



Open Liberty

# Liberty Quarterly Update 22.0.0.10-22.0.0.13

Alasdair Nottingham – Liberty Lead Architect

 @nottycode

# Agenda



Part 1: 30 Minute Liberty overview

Part 2: Liberty Developer Tools Update – Scott Kurz

Part 3: What is new this quarter

Part 4: Q&A

# 30 minute overview



# WebSphere Evolution

*and the influence of cloud*



WebSphere  
App Server



*Traditional App Servers*  
Monoliths  
Runtime-centric clustering  
Virtual Machines



WebSphere  
Liberty



Open Liberty



MICROPROFILE™  
OPTIMIZING ENTERPRISE JAVA



JAKARTA EE™



Kubernetes



OpenShift  
FaaS



Native  
Compilation  
InstantOn

*Constrained*

Waterfall

Methodology

Infrastructure

Agile

Utility

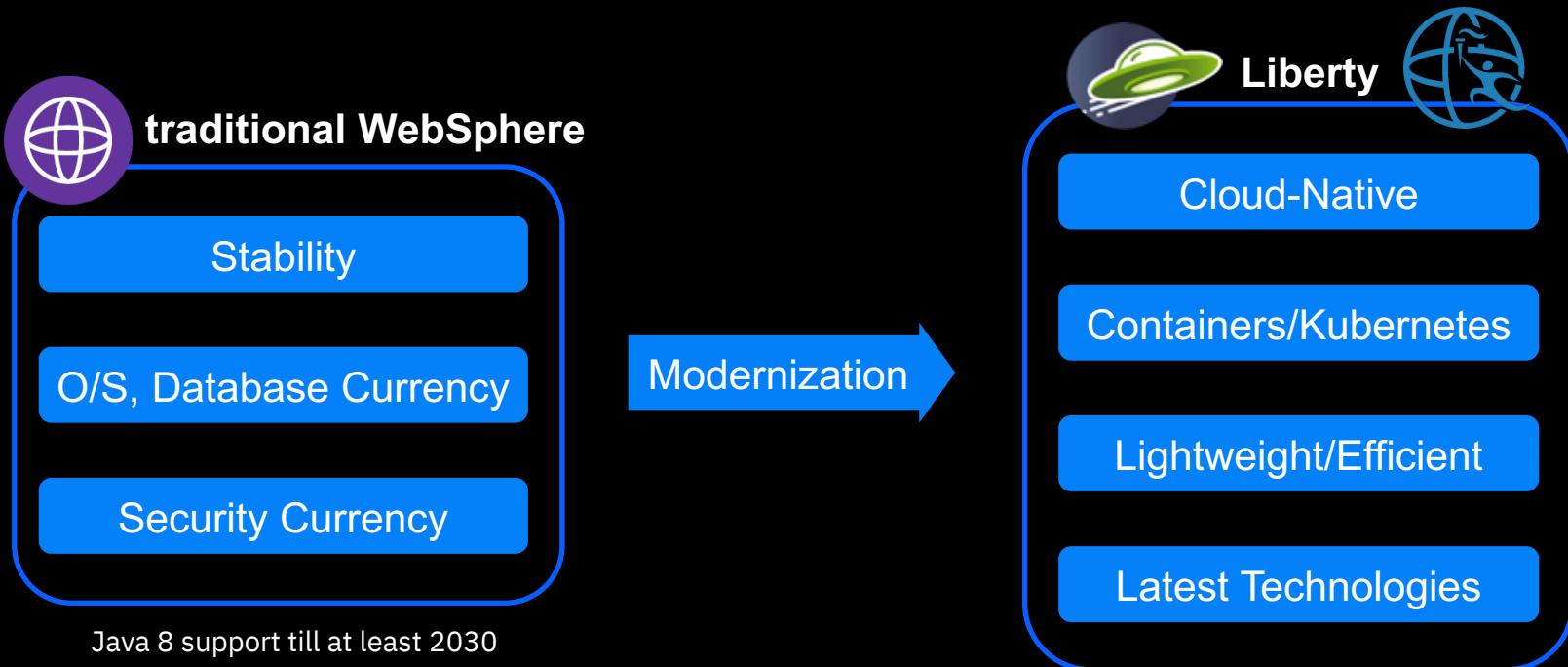
1998

2012

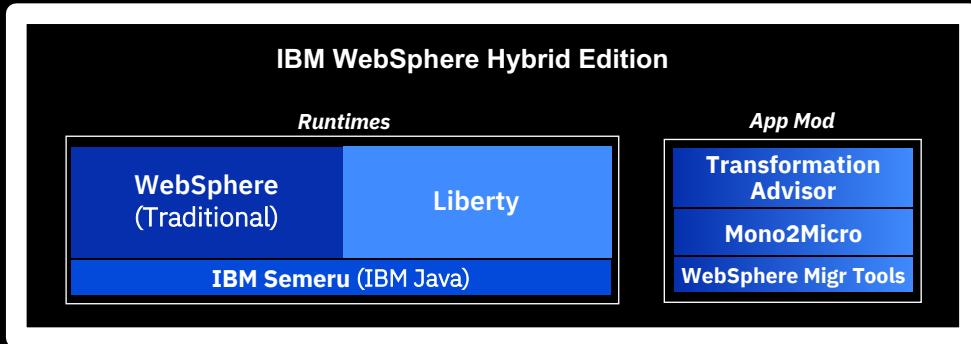
2022

# WebSphere Runtimes

*Support current and future runtime needs*



# Liberty, WebSphere and Java in 2023



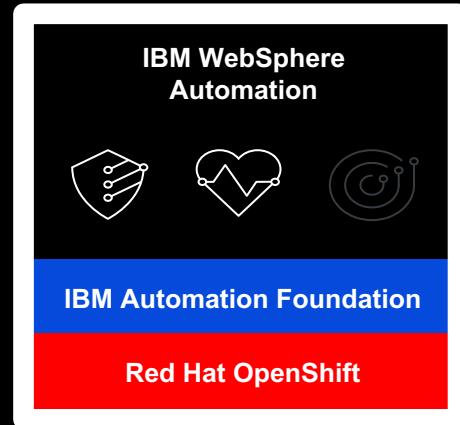
## WebSphere Hybrid Edition -

Provides flexibility across open source, platform and runtimes all in one place



## Automate Operations

*Manage any supported Runtime edition,  
deployed anywhere (VMs, containers, clouds)*



**AI-infused automation for WebSphere**  
Frees operations teams from routine “care and feeding” of WebSphere environments

# IBM WebSphere Liberty

1

50% increase in  
developer productivity

2

40% increase in  
IT admin productivity

3

195% ROI  
Payback 8 months

## Cloud-Native Development

- Simple rapid inner-loop developer experience in any IDE
- Optimized for Containers and Kubernetes
- Optimized for Continuous Integration, Continuous Delivery

## Operational Optimization

- Reduce costs with world-leading performance for microservices and monoliths
- Auto-tuning for continuous optimal performance in any environment
- Simple operator-based management in Kubernetes

## Application Modernization

- API & configuration compatibility for reduced effort and risk
- HA clustering in Containers and VMs
- Transformation Advisor & Mono2Micro tools help plan and execute move to container and microservices

<https://ibm.biz/WSHE-TEI>

# Just Enough Application Server



You control which features are loaded into each server instance

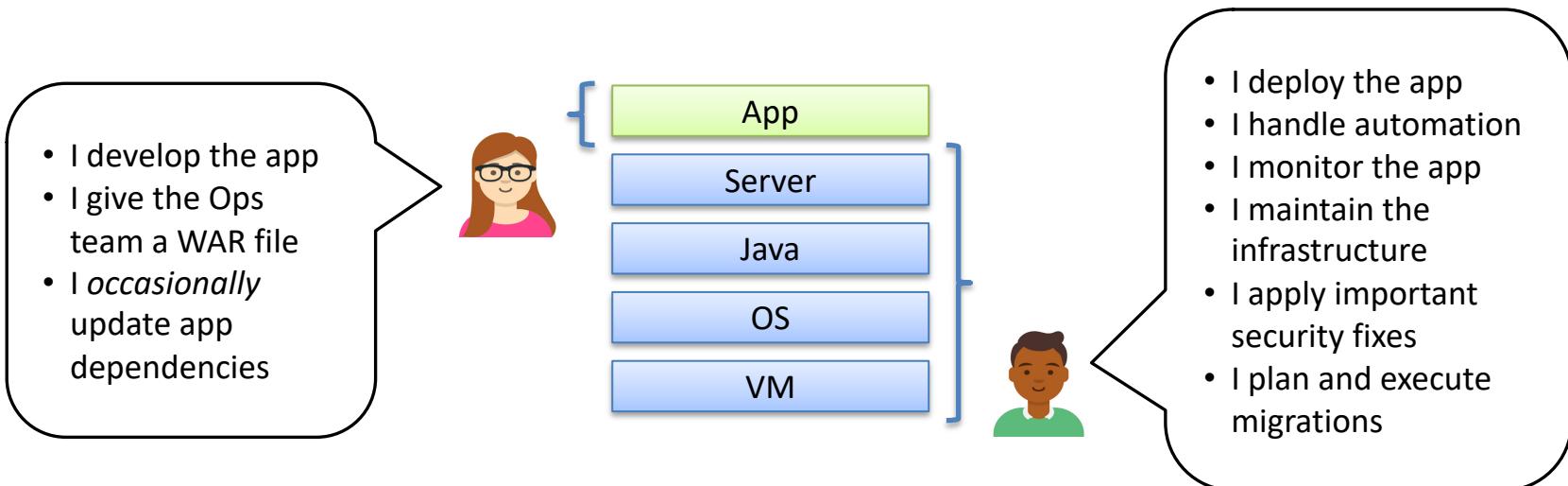


```
<feature>jaxrs-2.1</feature>
```



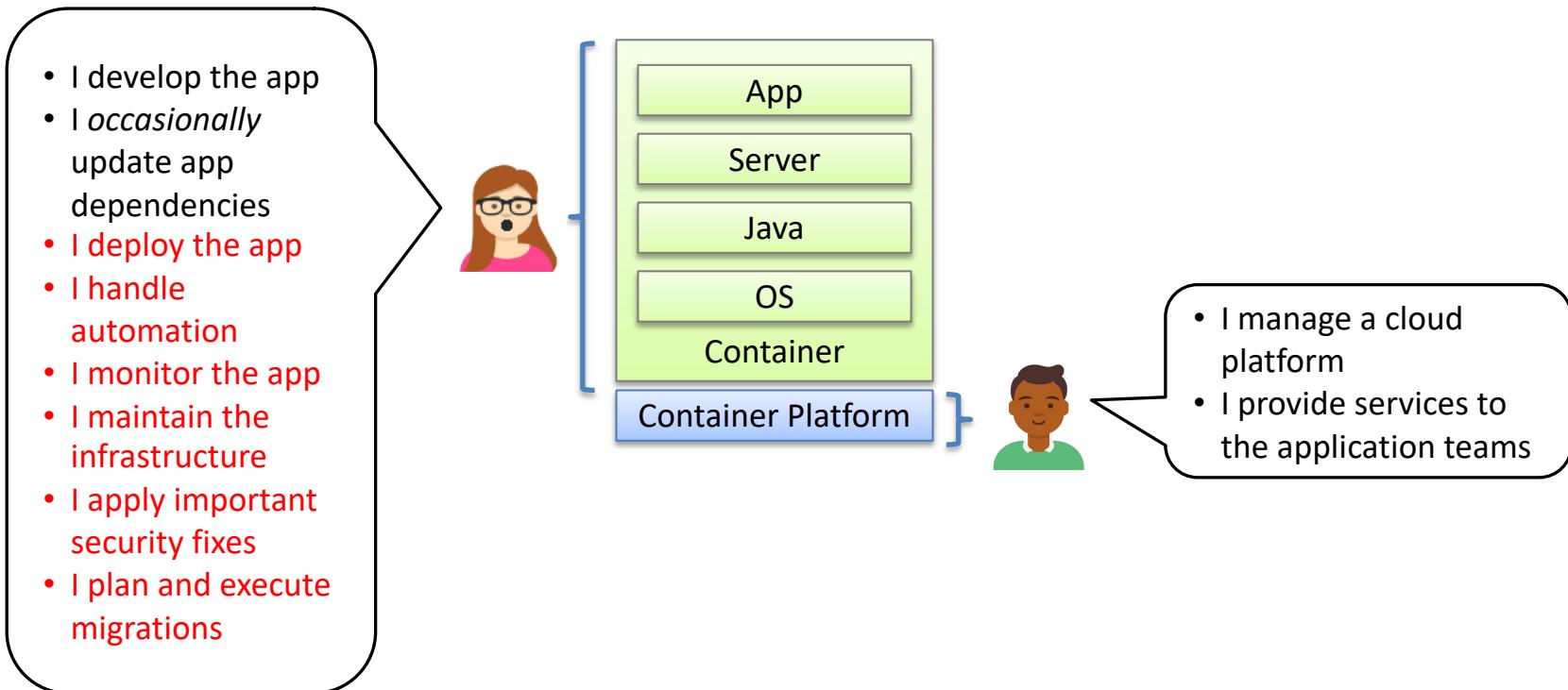
# Cloud platforms shift responsibilities

## *Traditional Deployment*



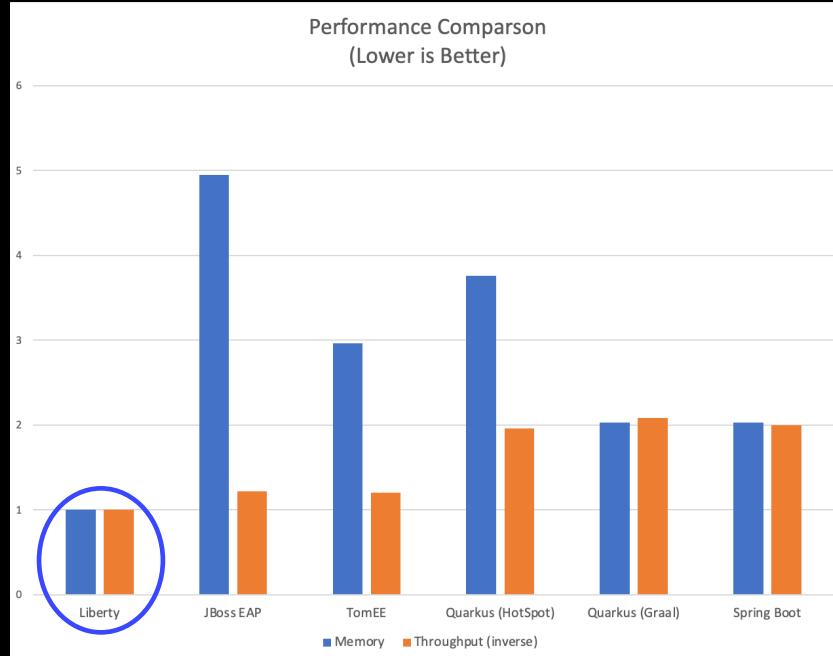
# Cloud platforms shift responsibilities

## *Cloud-native Platform Deployment*



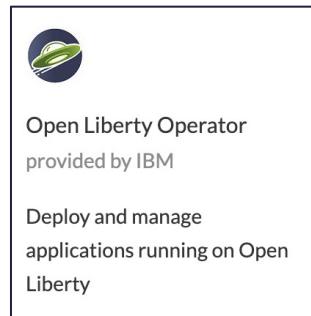
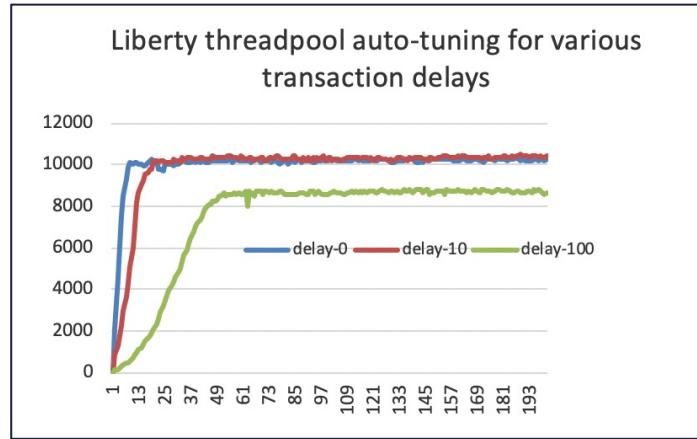
# WebSphere Liberty

*Low Operating Cost – Any architecture, VMs or Containers*



- Better throughput means fewer instances for the same workloads
- Fewer instances means lower infrastructure and support costs
- Lower memory means lower memory costs for each instance.
- Public clouds tie memory and CPU in pricing models

# Kubernetes optimized



- **Deliver faster** without costly tuning exercises
- Get **optimal performance** even as the environment changes
- **Simple Operator-based deploy** and day-2 operations experience
- Supported **production-ready images**
- **APIs** for Kubernetes integration
- Container-based **usage tracking**

# WebSphere Liberty

*Simple, low-risk modernization*

- ✓ Greatest API compatibility with traditional WebSphere
- ✓ Greatest configuration compatibility
- ✓ Native HA in VMs and Kubernetes
- ✓ Ideal for Microservices and Monoliths

Specs/APIs/SPIs	Liberty	JBoss EAP 7.4	Tomcat	Quarkus
Jakarta EE 9/9.1	✓		Small subset of Web Profile only	Small subset used by MicroProfile APIs restricted by compile-to-native
Jakarta EE 8	✓	✓		
Java EE 8	✓	✓		
Java EE 7	✓			
Java EE 6*	✓			
WebSphere APIs/SPIs for Security, Servlet, Caching, JSON, Transactions, MBeans	✓	N/A	N/A	N/A
<b>Configuration automatically migrated</b>				
<ul style="list-style-type: none"><li>✓ JDBC Providers</li><li>✓ JMS Connection Factories, Topics and Queues</li><li>✓ Service Integration Bus &amp; Messaging Engines</li><li>✓ JCA Authentication Alias</li><li>✓ JNDI String Name Space Bindings</li><li>✓ JVM Options</li><li>✓ Session Management</li><li>✓ JDAP Security</li><li>✓ Security Role Bindings</li><li>✓ TLS/SSL Configuration and Keystore/Truststore files</li></ul>				

# Developer Experience Update

Scott Kurz





*Support popular  
IDEs*

Create New



## **Dev Mode**

*Enable fast  
iterative  
development*

Build



Edit



Docker/Containerfile  
Deployment  
YAMLs

Debug

Hot Code Replace

Local |  
Containers

Test

JUnit

Testcontainers



*Support what  
developers use*



CI/CD

*Editing support for  
strategic APIs and  
artifacts*

This screenshot shows an IDE interface with several open files and toolbars. The top navigation bar includes 'EXPLORER', 'pom.xml', 'Dockerfile U', 'PropertiesResource.java M', 'EndpointIT.java U', and icons for 'File', 'Edit', 'Search', 'Run', 'Help'. The left sidebar has sections for 'START' (with 'PropertiesR...', 'SystemApplicatio...', 'liberty', 'webapp', 'test/java/it/io...', '.gitkeep', 'EndpointIT.java'), 'target', '.classpath', '.dockerignore', '.project', 'Dockerfile', and 'pom.xml'. The main editor area shows Java code for a REST client:

```
13 } MicroProfile: Generate a MicroProfile REST Client
14 Liberty : Generate a new Liberty starter project
15 Developer: Show Logs...
16 import javax.ws.rs.GET;
17 import javax.ws.rs.Produces;
18
19 import javax.json.JsonObject;
20 import javax.json.JsonObjectBuilder;
21 import javax.json.Json;
22
23 // tag::Path[]
24 @Path("properties-new")
25 // end::Path[]
26 public class PropertiesResource {
27
28     @GET
29     @Produces(MediaType.APPLICATION_JSON)
30     @Operation
31     public void @Operation Describes an operation or typically a HTTP m...
32         @Operation - org.eclipse.microprofile.openapi.annotation...
33         @CallbackOperation - org.eclipse.microprofile.openapi...
```

A tooltip for the '@Operation' annotation in line 30 provides a detailed description: 'Describes an operation or typically a HTTP method. Operation - org.eclipse.microprofile.openapi.annotation... CallbackOperation - org.eclipse.microprofile.openapi...'.

The bottom terminal window shows Liberty dev mode output:

```
guide-docker (liberty dev) + -x
[*****]
[*] Liberty is running in dev mode.
[*] To run tests on demand, press Enter.
[*] To restart the server, type 'r' and press Enter.
[*] To stop the server and quit dev mode, press Ctrl-C or type 'q' and press Enter.
[INFO] *
[INFO] * Liberty server port information:
[INFO] *     Liberty server HTTP port: [ 9080 ]
[INFO] *     Liberty debug port: [ 7777 ]
[INFO] [*****]
[INFO] Source compilation was successful.
```

Four numbered callouts provide additional context:

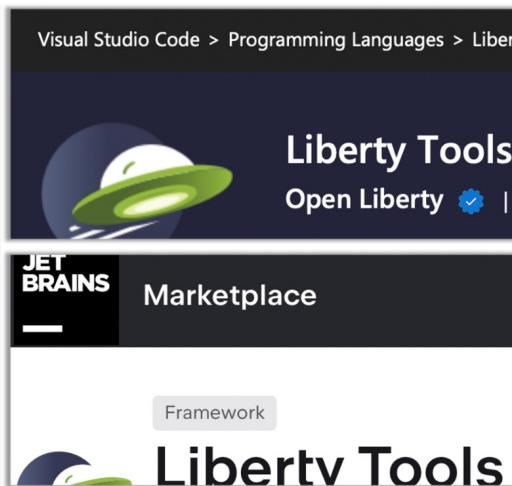
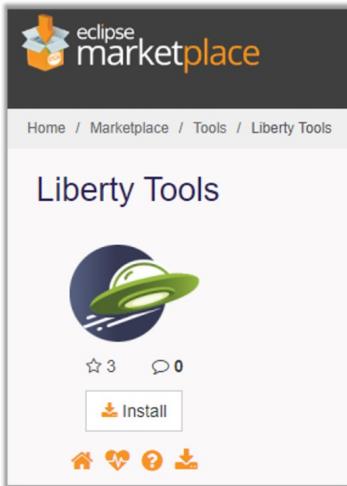
- From a supported popular editor (Eclipse IDE, IntelliJ IDEA or Visual Studio Code), import an existing Liberty Maven/Gradle project using Jakarta EE and/or MicroProfile APIs.
- Run/Debug with Liberty's dev mode – local or in container – for fast iterative development.
- Edit source files with coding assistance for Jakarta EE & MicroProfile API and Liberty configuration.
- Easily run tests.

Bottom status bar: prod\* ○ 0 ▲ 0 ✓ Ln 30, Col 42 Spaces: 4 UTF-8 LF Java JavaSE-1.8

# Liberty Tools



December 2022 early release



- Fast iterative development with Liberty dev mode
- Coding & edit assistance
  - Jakarta EE & MicroProfile APIs
  - Liberty configuration
- Consistent experience across IDEs
- Available in Eclipse IDE, IntelliJ IDEA, and Visual Studio Code marketplaces

# Recent Updates



# Periodic Table of Liberty (22.0.0.13)



zOS	batchSMFLogging-1.0	zosLocalAdapters-1.0	zosTransaction-1.0	zosSecurity-1.0
ND	collectiveController-1.0	dynamicRouting-1.0	healthManager-1.0	zosWlm-1.0
Base		clusterMember-1.0	healthAnalyzer-1.0	scalingController-1.0
Core	cloudant-1.0	jakartaee-8.0	batchManagement-1.0	scalingMember-1.0
Open Liberty	javaee-8.0	heritageAPIs-1.1	wsAtomicTransaction-1.2	acmeCA-1.0
	javaee-7.0	sipServlet-1.1		passwordUtilities-1.1
	jakartaee-9.1			wsSecurity-1.1
New in 4Q22	bells-1.0	mpGraphQL-2.0	adminCenter-1.0	wsSecuritySaml-1.0
New in 3Q22	concurrent-2.0	mpReactiveMessaging-1.0	collectiveMember-1.0	ldapRegistry-3.0
New in 2Q22	facesContainer-3.0	mpReactiveStreams-1.0	distributedMap-1.0	oauth-2.0
New in 1Q22	grpc-1.0	opentracing-1.3	eventLogging-1.0	openid-2.0
APIs	jdbc-4.3	osgiConsole-1.0	logstashCollector-1.0	openidConnectClient-1.0
	json-1.0	persistenceContainer-3.0	monitor-1.0	openidConnectServer-1.0
	jsonbContainer-2.0	springBoot-2.0	openapi-3.1	samlWeb-2.0
	jsonpContainer-2.0	webProfile-9.1	requestTiming-1.0	scim-1.0
	mail-2.0	webProfile-8.0	usageMetering-1.0	socialLogin-1.0
	microProfile-5.0	webProfile-7.0	restConnector-2.0	spnego-1.0
	mpContextPropagation-1.3	xmlBinding-3.0	sessionCache-1.0	transportSecurity-1.0

Operations

# Focus areas



Developer Experience

APIs

Core Runtime

Cloud

Security

# Liberty Last Quarter Review



## Security

- Use issue claim for selecting OIDC for JWT inbound propagation
- Distributed Auth Cache

## Dev Exp

- Liberty Maven/Gradle support for Java 17

## Core Runtime

- Java SE 19
- Bells to access SPI
- Bells config properties
- Limit age of FFDC log files

## API

## Cloud

- Semeru Cloud Compile support via Liberty Operator

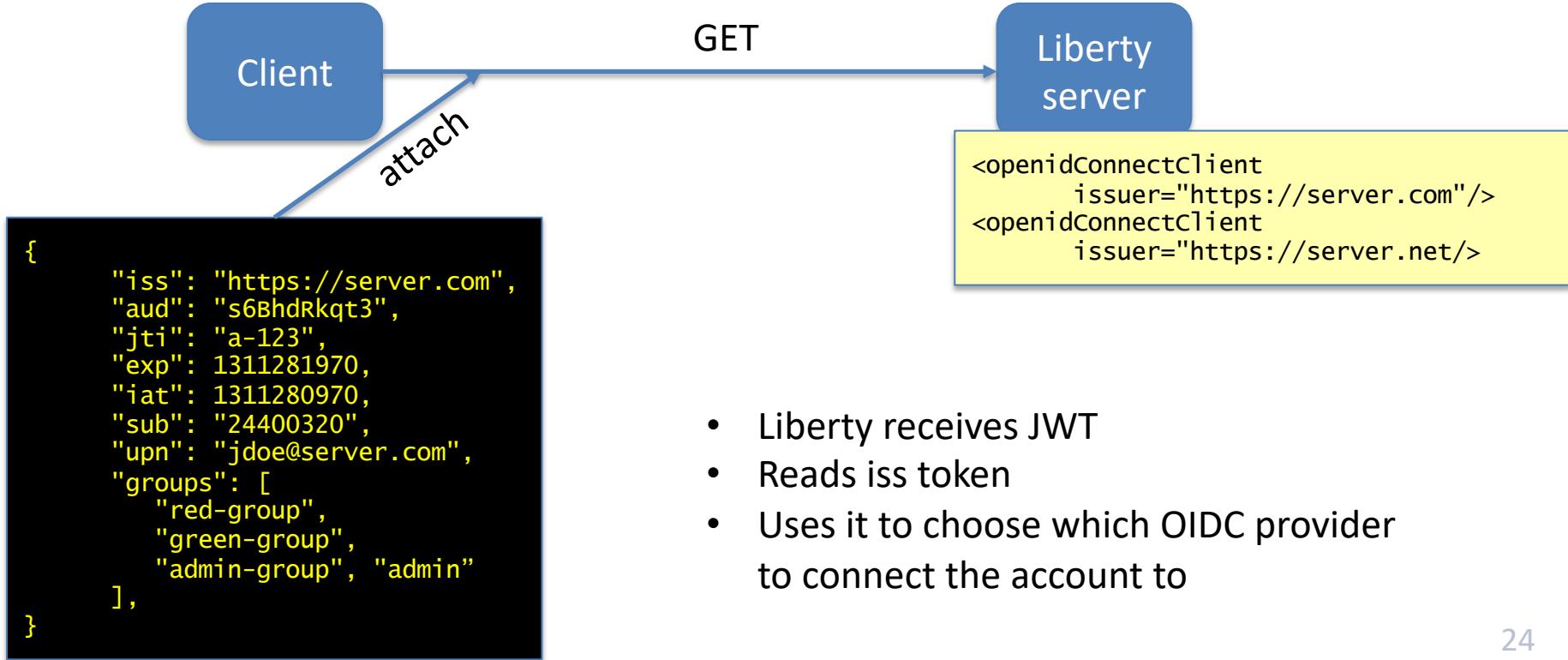
# Limit age of FFDC files



- Prior releases purged FFDC files when there were over 500
- Now you can limit ffdc files based on their age
- Age can be configured in number of minutes, hours or days
- Example - delete FFDC files over 2 days old

```
<logging maxFfdcAge="2d"/>
```

# Select OIDC config based on JWT issuer



# Distributed Security Cache



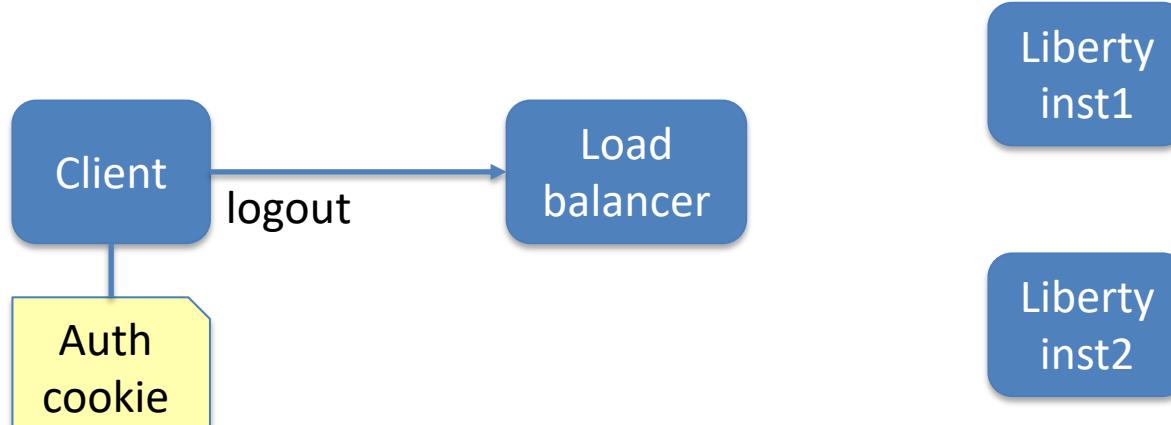
- Liberty tracks logged out auth tokens
- Browser stores Auth cookie



# Distributed Security Cache



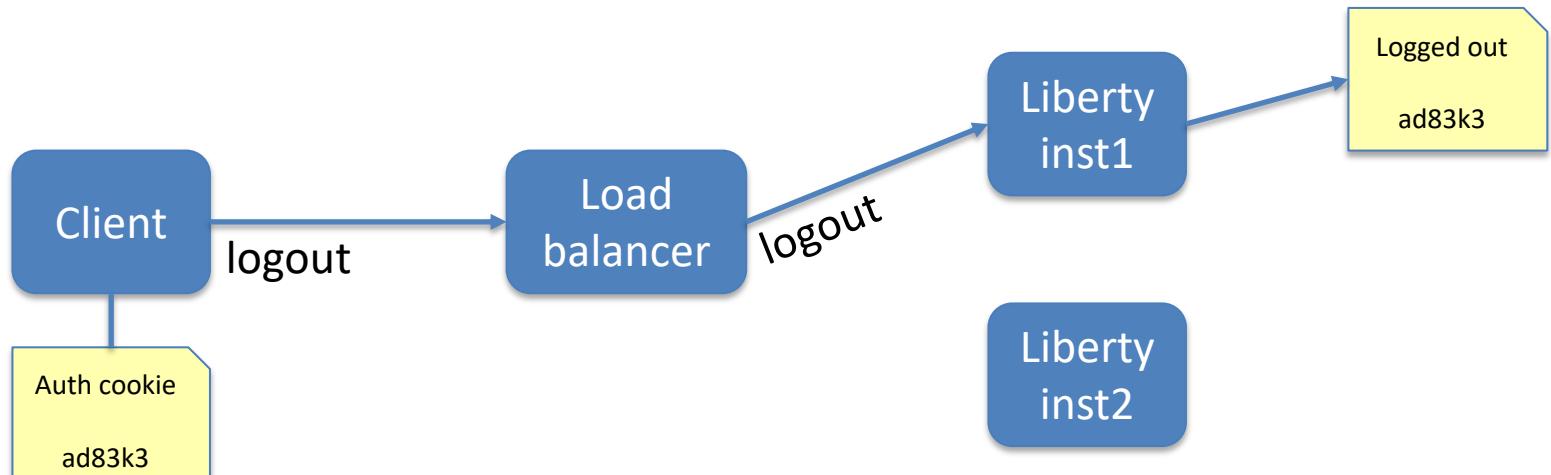
- Liberty tracks logged out auth tokens
- User clicks logout



# Distributed Security Cache



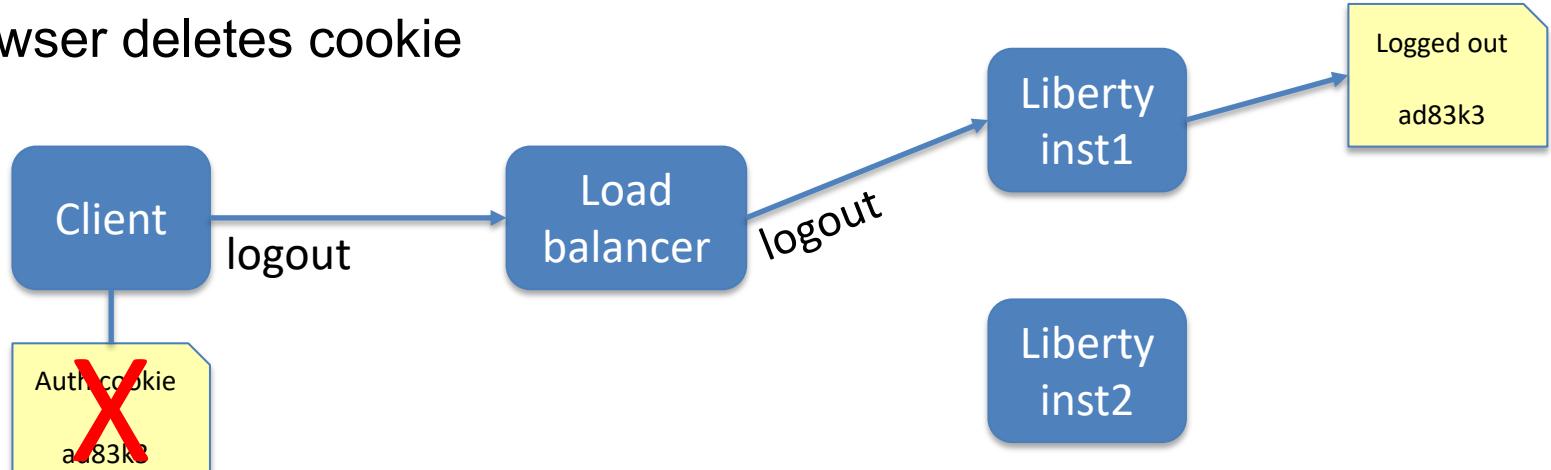
- Liberty tracks logged out auth tokens
- Load balancer routes to a Liberty instance
- Liberty instance records token as invalid



# Distributed Security Cache



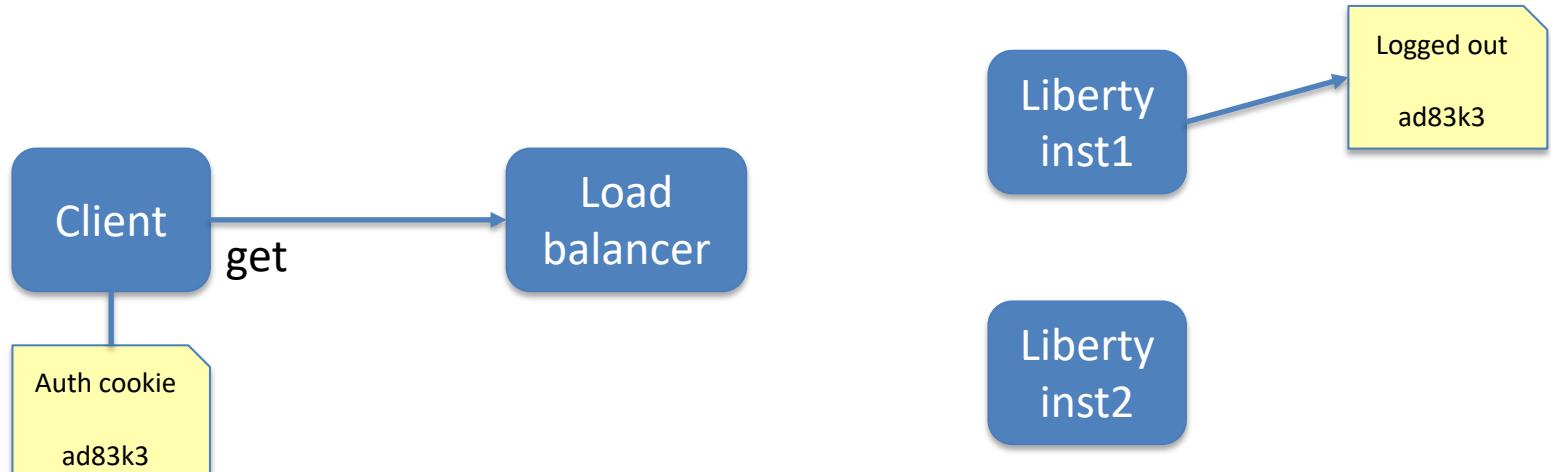
- Liberty tracks logged out auth tokens
- Load balancer routes to a Liberty instance
- Liberty instance records token as invalid
- Browser deletes cookie



# Distributed Security Cache



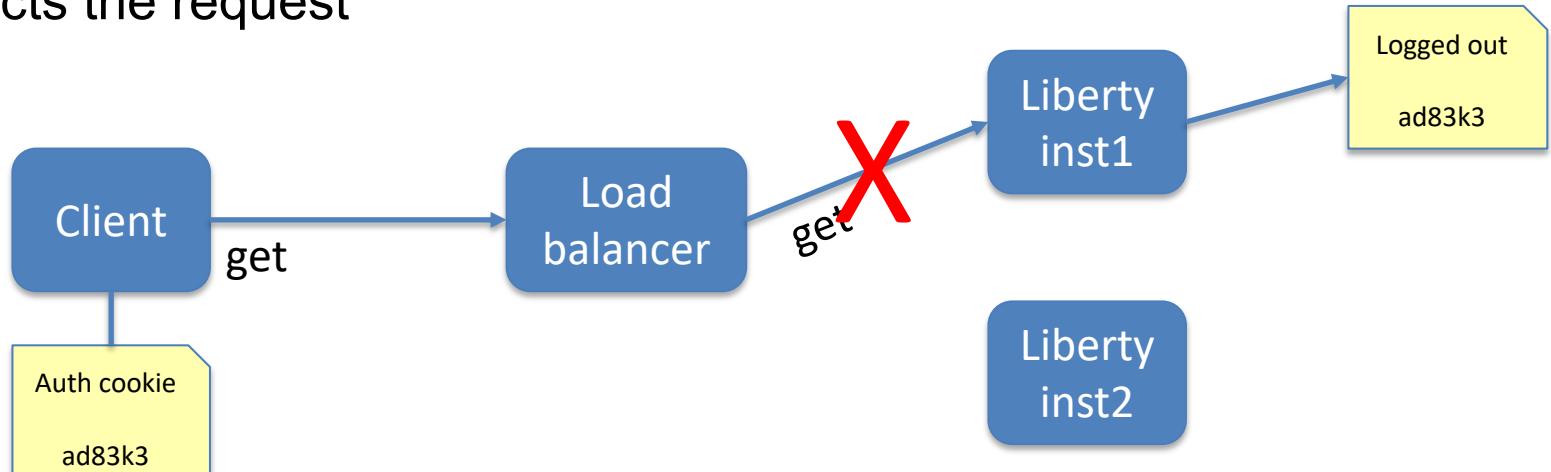
- But, what if the browser was naughty and kept the cookie
- Now browser does a get to a secured resource replaying the cookie



# Distributed Security Cache



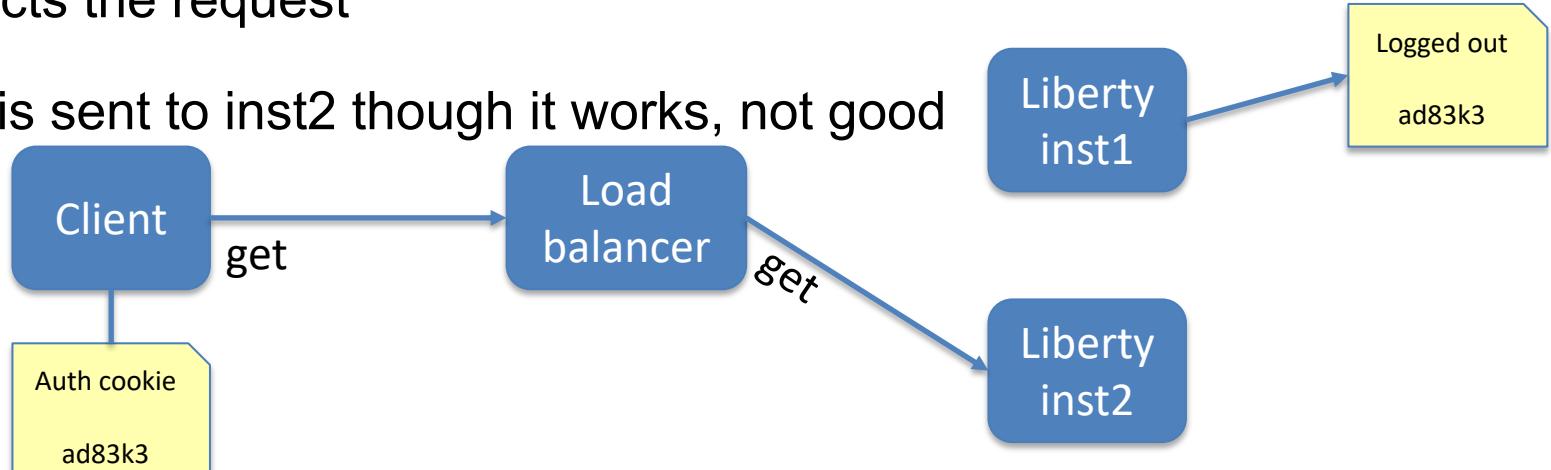
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- Load balancer sends to inst1 which knows the token is invalid so rejects the request



# Distributed Security Cache

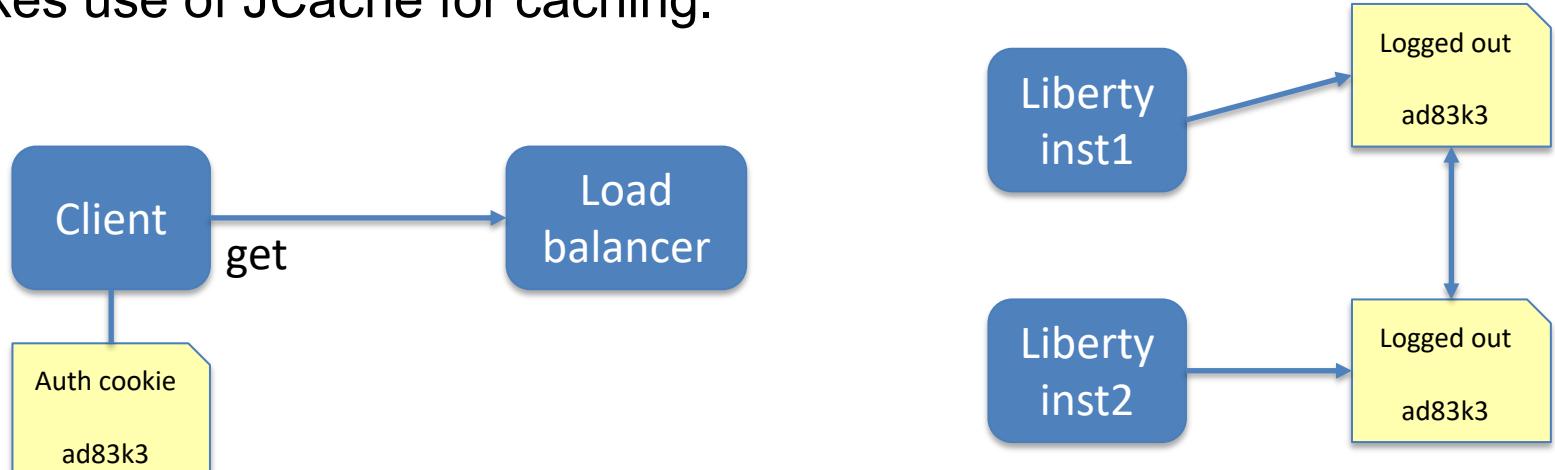


- But, what if the browser was naughty and kept the cookie
- Now browser does a get to a secured resource replaying the cookie
- Load balancer sends to inst1 which knows the token is invalid so rejects the request
- If it is sent to inst2 though it works, not good



# Distributed Security Cache

- When the distributed cache is enabled though the servers share the data
- So now no matter where the client is directed to they get rejected
- Makes use of JCache for caching.



# Distributed Security Cache



## Example Configuration

```
<featureManager>
    <feature>appSecurity-3.0</feature>
</featureManager>

<library id="JCacheProviderLib">
    <fileset dir="${shared.resource.dir}" includes="jcacheprovider.jar" />
</library>

<cache id="LoggedOutCookieCache" name="LoggedOutCookieCache">
    <cacheManager uri="uri://someuri">
        <properties prop1="value1" prop2="value2" />
        <cachingProvider jCacheLibraryRef="JCacheProviderLib" />
    </cacheManager>
</cache>

<webAppSecurity loggedoutCookieCacheRef="LoggedOutCookieCache" />
```

Configures where the Jcache provider implementation lives

# Distributed Security Cache



## Example Configuration

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Configures the cache

# Distributed Security Cache



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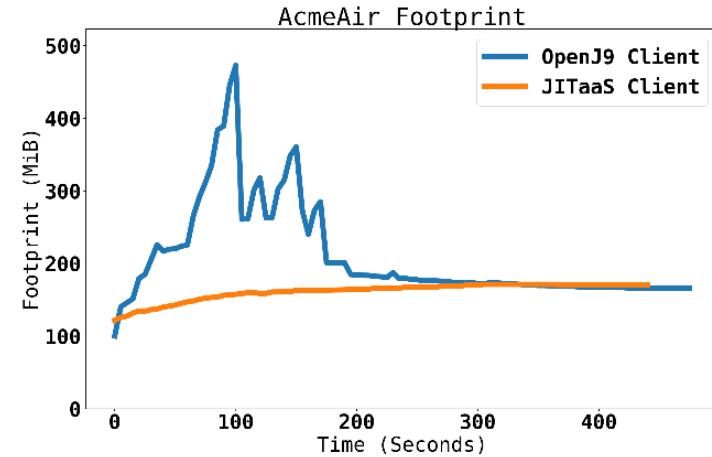
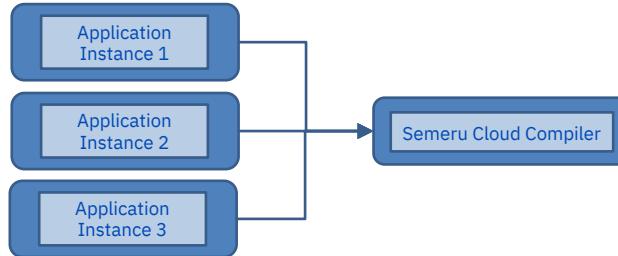
Configures Liberty to  
use the cache for  
tracking logged out  
cookies

# Deploying Liberty to Kube with Semeru Cloud Compiler

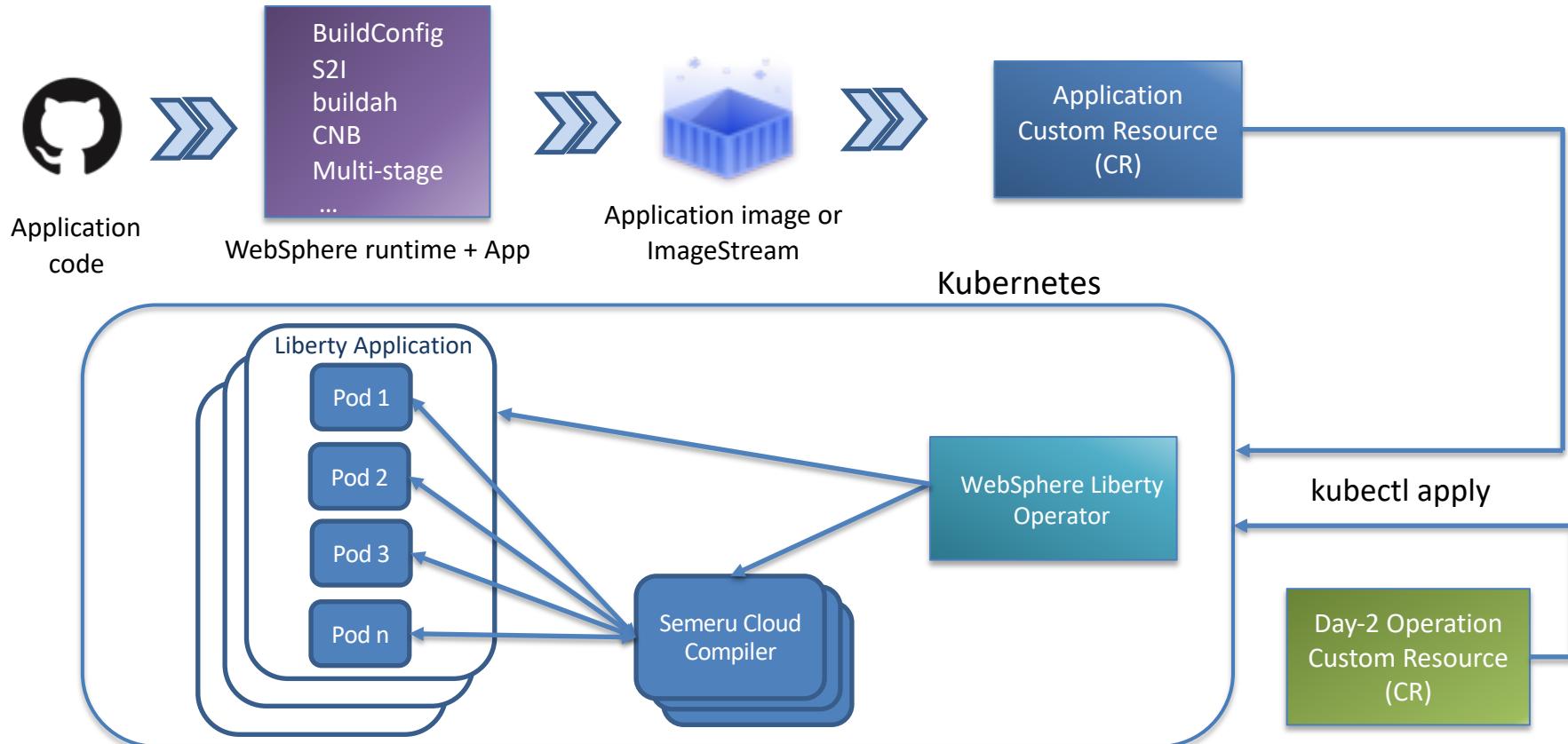


## Cloud Optimizer:

- Offloads costly JIT compilation to separate server
- Dramatically reduces peak memory usage
- Simple Kubernetes enablement through WebSphere Liberty Operator



# WebSphere Liberty Operator + Semeru Cloud Compiler



# Example deployment



```
apiVersion: liberty.websphere.ibm.com/v1
kind: WebSphereLibertyApplication
metadata:
  name: my-app
spec:
  license:
    accept: false
    edition: IBM WebSphere Application Server
    productEntitlementSource: Standalone
  applicationImage: quay.io/my-repo/my-app:1.0
  semeruCloudCompiler:
    enable: true
```

# Labs, Questions



# Open Liberty Guides

- Hands-on learning in ~20 minutes
- 55 guides
  - MicroProfile & Jakarta EE
  - Open Shift, Docker, Kubernetes Istio
- Latest Guide
  - *Containerizing microservices with Podman*

The screenshot shows the Open Liberty Guides website with a dark blue header featuring the Open Liberty logo, navigation links for Get Started, Guides, Docs, Support, and Blog, and a search bar with a 'Filter guides' button. The main content area has a title 'Guides' and a subtitle 'The quickest way to learn all things Open Liberty, and beyond!'. On the left, a sidebar lists categories: DEVELOP (37 guides), BUILD AND TEST (9 guides), and DEPLOY (9 guides). Under DEVELOP, sub-categories include Getting started, RESTful service, Reactive service, Configuration, Fault tolerance, Observability, Security, Persistence, and Client side. Under BUILD AND TEST, sub-categories include Build, Test, and Containerize. Under DEPLOY, sub-categories include Kubernetes and Cloud deployment. The main content area displays several guide cards with titles, descriptions, and duration estimates. For example, the first card under 'Getting started' is 'Getting started with Open Liberty' (25 minutes), and the first card under 'RESTful service' is 'Creating a RESTful web service' (30 minutes).

<https://openliberty.io/guides>

# Liberty References

Read



Why choose Liberty for  
Microservices  
[ibm.biz/6ReasonsWhyLiberty](https://ibm.biz/6ReasonsWhyLiberty)

Choosing the right Java  
runtime  
[ibm.biz/ChooseJavaRuntime](https://ibm.biz/ChooseJavaRuntime)

How to approach application  
modernization  
[ibm.biz/ModernizeJavaApps](https://ibm.biz/ModernizeJavaApps)

Watch



Explore the latest on WebSphere and  
Liberty  
[ibm.biz/LibertyTV](https://ibm.biz/LibertyTV)

View our recent Expert TV episode all  
about Liberty [ibm.biz/Liberty101](https://ibm.biz/Liberty101)

Learn more about Liberty in containers  
and Operator-based deployment  
[ibm.biz/LibertyContainerOperator](https://ibm.biz/LibertyContainerOperator)

Experience



Try Liberty as a beginner  
[openliberty.io/guides/getting-started.html](https://openliberty.io/guides/getting-started.html)

Learn Liberty, MicroProfile,  
Containers, Kubernetes,  
Hands-on  
[openliberty.io/guides](https://openliberty.io/guides)

Try dev mode in Containers  
<https://openliberty.io/guides/docker.html>

# Resources



## Programming API Links

- Eclipse MicroProfile: <https://microprofile.io>
- Jakarta EE: <https://jakarta.ee>

## Support Links

- Java support dates: <http://www.ibm.com/developerworks/java/jdk/lifecycle>
- Single Stream Continuous Delivery: <https://www.ibm.com/support/pages/node/869798>
- Container Support Policy: <https://www.ibm.com/support/pages/node/6349145>
- Enhancement Requests: <https://cloud-platform.ideas.ibm.com>

## Migration Tools

- IBM Transformation Advisor <http://ibm.biz/cloudta>
- WebSphere Binary Migration Toolkit: <http://ibm.biz/WAMT4AppBinaries>

# Resources



## Red Hat UBI images

- [icr.io/appcafe/websphere-liberty](https://crisostomo.github.io/appcafe/websphere-liberty)
- [icr.io/appcafe/open-liberty](https://crisostomo.github.io/appcafe/open-liberty)

## Ubuntu images

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

## Configuration/build files in github

- <https://github.com/WASdev/ci.docker>
- <https://github.com/OpenLiberty/ci.docker>

# Next Quarterly Update



## Liberty 22.0.0.10-13 Update

Session#1: Jan 19, 2023 from 1-2:30pm ET - <https://ibm.biz/Liberty-Jan19>

Session#2: Jan 26, 2023 from 9-10am ET - <https://ibm.biz/Liberty-Jan26>

## Liberty 23.0.0.1-3 Update

Session#1: April 13, 2023 from 1-2:30pm ET - <https://ibm.biz/Liberty-Apr13>

Session#2: April 20, 2023 from 9-10:30am ET - <https://ibm.biz/Liberty-Apr20>

# Join the Liberty CAB

## WebSphere Customer Advisory Board

Email:

[claudiab@us.ibm.com](mailto:claudiab@us.ibm.com)

Webex:

<https://ibm.webex.com/meet/claudiab>

Community Resource:

<http://ibm.biz/WASCABCommunityResources>

Advisory Board:

<http://ibm.biz/WebSphereAdvisoryBoard>

### Weekly meetings

Thursday and Friday  
9:15 am EST

Join →

### Monthly meetings

- Business Partner track
- Time zone friendly sessions

Join →

### Other Programs

- Cloud Pak Week
- Previews, Demos
- Labs, workshops
- 1-on-1

### We're here to help

**Join 350+** other members  
Be part of customer round tables and deep dive meetings

### Engage when you have time:

- Stay in the loop at meetings
- Share solutions and pain points
- Connect with other customers
- Access to resources and experts
- Customized meetings
- Special offers

# Questions?

<http://stackoverflow.com/questions/tagged/websphere-liberty>

alasdair@ibm.com



# Thank You

Your Feedback is Important

