



Open Liberty

# Liberty Quarterly Update 24.0.0.1-24.0.0.3

Alasdair Nottingham – Liberty Lead Architect

# Agenda



Part 1: 30 Minute Liberty overview

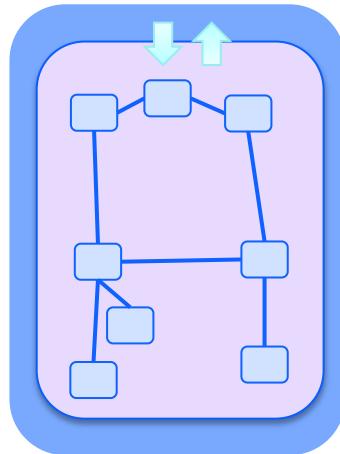
Part 2: What is new this quarter

Part 3: Q&A

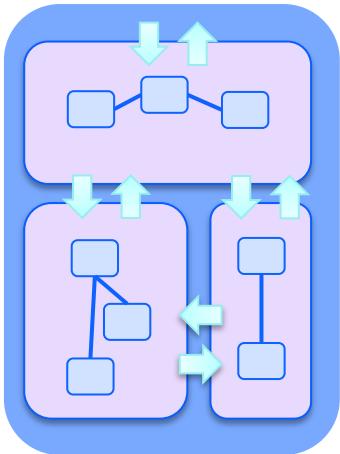
# 30 minute overview



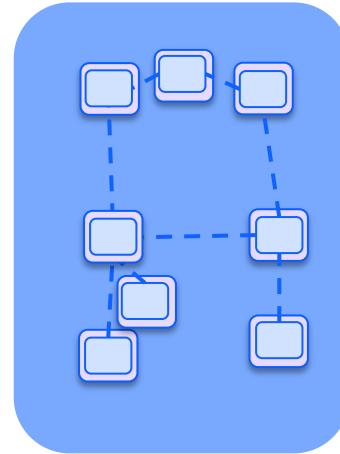
# There is a Spectrum of Architecture Styles



Monolith



"Macroservices"



Microservices



# Just enough application runtime

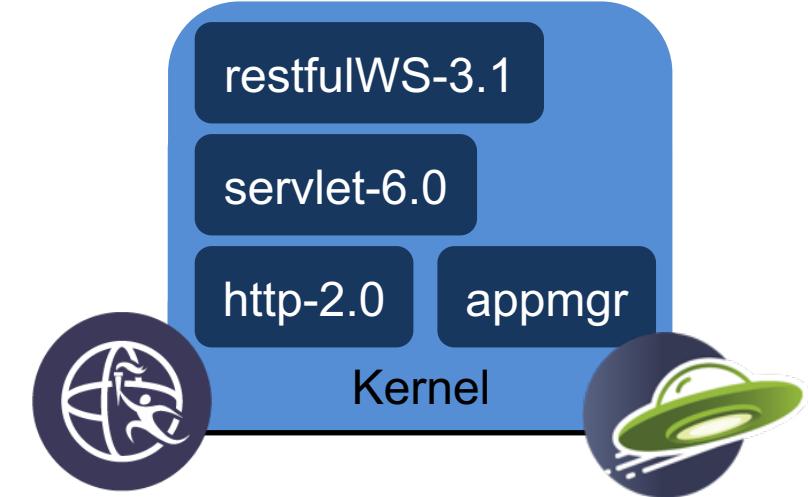


**With a Traditional App Server**, the Full API stack as well as administration and operations features are loaded in each server instance



**With Liberty**, you control which features are loaded into each server instance

```
<feature>restfulWS-3.1</feature>
```



# Simple right-size build

*Friction-free, right-size application and container build*



## Application Build

Maven and Gradle Plugins

All Liberty artefacts released to maven central

Package	Size on Disk	Memory
Java EE 8 / Jakarta EE 8 + MicroProfile 3.3	121MB	165MB
MicroProfile 3.3	59MB	113MB
Servlet 4.0	24MB	72MB

Right-size runtime

## Container Build

Leading container build approaches –  
Dockerfile, Cloud Native Buildpack,  
Source-2-Image

Certified Liberty images released to IBM Container Registry

```
FROM icr.io/appcafe/open-liberty:kernel-slim-java8-openj9-ubi  
  
COPY --chown=1001:0 server.xml /config/  
RUN features.sh  
COPY --chown=1001:0 target/*.war /config/apps  
RUN configure.sh
```

Production-ready right-size containers

# Liberty Operators

*Addressing the Kubernetes skills gap*



Insulate from Kubernetes complexities

Automate common task: deploy,  
scale, upgrade, dump gather

Security capabilities out-of-the-box

Reduce configuration by up to 80%

New: simplified license management  
(WebSphere Liberty Operator)



```
apiVersion: liberty.websphere.ibm.com/v1
kind: WebSphereLibertyApplication
metadata:
  name: liberty-cloud-demo
spec:
  license:
    accept: false
    edition: IBM WebSphere Application Server
    productEntitlementSource: Standalone
    metric: Processor Value Unit (PVU)
  replicas: 3
  applicationImage: liberty-cloud-demo:1.0
  pullPolicy: Always
  expose: true
  storage:
    size: 2Gi
    mountPath: "/logs"
```

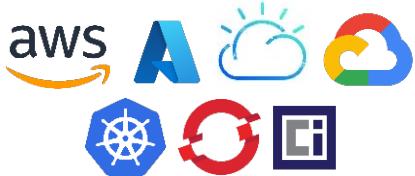
# Cloud Deployments

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## Support on leading clouds

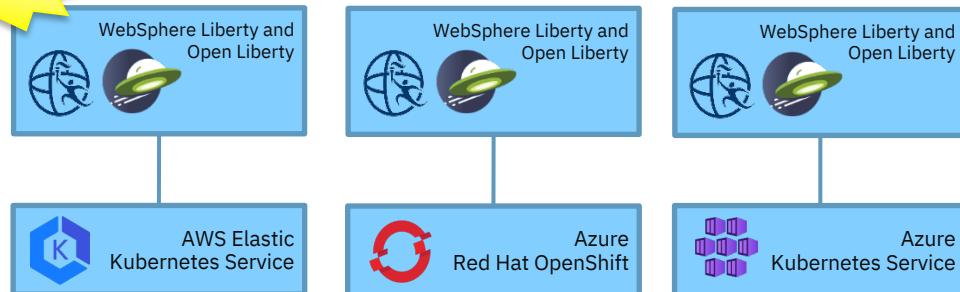
- Liberty supported on all leading Cloud Virtual Machine, Kubernetes and OpenShift Environments
- Azure, AWS, IBM Cloud, Google Cloud, ... (Bring-Your-Own-License)
- **New:** AWS ECS Fargate CaaS



## Simplified setup

- Marketplace and Partner Solution options simplify and accelerate setup in AWS and Azure at no extra cost
  - Provision or re-use Cluster
  - Provision or re-use container registry
  - Networking and load-balancing
  - Operator install and configuration
  - Application deployment

New 4Q22



<https://docs.microsoft.com/en-us/azure/developer/java/ee/websphere-family>

# Performance

*Help reduce costs and achieve sustainability targets*

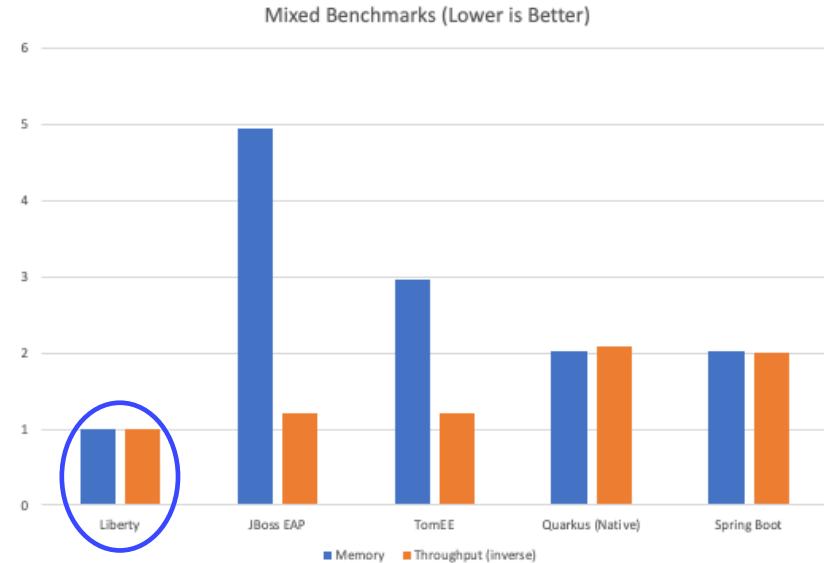
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Better throughput and lower memory mean less hardware for the same workloads

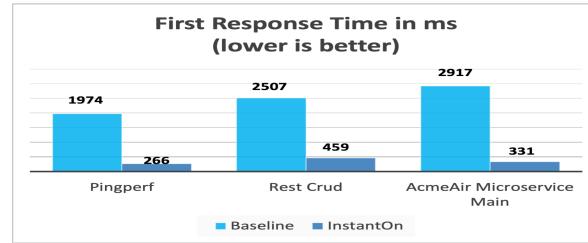
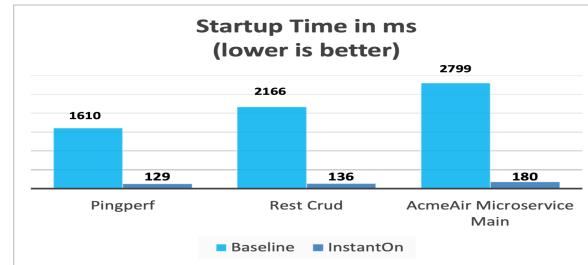
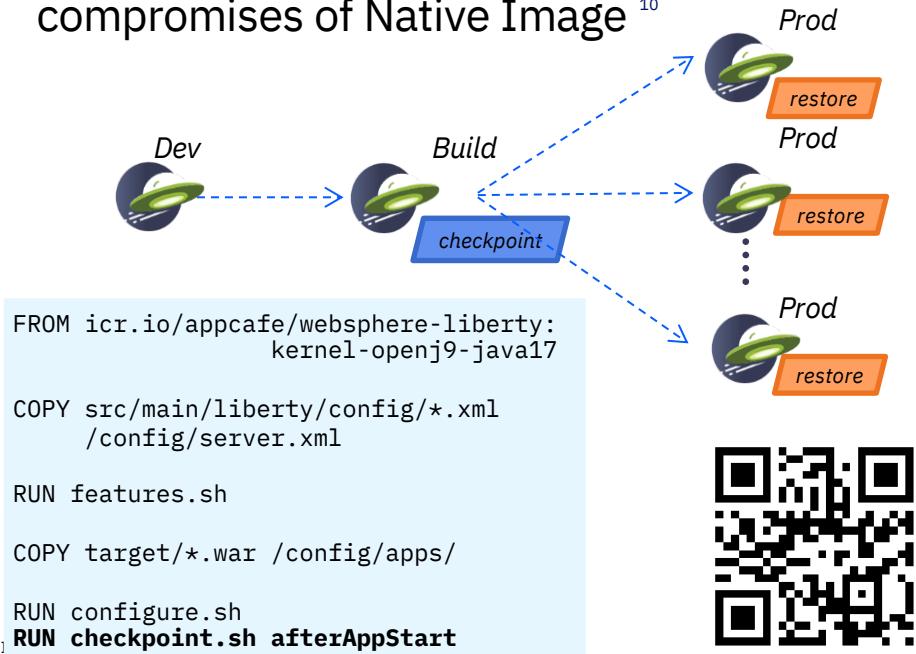
Less hardware means lower infrastructure and license costs

Less hardware means lower environmental impact



# InstantOn without compromise

- Start applications in milliseconds
- Ideal for serverless
- Up to 10-18x faster
- With all the benefits of the JVM and none of the compromises of Native Image<sup>10</sup>



Characteristics	Semeru InstantOn	Semeru JVM	Graal Native
Full Java support	Yes	Yes	No
'Instant on'	Yes	No	Yes
High throughput	Yes	Yes	No
Low memory (under load)	Yes	Yes	No
Dev-prod parity	Yes	Yes	No

# Cloud Optimization

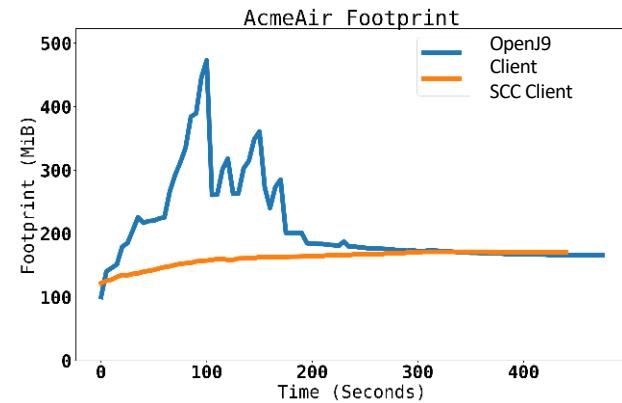
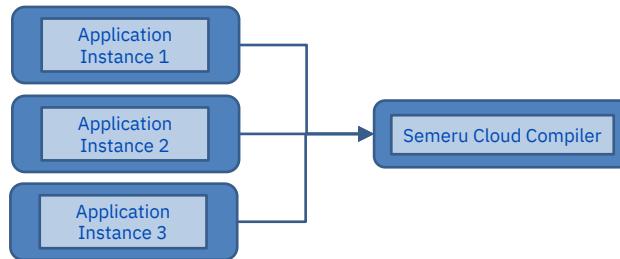
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## *Optimizing memory for Kubernetes deployments*

Offloads costly JIT compilation to separate server

Dramatically reduces peak memory usage

Future: Simple Kubernetes enablement through Liberty Operators

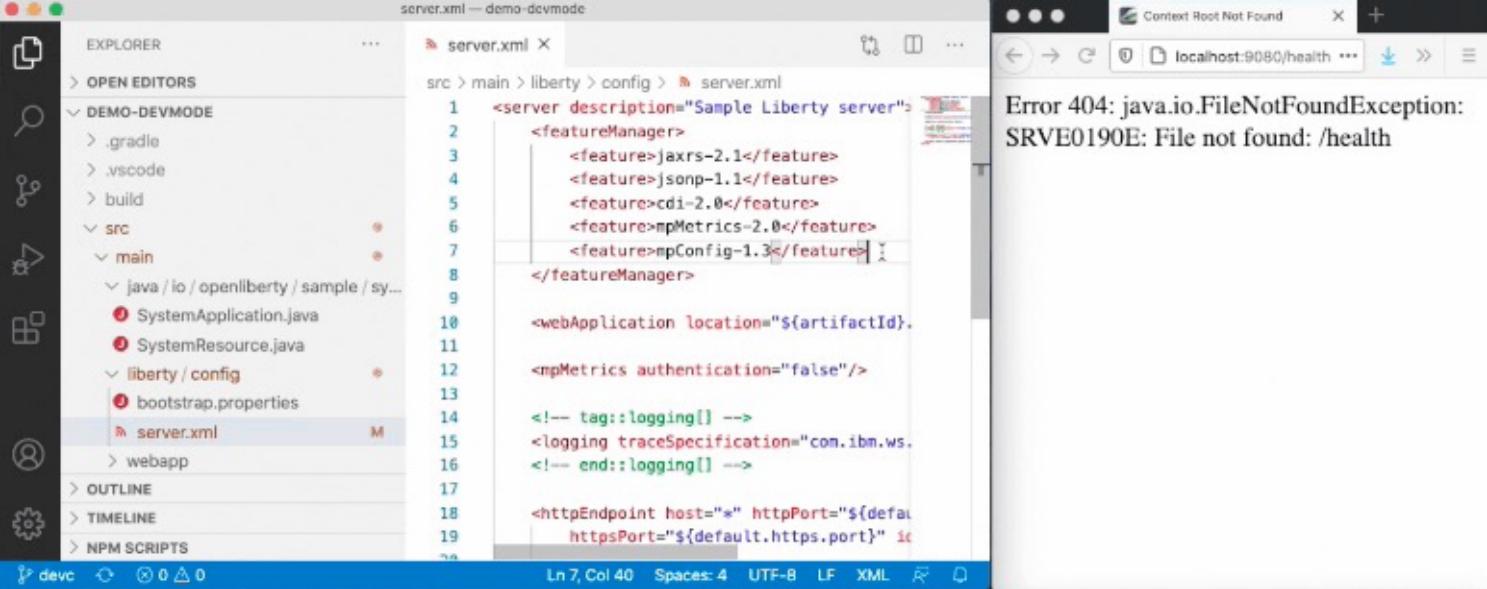


Service	Memory limit w/o SCC Server	Memory limit with SCC Server	Saving
Auth	1,050 MB	750 MB	300MB
Booking	3,300 MB	2,400 MB	900MB
Customer	1,650 MB	1,050 MB	600MB
Flight	2,250 MB	1,250 MB	1,000 MB
Main	600 MB	450 MB	150MB
Total	8,850 MB	5,900 MB	2,950 MB

# Dev Mode

- No rebuild
- No redeploy
- No install
- No restart
- Just code!

- In containers too



The screenshot shows a development environment with multiple windows. On the left is the Explorer view of a project named 'DEMO-DEVMODE' containing files like .gradle, .vscode, build, src/main/java, and server.xml. The server.xml file is selected and shown in the central code editor. The code defines a Liberty server with various features and a web application. Below the code editor is a terminal window displaying logs from a Docker container running in dev mode. The logs include information about Liberty starting in dev mode, port mappings, and successful source compilation. To the right of the terminal is a browser window showing a 404 error page for 'localhost:9080/health'.

```
<server description="Sample Liberty server">
    <featureManager>
        <feature>jaxrs-2.1</feature>
        <feature>jsonp-1.1</feature>
        <feature>cdi-2.0</feature>
        <feature>mpMetrics-2.0</feature>
        <feature>mpConfig-1.3</feature>
    </featureManager>

    <webApplication location="${artifactId}.war">
        <mpMetrics authentication="false"/>
        <!-- tag::logging[] -->
        <logging traceSpecification="com.ibm.ws.<!-- end::logging[] -->

        <httpEndpoint host="*" httpPort="${default.http.port}" httpsPort="${default.https.port}">
```

```
[INFO] ****
[INFO] *      Liberty is running in dev mode.
[INFO] *      To run tests on demand, press Enter.
[INFO] *      To rebuild the Docker image and restart the container, type 'r' and press Enter.
[INFO] *      To stop the server and quit dev mode, press Ctrl-C or type 'q' and press Enter.
[INFO] *
[INFO] *      Liberty container port information:
[INFO] *          Internal container HTTP port [ 9080 ] is mapped to Docker host port [ 9080 ]
[INFO] *          Internal container HTTPS port [ 9443 ] is mapped to Docker host port [ 9443 ]
[INFO] *          Liberty debug port mapped to Docker host port: [ 7777 ]
[INFO] *
[INFO] *      Docker network information:
[INFO] *          Container name: [ liberty-dev ]
[INFO] *          IP address [ 172.17.0.2 ] on Docker network [ bridge ]
[INFO] ****
[INFO] Source compilation was successful.
[INFO] Tests compilation was successful.
[INFO] [AUDIT   ] CWWKTC0017I: Web application removed (default_host): http://c1bf2d4d704a:9080/
[INFO] [AUDIT   ] CWWKZ0009I: The application demo-devmode-maven has stopped successfully.
[INFO] [AUDIT   ] CWWKTC0016I: Web application available (default_host): http://c1bf2d4d704a:9080/
[INFO] [AUDIT   ] CWWKZ0003I: The application demo-devmode-maven updated in 1.157 seconds.
```



# CI/CD Optimized

*Seamless currency to eliminate technical debt and stay secure*

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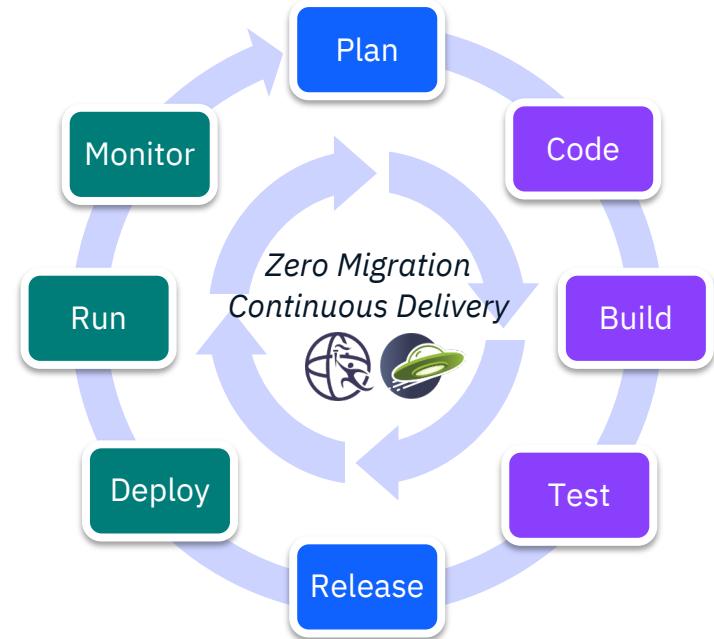


**Zero Migration** makes staying current easy

- No configuration or runtime behavior changes

**Continuous Delivery** gives frequent and reliable access to the latest features and fixes

- Full releases every 4 weeks
- Quarterly LTS releases



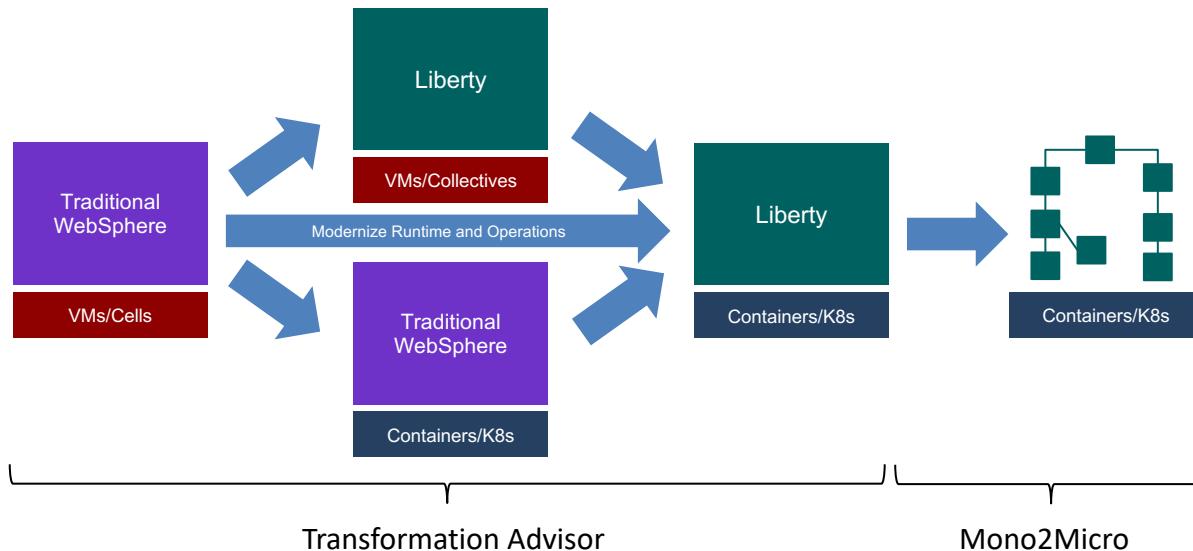
# Liberty is Ideal for Modernization

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Liberty is the only runtime with the breadth of first-class deployment, API, and architecture choices to enable progressive modernization, reducing risk, reducing cost, and reducing time-to-value

- First-class support for VMs and Containers/Kubernetes
- First-class support for Monoliths and Microservices
- First-class support for Java EE, Jakarta EE and MicroProfile



# Recent Updates



# Periodic Table of Liberty (24.0.0.3)

zOS	batchSMFLogging-1.0				zosLocalAdapters-1.0	zosTransaction-1.0	zosSecurity-1.0
ND	collectiveController-1.0		dynamicRouting-1.0	clusterMember-1.0	healthManager-1.0	zosWlm-1.0	zosSecurity-1.0
Base	cloudant-1.0	jakartaee-9.1	jakartaee-8.0	jakartaee-8.0	healthAnalyzer-1.0	scalingController-1.0	Security
Core	javaee-8.0	heritageAPIs-1.1	javaee-7.0	sipServlet-1.1	batchManagement-1.0	scalingMember-1.0	
Open Liberty	jakartaee-10.0				wsAtomicTransaction-1.2		
New in 4Q23	appAuthorization-2.1	mpGraphQL-2.0	mpReactiveMessaging-3.0	mpReactiveStreams-3.0	adminCenter-1.0	audit-1.0	ldapRegistry-3.0
New in 3Q23	bells-1.0				collectiveMember-1.0	constrainedDelegation-1.0	oauth-2.0
New in 2Q23	facesContainer-4.0				distributedMap-1.0	federatedRegistry-1.0	openid-2.0
New in 1Q24	grpc-1.0	osgiConsole-1.0			eventLogging-1.0	jwt-1.0	openidConnectClient-1.0
	jdbc-4.3		persistenceContainer-3.1		logstashCollector-1.0	jwtSso-1.0	openidConnectServer-1.0
	json-1.0	springBoot-3.0			monitor-1.0	sessionDatabase-1.0	passwordUtilities-1.1
	jsonbContainer-3.0		webProfile-10.0		openapi-3.1	webCache-1.0	samlWeb-2.0
	jsonpContainer-2.1		webProfile-9.1		requestTiming-1.0	wmqMessagingClient-3.1	scim-1.0
	mail-2.1		webProfile-8.0		usageMetering-1.0		socialLogin-1.0
	microProfile-6.1		webProfile-7.0		restConnector-2.0		spnego-1.0
APIs	mpContextPropagation-1.3		xmlBinding-4.0		sessionCache-1.0		transportSecurity-1.0

# Focus areas



Developer Experience

APIs

Core Runtime

Cloud

Security

# Liberty Last Quarter Review



## Security

- OpenID Connect Back Channel Logout

## Dev Exp

## Core Runtime

- InstantOn
  - scim-1.0
  - jaxws-2.2
  - xmlWS-3.0
- InstantOn support for Power and z
- Verbose GC OOTB

## API

- MicroProfile Reactive Messaging 3.0
- MicroProfile Reactive Streams 3.0

## Cloud

- Java 21 container images

# Cloud native reactive microservices with WebSphere Liberty InstantOn and Kafka

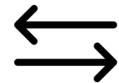
Developed by Kevin Grigorenko

GitHub: <https://github.com/IBM/libertyEventDrivenSurvey>

Solution includes:

- 01 Microservices (containers)
- 02 Cloud Native (containers)
- 03 MicroProfile Reactive Messaging
- 04 Kafka event streams
- 05 Knative Scale-to-zero
- 06 Liberty InstantOn
- 07 Red Hat OpenShift

# Microservices



HTTP/  
REST

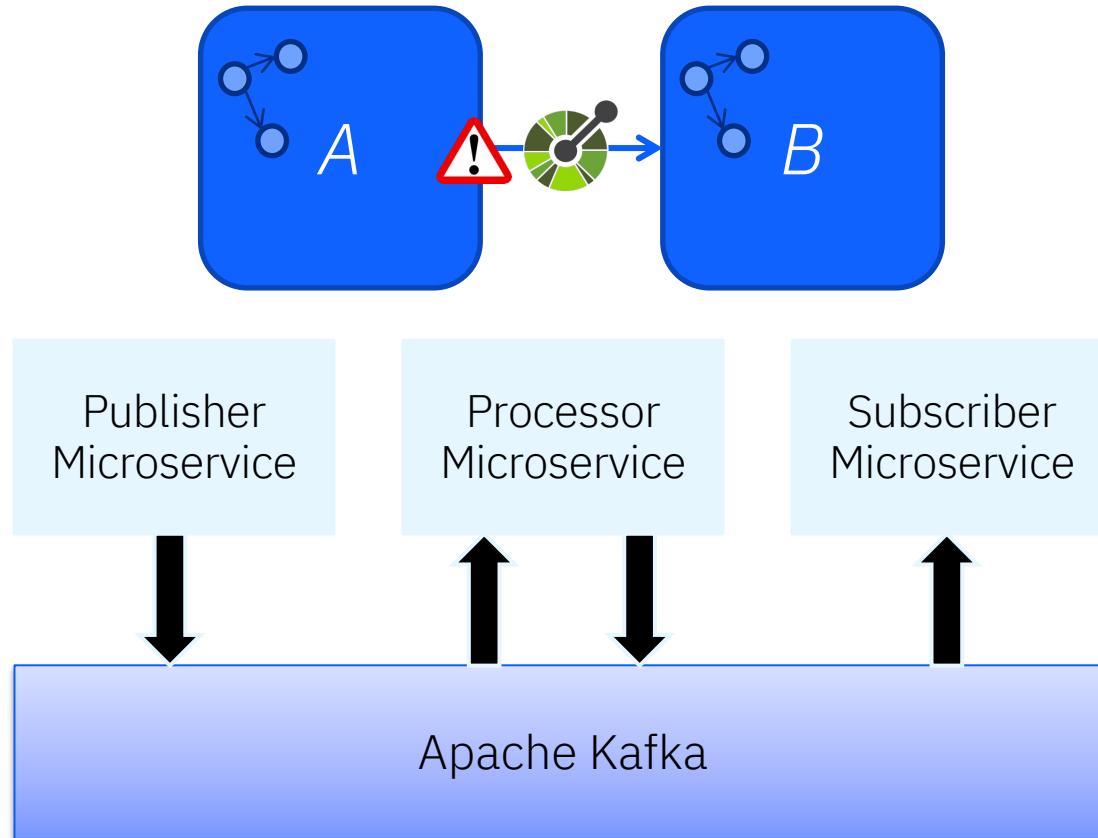
## Microservice

- Limited functional scope
- Network-accessible service
- Runs in its own process

## Container



# Reactive Microservices



## Publisher Microservice

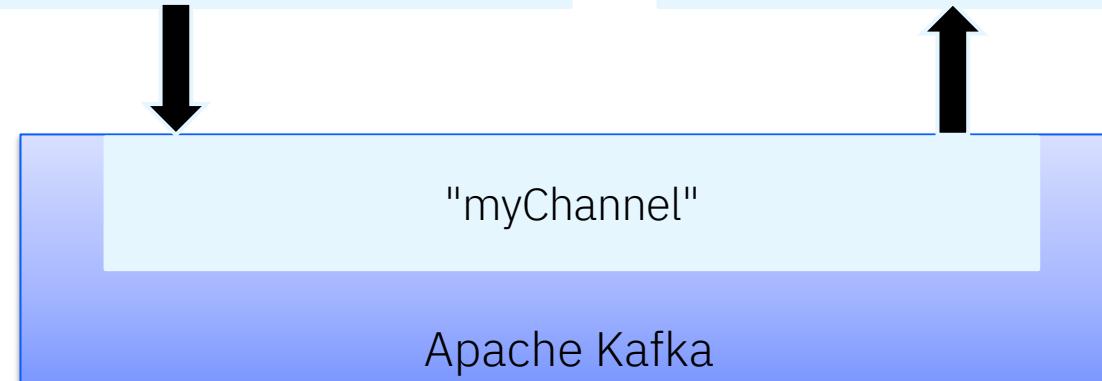
```
@Inject @Channel("myChannel")
private Emitter<String> emitter;

public void publishMessage() {
    emitter.send("a");
    emitter.send("b");
}
```

## Subscriber Microservice

```
@Incoming("myChannel")
public void sink(String word)

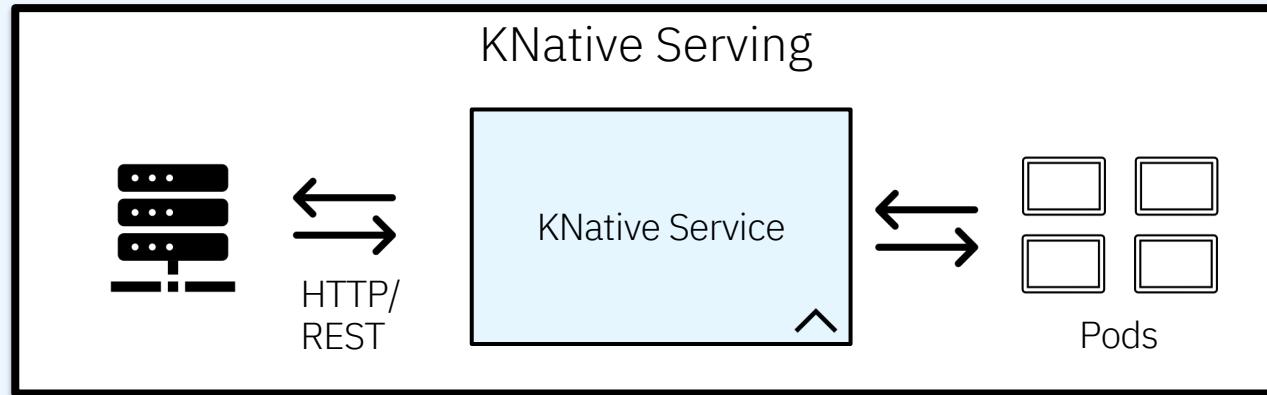
@Incoming("myChannel")
@Outgoing("outgoing1")
public void transform(String word)
```



# Knative Serving

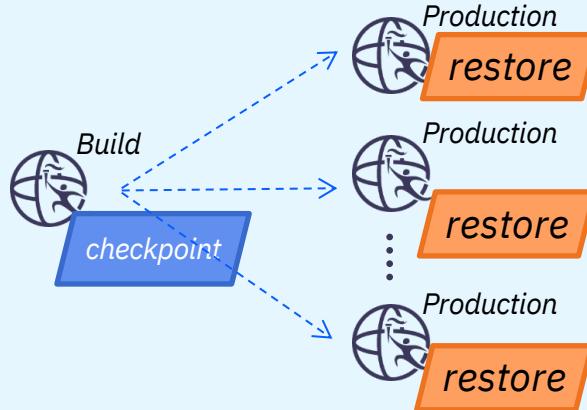


## OpenShift Serverless



```
autoscaling.knative.dev/max-scale: "10"  
autoscaling.knative.dev/scale-down-delay: "300s"
```

# IBM WebSphere Liberty InstantOn



Up to  
15X  
faster!



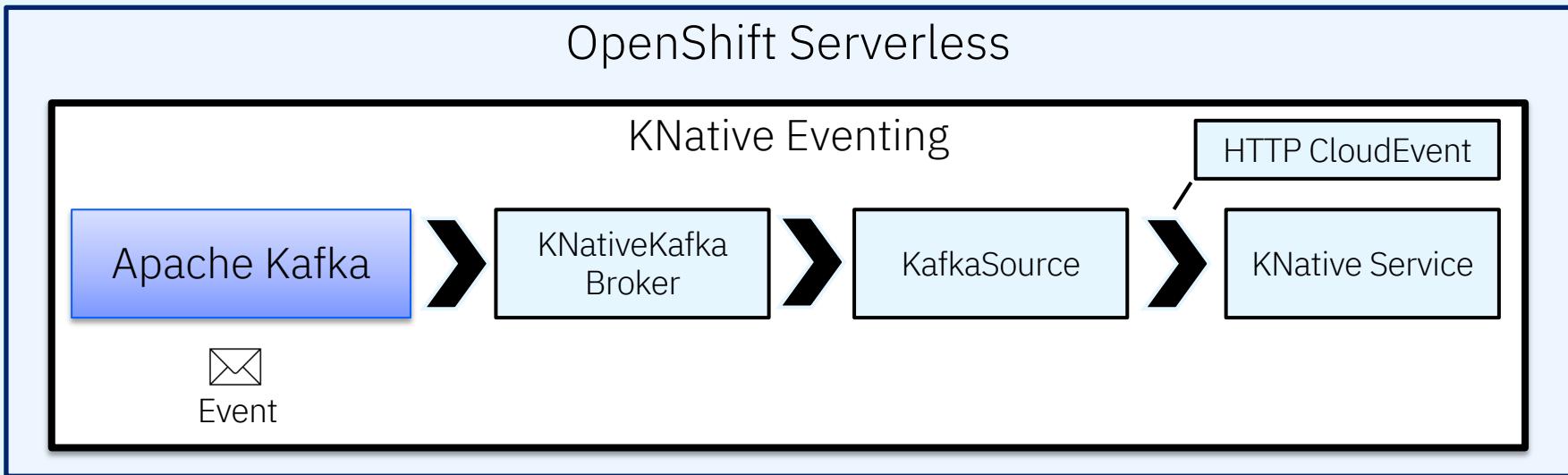
IBM WebSphere Liberty



IBM Semeru Runtimes



# Knative Eventing



## Publisher Microservice

```
@Inject @Channel("myChannel")
private Emitter<String> emitter;

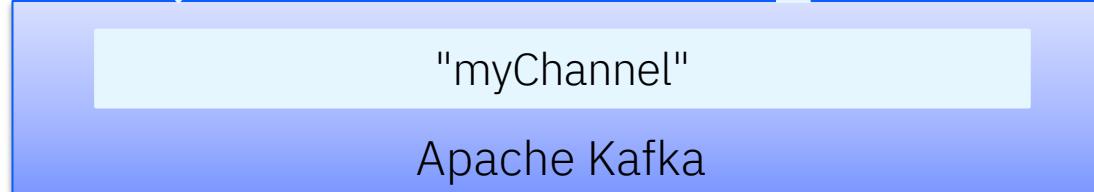
public void publishMessage() {
    emitter.send("a");
    emitter.send("b");
}
```

## Subscriber Microservice

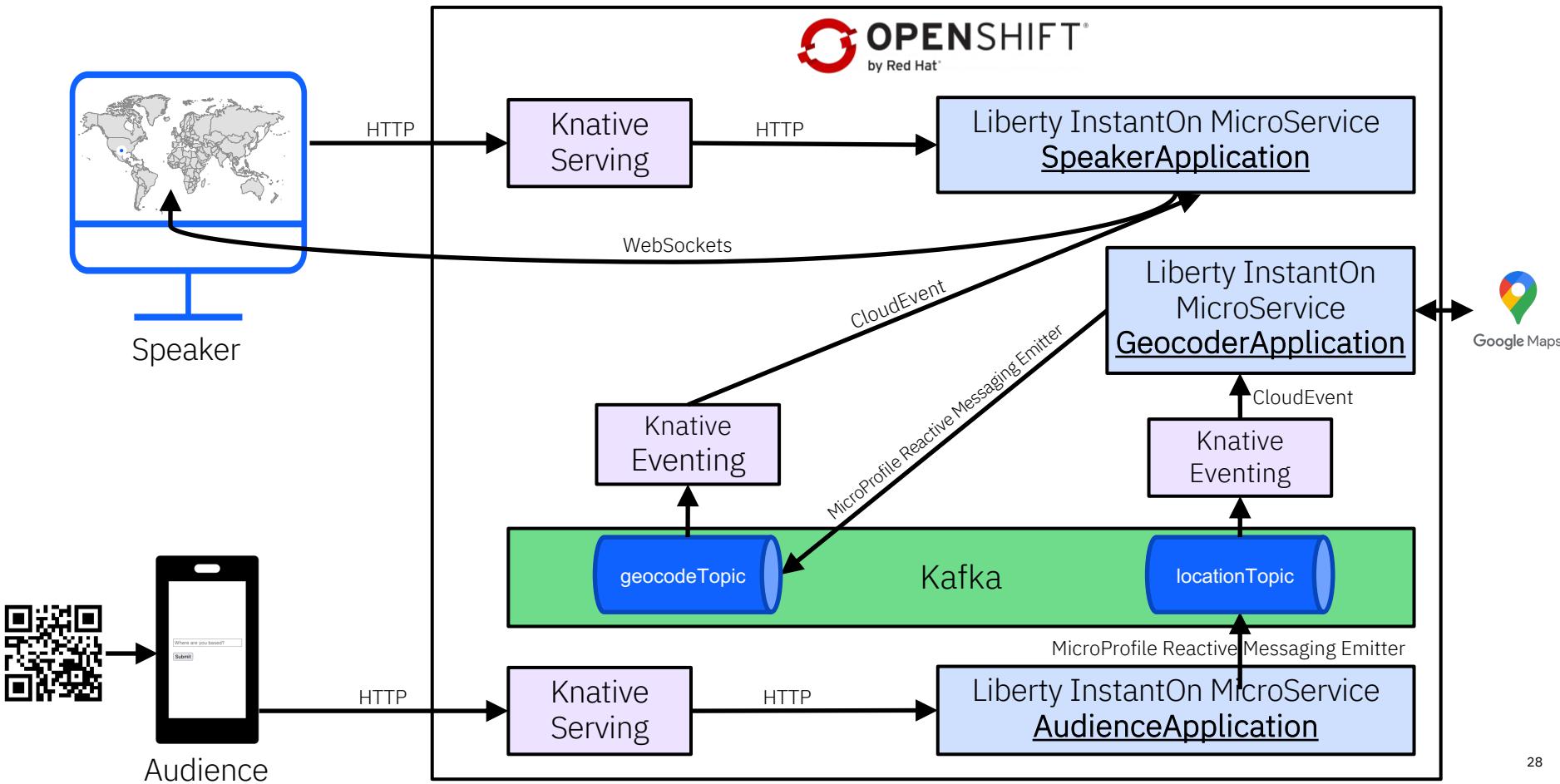
```
@RequestScoped
public class CloudEventsProcessor {
    @Path("locationInput")
    @POST
    @Produces(MediaType.APPLICATION_JSON)
    public Response locationInput(CloudEvent incoming) {
        CloudEventData data = incoming.getData();
        String location = null;
        try (StringDeserializer deserializer = new StringDeserializer()) {
            location = deserializer.deserialize(null, data.toBytes());
        }
    }
}
```



Knative Eventing



# Event Driven Architecture

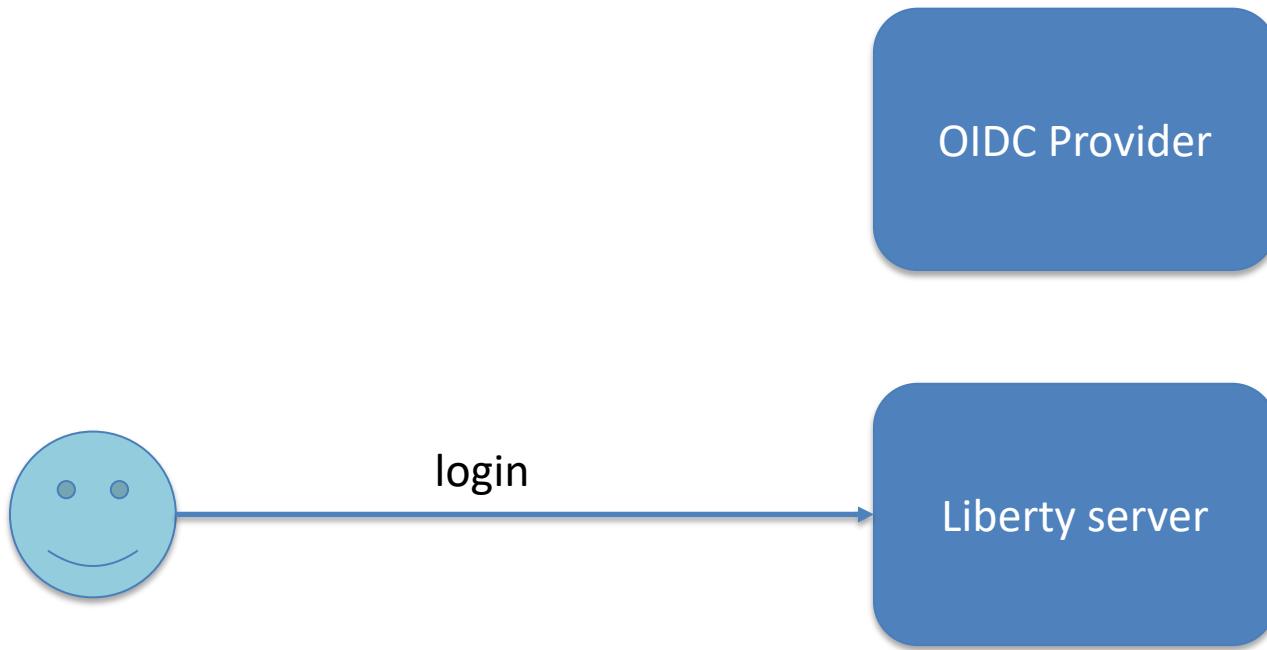


# Periodic Table of Liberty (24.0.0.3)

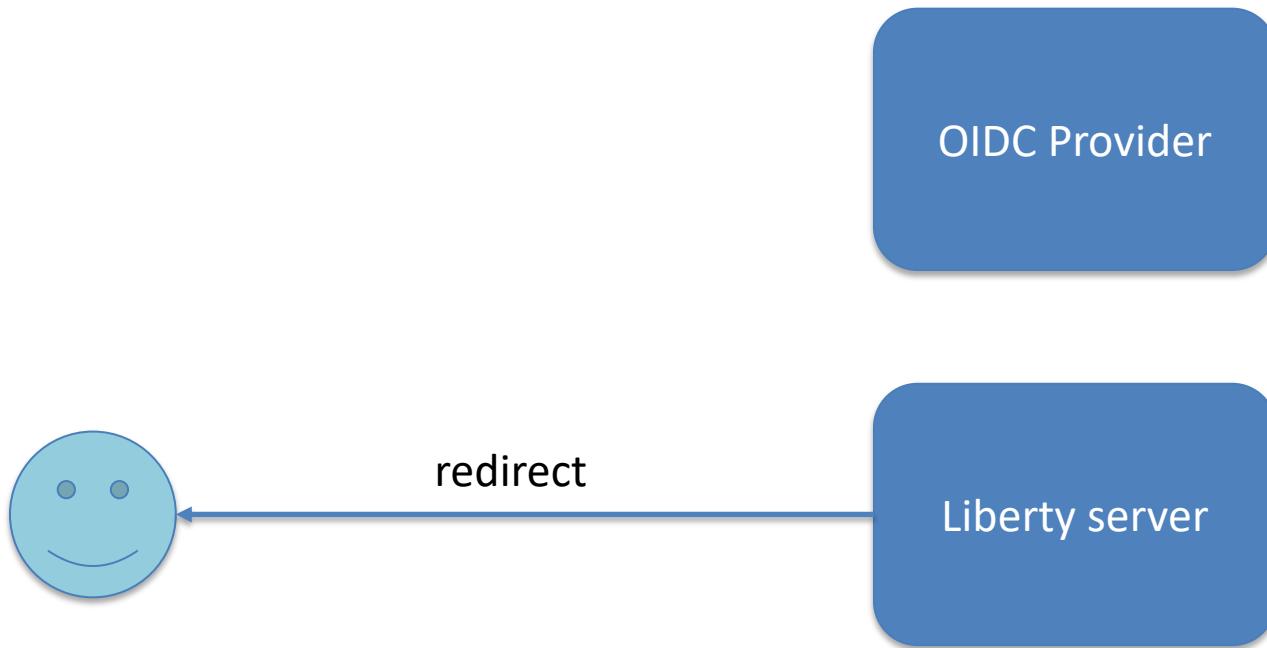
Open Liberty

zOS	batchSMFLogging-1.0				zosLocalAdapters-1.0	zosTransaction-1.0	zosSecurity-1.0
ND	collectiveController-1.0		dynamicRouting-1.0	clusterMember-1.0	healthManager-1.0	zosWlm-1.0	zosSecurity-1.0
Base					healthAnalyzer-1.0	scalingController-1.0	Security
Core	cloudant-1.0		jakartaee-9.1		batchManagement-1.0		Operations
Open Liberty	javaee-8.0		jakartaee-8.0		wsAtomicTransaction-1.2		acmeCA-1.0
New in 4Q23	javaee-7.0		heritageAPIs-1.1		adminCenter-1.0		wsSecurity-1.1
New in 3Q23	jakartaee-10.0		sipServlet-1.1				wsSecuritySaml-1.0
New in 2Q23	appAuthorization-2.1		mpGraphQL-2.0				ldapRegistry-3.0
New in 1Q24	bells-1.0		mpReactiveMessaging-3.0		collectiveMember-1.0		audit-1.0
APIs	facesContainer-4.0		mpReactiveStreams-3.0		distributedMap-1.0		constrainedDelegation-1.0
	grpc-1.0		osgiConsole-1.0		eventLogging-1.0		oauth-2.0
	jdbc-4.3		persistenceContainer-3.1		logstashCollector-1.0		openid-2.0
	json-1.0		springBoot-3.0		monitor-1.0		openidConnectClient-1.0
	jsonbContainer-3.0		webProfile-10.0		openapi-3.1		openidConnectServer-1.0
	jsonpContainer-2.1		webProfile-9.1		requestTiming-1.0		passwordUtilities-1.1
	mail-2.1		webProfile-8.0		usageMetering-1.0		samlWeb-2.0
	microProfile-6.1		webProfile-7.0		restConnector-2.0		scim-1.0
	mpContextPropagation-1.3		xmlBinding-4.0		sessionCache-1.0		socialLogin-1.0
							spnego-1.0
							transportSecurity-1.0

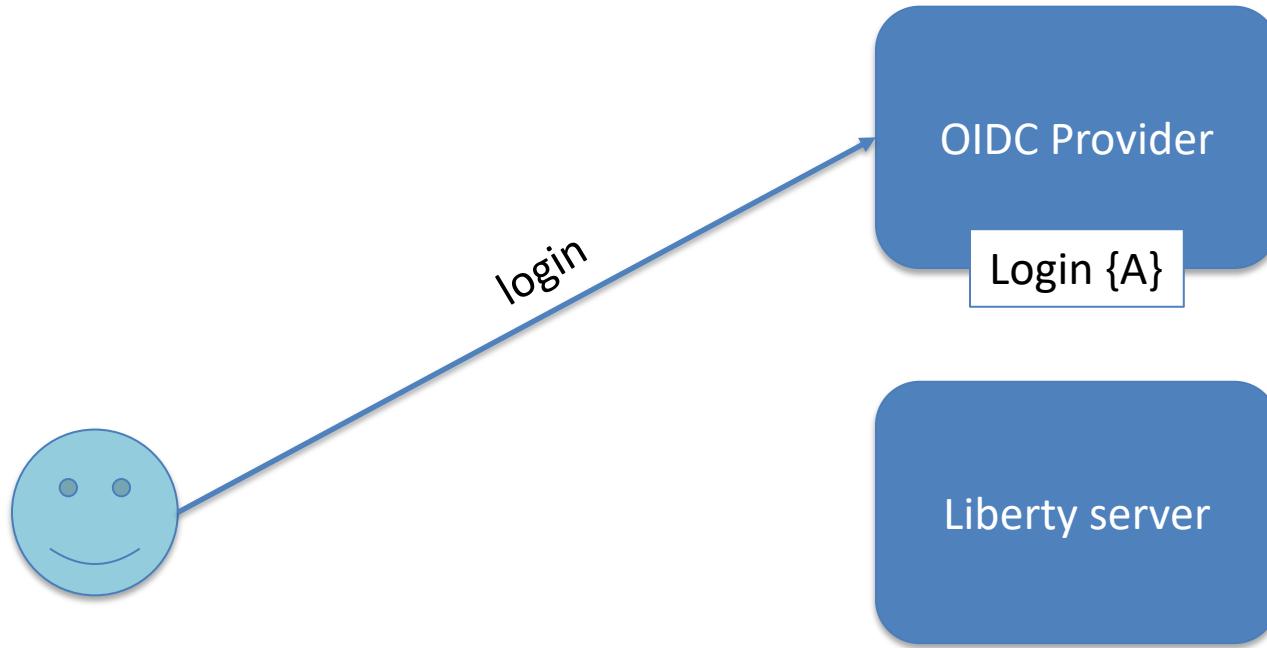
# SSO with OIDC



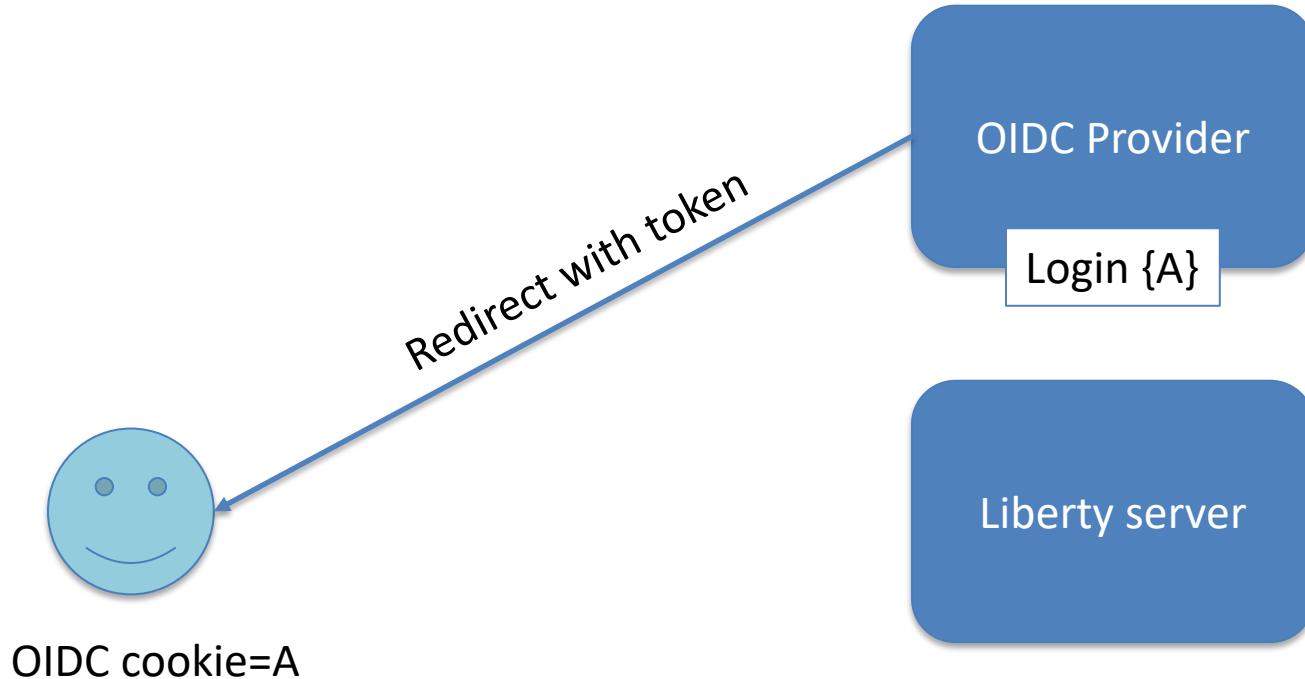
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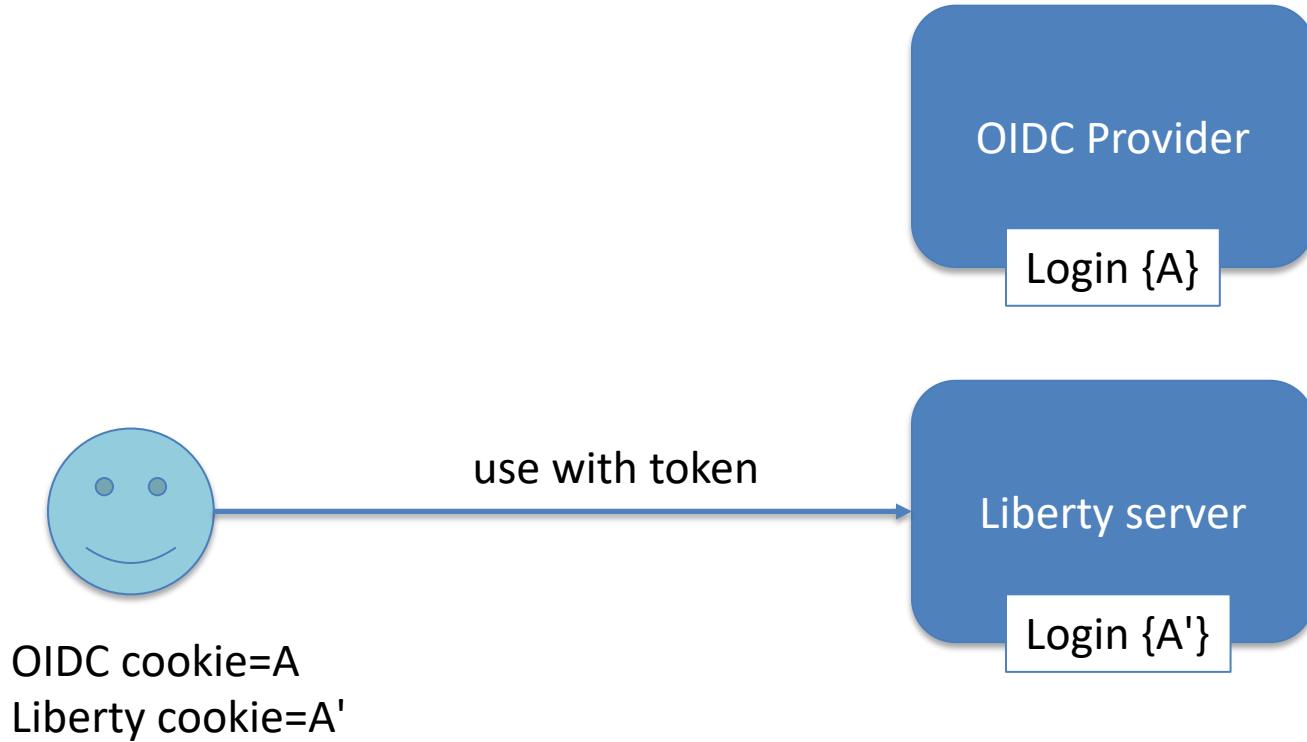
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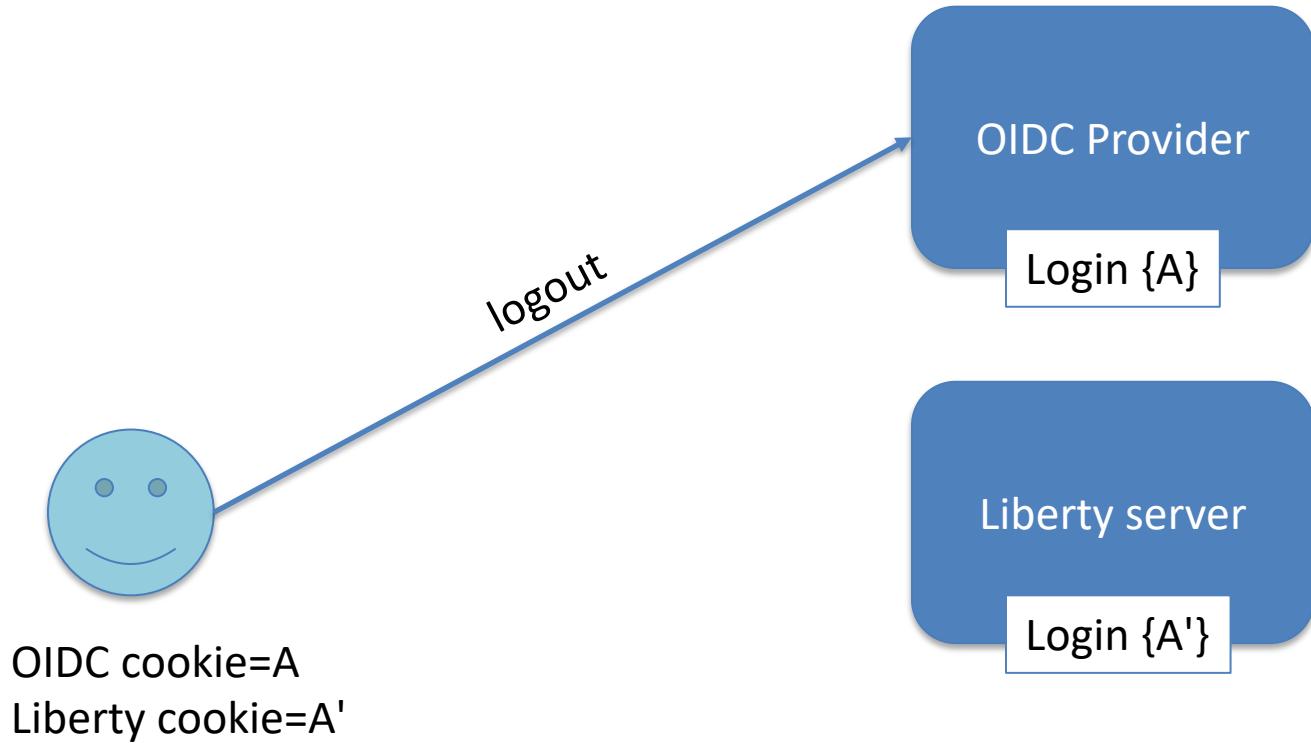
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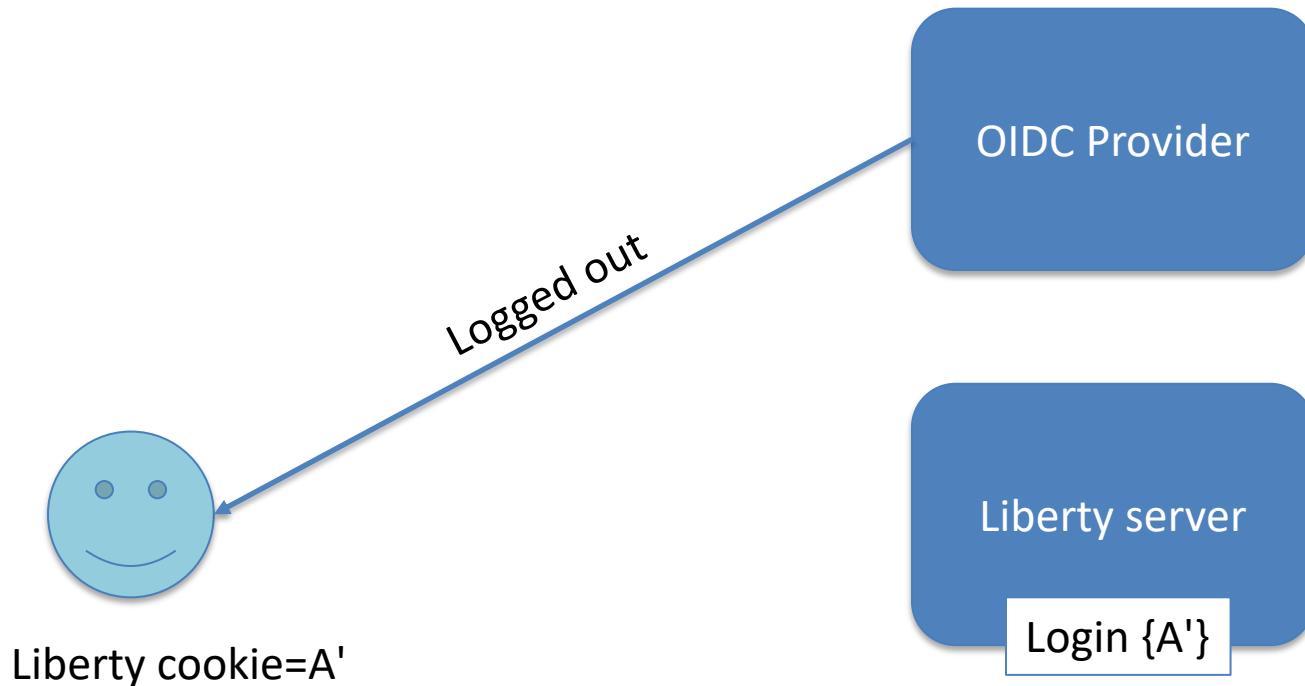
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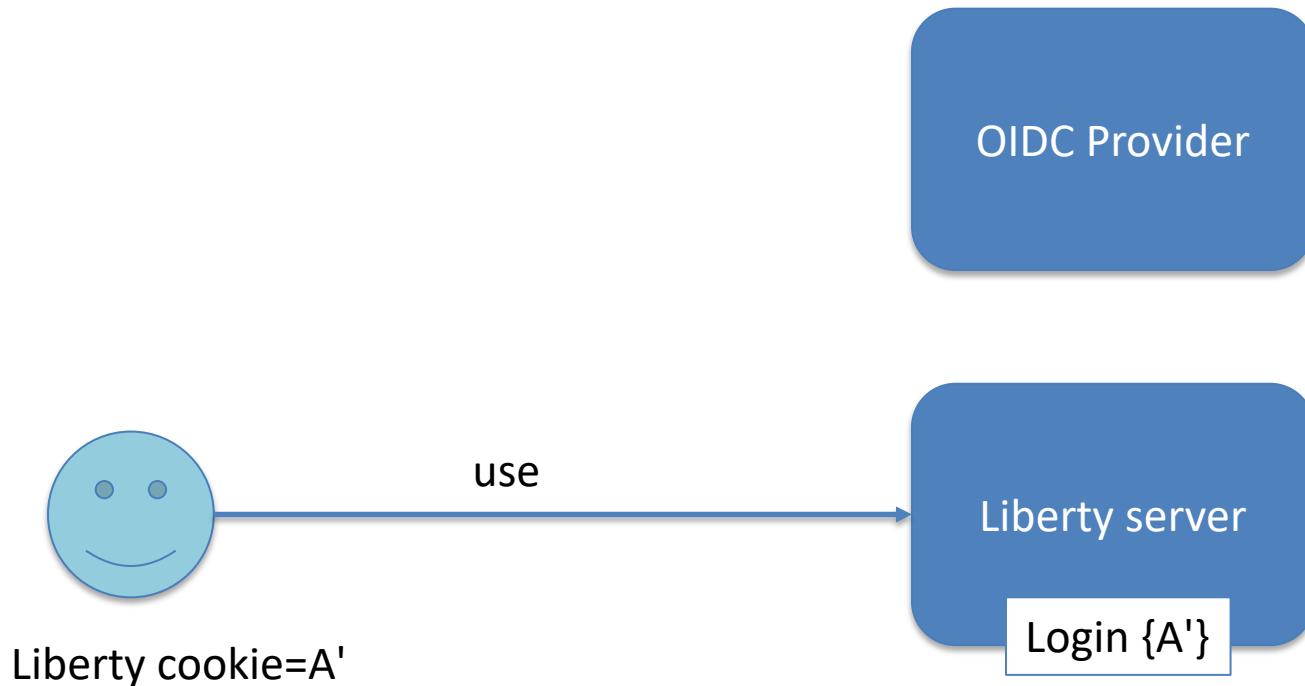
# SSO with OIDC logout



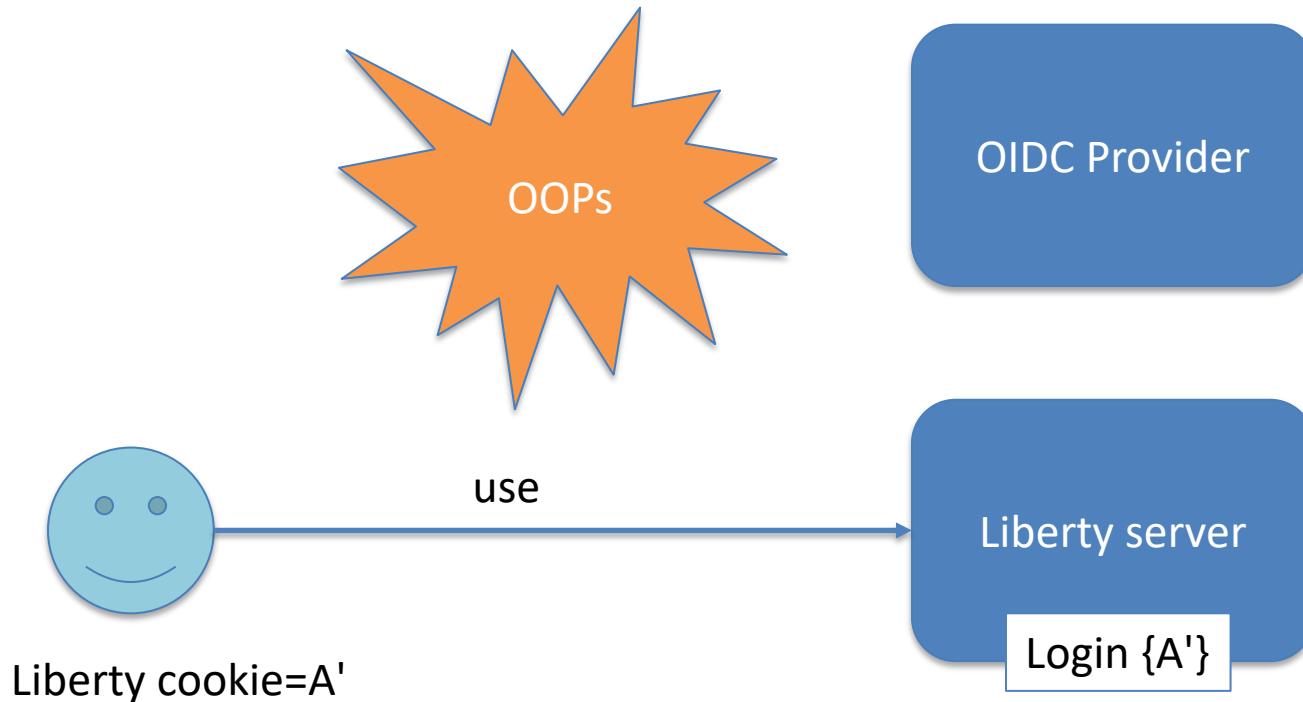
# SSO with OIDC logout



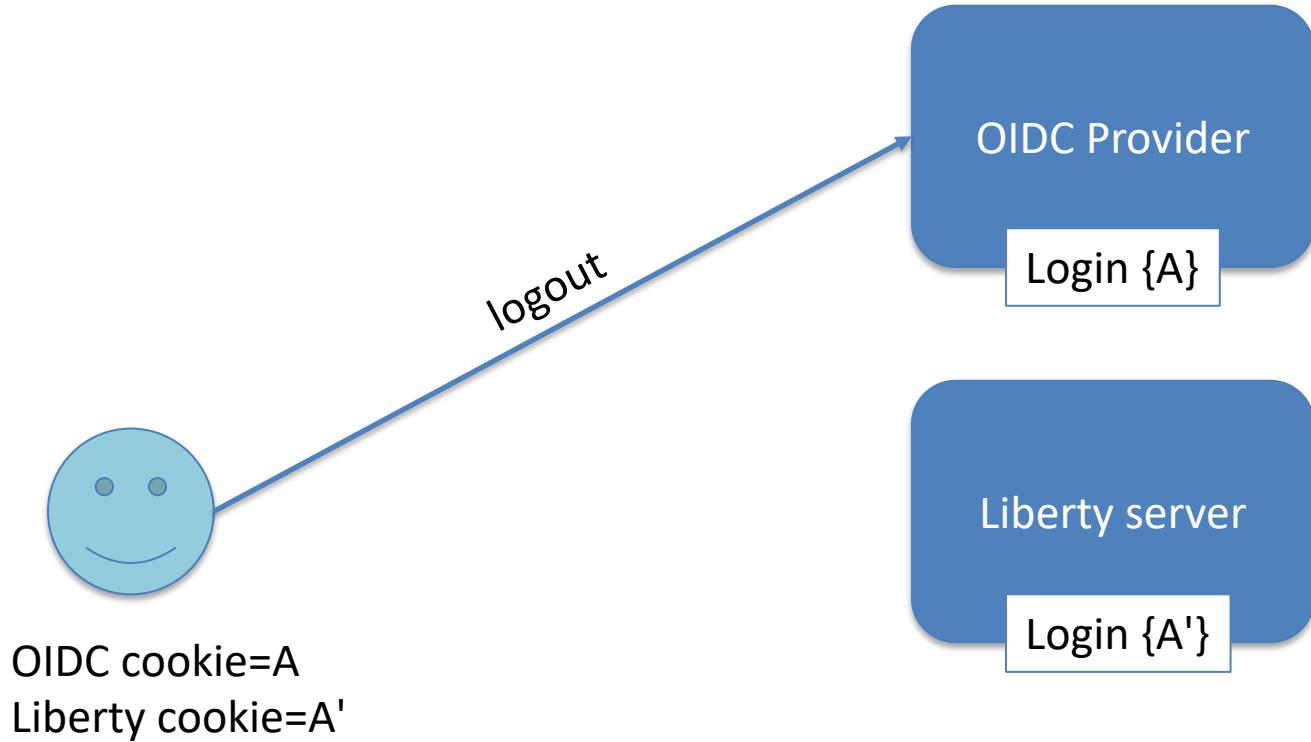
# SSO with OIDC



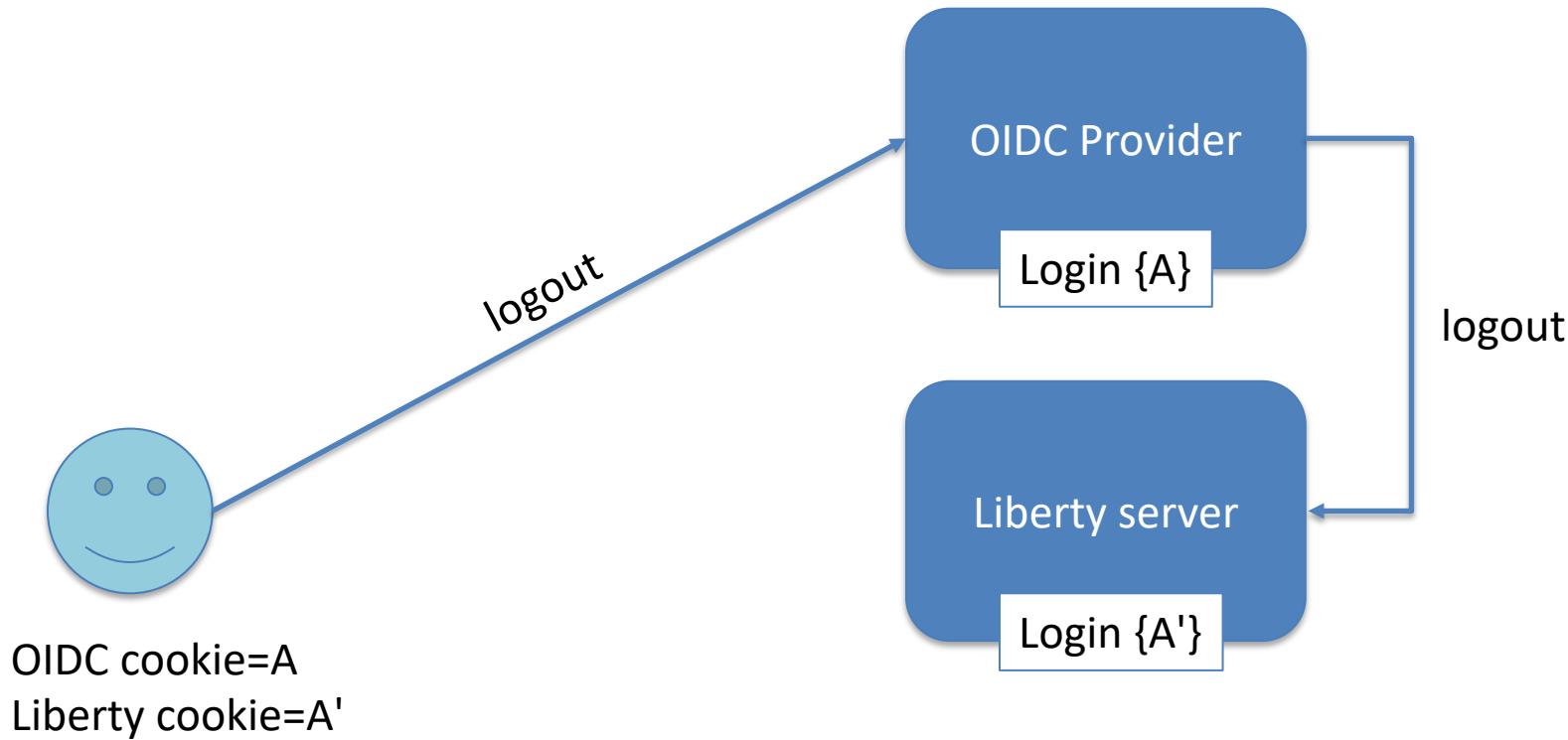
# SSO with OIDC



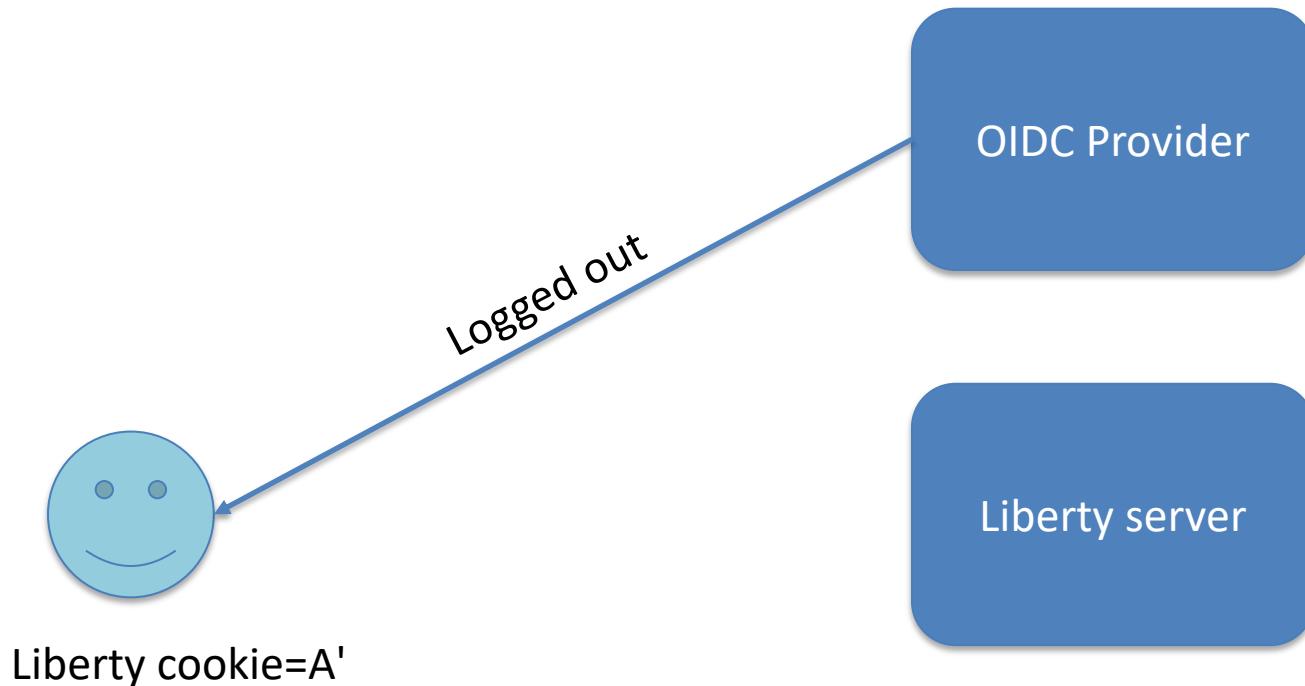
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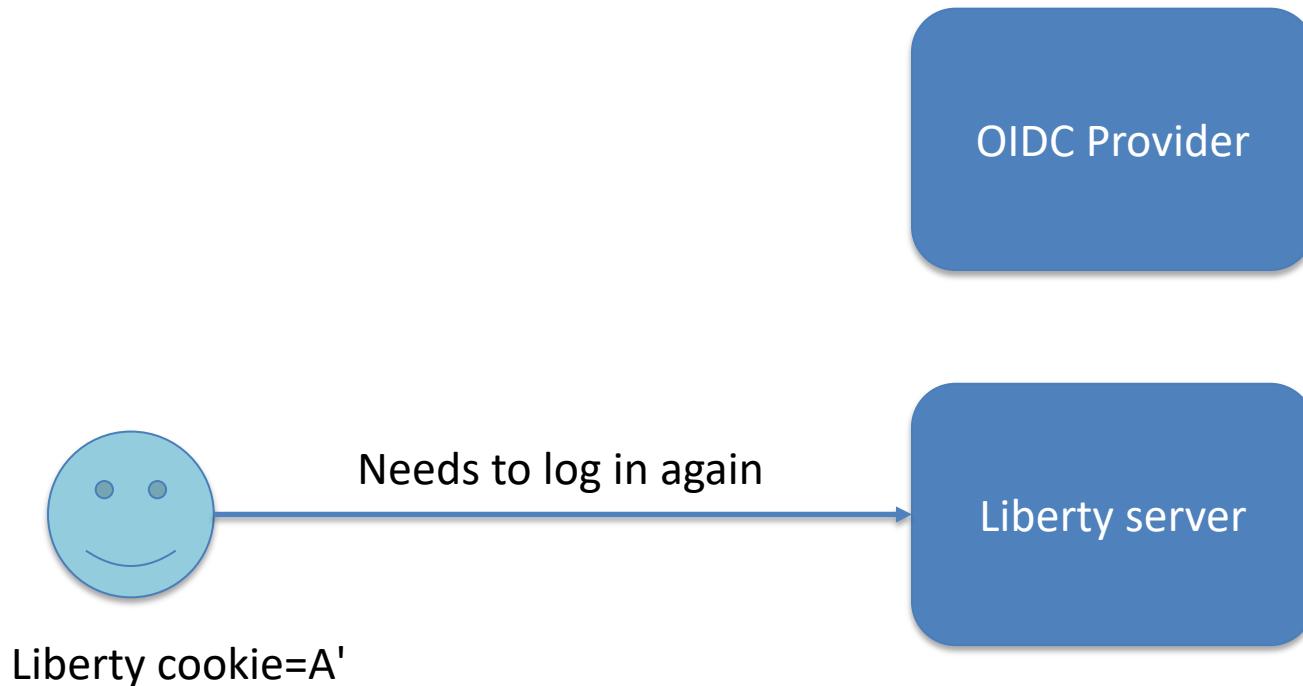
# SSO with OIDC logout



# SSO with OIDC logout



# SSO with OIDC



# How to configure



- Configuration goes in your OIDC Provider
- socialLogin-1.0
  - [https://hostname.for.liberty/ibm/api/social-login/backchannel\\_logout/{socialLoginId}](https://hostname.for.liberty/ibm/api/social-login/backchannel_logout/{socialLoginId})
- OpenidConnectClient-1.0
  - [https://hostname.for.liberty/oidcclient/backchannel\\_logout/{oidcClientId}](https://hostname.for.liberty/oidcclient/backchannel_logout/{oidcClientId})
- Id value is from the id attribute on oidcLogin or openidConnectClient element in Liberty server.xml

# Labs, Questions



# Open Liberty Guides

- Hands-on learning in ~20 minutes
- 64 guides
  - MicroProfile & Jakarta EE
  - Open Shift, Docker, Kubernetes Istio
- Latest Guide
  - *Enabling distributed tracing in microservices with OpenTelemetry and Jaeger*

The screenshot shows the Open Liberty Guides homepage. At the top right is a logo featuring a green leaf-like icon and the text "Open Liberty" above a stylized flying saucer. Below the header is a search bar with a "Filter guides" button. The main content area is titled "Guides" with the 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). The DEVELOP section includes links for Getting started, RESTful service, Reactive service, Configuration, Fault tolerance, Observability, Security, Persistence, and Client side. The BUILD AND TEST section includes links for Build, Test, and Containerize. The DEPLOY section includes links for Kubernetes and Cloud deployment. The main content area displays several guide cards. One card for "Developing your cloud-native application" has a "Getting started" section with a "25 minutes" duration. Another card for "Injecting dependencies into microservices" also has a "25 minutes" duration. Other visible cards include "Creating a RESTful web service" (30 minutes), "Consuming RESTful services with template interfaces" (20 minutes), "Consuming a RESTful web service" (25 minutes), "Documenting RESTful APIs" (20 minutes), "Creating a hypermedia-driven RESTful web service" (30 minutes), and "Consuming RESTful services asynchronously with template interfaces" (15 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>

## Developer Tools

- IntelliJ IDEA <https://plugins.jetbrains.com/plugin/14856-liberty-tools>
- VS Code <https://marketplace.visualstudio.com/items?itemName=Open-Liberty.liberty-dev-vscode-ext>
- Eclipse <https://marketplace.eclipse.org/content/liberty-tools>

# Resources



## Red Hat UBI images

- [icr.io/appcafe/websphere-liberty](https://cr.console.redhat.com/appcafe/websphere-liberty)
- [icr.io/appcafe/open-liberty](https://cr.console.redhat.com/appcafe/open-liberty)

## Configuration/build files in github

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

# Next Quarterly Update



## **Liberty 24.0.0.1-3 Update**

~~Session#1: April 18, 2024 from 9-10:30 ET~~

Session#2: April 25, 2024 from 1-2:30 ET

## **Liberty 24.0.0.4-6 Update**

Session#1: July 18, 2024 from 9-10:30 ET - <https://ibm.biz/Liberty-Jul18>

Session#2: July 25, 2024 from 1-2:30 ET - <https://ibm.biz/Liberty-Jul25>

# 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

