beyond the Java application server

Containers

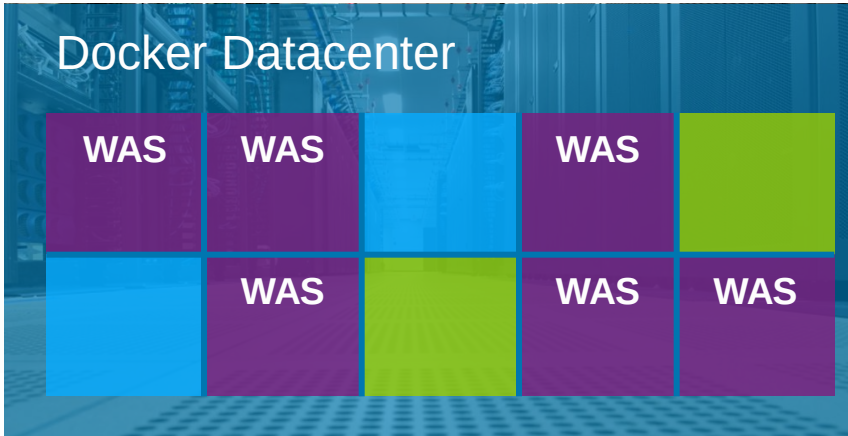
Integration with Docker Deployments



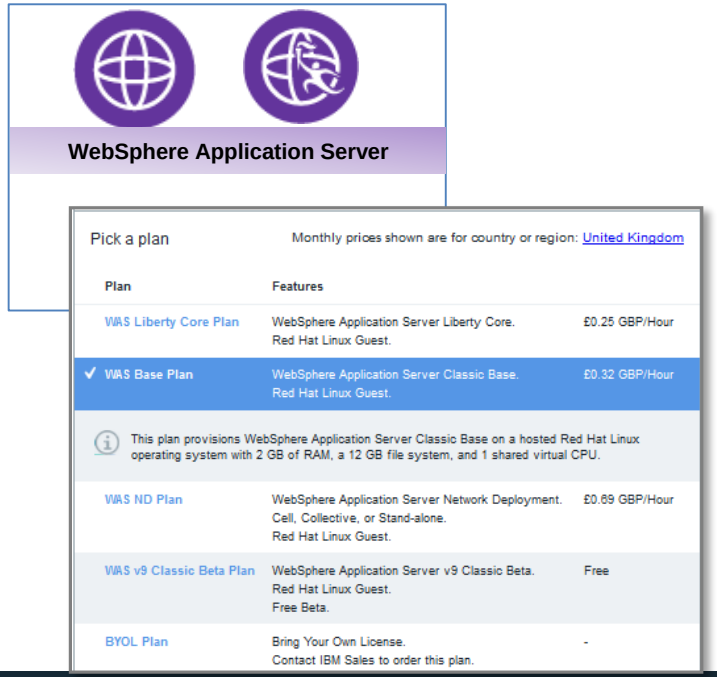
Docker Container Deployments

Heterogeneous Container lifecycle and operational management

- IBM Containers provide a managed runtime environment for Docker in Bluemix
- On-prem solutions also include Docker Datacenter, from Docker Inc, **which IBM also supports as a reseller**
- Both provide secure Docker registry, the ability to deploy and manage multiple-container **Compose** topologies and load-balancing across container clusters using Docker **Swarm**
- The choice is transparent to the WebSphere application container
- Standalone containers or Collectives with built-in WAS intelligent management



Why are customers interested in WAS on Cloud?



- Available for Liberty Core, WAS Base and WAS ND
- WAS as a service is the ability to provision WAS Base or ND cell/collective topologies on Bluemix infrastructure.
- Fastest way to exploit cloud in existing WAS deployments because the application starting-point is “as-is”

Virtual Machines

openstack

WAS for Bluemix – Single-Tenant Option

Isolate WebSphere Workload

All of the supporting infrastructure running WAS serves a single customer. With single tenancy, each customer has their own independent hardware and instances of WAS. With this option, there's essentially no sharing going on.

Fully Integrated Hybrid Environment

Blur the lines between on-prem and off-prem resources. Use a high speed, direct network link between our Bluemix data centers and customers datacenters to access your data.

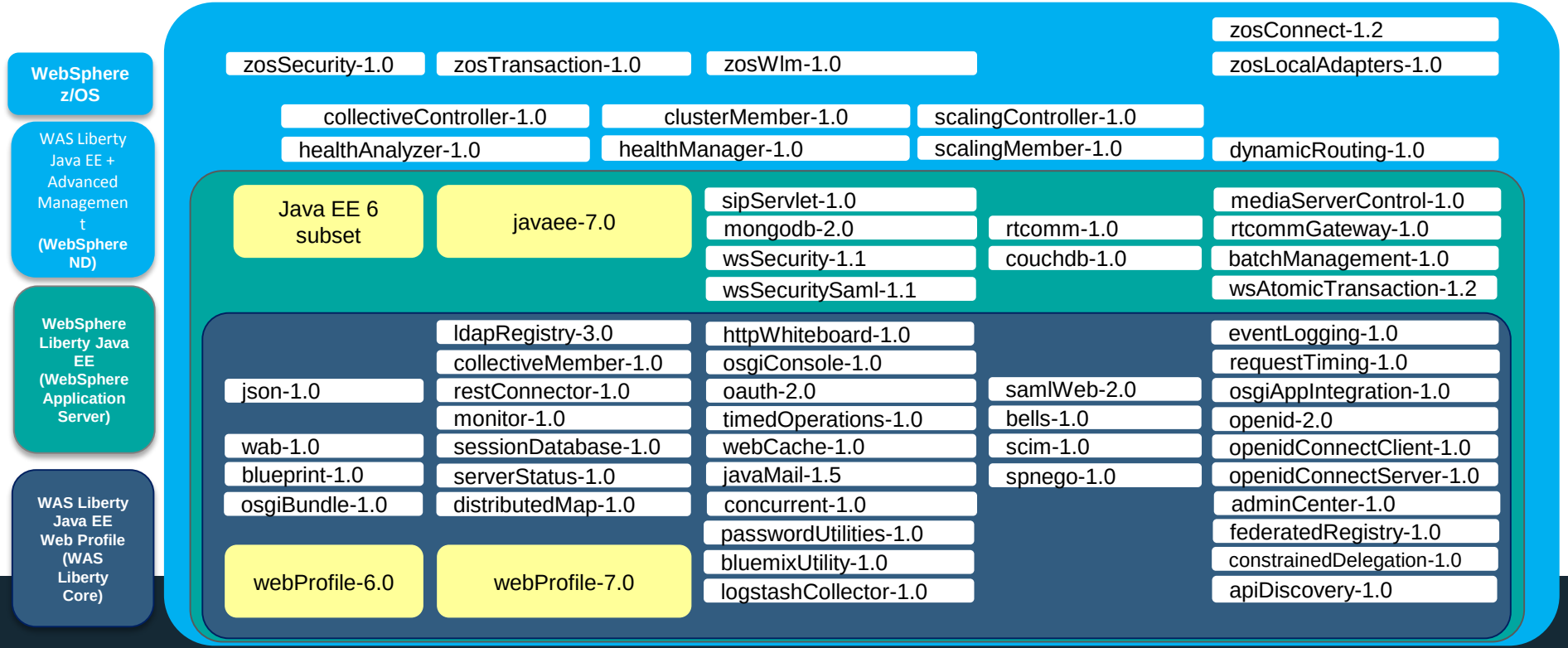
Super-Secure Data

Customers moving sensitive financial, health, or government-regulated data to and from WAS for Bluemix can further ensure its security by completely avoiding exposure to the public Internet.

Product Terminology

What you buy Product/Edition/License	**What you install** Runtime / features		
WebSphere Application Server Network Deployment (& z/OS)	WAS Liberty Java EE + Advanced Management	and/or	WAS traditional Java EE + Advanced Management
WebSphere Application Server (Base)	WAS Liberty Java EE	and/or	WAS traditional Java EE
WebSphere Application Server Liberty Core	WAS Liberty Java EE Web profile		

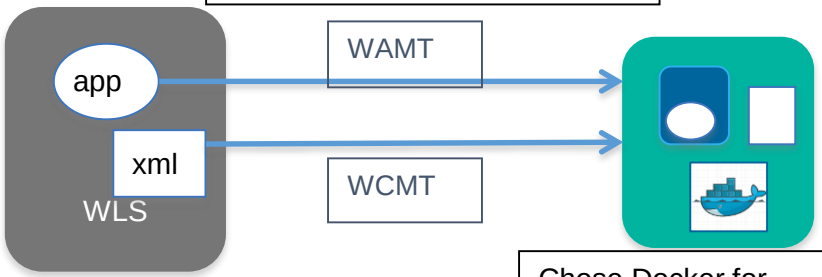
Composable Features For Different Liberty editions



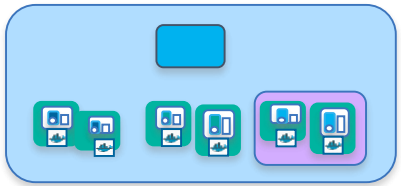
Liberty & Docker as flexible route to cloud

Apps moving from WebLogic to Liberty and Docker to position for Cloud

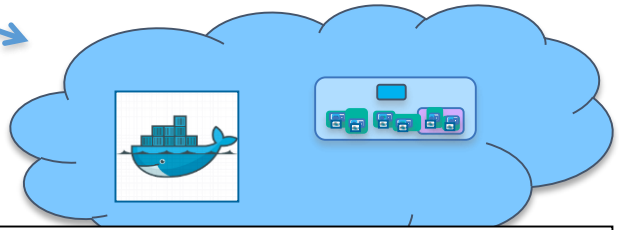
Migration tools make it easy to move



Chose Docker for maximum portability



Using built-in management for initial deployments (local data center)

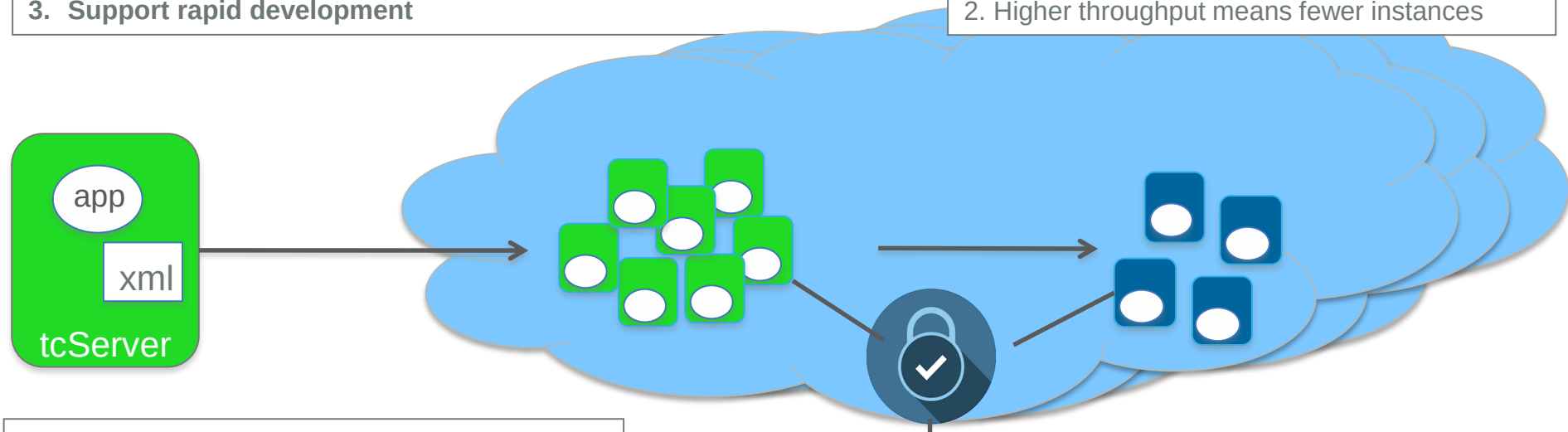


Will later deploy same images to chosen cloud platform(s)

tcServer to Liberty Instant Runtime

Move to cloud:
1. **Improve high availability: multiple Bluemix DCs**
2. **Achieve elastic scale for unpredictable workload**
3. **Support rapid development**

Second move to Liberty buildpack took 1 day and reduced costs:
1. Liberty support included in price
2. Higher throughput means fewer instances



Initial migration to Java buildpack in Bluemix Instant Runtimes

http://ibm.biz/libertyUC5

Security to Deploy with Confidence

Build apps seamlessly and securely within your enterprise

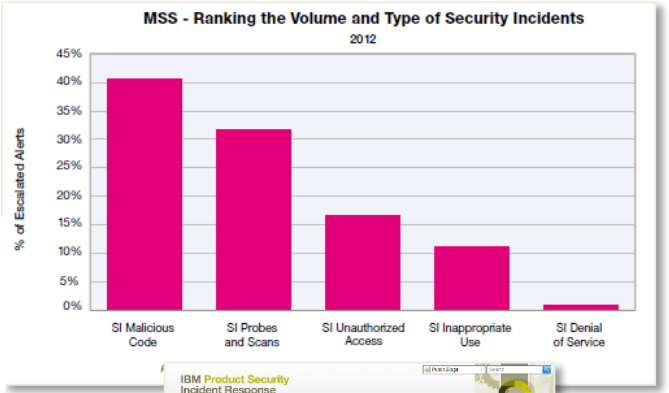
*Deploy, run and scale software securely on premise and in the **cloud***	*Connect **mobile** apps to enterprise data and services securely*	*Access **data** quickly, efficiently, and securely*
WAS	**WAS, MQ, MobileFirstFoundation, IIB**	**IIB, MQ**

As of 2014, IBM had **3,000 security patents** and **25 labs worldwide**

In 2012, IBM announced its own **division for security**

IBM WebSphere portfolio accredited by **Open Trusted Technology Provider Standard accreditation**

Key elements of Security in the IBM SW Development Lifecycle

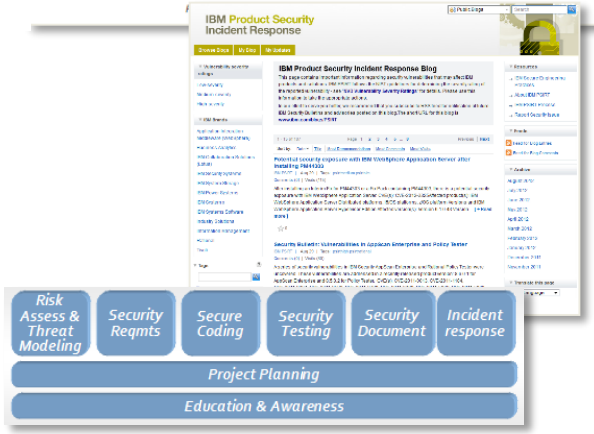


IBM X-Force Research and Development: educates the public about emerging Internet threats, researches and evaluates vulnerabilities and security issues, and develops assessment and countermeasure technology for IBM products and services.

Source Code Asset Protection: a key initiative for protecting IBM critical assets used within our products and services.

Product Security Incident Response (PSIRT): designed to timely identify, analyze, resolve and report security vulnerabilities in IBM products.

Secure Engineering Initiative: designed to provide development teams with the process, skills, tools and knowledge needed to develop products & services with Security in Mind.



Public information: http://www.ibm.com/security/secure-engineering/

Key Security Features built into WebSphere Application Server

WebSphere Application Server is built using solid secure engineering practices, leveraging security standards, and offers a rich set of security features and capability.

"Secure by Default"
Simplified to ensure properly configure and Secure.
Administration Security is enabled out of the box

Standard Security Tokens
Includes SPNEGO, SAML, Oauth, OpenID, OpenID Connect

Authentication
Basic, Form Based, Certificate, customized Logon

Multiple User Registry Options
File Based, LDAP, z/OS SAF Operating System, Custom

EE Security Standards
JAAS, JACC, JASPI, and EE Programmatic API

Session Security
Insure the integrity of a HTTP Session and all cookies are secure

Application Security
Security for Web Apps, EJB, Web Services, JMX

Encryption
TLS 1.2, SHA2, Suit B, Elliptic Curve, AES256

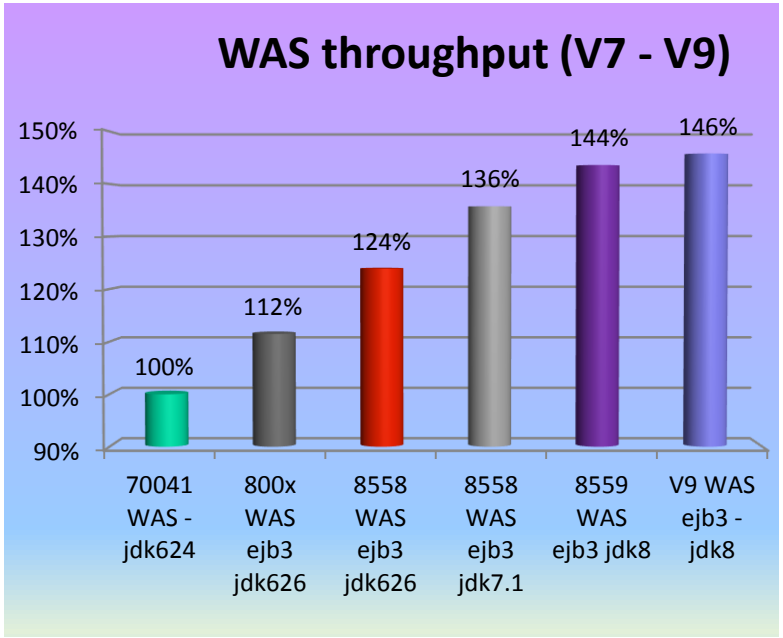
Federation
Federate multiple User Registries and API for member Management

Secure Engineering
Leader in Secure Engineering Practices. OTT-PS Accredited.

Security Stand. Compliant
FIPS 140-2, 800-131a, 800-161

WebSphere performance from V8 thru V9 (with Java upgrades)

- This cumulative chart shows the improvement of WAS performance due to both JAVA improvements and WAS product improvements.
- Dynacache and Large server pages were used where applicable in these measurements.
- JDK8 first supported in v8559 as an optional install. JDK8 is the default for V9.
- Daytrader3 used for benchmarking

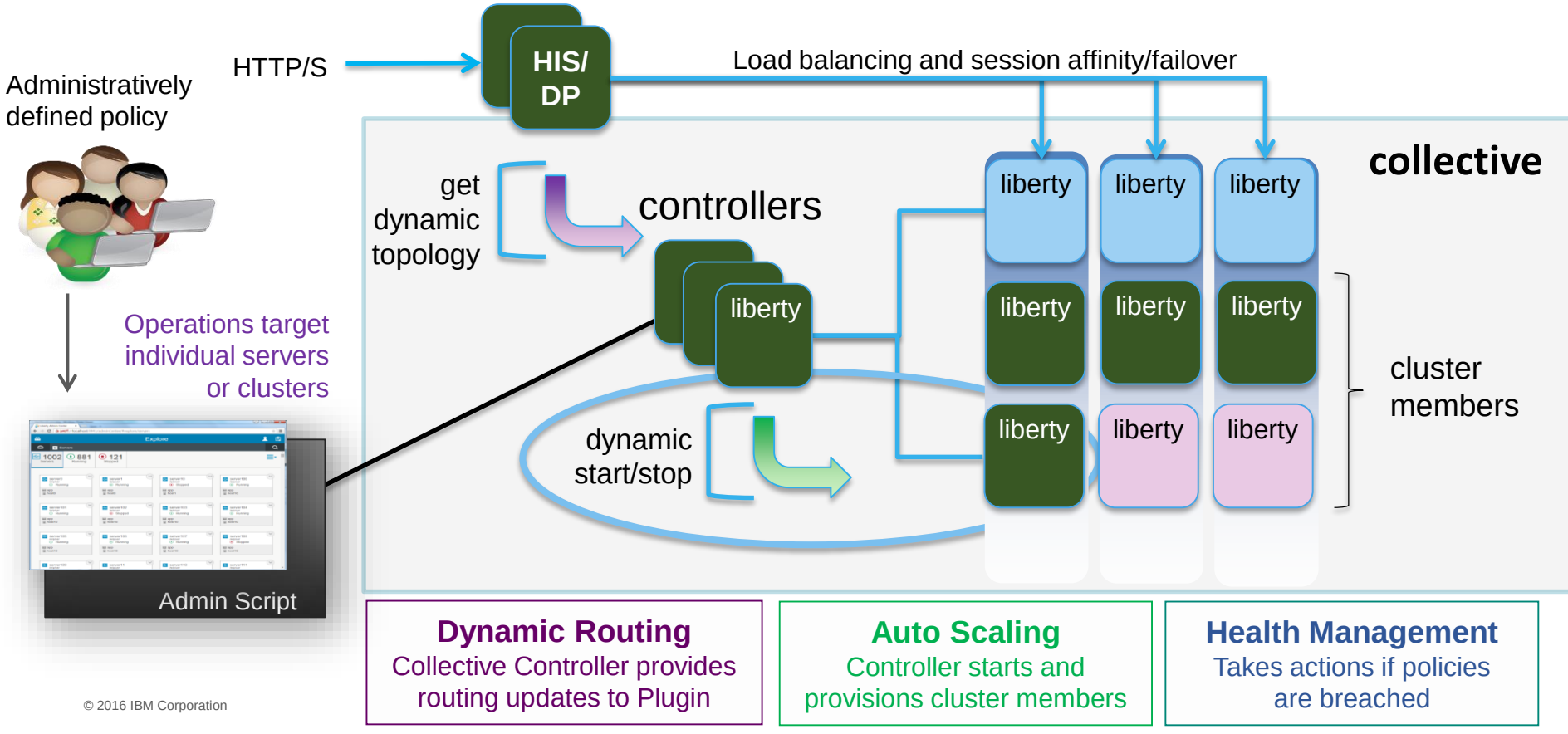


System Configuration:
DayTrader3: AIX7: Power7 - 2 proc - SMT2, 32 GB RAM

** 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.

WAS ND: Intelligent Management

Collectives



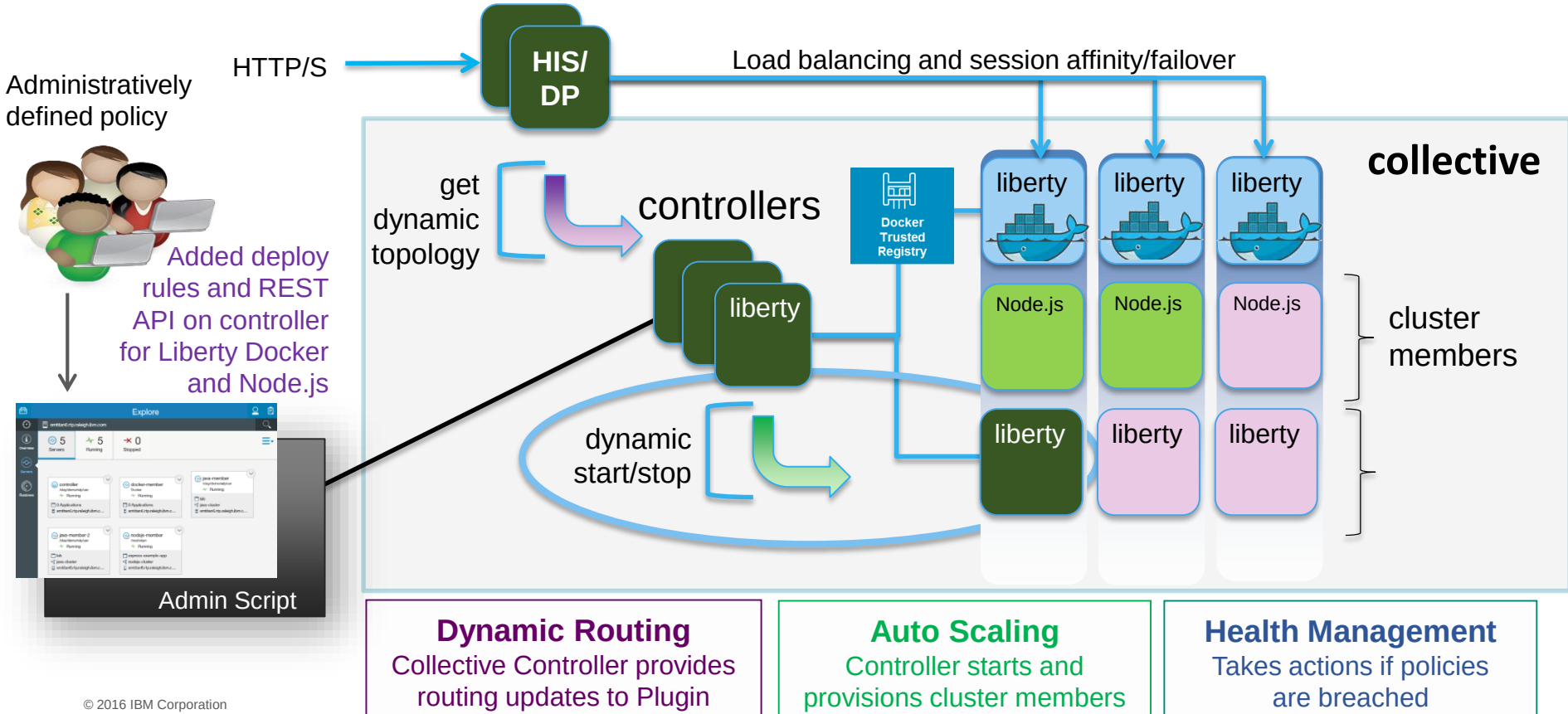
Dynamic Routing
Collective Controller provides routing updates to Plugin

Auto Scaling
Controller starts and provisions cluster members

Health Management
Takes actions if policies are breached

WAS ND Intelligent Management: Supports Node.js and Docker

Collectives



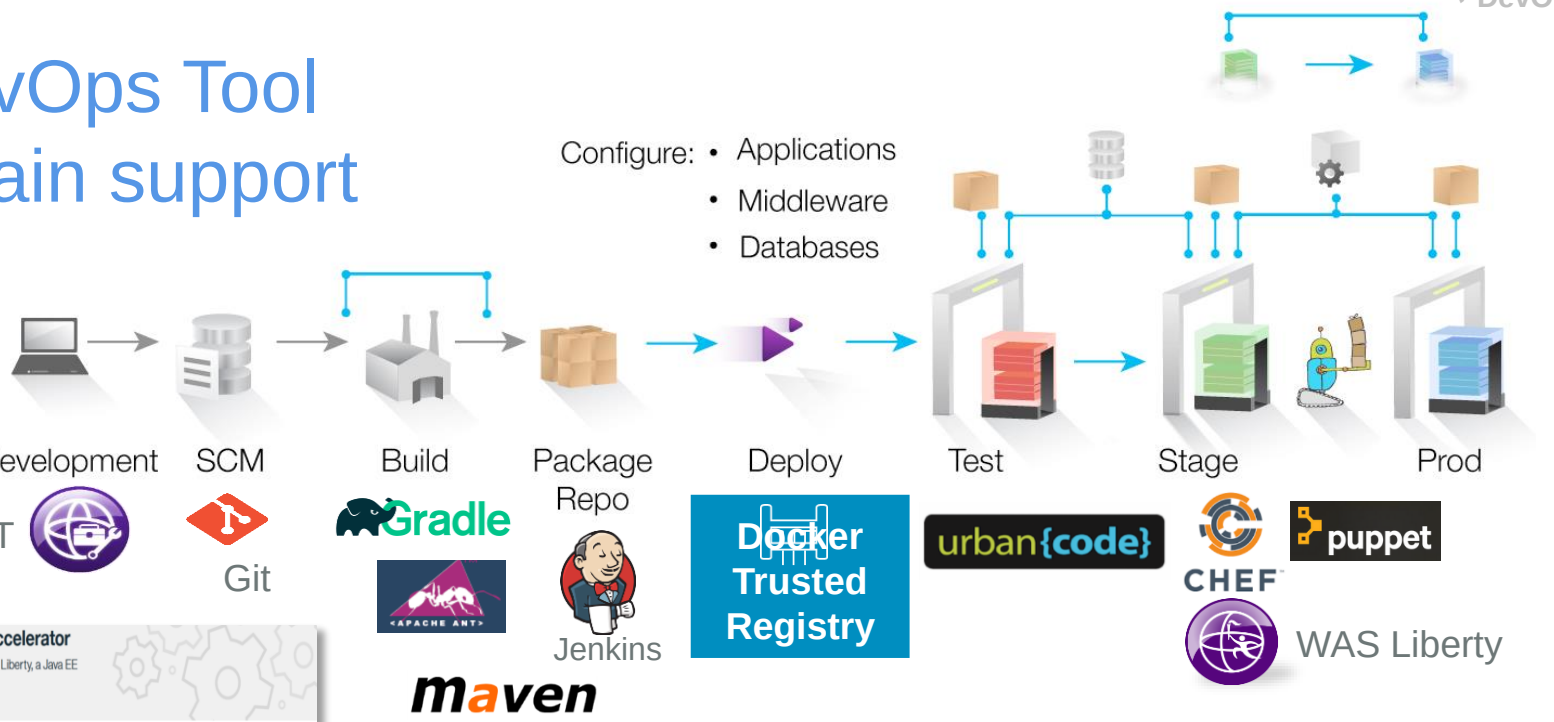
Dynamic Routing
Collective Controller provides routing updates to Plugin

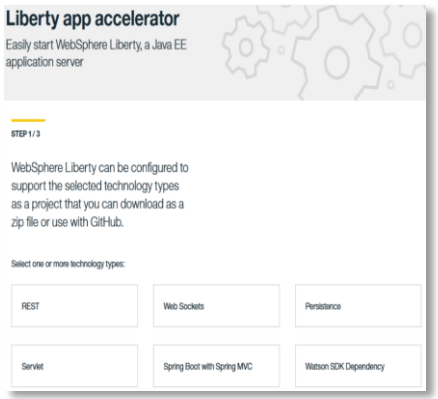
Auto Scaling
Controller starts and provisions cluster members
(Node.js coming soon)

Health Management
Takes actions if policies are breached

DevOps Ready

DevOps Tool Chain support





- ✓WebSphere Application server works with your DevOps pipeline
  - ✓Build automation tools with Maven, Ant, Gradle
  - ✓Continuous Integration with Jenkins
  - ✓Continuous Testing with Rational Test Virtualization server
  - ✓Continuous Delivery Urban Code, Chef, Puppet

✓DevOps ready

IBM UrbanCode Deploy speeds WAS applications to Hybrid Cloud including Bluemix

UrbanCode automates your application deployment process

UrbanCode deploys all the application components so you can set up environments painlessly in minutes versus hours.

Use Cloud Blueprints to deploy the entire application environment to hybrid cloud

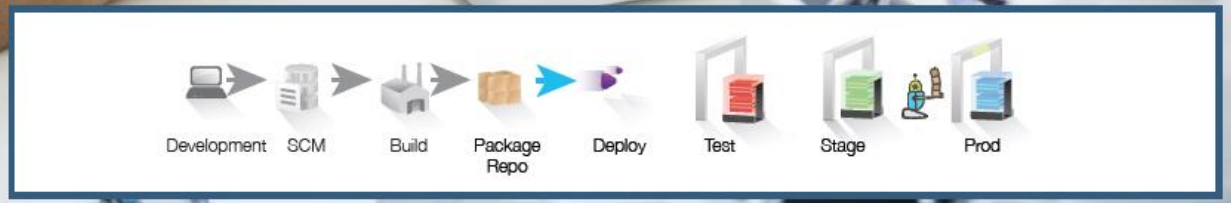
With the blueprinting capability of UrbanCode Deploy you can blueprint your target environments and quickly reuse them for any cloud.

UrbanCode also automatically configures the environment to support the application

Eliminate the manual configuration steps to reduce risk and speed applications from Dev to QA to Prod consistently and in a repeatable fashion. UrbanCode deploys, tracks and versions WAS configurations.

Benefits: *Automated, Fast, Repeatable*

- **Reduced Risk:** Automated, consistent deployments and rollbacks of applications
- **Repeatable Process:** Orchestration of changes across servers, tiers and components
- **Consistent:** Configuration and security differences across environments
- **Traceable:** Clear visibility: what is deployed where and who changed what
- **Integrated:** With middleware, provisioning and service virtualization



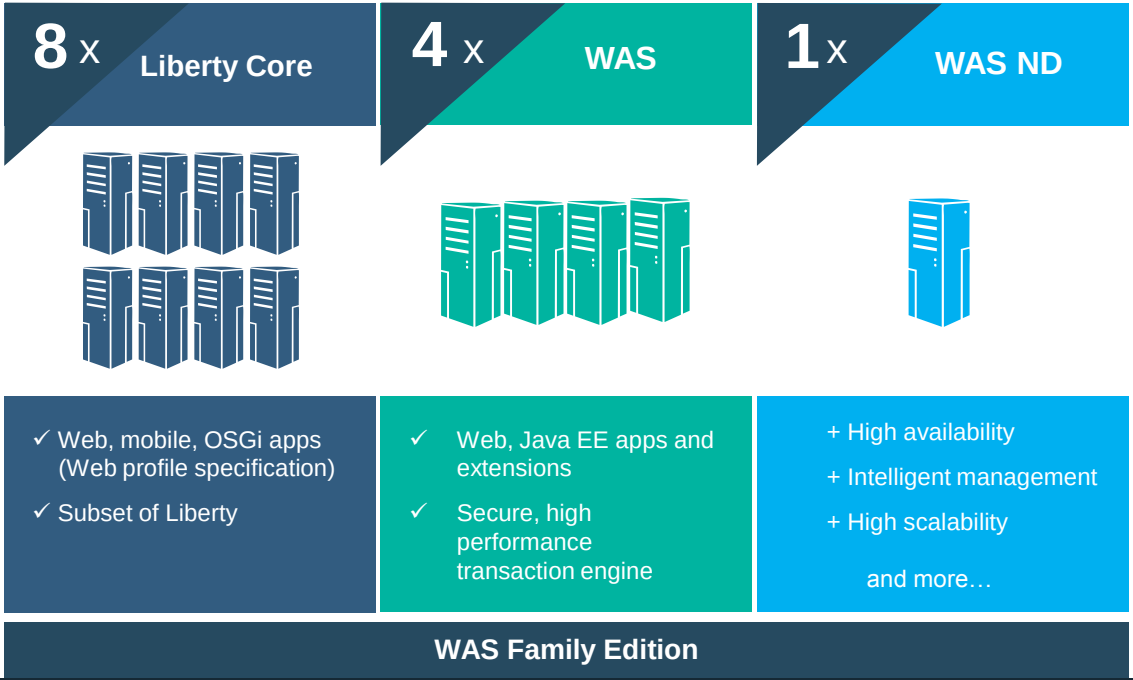
WebSphere Application Server Family Edition

1 PVU of Family Edition entitles:

1 PVU ND *or*
4 PVUs Base *or*
8 PVUs Liberty Core

OR mix & match

AND can redeploy new mix over time



Introducing the new Virtual Processor Core – VPC

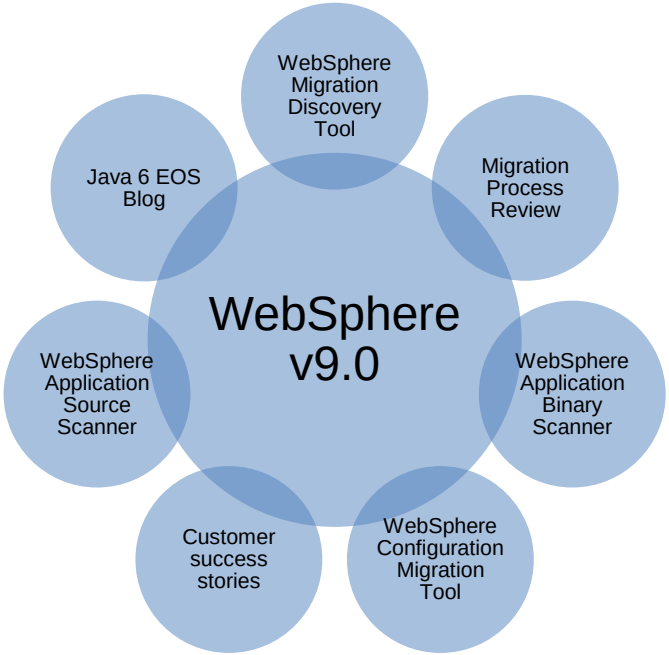
- Newly introduced simplified license metric
  - The Virtual Processor Core (**VPC**) is sold as a monthly license charge
  - Will replace PVU as the WAS monthly pricing metric
    - PVU remains as WAS perpetual licensing metric. No change.
- Virtual Processor Core
  - Virtual Cores available to the operating system
    - 1 VPC for every VPC available to a virtual Servers Operating System, or 1 VPC for each physical core of a non-partitioned physical server
    - If the number of VPCs is greater than the physical cores, then you only need to license the number of physical cores on the machine
- Benefits to Customers
  - Simplifies Processor and Sub-capacity Licensing
  - Aligns to Cloud Hosted Solution Licensing standards across MSP's
  - Makes it easier for customers On-prem and in Cloud to stay in compliance

In general 1 VPC will be price equivalent to 70 PVUs

VPC – New WAS Monthly Standard

- WAS editions: WAS Family, WAS ND, WAS, WAS Liberty Core
- WAS Term/Subscription Simplified
  - Monthly PVU parts being withdrawn
  - WAS Fixed Term License (1 year term) parts being withdrawn
- Existing customers simply buy VPC at the end of their current monthly terms instead of renewing the PVU-based monthly WAS parts
  - PVU-based monthly parts will be restricted at End of Marketing date on Oct 18, 2016
- Announcement letters
  - WAS VPC announcement http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&appname=iSource&supplier=877&letternum=ENUSZP16-0390
- Marketing Blog - https://www.ibm.com/blogs/systems/websphere-brings-cloud-economics-premises-world/

Help migrating to WebSphere v9



Migration Impact Overview

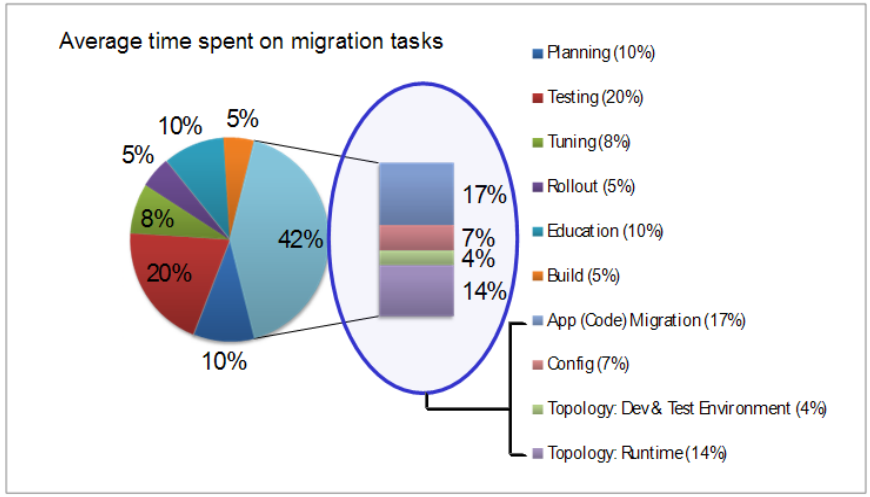
Migration impact is gated by two overarching factors

1. The versions involved in the customer Migration scenario
   - Moving from v7.0 to v9.0 is different than moving from v6.0.2 to v9.0
   - MOST CUSTOMERS are at 7.0 or later!
2. The amount of change introduced in and between these versions
   - Moving from v7.0 to v9.0 involves changes introduced by v8.0, v8.5 and v9.0.
3. VERY FEW breaking changes going to Java SE 8 from SE 7
   - Most upgrade scenarios straightforward from 7.0

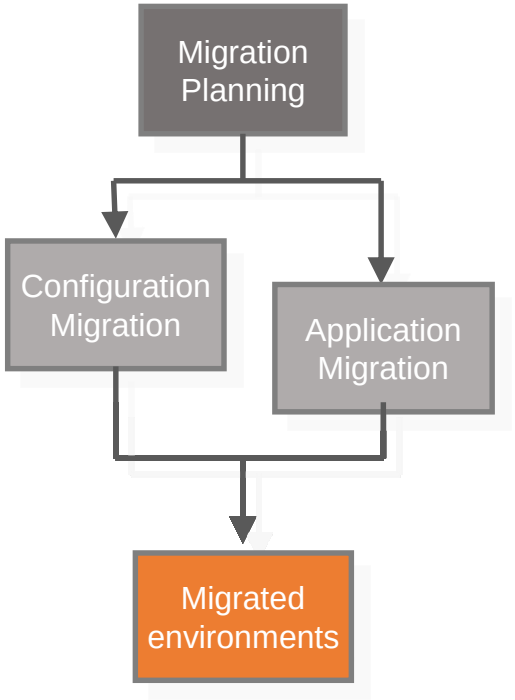
Most common scenario - v7.0 to v9.0

	v6.0.2	v6.1	v7.0	v8.0	v8.5	V9.0
Configuration	Port assignment	Security	None	None	Port assignments	Core group wire protocol
Application	JSP and Servlet	Java SE	Some	Minimal	**None***	Java EE 7 Java SE 8

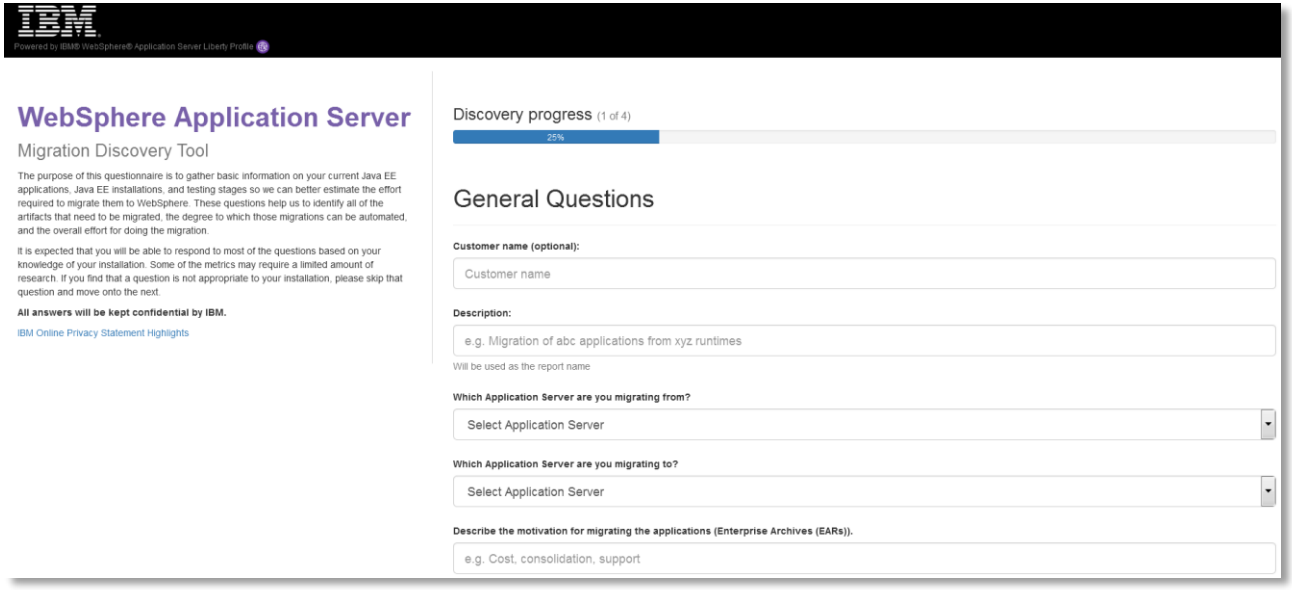
Migration Process Overview



- The whole migration process involves a variety of steps
- Application changes and testing is 37%
- Migrating configuration is 25%
- Resources and tools are available to analyze and automate



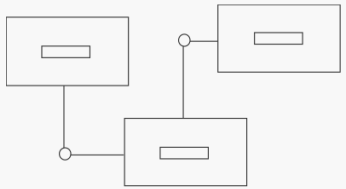
WebSphere Application Server Migration Discovery Tool (here)



Migration Decision Support Tool

http://whichwas.mybluemix.net

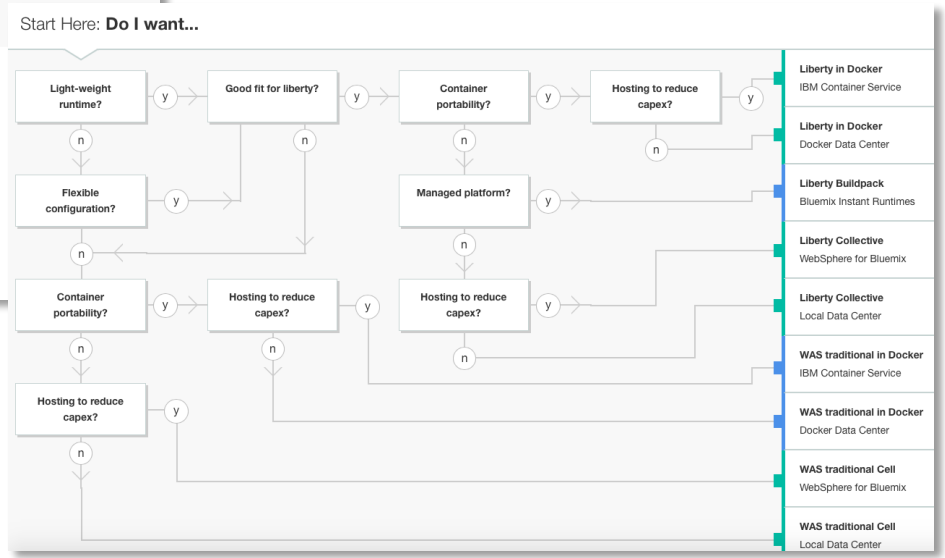
WebSphere Migration Strategy



As you consider the future of your WebSphere applications, how will you innovate to support **social, mobile, analytics, and cloud technologies** to better serve your customers?

Show me the simplest migration

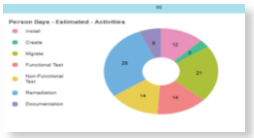
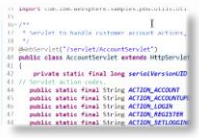
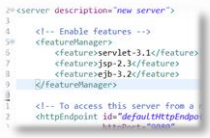
Show me the choices to transform and modernize



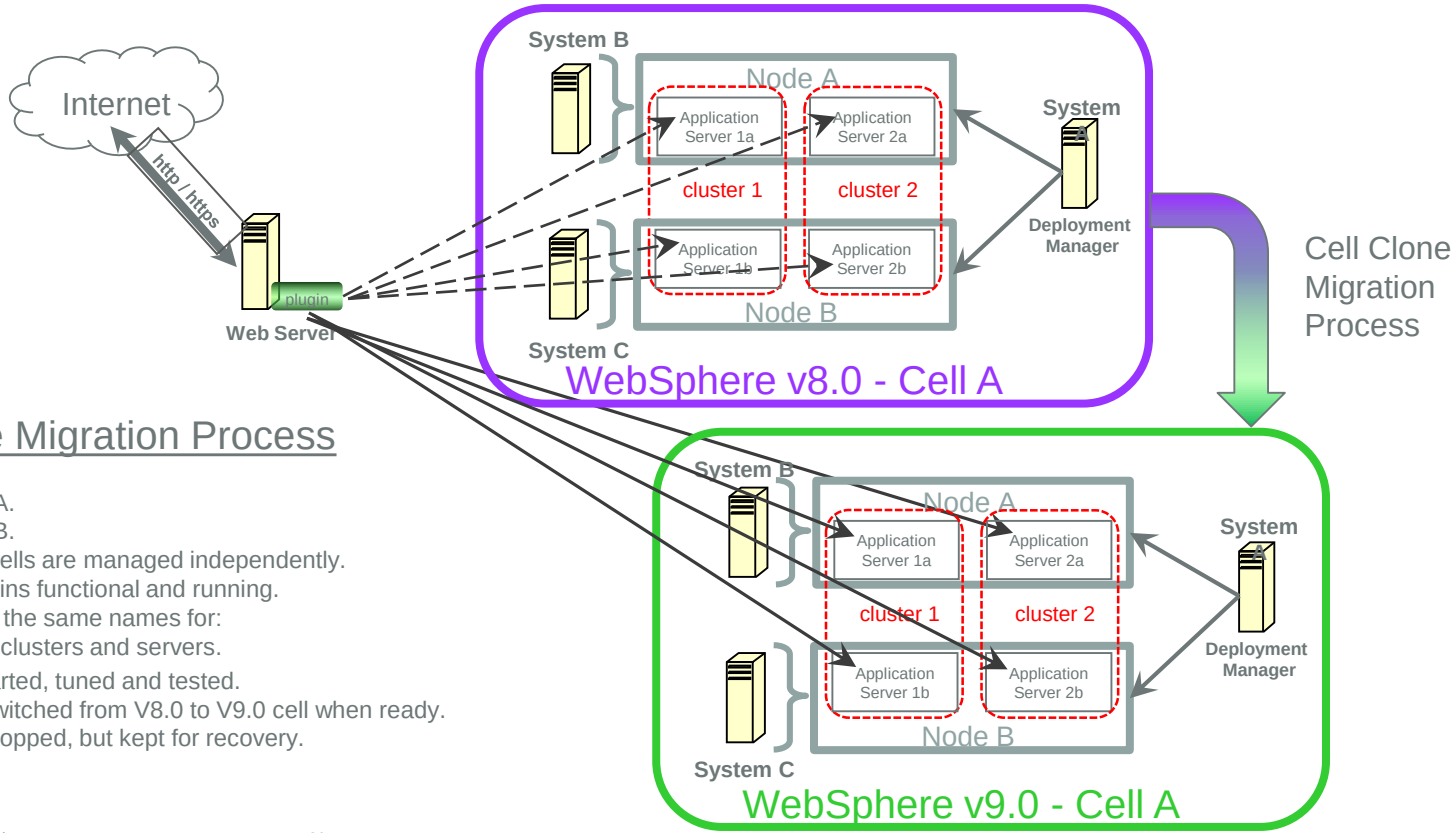
An Overview of WebSphere Migration Toolkit

A set of tools that help you:

- Migrate between versions of WebSphere Application Server
- Migrate from traditional WebSphere to Liberty
- Move your applications to cloud platforms
- Migrate from third-party application servers to WebSphere

Migration discovery (WMDT)	***Binary analysis***	***Source migration (WAMT)***	***Configuration migration***
			
On-line tool that helps you • Estimate the effort required to migrate your application to WebSphere Application Server from third-party application servers • Select the IBM cloud platform suited to host your application and estimate migration to that platform.	Command-line analysis of application binaries that provides • High level evaluation report showing the Java EE technologies your application uses • Detailed analysis for migration between versions of traditional WebSphere, Liberty, and Liberty Core • Cloud migration for instant runtimes differences • Cloud connectivity analysis	Eclipse plugins that scans application source to provide • High level evaluation report • A line-by-line analysis of code changes required • Detailed analysis from third-party applications servers • Detailed analysis for migration between versions of traditional WebSphere, Liberty, and Liberty Core • Cloud migration for instant runtimes differences • Cloud connectivity analysis	WCMT – Eclipse plugin that helps migrate server configuration • From third-party application servers to WebSphere Application Server. • Between versions of WebSphere Application Server including traditional WebSphere to Liberty WASPreUpgrade and WASPostUpgrade commands to move WebSphere traditional configuration between profiles.

Technical Background – New Clone Migration Strategy



Cell Clone Migration Process

1. Migrate dmgr.
2. Migrate node A.
3. Migrate node B.
4. Once cloned cells are managed independently.
5. V8.0 cell remains functional and running.
6. V9.0 keeps all the same names for:
   cell, nodes, clusters and servers.
7. V9.0 cell is started, tuned and tested.
8. Web Server switched from V8.0 to V9.0 cell when ready.
9. V8.0 can be stopped, but kept for recovery.

WAS Migration Methodology Overview

Migration Team Engagement

Migration Tools
(No charge)
Self-paced
FREE!

Set of online Migration Tools used by customers to determine migration path, estimate effort and complexity.

Migration Discovery Tool

Migration Toolkit

Configuration Tool

Technical Accelerators
(No charge)
1-2 days
FREE!

Migration Education Workshop delivered as a "city tour" to multiple customers by the Cloud Migration Team.
PoT delivered by Tech Sales.
PoC available when there is a strong competitive threat.

✓ Migration Workshop Flyer

Migration Assessment
(Fee-based)
10 days

Deep dive 10 day Migration Assessment delivered by the Cloud Migration Team as billable services engagement.
Offering ID: **WS122**

✓ V9 Migration Offering

Full Migration
(Fee-based)
Duration varies

Migration services for pilot and production migrations
Duration varies, depending on scope & complexity.
Delivered by Cloud Professional Services or selected partners.

Get started today

1. Start your migration at IBM's "One Stop Shop" for free tools and offers

2. Plan and estimate your migration path with the Migration Discovery Tool

3. Contact IBM or your IBM Business Partner & Join the WebSphere User Community