



Open Liberty

# Liberty Quarterly Update

## 20.0.0.10-20.0.0.12

Alasdair Nottingham – Liberty Lead Architect



@nottycode

# Agenda

Open Liberty



Part 1: 10 Minute Liberty overview

Part 2: What is new this quarter

Part 3: Q&A

# 10 minute overview

# Why Choose Liberty

Open Liberty



- Cloud Ready
  - Container optimized
  - Designed for dev/ops
  - Small disk footprint
  - Efficient memory usage
  - Fast startup
  - High throughput
  - Self-Tuned Thread Pool
- Developer friendly
  - Just enough application server
  - Fast inner loop with dev mode
  - Support for industry standard dev tools
  - Jakarta EE, Java EE, MicroProfile APIs
  - Zero Migration

# What people are saying

- "Light operation and efficient operation (restart time can be reduced compared to ND)"
- "Ease of use small footprint ability to be built into a container"
- "It's the best tool for the job."
- "Easy to manage, Cloud Ready a Smart Product with cool feature. Modular flexible and fast."
- "Simple, well supported, cloud and container friendly."
- "Liberty is a fast-to-configure application server with some advantages over other similar products."
- "Simplicity of use."
- "Now that we have experienced Liberty, we are spoiled and want to stick to those easy, non-impacting migrations."

Open Liberty



Alex Lewis  
@seekingbinary

Follow

Starting to use this in my own projects. Thoroughly recommended. Keep up the great work @OpenLibertyIO team.

openlibertyio @OpenLibertyIO

Dev mode support and more developer experience enhancements to the Liberty Maven plug-in: [openliberty.io/blog/2019/11/2...](https://openliberty.io/blog/2019/11/2...)

11:36 PM - 28 Nov 2019

5 Retweets 13 Likes



Tim Zöller  
@javahippie

Follow

The @OpenLibertyIO dev mode is one of the best hot-reload features I have ever worked with, I am seriously impressed!

11:56 PM - 25 Oct 2019

9 Retweets 25 Likes



Philip Riecks  
@rieckpil

Follow

This Maven plugin is really a gamechanger for the development experience when it comes to developing @JakartaEE and @MicroProfileIO applications on @OpenLibertyIO. Read my review here: [rieckpil.de/joyful-open-li ...](https://rieckpil.de/joyful-open-li...)

# Just Enough Application Server

Open Liberty



You control which features are loaded into each server instance

Java EE



```
<feature>jsf-2.3</feature>
```

jsp-2.3

jsf-2.3

servlet-4.0

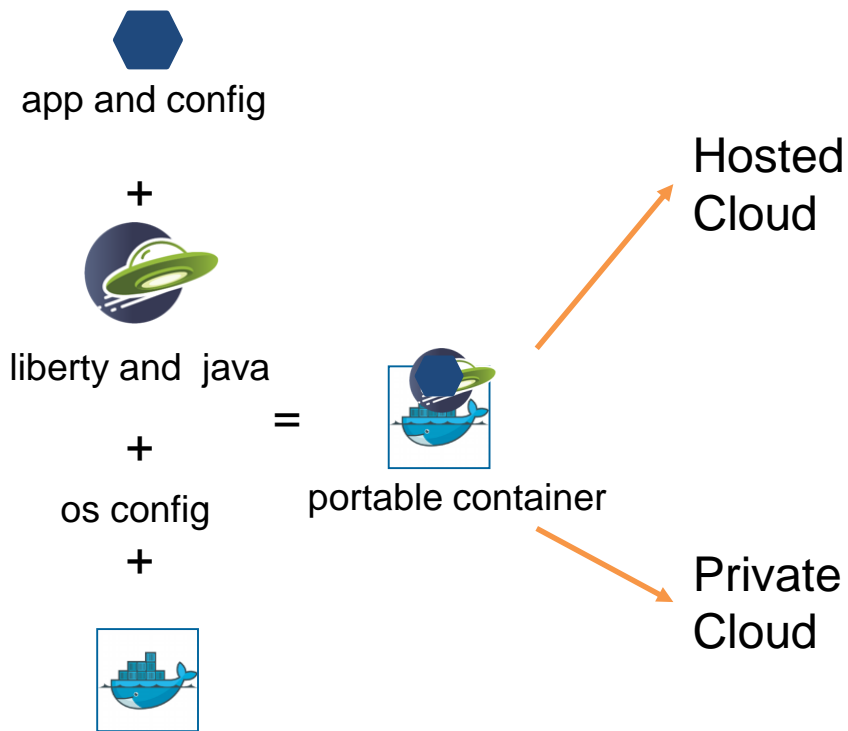
http-2.0

appmgr

Kernel



# Liberty in Containers



IBM Cloud Kubernetes Service  
Azure Kubernetes Service  
Google Kubernetes Engine  
Amazon Elastic Kubernetes Service  
Jelastic

Red Hat Open Shift Container Platform  
Pivotal Kubernetes Service  
Pivotal Cloud Foundry

FROM open-liberty  
ADD myapp.war /config/dropins/myapp.war

# Liberty Zero Migration

Open Liberty



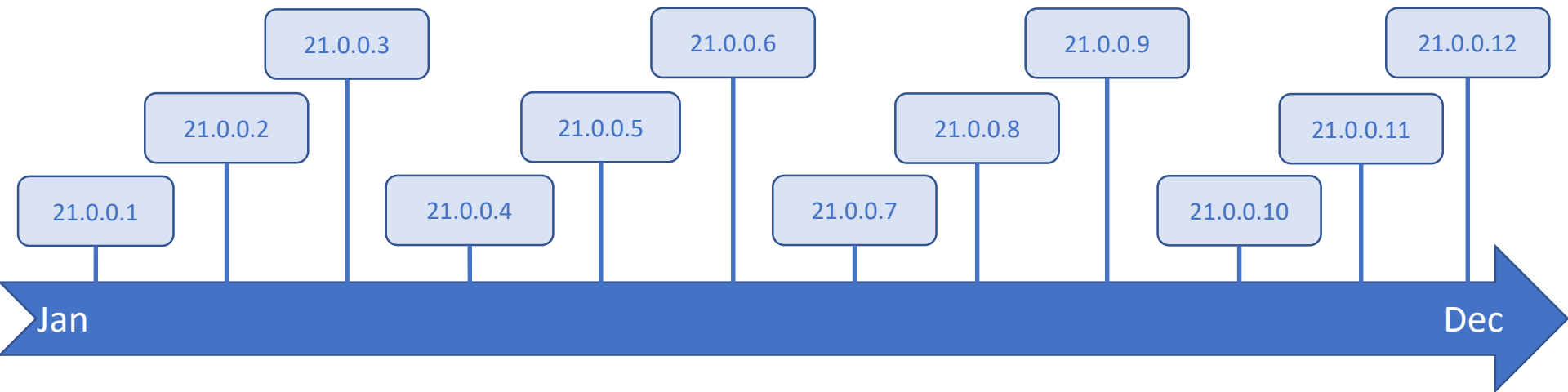
- Zero config migration
  - Write once, run forever
- Zero app migration
  - No behavior changes in existing features
  - New behaviors in new features
- Choose your Java
  - Java 15, 11, 8
  - AdoptOpenJDK
  - IBM
  - OpenJDK
  - Oracle





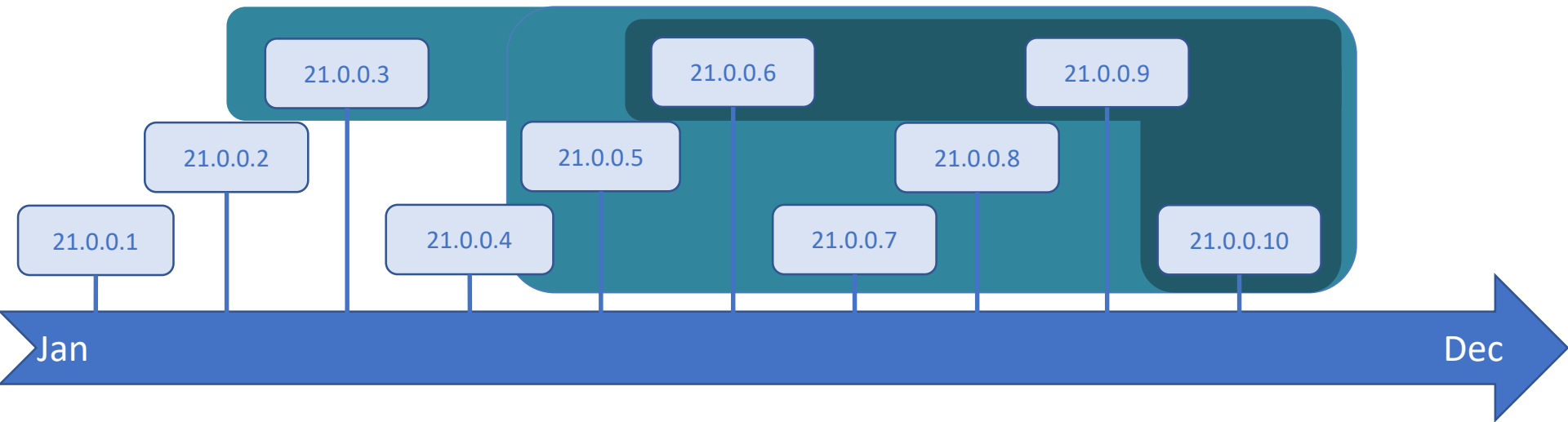
# Liberty Release Cadence

Open Liberty



	All CD releases	CD releases ending .3 .6 .9 .12
Support Provided	5 years	5 years
iFixes	24 weeks	2 years
Proactive Security iFixes	Most recent	Most recent 2

# Liberty Release Cadence Example



	All CD releases	CD releases ending .3 .6 .9 .12
Support Provided	5 years	5 years
iFixes	24 weeks	2 years
Proactive Security iFixes	Most recent	Most recent 2

# How to get Support

Open Liberty



## WebSphere



z/OS  
ND  
Base  
Core



## WebSphere Hybrid Edition

### IBM Integrated Application Runtimes

Java:

- WebSphere
- Liberty
- MicroProfile
- Jakarta EE
- OpenJ9



Cloud Foundry Migration Runtime

Transformation Advisor

Mono2micro



Red Hat OpenShift

# IBM WebSphere Hybrid Edition Summary

## WebSphere Hybrid Edition is the destination for application workloads

- **Modernize:** Enables application and operational modernization
- **At Your Pace:** Run existing and new workloads side-by-side and transition to containers
- **Flexibility:** Simple, ratio-based deployment flexibility
- **Reduce Cost:** lower cloud costs by 75% - low disk & memory footprint, high throughput, without the compromises

## WebSphere Hybrid Edition Bill of Materials

- WebSphere Application Server: WebSphere ND | WebSphere Base | Liberty Core | Open Liberty
- IBM Modernization & Developer Tools: Transformation Advisor | Mono2Micro | WebSphere Migration Toolkit
- IBM Cloud Foundry Migration Runtime

## WebSphere Hybrid Edition Benefits

- Protects and optimizes existing WAS investment
- Complete set of tooling to begin or accelerate the modernization journey
- Cloud native dev, build, test, deploy experience
- Mix and match capabilities to change the solution mix over time with ratio-based deployments

# WSHE – Runtimes & Ratios

*“Right-size” and modernize with flexible runtime options and ratios*

- **EXAMPLE:** 1 VPC of WSHE entitles you to deploy 4 VPCs from:
  - Open Liberty
  - WebSphere Liberty Base
  - traditional WAS Base

Edition (Ratio)	Runtime					
	Liberty Core	Open Liberty	Liberty Base	tWAS Base	Liberty ND	tWAS ND
WAS ND (1:1)					✓	✓
WAS Base (4:1)		✓	✓	✓		
Liberty Core (8:1)	✓					

# IBM Cloud Foundry Migration Runtime

*Progressively transform Cloud Foundry applications to native Kubernetes on OpenShift with flexible common-sense licensing*

## Cost Savings - Licensing

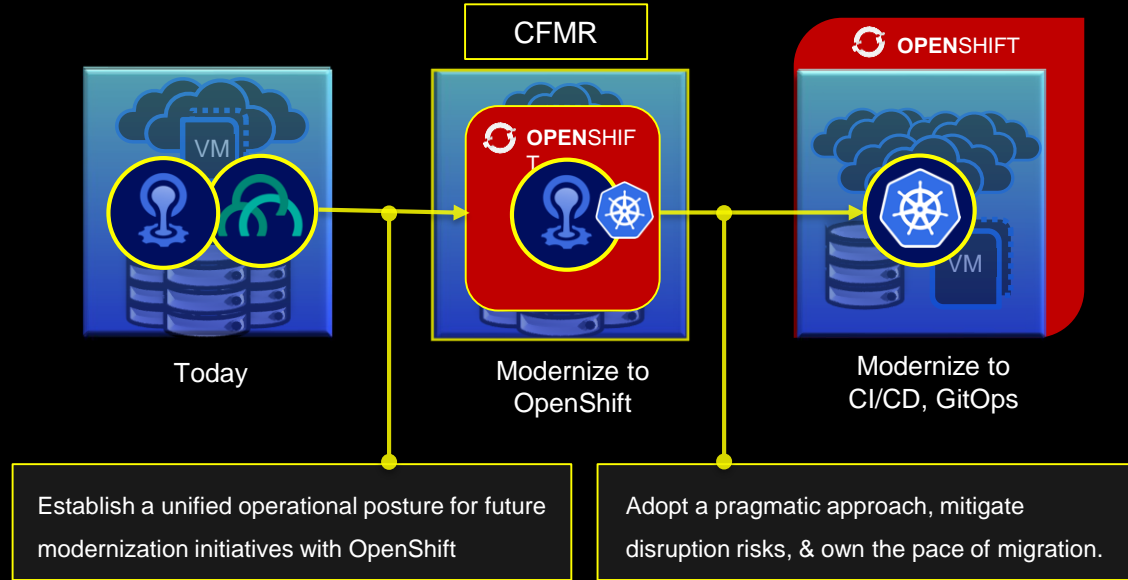
Reduce costs by up to 50% vs App Instance licensing (VMware/PCF)

## Operational Consolidation

Lift & Shift existing Cloud Foundry applications to containers on OpenShift

## Minimize Migration Risks

Accelerate your Kubernetes cloud strategy without critical impact to your dev pipelines & workflows



# Mono2Micro

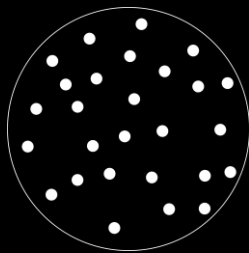
AI based automatic transformation of monoliths into microservices



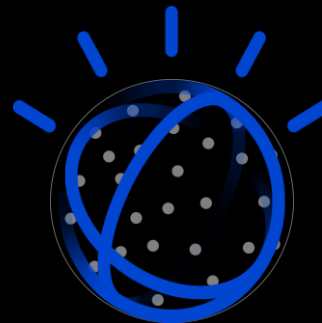
**Unlock:** Modernize and leverage existing investments

Mono2Micro's AI capabilities generate recommendations, semantic analysis and a significant portion of the code needed for refactoring

Monolith



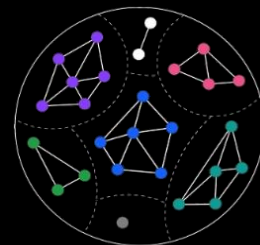
Microservice Generation Engine



AI identifies high cohesive, low coupling components

User can interactively refine recommended Microservices

Microservices



Generated Microservices ready to be deployed

Generates code for communication between microservices

# Recent Updates



# Periodic Table of Liberty (20.0.0.12)



zOS

ND

Base

Core























































Open  
Liberty

New in  
4Q20

New in  
3Q20

New in  
2Q20

New in  
1Q20

batchSMFLogging-1.0		zosLocalAdapters-1.0		zosTransaction-1.0		zosSecurity-1.0		
collectiveController-1.0		zosRequestLogging-1.0		zosWlm-1.0		zosSecurity-1.0		
dynamicRouting-1.0		healthManager-1.0		scalingController-1.0		Security		
clusterMember-1.0		healthAnalyzer-1.0		scalingMember-1.0				
cloudant-1.0	 heritageAPIs-1.0	batchManagement-1.0		Operations		passwordUtilities-1.0		
javaee-7.0	 sipServlet-1.1	 wsAtomicTransaction-1.2				wsSecurity-1.1		
javaee-8.0						wsSecuritySaml-1.0		
jakartaee-8.0								
bells-1.0	 mpContextPropagation-1.0		adminCenter-1.0	acmeCA-1.0		audit-1.0		
concurrent-1.0	 mpGraphQL-1.0		collectiveMember-1.0	constrainedDelegation-1.0		ldapRegistry-3.0		
javaMail-1.6	 mpReactiveMessaging-1.0		distributedMap-1.0		federatedRepository-1.0		oauth-2.0	
jaxb-2.2	 mpReactiveStreams-1.0		eventLogging-1.0		jwt-1.0		openid-2.0	
jdbc-4.3	 opentracing-1.3		logstashCollector-1.0		jwtSso-1.0		openidConnectClient-1.0	
jpaContainer-2.2	 osgiConsole-1.0		monitor-1.0		sessionDatabase-1.0		openidConnectServer-1.0	
jsfContainer-2.3	 springBoot-2.0		openapi-3.1		webCache-1.0		samlWeb-2.0	
json-1.0	 webProfile-7.0		requestTiming-1.0				scim-1.0	
jsonbContainer-1.0	 webProfile-8.0		usageMetering-1.0				socialLogin-1.0	
jsonpContainer-1.1			restConnector-2.0				spnego-1.0	
microProfile-3.3			sessionCache-1.0				transportSecurity-1.0	
APIs								

# Focus areas

Open Liberty



Developer Experience

APIs

Foundation

Orchestration

Security

# Liberty Last Quarter Review

Open Liberty



## Security

- Support for ACME cert management and LetsEncrypt
- Liberty Database login using Kerberos
- Enforce cipher order with TLS

## Dev Exp

- Liberty dev mode for containers
- Liberty Maven Tools 3.3
- Liberty Gradle Tools 3.1
- Open Liberty VS Code Tools includes MicroProfile Tools

## Foundation

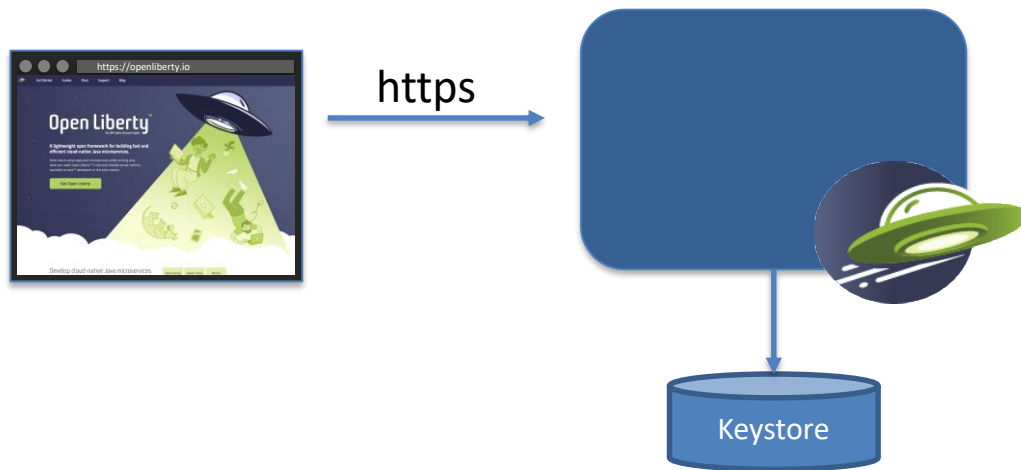
- Support for traditional WebSphere style EJB names

## API

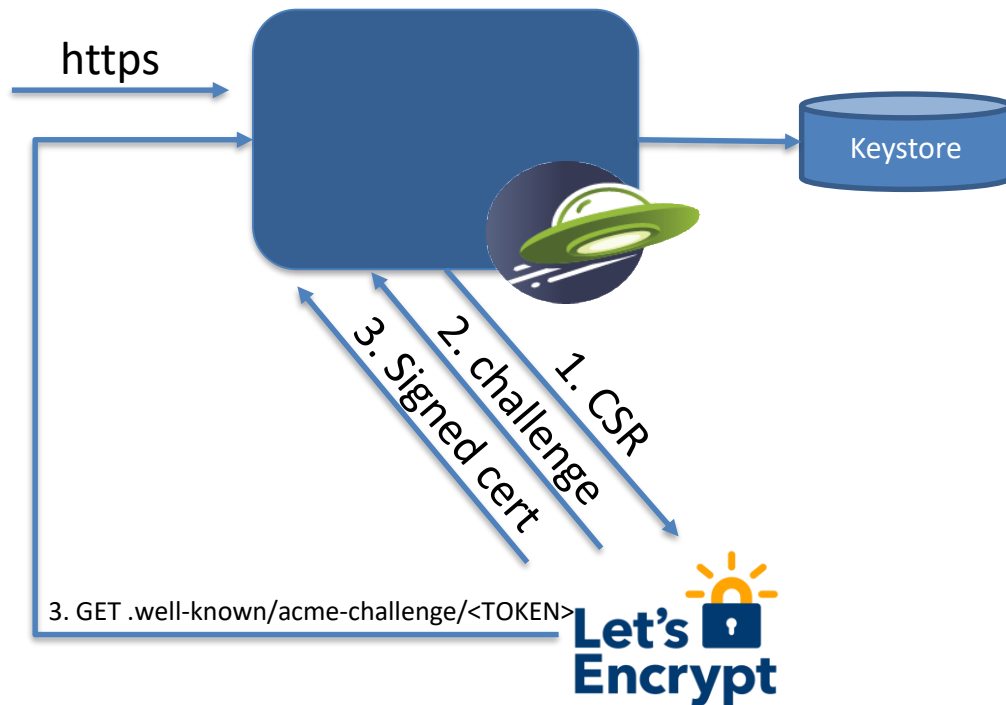
## Orchestration

- Docker images using minimal kernel
- Red Hat DataGrid for HTTP Session replication

# Automatic Certificate Management API



# Automatic Certificate Management API



# AMCE config



## Use with LetsEncrypt

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

<acmeCA directoryURI="https://acme-v02.api.letsencrypt.org/directory"
  renewBeforeExpiration="30d">
  <domain>my_host_name.domain.com</domain>
</acmeCA>
```

## Use with corporate CA

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

<acmeCA directoryURI="https://myca.mycompany.com/directory" >
  <domain>my_host_name.mycompany.com</domain>
</acmeCA>
```

# Custom EJB bindings



- Liberty now supports EJB binding names from traditional WebSphere deployed applications
- EJB 2.x bean binding from ibm-ejb-jar-bnd.xmi

```
<ejbBindings xmi:id="BeanBinding_8" jndiName="ejb/SLCMTTxTimeoutHome">  
  <enterpriseBean xmi:type="ejb:Session"  
    href="META-INF/ejb-jar.xml#SLCMTTxTimeout"/>  
</ejbBindings>
```

- ejb/SLCMTTxTimeoutHome
- java:global/<app>/<module>/<bean>!<interface>

# Custom EJB bindings



- Liberty now supports EJB binding names from traditional WebSphere deployed applications
- EJB 3.x bean binding from ibm-ejb-jar-bnd.xml

```
<session name="NoInterceptorBasicStateless">  
  <interface class="com.ejbs.InventoryService"  
    binding-name="ejb/Inventory"/>  
</session>
```

- EJB bound to:
  - ejb/Inventory
  - java:global/<app>/<module>/NoInterceptorBasicStatelesscom.ejbs.InventoryService



# Custom EJB bindings

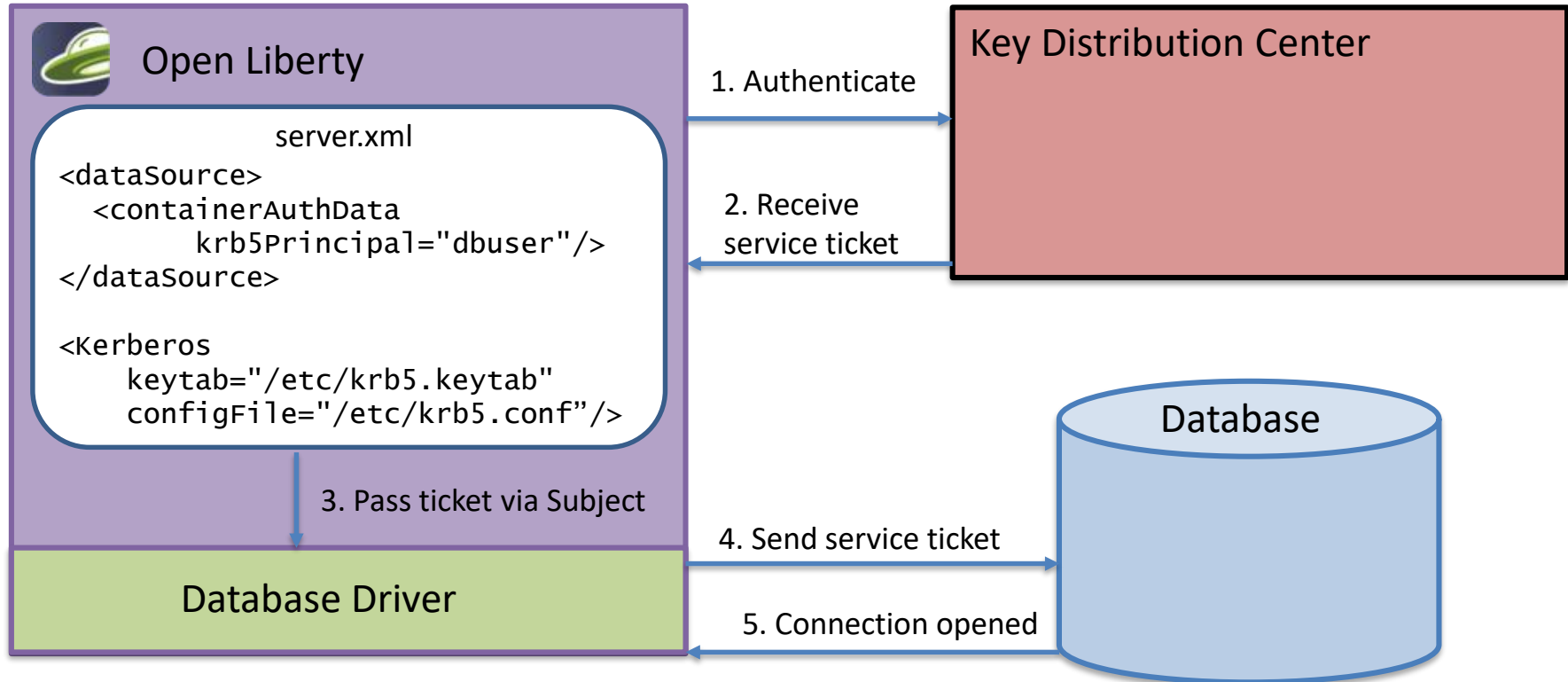


- Liberty now supports EJB binding names from traditional WebSphere deployed applications
- Override in server.xml

```
<ejbApplication location="EJBTest.jar">
  <ejb-jar-bnd>
    <session name="InventoryServiceBean">
      <interface class="com.ejbs.InventoryService"
        binding-name="ejb/Inventory"/>
    </session>
  </ejb-jar-bnd>
</ejbApplication>
```

- EJB bound to:
  - ejb/Inventory
  - java:global/<app>/<module>/NoInterceptorBasicStatelesscom.ejbs.InventoryService

# Kerberos authentication to Database



# Config for Kerberos Authentication



## Keytab Search order

1. server.xml
2. <user.home>/krb5.keytab

## Credential Cache Search order

1. server.xml
2. KRB5CCNAME environment variable
3. /tmp/krb5cc\_<uid>
4. <user.home>/krb5cc\_<user.name>

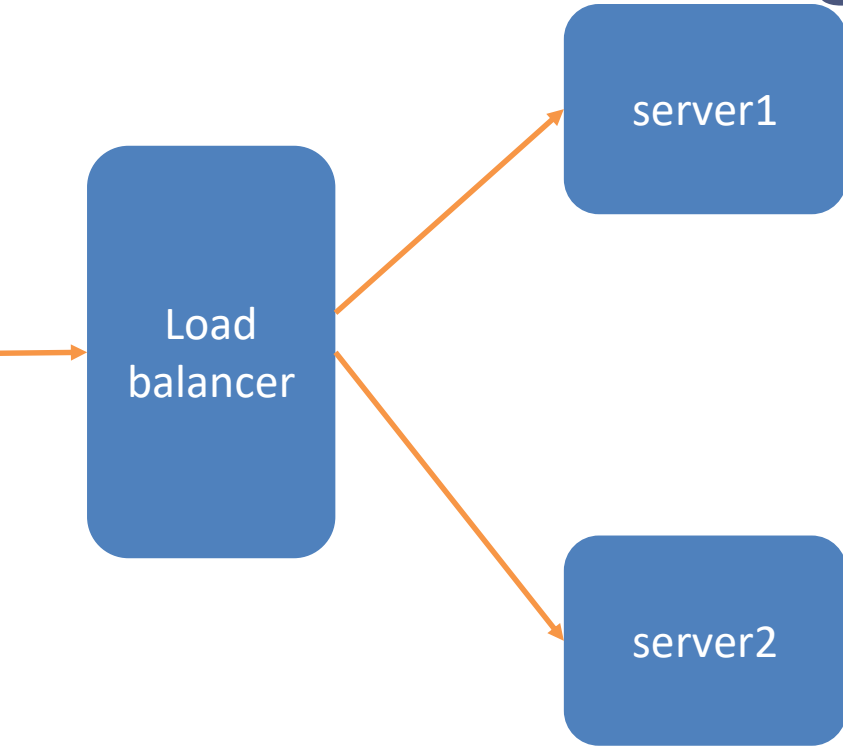
## Server.xml

```
<containerAuthData id="krb"
                    krb5Principal ="dbuser"
                    krb5TicketCache= "/home/user/krb5cc"/>

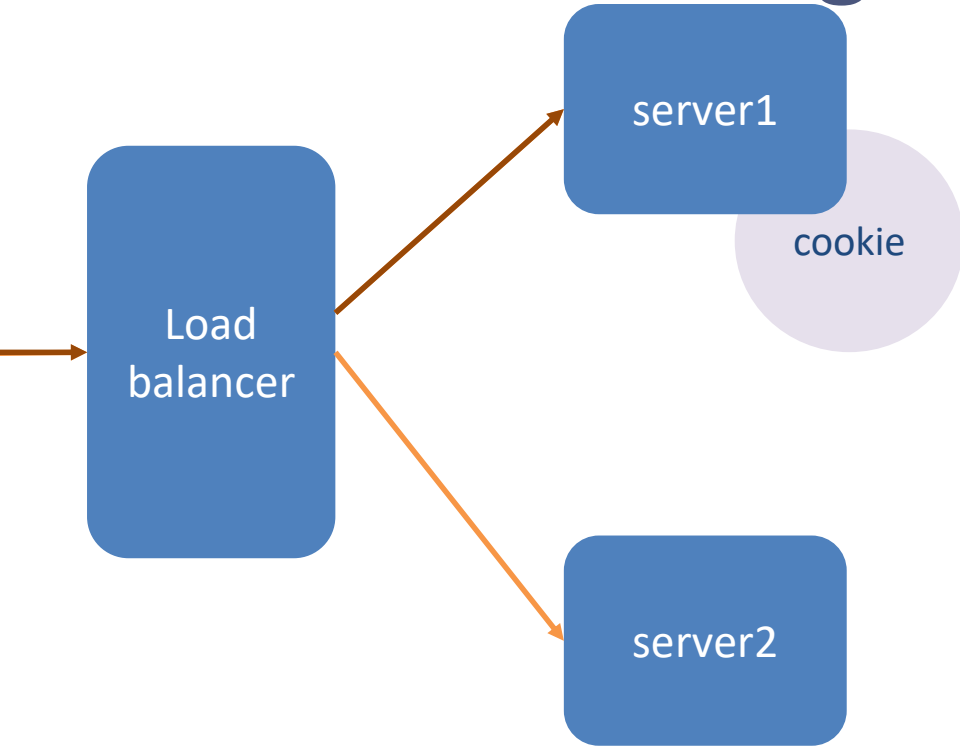
<kerberos keytab ="/etc/krb5.keytab"/>

<dataSource jndiName="db/myDatabase"
            containerAuthDataRef="krb"
</dataSource>
```

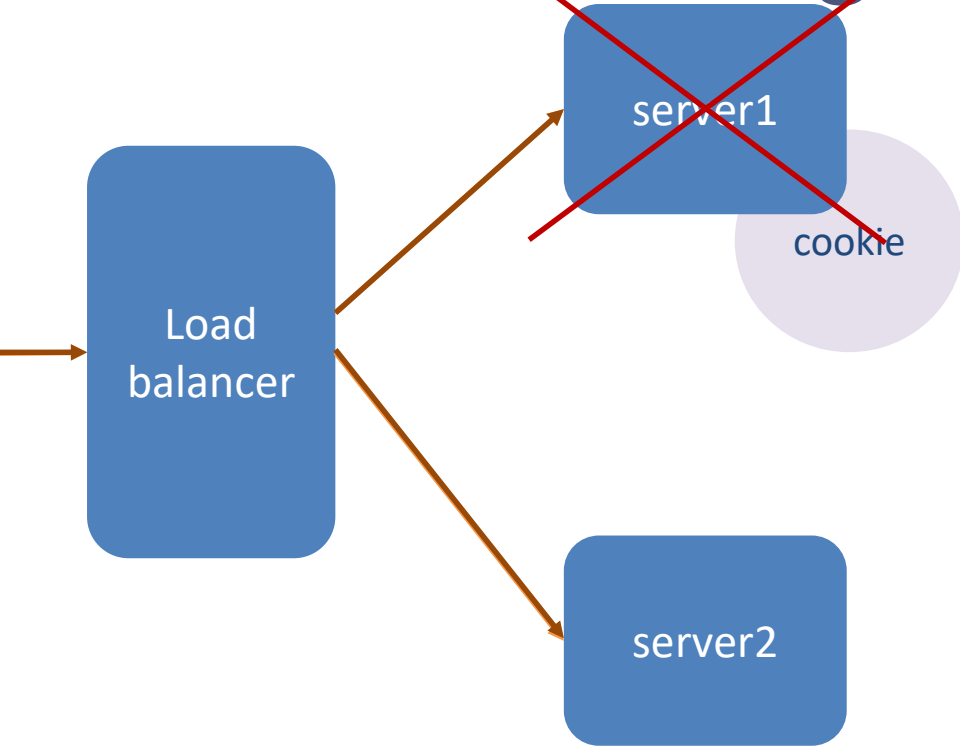
# Session Caching



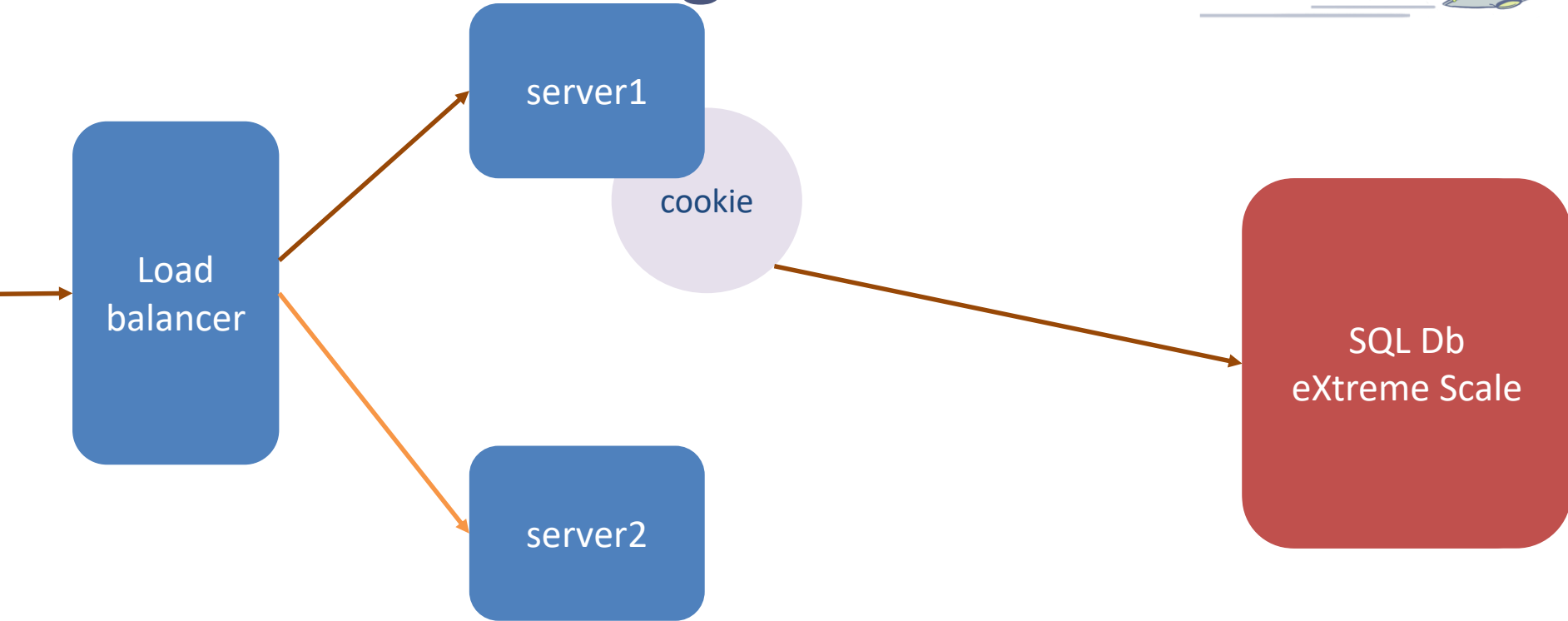
# Session Caching



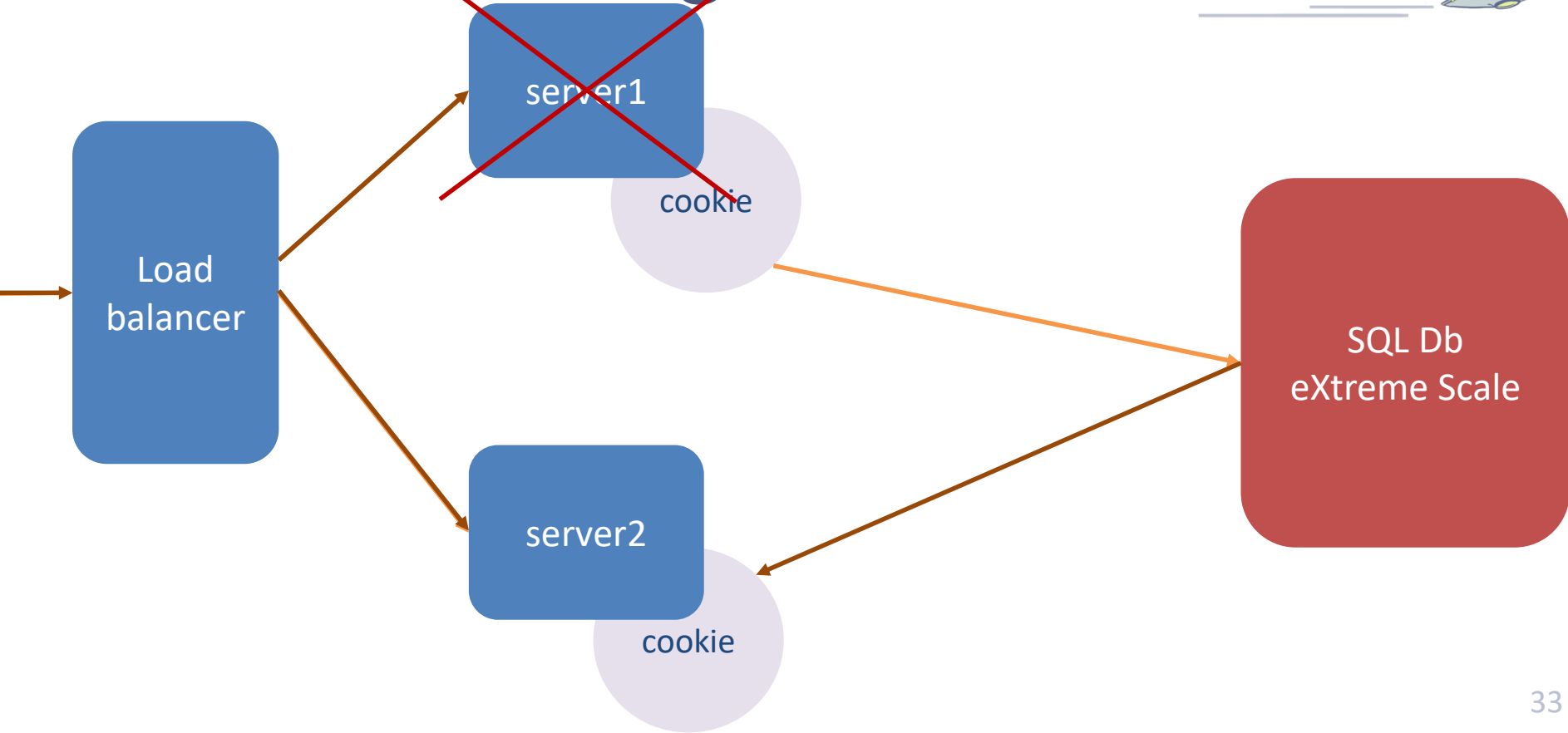
# Session Caching



# Session Caching

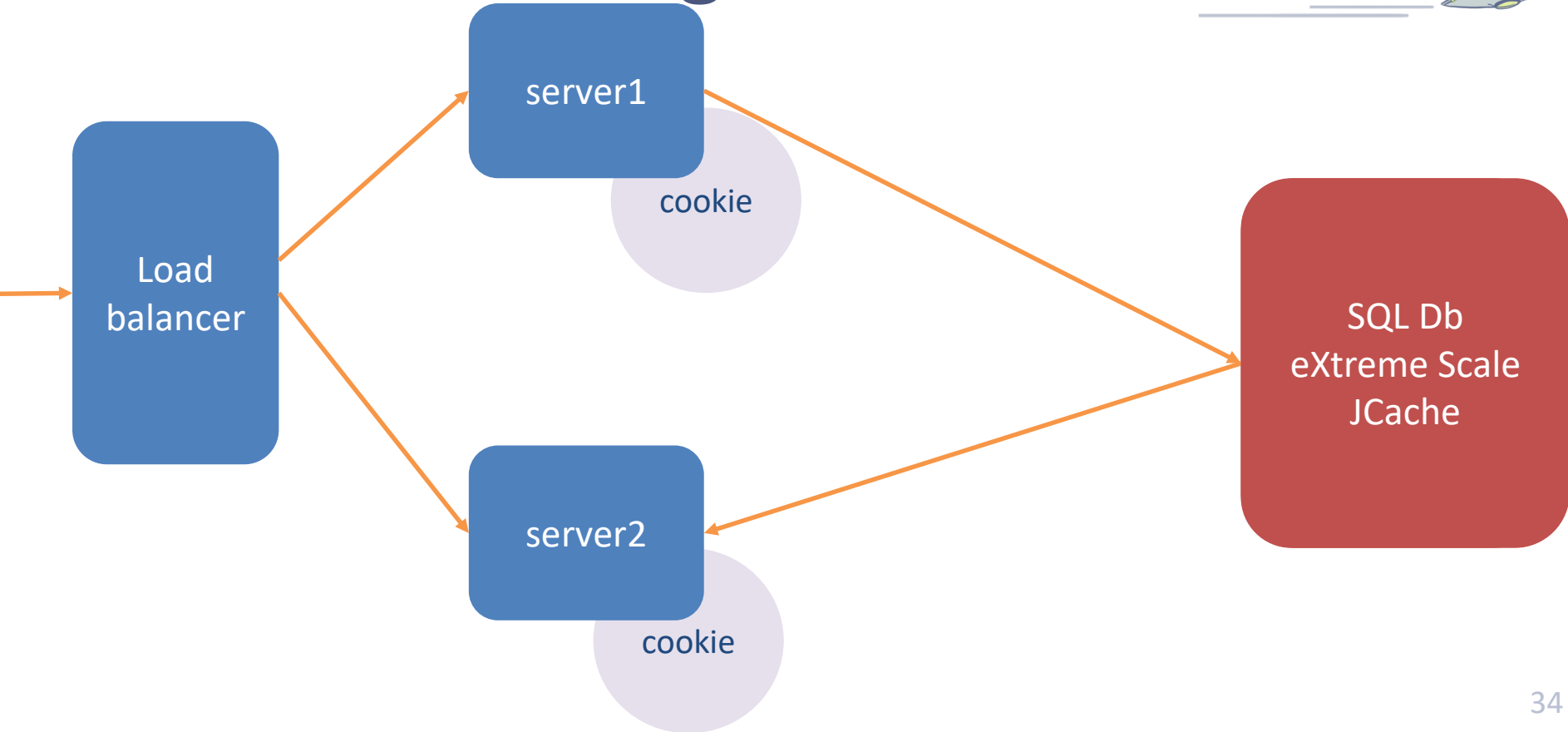


# Session Caching



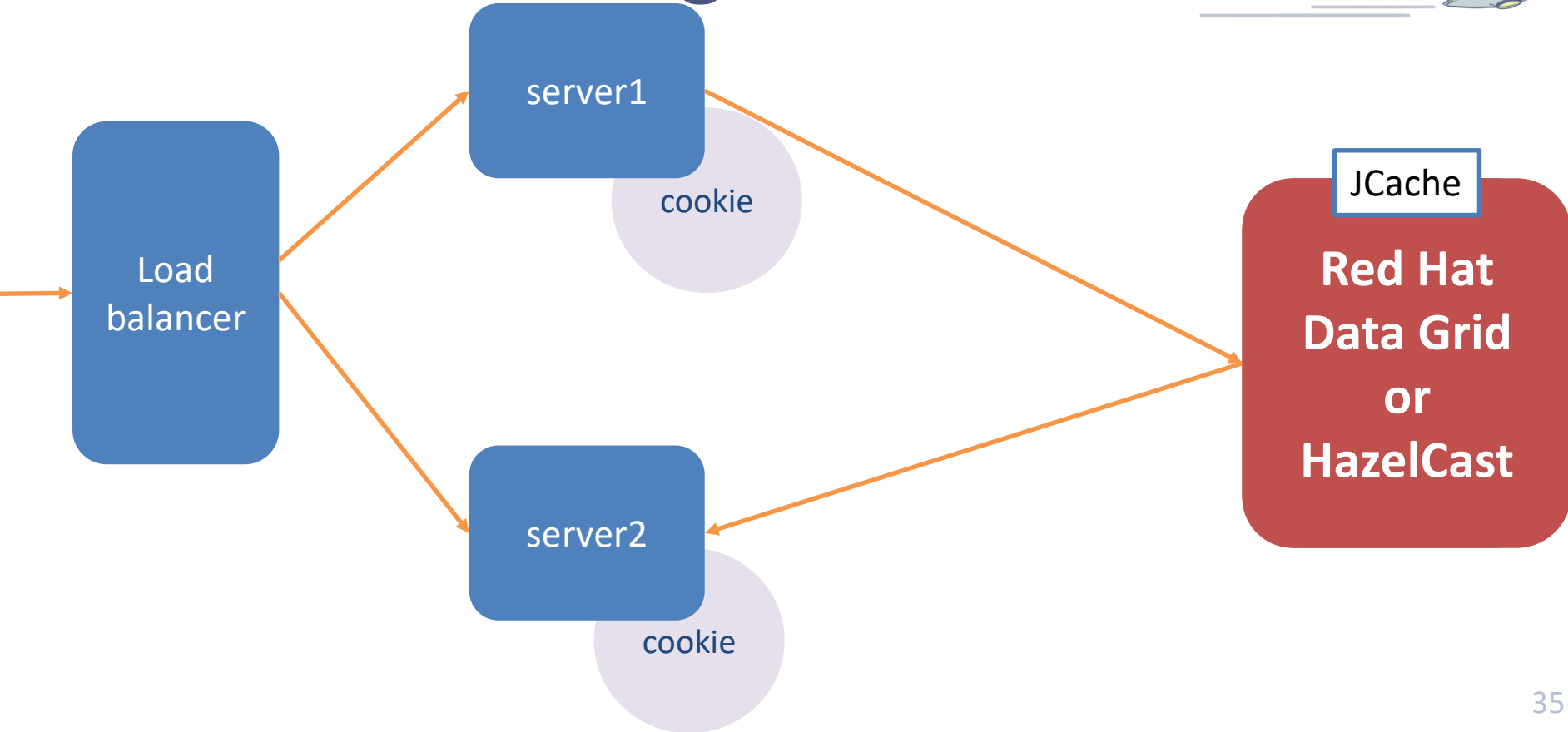


# Session Caching



# Session Caching

Open Liberty



# Configure Red Hat Data Grid



- Configure `httpSessionCache` with the Red Hat DataGrid client jars
- Provide location of the Red Hat instance and authentication creds

```
<httpSessionCache libraryRef="rhdgLib">
  <properties
infinispan.client.hotrod.server_list="hostOne:11322;hostTwo:11322"
    infinispan.client.hotrod.java_serial_whitelist=".*"
    infinispan.client.hotrod.auth_username="cacheUser"
    infinispan.client.hotrod.auth_password="cacheUserPassword"
    infinispan.client.hotrod.auth_realm="default"
    infinispan.client.hotrod.sasl_mechanism="DIGEST-MD5"
    infinispan.client.hotrod.auth_server_name="infinispan"/>
</httpSessionCache>

<library id=" rhdgLib ">
  <file name="${server.config.dir}/lib/rhdg.jar"/>
</library>
```

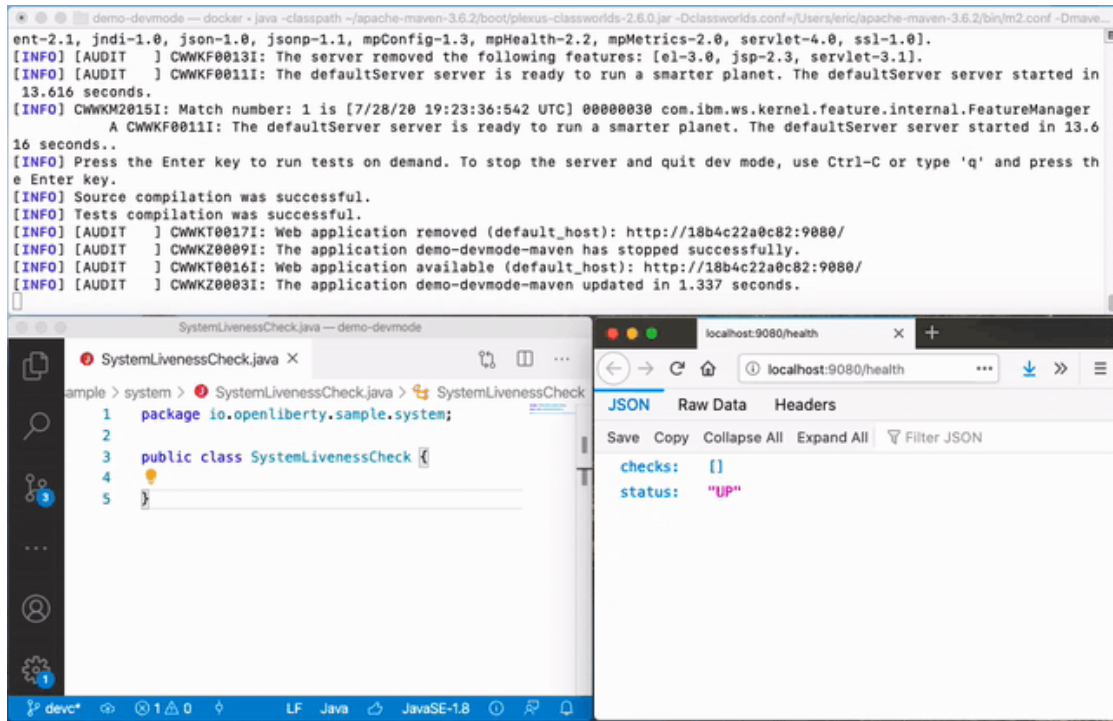
# Dev mode

Open Liberty



- Maven
- Gradle
- Runs Liberty in local JVM
- Change source, automatic recompile and it runs in Liberty

```
mvn liberty:dev
gradle libertyDev
```



# Dev mode for containers

Open Liberty



- Maven
- Gradle
- Runs Liberty in a docker container
- Uses your production container image
- Allows local dev

```
mvn liberty:devc
gradle libertyDevc
```

The screenshot displays the Open Liberty development environment. At the top, a terminal window shows the startup logs for the 'demo-devmode' container, including information about the default server and the application's readiness. Below the terminal, a code editor shows the 'SystemLivenessCheck.java' file, which defines a 'SystemLivenessCheck' class. To the right, a web browser window shows the 'localhost:9080/health' endpoint, displaying a JSON response with 'checks: []' and 'status: "UP"'. The bottom status bar indicates the environment is running on 'devc' with 'LF Java' and 'JavaSE-1.8'.

# Labs, Questions

# WebSphere Liberty Virtual POT

Open Liberty



Download the operating system specific content zip file from either

<https://ibm.box.com/WASLibertyVPoT> (fast - about 10 minute download)

<https://public.dhe.ibm.com/ibmdl/export/pub/software/websphere/wasdev/pot/> (slower but firewall friendly – about 1 hour download)



Liberty Quarterly Update\_20.0.0.4-6.final.pdf



LibertyPoT\_20.0.0.6\_WIN.zip [V2]



LibertyPoT\_20.0.0.6\_MAC.zip [V2]



LibertyPoT\_20.0.0.6\_LINUX.zip [V2]



labs\_n\_presentations\_only.zip [V2]



LibertyResourceList.pdf [V2]

charts only

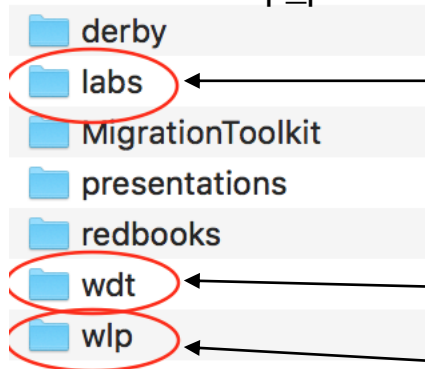
charts & lab instructions  
only

# WebSphere Liberty Virtual POT



Unzip to C:\wlp\_pot

- Note: You can unzip to anywhere you wish but the lab instructions assume the unzip location is C:\wlp\_pot



All labs in here

Eclipse IDE with Liberty tools

Liberty runtime and Java SDK

Follow [labs\gettingStarted\0\\_setup\\_20180105\setup.pdf](#)

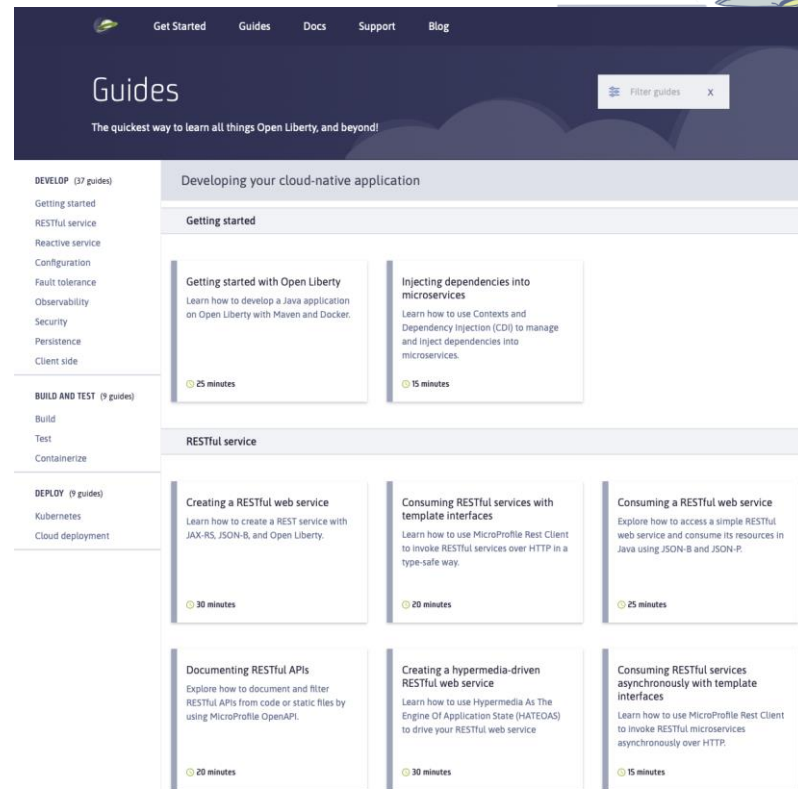
Then choose any labs you want to do



# Open Liberty Guides



- Hands-on learning in ~20 minutes
- 52 guides
  - MicroProfile & Jakarta EE
  - Open Shift, Docker, Kubernetes Istio
- Latest Guides
  - *Authenticating users through social media providers*
  - *Deploying microservices to OpenShift by using Kubernetes Operators*



<https://openliberty.io/guides>

# Resources

Open Liberty



- Open Liberty: <https://www.openliberty.io/>
- Eclipse MicroProfile: <https://microprofile.io/>
- Jakarta EE: <https://jakarta.ee/>
- Liberty advantage: <https://www.ibm.com/downloads/cas/NVY3KY4E>
- Open Liberty Guides: <https://openliberty.io/guides>
- Why Liberty is the best Java runtime for the Cloud <https://developer.ibm.com/wasdev/docs/liberty-profile-best-java-runtime-cloud/>
- WebSphere Application Server V8.5 Administration and Configuration Guide for Liberty Profile (Redbook)  
<http://www.redbooks.ibm.com/abstracts/sg248170.html?Open>
- Liberty videos: [https://www.ibm.com/support/knowledgecenter/SSAW57\\_liberty/com.ibm.websphere.wlp.nd.multiplatform.doc/ae/covr\\_media.html](https://www.ibm.com/support/knowledgecenter/SSAW57_liberty/com.ibm.websphere.wlp.nd.multiplatform.doc/ae/covr_media.html)
- Java support dates <http://www.ibm.com/developerworks/java/jdk/lifecycle>
- Single Stream Continuous Delivery <https://www-01.ibm.com/support/docview.wss?uid=ibm10869798>
- WebSphere Migration Knowledge Collection: Planning and Resources <https://www-01.ibm.com/support/docview.wss?uid=swg27008724>
- IBM Transformation Advisor <http://ibm.biz/cloudta>
- WebSphere Binary Migration Toolkit: <http://ibm.biz/WAMT4AppBinaries>

# Next Quarterly Update



## **Liberty 20.0.0.10-12 Update**

~~Session#1: January 13, 2021 from 1-3pm ET - <http://ibm.biz/Liberty-Jan13>~~

Session#2: January 20, 2021 from 9-11am ET - <http://ibm.biz/Liberty-Jan20>

## **Liberty 21.0.0.1-3 Update**

Session#1: April 14, 2021 from 1-3pm ET - <http://ibm.biz/Liberty-Apr14>

Session#2: April 21, 2021 from 9-11am ET - <http://ibm.biz/Liberty-Apr21>

# WebSphere & Cloud Pak for Apps Customer Advisory Board

All Customers and Business  
Partners welcome

<http://ibm.biz/WebSphereAdvisoryBoard>

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

## OPEN invitation

Join 230+ other  
members

Recordings/charts:

[ibm.biz/WASCABCommunityResources](http://ibm.biz/WASCABCommunityResources)

**NEW**

Monthly  
sessions for  
Business  
Partners and in  
the IST timezone

## Possible engagement levels – no commitment needed:

1. Fly on the wall – NEW\*\*
2. Stay ahead of the curve: more time commitment
3. Close the gap: quarterly involvement
4. At your own pace: impact longer term goals

## What you get out of it:

- ✓ **Direct access** to architects, developers, team leads during sessions
- ✓ **Insight** into roadmaps, pre-announce insider tips (under Feedback agreement)
- ✓ Directly **influence** deliverables
- ✓ **Gain** insights from other customers
- ✓ **Bonus:** special sessions at conferences
- ✓ **Bonus:** Free Cloud assessment

# Questions?

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



# Thank You

Your Feedback is Important