

IBM Cloud Private 3.1.2

**Lab Exercise
Application Modernization
Duration: 45 Min**

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Objective

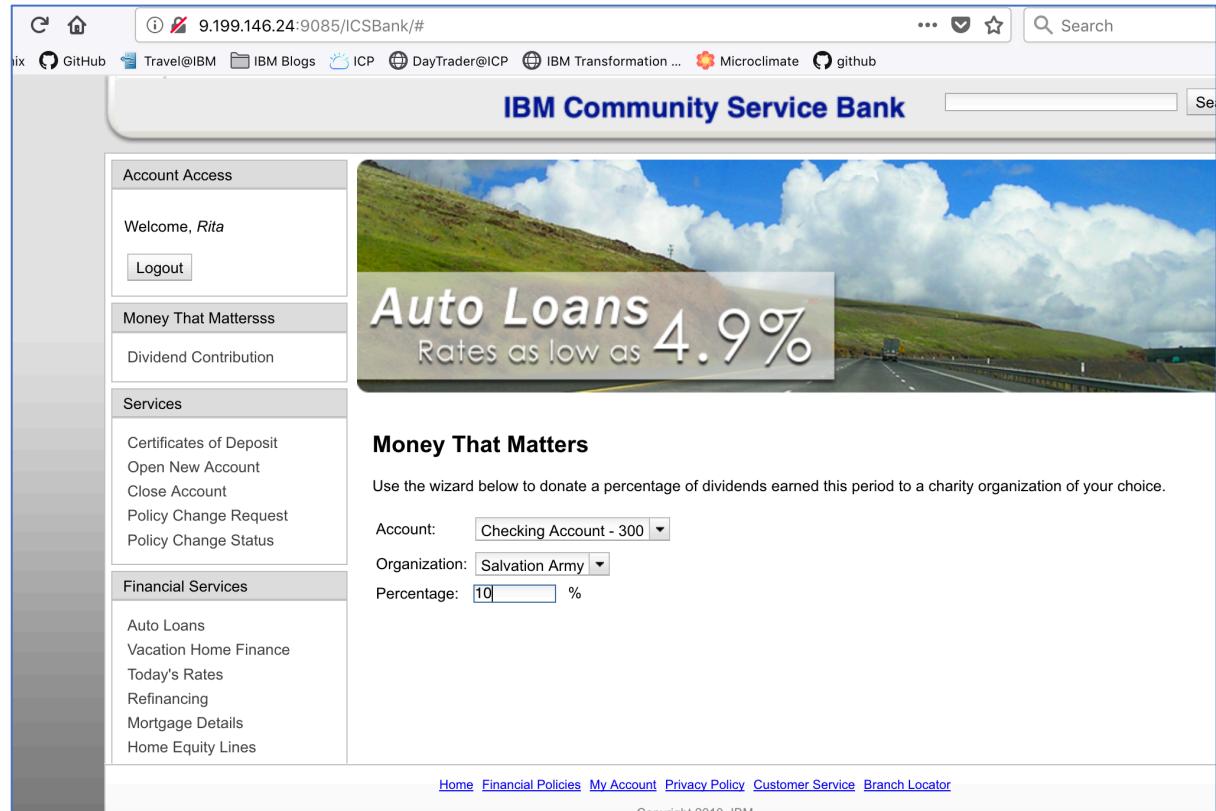
In this lab, we will use Transformation Advisor to evaluate an on-premise traditional WebSphere application and deploy the same on IBM Cloud Private (ICP) environment.

We'll use Transformation Advisor and look at the recommendations, then download the generated migration bundle, which will help us deploy the application on ICP.

Overview of application, which is planned for modernization

Application Scenario

Customer has a Banking application called ICSBank. Along with the regular banking services, this application provides a wizard to donate a percentage of dividends earned this period to a charity organization of choice.



Existing Application and middleware details

Currently customer uses WebSphere Application Server 8.5.5.12 and DB2 V9.5 and both the servers are hosted in an on-prem environment.

WAS Admin Console:

Cell=donor1Cell02, Profile=Dmgr01

Enterprise Applications

Use this page to manage installed applications. A single application can be deployed onto multiple servers.

[+] Preferences

Start Stop Install Uninstall Update Rollout Update Remove File Export Export DDL Export File

Select Name Application Status

You can administer the following resources:

	Name	Status
<input type="checkbox"/>	DefaultApplication	
<input type="checkbox"/>	ICSBank_war	
<input type="checkbox"/>	ModResorts_war	

Total 3

Current environment has total 3 applications, including ICSBank Application.

Lab Preparation:

- Transformation Advisor is installed on the ICP lab environment in default namespace.
- Following files are given to you along with this lab.
 - ICSBank.war (presumed to be deployed on WAS ND Environment at the Bank).
 - Dmgr01.zip, this would be your Transformation Advisor data collected from existing WAS environment.

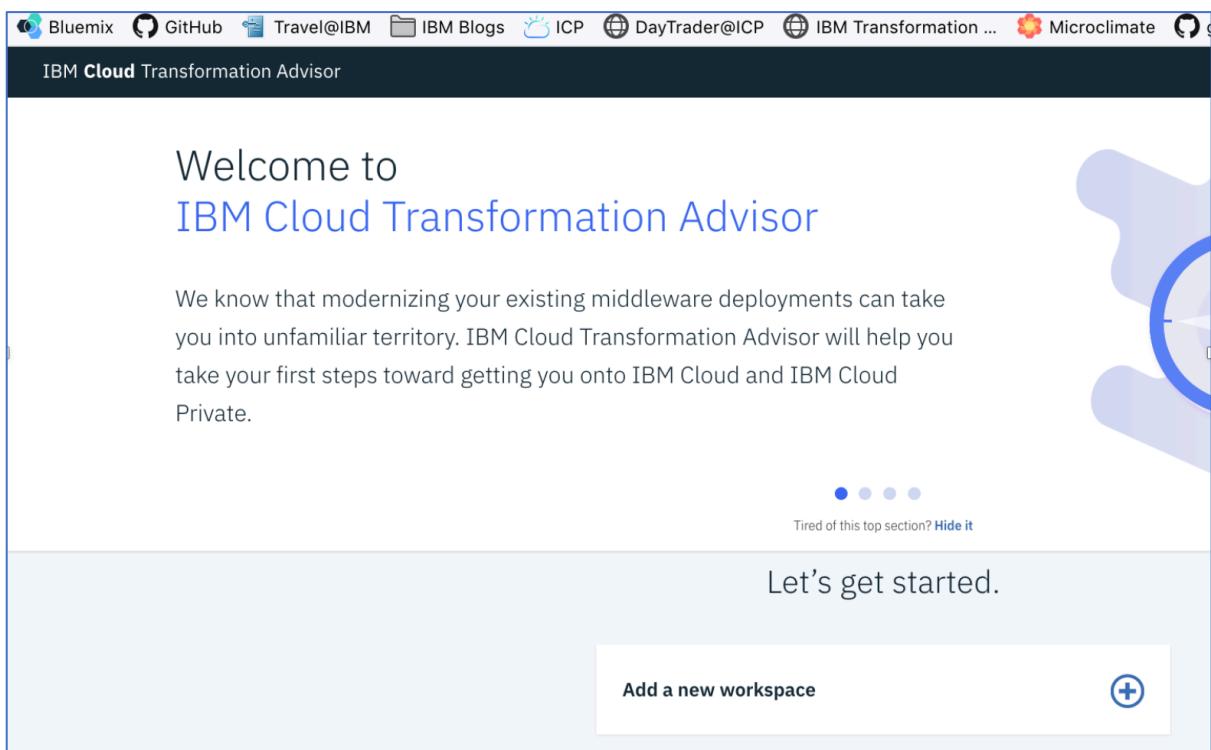
Detailed steps for Application Modernization Lab:

Step 1: Open Transformation Advisor from ICP Console:

Once installed access the URL from your browser as described below, you will see the following screen.

Open transformation advisor URL <https://174.37.17.188/ta-ui/>

- Transformation Advisor screen is presented as shown below:



Step 2: Transformation Advisor: Create workspace for migration activities

You should get started by creating a new workspace that will be used to house your recommendations, this can be any string you want, such as the project name or the name for the portfolio of applications you will be analysing, basically anything that will help you to easily identify your work when you return to it at a later date.

- Create a workspace by clicking on 'Add a new workspace'
- Name the workspace as "<UserID>apps". Eg: user1apps
- Click 'Next'
- Provide a name for the Collection. Eg: "Collection1"

Add a new workspace

1 / 2 Name a new workspace to begin [i](#)

Example: Workspace1

Next

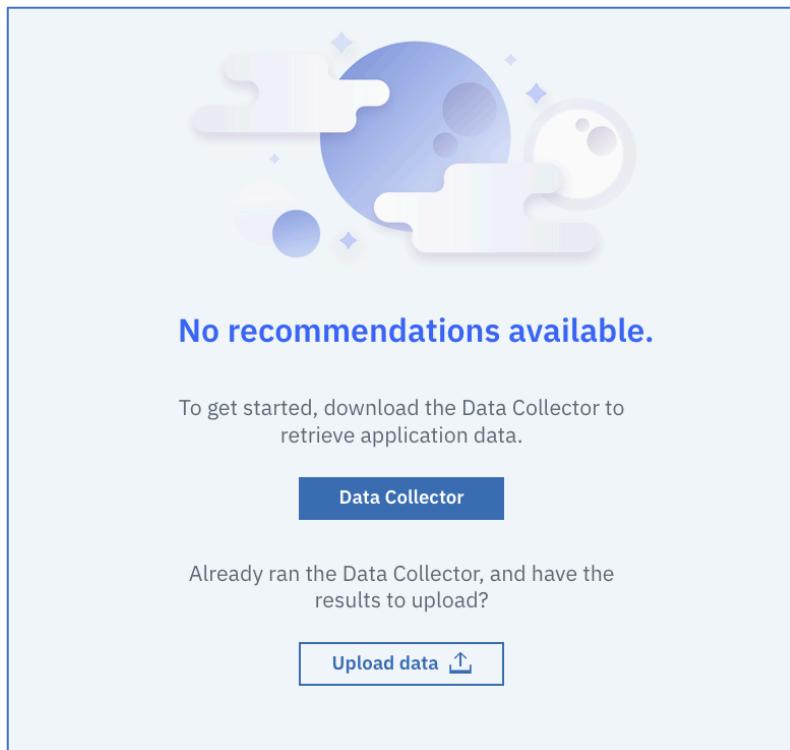
Add a new workspace

2 / 2 Create a collection to assign to your workspace [i](#)

Example: Collection1

Back **Let's go**

- The Data Collector tab should now display the screen shown below. The data collector is a downloadable zip file that needs to be extracted and run on your target server where the applications you wish to migrate are located ie your application server machine. You should choose the correct data collector for your target server's operating system.



- **Please note:** For this lab, WAS environment is not available, hence the downloading and running the data collector can be skipped. (Ideally, customer should download the zip file and copy/ftp to your target WAS server, then follow the directions as described on the page to unzip and run the data collector. But we skip this part for current lab.)
- You can use the file 'Dmgr01.zip' which is collected from one of existing WAS environment for this lab.
- Click on 'Upload data' and use the Dmgr01.zip to upload existing WAS data and click on 'upload'.

Upload data

```
$ ls
AppSrv01 AppSrv01.zip bin
conf environment.json jre lib
```

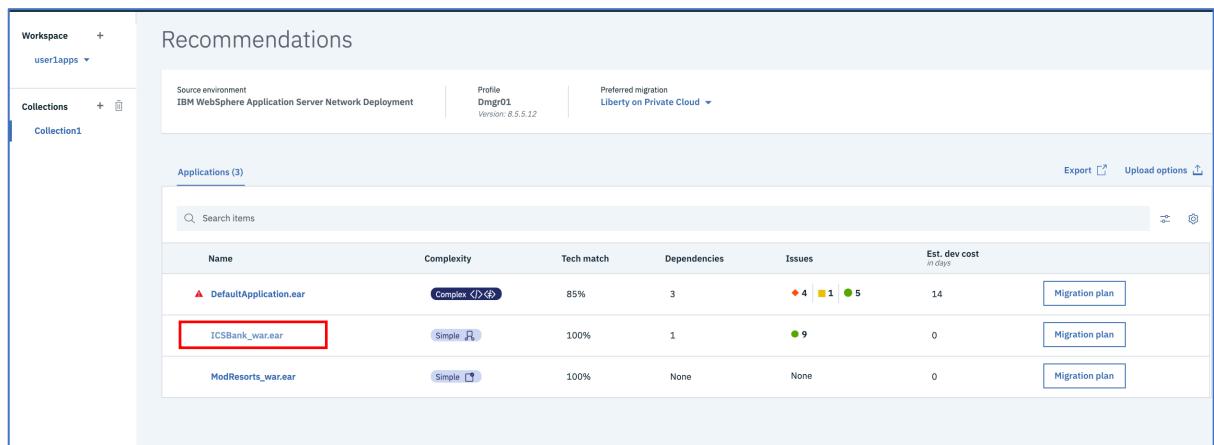
02 Copy the zip file(s) to a location where you can access them with this browser and select them using the Drop or add file button below

Please upload 1 file at a time

Drop or Add File

Upload

- View the recommendations and cost estimates. The Recommendations view after the data collector has completed and uploaded results should display a screen similar to that shown below.



The screenshot shows the 'Recommendations' tab in the IBM Cloud Private interface. On the left, there's a sidebar with 'Workspace' (user1apps), 'Collections' (Collection1), and a search bar. The main area is titled 'Recommendations' and displays the following information:

Name	Complexity	Tech match	Dependencies	Issues	Est. dev cost	Migration plan
DefaultApplication.ear	Complex	85%	3	4 1 5	14	Migration plan
ICSBank_war.ear	Simple	100%	1	9	0	Migration plan
ModResorts_war.ear	Simple	100%	None	None	0	Migration plan

The recommendations tab shows you a table with a summary row for each application found on your application server. Each row contains the following information :

Application Name : The name of the EAR/WAR file found on the application server.

Complexity : This is an indication of how complex Transformation Advisor considers this application to be if you were to migrate it to the cloud.

Technology Match : This is a percentage and if less than 100% it indicates that there may be some technologies that are not suitable for the recommended platform. You should investigate the details and ensure your application is actually using the technologies.

Dependencies : This shows potential external dependencies detected during the scan. Work may be needed to configure access to these external dependencies.

Possible Issues : This indicates the number and severity of potential issues migrating the application.

Dev Cost : This is an estimate in days of the development effort to perform the migration.

Total Cost : This is the total estimate in days of the overhead and development costs in migration up to the point of functional testing.

Migration Plan : This button will take you to the Migration tab for the application.

Step 3: Look at various reports for ICSBank Application

Clicking on any application row will show you the details behind the analysis. You can see a lot more detail. For starters, the complexity rating is explained for you.

- Click on ICSBank_war.ear file and look at the detail report:

The screenshot shows the 'IBM Cloud Transformation Advisor' interface. The main title is 'Complexity'. Below it, under 'Overall Complexity', it says 'Simple'. A note states: 'Every Moderate or Complex rule discovered during analysis is listed here and must be resolved to enable a Simple migration'. Under 'Simple Rules', there is one entry: 'Rule Name: Connect to existing systems', 'Rule Complexity: Simple', and 'Description: This application can be migrated without code changes and the external dependencies can be accurately mapped by the migration tools'. Below this is the 'Application Details' section, which includes the 'Application Name: ICSBank_war.ear' and 'Target Option: Liberty on Private Cloud'. The 'Cost' section shows three rows: 'Development' (0), 'Typical Overhead' (5), and 'Total' (5). The 'Estimated Dev' column is on the far right.

Cost	Explanation	Estimated Dev
Development	The initial development effort estimate is based on how long it takes an experienced application developer to re-write code, for example: one Entity Enterprise Java Bean. Depending on your team's expertise, adjust the scaling factor to better estimate expected effort.	0 ⓘ
Typical Overhead	In migrating, there will be some overhead costs like management, server configuration and unit testing. Adjust the estimate for how much overhead your team will need.	5
Total		5

- Scrolling to the end of the Recommendations screen will show three links to further detailed reports.
 1. *Analysis Report*
 2. *Technology Report*
 3. *Inventory Report*

Technology Report	Inventory Report	Analysis Report
See further details on which IBM platforms support the technologies used by the applications	High-level inventory of the content and structure of each application, plus information about potential deployment problems and performance considerations	Potential issues, their severity and possible solutions

- Review all three reports (Analysis Report will give you detailed analysis of application and technologies it uses)
 - Analysis Report:** The binary scanner's detailed migration report digs deeper to understand the nitty-gritty details of the migration. The detailed report helps with migration issues like deprecated or removed APIs, Java SE version differences, and Java EE behaviour differences.

Detailed Migration Analysis Report

6/18/19 6:28 AM
/opt/IBM/WebSphere/AppServer/profiles/Dmgr01/config/cells/donor1Cell02/applications/ICSBank_war.ear/ICSBank_war.ear

Rules flagged	Total results
9	1,043

Source options
--sourceAppServer=was855 --sourceJava=ibm6 --sourceJavaEE=ee6

Target options
--targetAppServer=liberty --targetJava=ibm8 --targetCloud=dockerIBMCLOUD

Scan options
--excludePackages=com.ibm, com.informix, com.microsoft, com.sybase, com.sun, java, javax, net, oracle, org, sql, _ibmjsp

Rule Severity Summary

SYMBOL	LABEL	RULES FLAGGED	TOTAL RESULTS	DESCRIPTION
🔴	Severe	1	6	Severe rules indicate an API removal or behavior change that can break the application and must be addressed.
⚠️	Warning	5	1032	Warning rules indicate behavior changes that might break the application and should be evaluated.
ℹ️	Information	3	5	Information rules indicate the use of deprecated APIs or minor behavior changes that will not affect most applications.

- Technology Report:** The binary scanner can examine your application and generate the Application Evaluation Report, which shows the editions of WebSphere Application Server that are best suited to run the application. The report provides a list of Java EE programming models that are used by the application, and it indicates on which platforms the application can be supported.

Application Technology Evaluation Report

5/22/19 7:57 AM
/opt/IBM/WebSphere/AppServer/profiles/Dmgr01/config/cells/donor1Cell02/applications/ICSBank_war.ear/ICSBank_war.ear

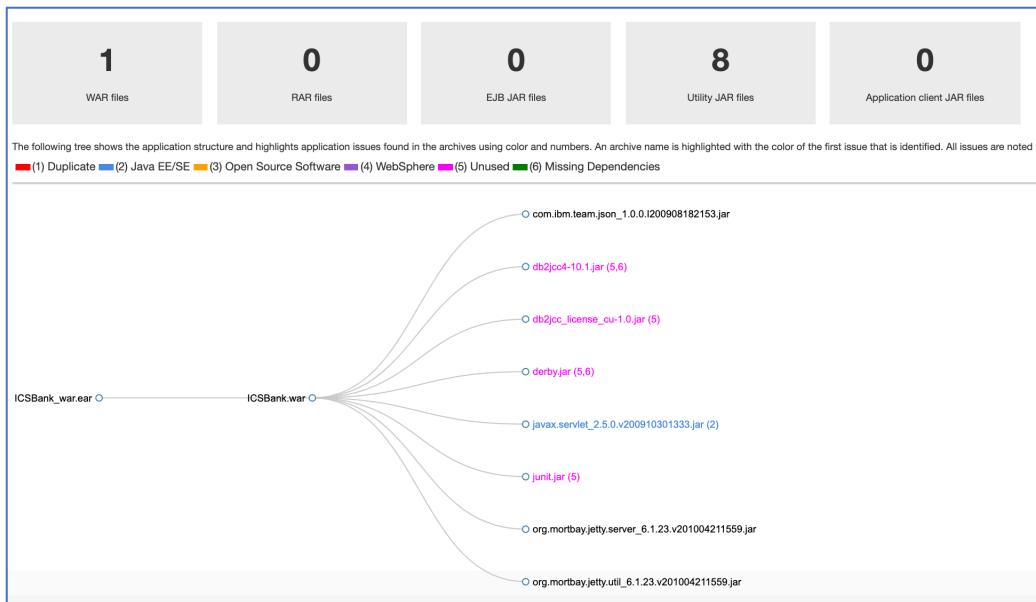
Scan options: --baseEdition --coreEdition --libertyBuildpackEdition --ndEdition --zosEdition --traditional --liberty --excludePackages=com.ibm, com.informix, org, sql, _ibmjsp

WebSphere Application Server V9.0

The highlighted columns indicate which IBM platforms fully support the technologies used by the included application.
Recommendation: Detailed migration analysis should be used to determine if there are migration issues that must be addressed before deploying your application.

	Liberty for Java on IBM Cloud	Liberty Core	Liberty	WebSphere traditional	Network Deployment Liberty
WEB APPLICATION TECHNOLOGIES					
Java Servlet	✓	✓	✓	✓	✓
JAVA EE-RELATED SPECIFICATIONS IN JAVA SE					
Java API for XML Processing (JAXP)	✓	✓	✓	✓	✓
Java Database Connectivity (JDBC)	✓	✓	✓	✓	✓

- Inventory Report:** The binary scanner has an inventory report that helps you examine what's in your application including the number of modules and the technologies in those modules.



- To go back to recommendation screen, click on 'recommendation'.

IBM Cloud Transformation Advisor

← Recommendations

Complexity

Overall Complexity: Simple

Every Moderate or Complex rule discovered during analysis is listed below.

- Similar to ICSBank, click on other applications as well. You can see that 'DefaultApplication.ear' is identified as a complex one. You can look at the Analysis Report of same and understand why is it considered as complex.

Source environment: IBM WebSphere Application Server Network Deployment
Profile: Dmgr01 Version: 8.5.5.12
Preferred migration: Liberty on Private Cloud

Name	Complexity	Tech match	Dependencies	Issues	Est. dev cost in days
DefaultApplication.ear	Complex ⓘ	85%	3	♦ 4 ■ 1 ● 5	14
ICSBank_war.ear	Simple ⓘ	100%	1	● 9	0
ModResorts_war.ear	Simple ⓘ	100%	None	None	0

Step 4: Look at the all the artifacts generated by Transformation Advisor

Once you have decided on an application you would like to migrate, hit the Migrate button and you will land on the Migration Tab.

- Click on 'Migration Plan' button of ICSBank application:

Source environment: IBM WebSphere Application Server Network Deployment
Profile: Dmgr01 Version: 8.5.5.12
Preferred migration: Liberty on Private Cloud

Application	Tech match	Dependencies	Issues	Est. dev cost in days	
DefaultApplication.ear	Complex ⓘ	85%	3	♦ 4 ■ 1 ● 5	<button>Migration plan</button>
ICSBank_war.ear	Simple ⓘ	100%	1	● 9	<button>Migration plan</button>
ModResorts_war.ear	Simple ⓘ	100%	None	None	<button>Migration plan</button>

- TA will automatically generate the artefacts you will need to containerize your application running on liberty and deploy to IBM Cloud Private. You will have the opportunity on this page to upload your application binaries and any external drivers we have detected that you may need. You can then download them all in a single zip and use them for the next steps to migrate.
- A pdf document is included in the zip bundle that will give you detailed instructions on the next steps you need to take. Alternatively as you will see on the right hand side there are instructions also available here.
- Please note that the Application Binaries (.war or .ear files) are not downloaded by data collector, and user need to provide it.

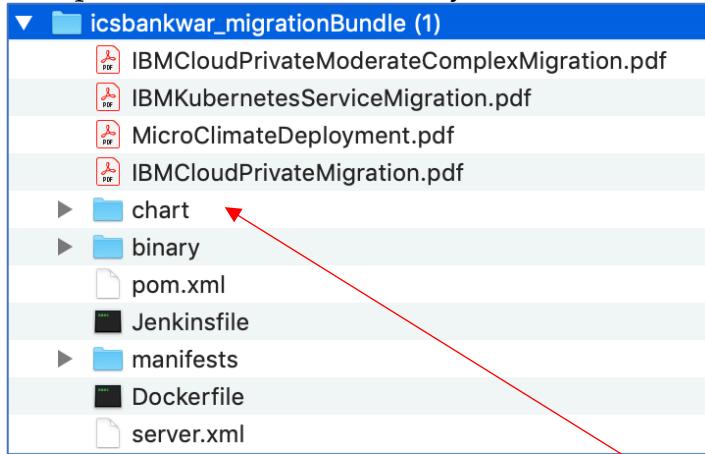
The screenshot shows the 'Migration Bundle' section of the IBM Cloud Private interface. At the top, a message says 'Your migration bundle is almost ready'. Below it, the 'MIGRATION BUNDLE' section contains a note: 'The files included in your migration bundle help your migration to IBM WebSphere Liberty, create an image and help you package your application as a helm chart for easy deployment.' A 'Download bundle' button is present. The 'Migration Files' section lists several files with download links: server.xml, Dockerfile (selected), Helm Charts, deployment.yaml, Jenkinsfile, and pom.xml. The 'Application Dependencies' section shows one entry: APPLICATION Binary, with an 'Add file' link.

- Click on “Add File” link as shown in the above screen and upload the ICSBank.war file provided in the lab material.
- Once upload is complete, you will notice that the ‘Download Bundle’ button is enabled at the top of the screen.

The screenshot shows the same interface after adding the ICSBank.war file. The 'Download bundle' button is now highlighted with a red box. The 'Application Dependencies' section now includes the uploaded 'APPLICATION Binary' file, which is labeled 'icsbank.war' with a delete icon.

- Click on ‘Download Bundle’ and save the zip file to local machine (Jump Server).
- You will find file named ‘icsbankwar_migrationBundle.zip’.

- Unzip it to some new folder (say 'TALab' folder).



- You will find various files, including helm chart, which would be used to deploy application on to ICP.

Check the image location in values.yaml file, inside chart / icsbankwar folder.

(Please note: We are using the pre-built image from docker-hub. Ideally we should run docker build (using dockerfile), docker tag and docker push commands to use our new image. But in the interest of time and resources, we have given common image on docker-hub)

- You will find the image name as :

```
15 ## Common Image Variables
16 #####
17 image:
18   repository: "mycluster.icp:8500/default/icsbankwar"
19   tag: latest
20   pullPolicy: IfNotPresent
```

- Change above line to 'docker.io/cvishal/icsbank'

```
image:
  repository: "docker.io/cvishal/icsbank"
  tag: latest
  pullPolicy: IfNotPresent
  license: ""
```

Step 5: Prepare Helm Chart for application installation.

Setup the command line environment for kubectl :

- Login to ICP Console using user(id)/passw0rd.
- On top right corner -> configure client -> copy the content.
- Paste the content on the command prompt.

The screenshot shows the IBM Cloud Private UI with a modal dialog titled "Configure client". The dialog instructs the user to run commands in the kubectl command line interface for the cluster. It includes prerequisites ("Install the kubectl CLI: kubectl") and configuration commands:

```
kubectl config set-cluster mycluster --server=https://172.17.12.8:8001 --insecure-skip-tls-verify
kubectl config set-context mycluster-context --cluster=mycluster
kubectl config set-credentials admin --token=20XAjO3KV1QLCJhbGcOD3Su21Nq3ey3hdF9oy
kubectl config set-context mycluster-context --user=admin --namespace=cert-manager
kubectl config use-context mycluster-context
```

Make sure that `--namespace` is selected to user3. (you can repeat the last pasted line with your own namespace)

```
kubectl config set-context optumera-context --user=<user(id)> --namespace=<user(id)>
```

Setup the command line environment for helm commands :

- Run 'cloudctl login -a <https://174.37.17.188:8443/> -u <user(id)>'
- Login with <user(id)>/passw0rd
- Look at the last line which shows helm home directory.
- Set `HELM_HOME=C:\Users\Administrator\.helm`

Step 6: Deploy Application Helm Chart with Unique Name

- `cd TALab/chart`
- `helm install icsbankwar --name icsbank(uniqueuserid) -tls`

```
[root@icp012019-icp012019-1 chart]# helm install icsbankwar --tls
NAME: honest-labradoodle
LAST DEPLOYED: Tue May 14 15:25:21 2019
NAMESPACE: default
STATUS: DEPLOYED

RESOURCES:
==> v1/Service
NAME                           TYPE      CLUSTER-IP     EXTERNAL-IP   PORT(S)          AGE
honest-labradoodle-icsbankwar-service  NodePort  10.0.176.177  <none>        9080:32575/TCP,9443:31405/TCP  1s

==> v1beta1/Deployment
NAME                           DESIRED  CURRENT  UP-TO-DATE  AVAILABLE  AGE
honest-labradoodle-icsbankwar-deployment  1        0        0           0          1s

==> v1/Pod(related)
NAME                           READY  STATUS    RESTARTS  AGE
honest-labradoodle-icsbankwar-deployment-5c5b7dbdd6-s5995  0/1    Pending   0          1s
```

- Wait for few min (check application status by 'kubectl get pods -n <user(id)>'). Example: user3, which is name of namespace.
- Make sure you see pod status as running and Ready 1/1
- Open the Firefox browser in **Private/Incognito mode**.
- Access the application : <https://174.37.17.188:port/ICSBank>

Getting hostname and portnumber

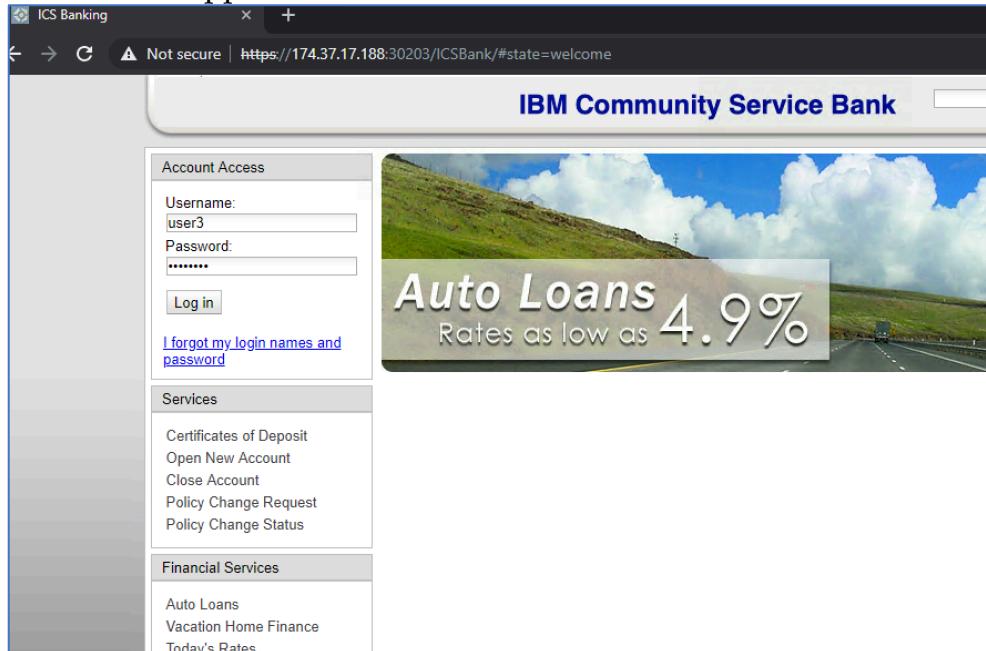
- Host = Proxy Host IP (174.37.17.188)

- Port = (`kubectl get svc -n <user(id)>`) and look at the https node port.

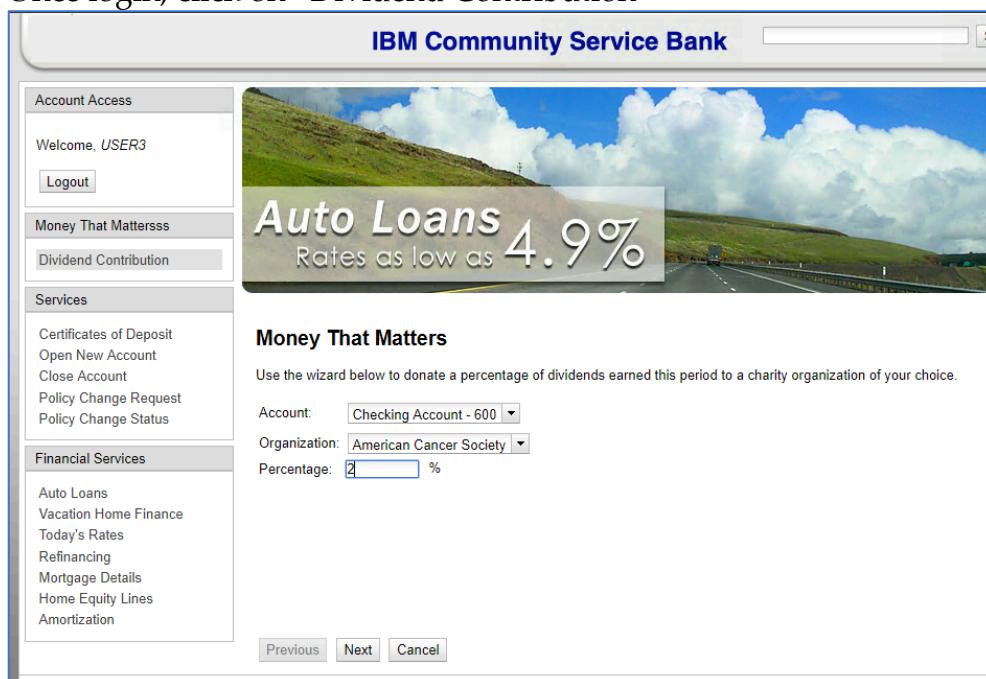
NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
icsbank3-icsbankwar	NodePort	20.0.108.57	<none>	9443:30203/TCP	2m53s
podinfo	NodePort	20.0.188.63	<none>	80:30709/TCP	166m
user3sumapp1	NodePort	20.0.47.107	<none>	80:32131/TCP	27h
user4sumapp1	NodePort	20.0.58.2	<none>	80:31538/TCP	26h

Access the application using <https://174.37.17.188:30203/ICSBank>
Use Port from your own environment.

You will see application:



Once login, click on “Dividend Contribution”



This is application, which is migrated to ICP and running inside Liberty Container/

- You can login with <user(id)> e.g. user1 and password as Passw0rd.

Summary

In this lab, we have successfully migrated WAS Application, running on WAS ND environment to Liberty Container on ICP. This application is running on container platform and this is the first step towards application modernization.