Chapter 2 Lab Work: Architectures

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Contents

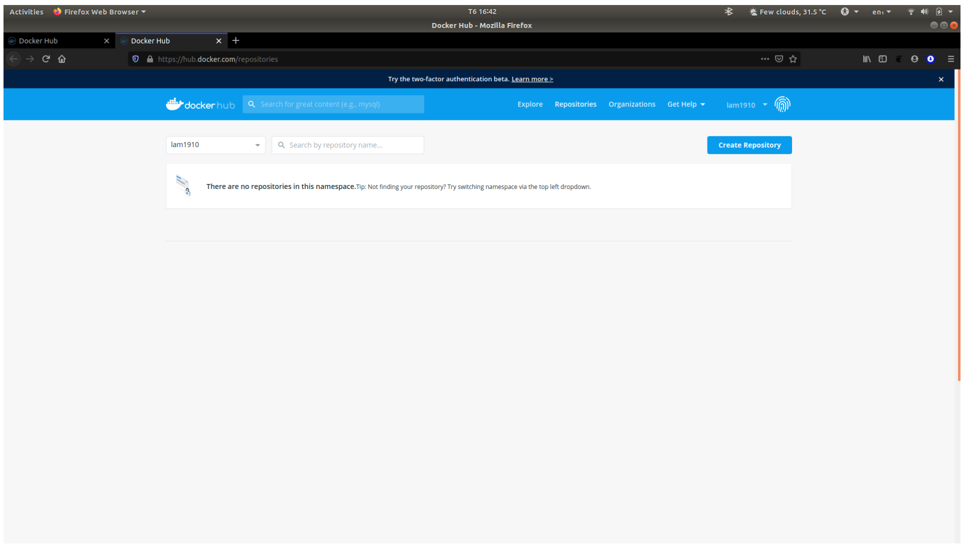
1 Commands Used

- snap install kubectl –classic
- kubectl version
- git clone https://github.com/anhth318/microservices-demo.git
- cd path/to/the/cloned/repository/microservice-demo
- ./mvnw clean package -Dmaven.test.skip=true
- docker login
- docker build –tag=microservice-kubernetes-demo-apache apache
- docker tag microservice-kubernetes-demo-apache *lam1910*/microservice-kubernetes-demo-apache:latest
- docker push *lam1910*/microservice-kubernetes-demo-apache
- docker build –tag=microservice-kubernetes-demo-catalog microservice-kubernetes-demo-catalog
- docker tag microservice-kubernetes-demo-catalog *lam1910*/microservice-kubernetes-demo-catalog
- docker push *lam1910*/microservice-kubernetes-demo-catalog
- docker build –tag=microservice-kubernetes-demo-customer microservice-kubernetes-demo-customer
- docker tag microservice-kubernetes-demo-customer *lam1910*/microservice-kubernetes-demo-customer
- docker push *lam1910*/microservice-kubernetes-demo-customer
- docker build –tag=microservice-kubernetes-demo-order microservice-kubernetes-demo-order
- docker tag microservice-kubernetes-demo-order *lam1910*/microservice-kubernetes-demo-order:lastest
- docker push *lam1910*/microservice-kubernetes-demo-order

2 Changes in Dockerhub Website

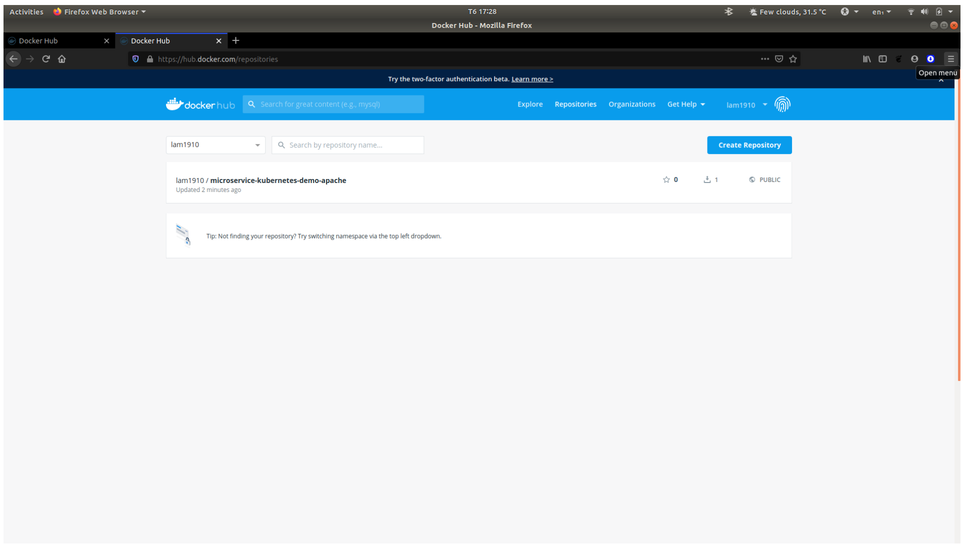
As you can see from 1, after you run all the the commands from 1, you will have 4 repositories in your account's repositories[1].

[1]You can find out more at My Docker


Activities
Firefox Web Browser
T6 16:42
Few clouds, 31.5 °C
Docker Hub - Mozilla Firefox
Docker Hub
Docker Hub
https://hub.docker.com/repositories
Try the two-factor authentication beta. Learn more >
docker hub
Search for great content (e.g., mysql)
Explore
Repositories
Organizations
Get Help
lam1910
lam1910
Search by repository name...
Create Repository

There are no repositories in this namespace. Tip: Not finding your repository? Try switching namespace via the top left dropdown.

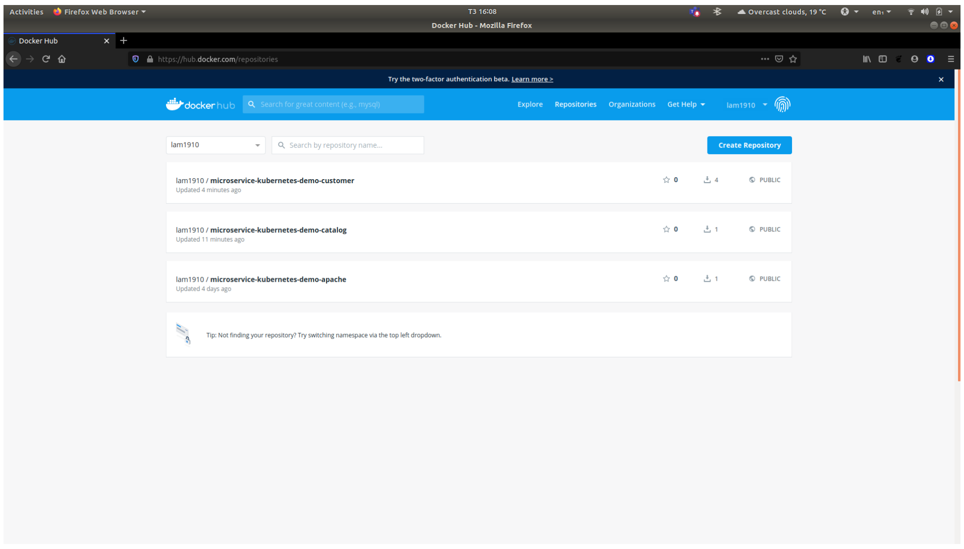
(a) Before pushing anything


Activities
Firefox Web Browser
T6 17:28
Few clouds, 31.5 °C
Docker Hub - Mozilla Firefox
Docker Hub
Docker Hub
https://hub.docker.com/repositories
Open menu
Try the two-factor authentication beta. Learn more >
docker hub
Search for great content (e.g., mysql)
Explore
Repositories
Organizations
Get Help
lam1910
lam1910
Search by repository name...
Create Repository

lam1910 / **microservice-kubernetes-demo-apache** 0 1 PUBLIC
Updated 2 minutes ago

Tip: Not finding your repository? Try switching namespace via the top left dropdown.

(b) After pushing one service


Activities
Firefox Web Browser
T3 16:08
Overcast clouds, 19 °C
Docker Hub - Mozilla Firefox
Docker Hub
https://hub.docker.com/repositories
Try the two-factor authentication beta. Learn more >
docker hub
Search for great content (e.g., mysql)
Explore
Repositories
Organizations
Get Help
lam1910
lam1910
Search by repository name...
Create Repository

lam1910 / **microservice-kubernetes-demo-customer** 0 4 PUBLIC
Updated 4 minutes ago

lam1910 / **microservice-kubernetes-demo-catalog** 0 1 PUBLIC
Updated 11 minutes ago

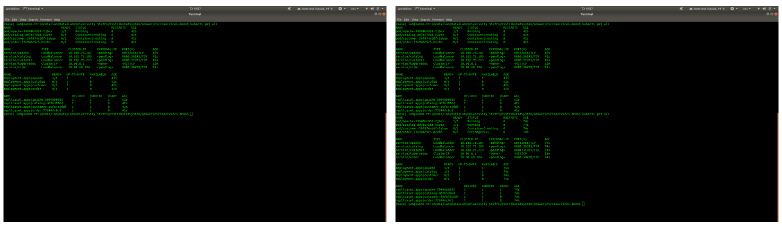
lam1910 / **microservice-kubernetes-demo-apache** 0 1 PUBLIC
Updated 4 days ago

Tip: Not finding your repository? Try switching namespace via the top left dropdown.

(c) After pushing all services

Figure 1: Result from web browser

3 Status of Pods



```
(base) lam@lamnn-tt:/media/lam/Data/Lam/Universsity Stuffs/DistributedSystem/Answer/microservices-demo$ kubectl get all
NAME                           READY   STATUS              RESTARTS   AGE
pod/apache-59948b6955-2jbnx     1/1     Running             0          42s
pod/catalog-dd7b5786d-vxvtz     0/1     ContainerCreating   0          42s
pod/customer-59f874cddf-2sbgm   0/1     ContainerCreating   0          42s
pod/order-776946c9c5-bzvfn      0/1     ContainerCreating   0          42s

NAME                 TYPE           CLUSTER-IP       EXTERNAL-IP   PORT(S)          AGE
service/apache       LoadBalancer   10.108.78.207    <pending>     80:32666/TCP     42s
service/catalog      LoadBalancer   10.102.71.193    <pending>     8080:30592/TCP   42s
service/customer     LoadBalancer   10.106.93.213    <pending>     8080:31781/TCP   42s
service/kubernetes   ClusterIP      10.96.0.1        <none>        443/TCP          32m
service/order        LoadBalancer   10.98.60.104     <pending>     8080:30478/TCP   42s

NAME                       READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/apache     1/1     1            1           43s
deployment.apps/catalog    0/1     1            0           42s
deployment.apps/customer   0/1     1            0           42s
deployment.apps/order      0/1     1            0           42s

NAME                                  DESIRED   CURRENT   READY   AGE
replicaset.apps/apache-59948b6955     1         1         1       42s
replicaset.apps/catalog-dd7b5786d     1         1         0       42s
replicaset.apps/customer-59f874cddf   1         1         0       42s
replicaset.apps/order-776946c9c5      1         1         0       42s
(base) lam@lamnn-tt:/media/lam/Data/Lam/Universsity Stuffs/DistributedSystem/Answer/microservices-demo$
```

```
(base) lam@lamnn-tt:/media/lam/Data/Lam/Universsity Stuffs/DistributedSystem/Answer/microservices-demo$ kubectl get all
NAME                           READY   STATUS              RESTARTS   AGE
pod/apache-59948b6955-2jbnx     1/1     Running             0          42s
pod/catalog-dd7b5786d-vxvtz     0/1     ContainerCreating   0          42s
pod/customer-59f874cddf-2sbgm   0/1     ContainerCreating   0          42s
pod/order-776946c9c5-bzvfn      0/1     ContainerCreating   0          42s

NAME                 TYPE           CLUSTER-IP       EXTERNAL-IP   PORT(S)          AGE
service/apache       LoadBalancer   10.108.78.207    <pending>     80:32666/TCP     42s
service/catalog      LoadBalancer   10.102.71.193    <pending>     8080:30592/TCP   42s
service/customer     LoadBalancer   10.106.93.213    <pending>     8080:31781/TCP   42s
service/kubernetes   ClusterIP      10.96.0.1        <none>        443/TCP          32m
service/order        LoadBalancer   10.98.60.104     <pending>     8080:30478/TCP   42s

NAME                       READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/apache     1/1     1            1           43s
deployment.apps/catalog    0/1     1            0           42s
deployment.apps/customer   0/1     1            0           42s
deployment.apps/order      0/1     1            0           42s

NAME                                  DESIRED   CURRENT   READY   AGE
replicaset.apps/apache-59948b6955     1         1         1       42s
replicaset.apps/catalog-dd7b5786d     1         1         0       42s
replicaset.apps/customer-59f874cddf   1         1         0       42s
replicaset.apps/order-776946c9c5      1         1         0       42s
(base) lam@lamnn-tt:/media/lam/Data/Lam/Universsity Stuffs/DistributedSystem/Answer/microservices-demo$ kubectl get all
NAME                           READY   STATUS              RESTARTS   AGE
pod/apache-59948b6955-2jbnx     1/1     Running             0          74s
pod/catalog-dd7b5786d-vxvtz     1/1     Running             0          74s
pod/customer-59f874cddf-2sbgm   0/1     ContainerCreating   0          74s
pod/order-776946c9c5-bzvfn      0/1     ErrImagePull        0          74s

NAME                 TYPE           CLUSTER-IP       EXTERNAL-IP   PORT(S)          AGE
service/apache       LoadBalancer   10.108.78.207    <pending>     80:32666/TCP     74s
service/catalog      LoadBalancer   10.102.71.193    <pending>     8080:30592/TCP   74s
service/customer     LoadBalancer   10.106.93.213    <pending>     8080:31781/TCP   74s
service/kubernetes   ClusterIP      10.96.0.1        <none>        443/TCP          33m
service/order        LoadBalancer   10.98.60.104     <pending>     8080:30478/TCP   74s

NAME                       READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/apache     1/1     1            1           75s
deployment.apps/catalog    1/1     1            1           74s
deployment.apps/customer   0/1     1            0           74s
deployment.apps/order      0/1     1            0           74s

NAME                                  DESIRED   CURRENT   READY   AGE
replicaset.apps/apache-59948b6955     1         1         1       74s
replicaset.apps/catalog-dd7b5786d     1         1         1       74s
replicaset.apps/customer-59f874cddf   1         1         0       74s
replicaset.apps/order-776946c9c5      1         1         0       74s
(base) lam@lamnn-tt:/media/lam/Data/Lam/Universsity Stuffs/DistributedSystem/Answer/microservices-demo$
```

(a) Pods status at second 34th (b) Pods status at second 74th

Figure 2: Status of pods at two time slots

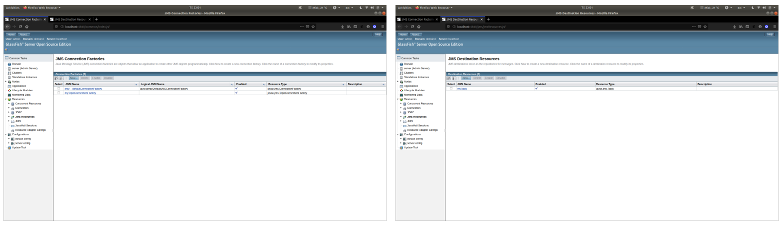
The different between two timeframe from 2 is that the age of the pods.

4 Role of Application Server Glassfish

Glassfish Server is a webserver to deploy web application that was written in java. It uses the Message Queue software as its native JMS provide, providing transparent JMS messaging support.

5 Role of the Two JNDIs

By making calls to the JNDI API, applications locate resources and other program objects. Each resource object is identified by a unique, people-friendly name, called the JNDI name. A resource object and its JNDI name are bound together by the naming and directory service, which is included with the GlassFish Server. JNDI allows distributed applications to look up services in an abstract, resource-independent way.



JMS Connection Factories

Java Message Service (JMS) connection factories are objects that allow an application to create other JMS objects programmatically. Click New to create a new connection factory. Click the name of a connection factory to modify its properties.

Connection Factories (2)

Select	JNDI Name	Logical JNDI Name	Enabled	Resource Type	Description
☐	jms/__defaultConnectionFactory	java:comp/DefaultJMSConnectionFactory	✓	javax.jms.ConnectionFactory	
☐	myTopicConnectionFactory		✓	javax.jms.TopicConnectionFactory	

JMS Destination Resources

JMS destinations serve as the repositories for messages. Click New to create a new destination resource. Click the name of a destination resource to modify its properties.

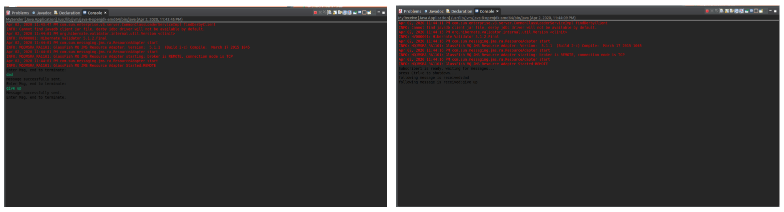
Destination Resources (1)

Select	JNDI Name	Enabled	Resource Type	Description
☐	myTopic	✓	javax.jms.Topic	

(a) JMS Connection Factories (b) JMS Destination Resources

Figure 3: JNDIs

6 The Message Passing Method of Sender and Receiver Explaination



```
MySender [Java Application] /usr/lib/jvm/java-8-openjdk-amd64/bin/java (Apr 2, 2020, 11:43:45 PM)
Apr 02, 2020 11:43:47 PM com.sun.enterprise.v3.server.CommonClassLoaderServiceImpl findDerbyClient
INFO: Cannot find javadb client jar file, derby jdbc driver will not be available by default.
Apr 02, 2020 11:44:01 PM org.hibernate.validator.internal.util.Version <clinit>
INFO: HV000001: Hibernate Validator 5.1.2.Final
Apr 02, 2020 11:44:01 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter: Version:  5.1.1  (Build 2-c) Compile:  March 17 2015 1045
Apr 02, 2020 11:44:01 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter starting: broker is REMOTE, connection mode is TCP
Apr 02, 2020 11:44:01 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter Started:REMOTE
Enter Msg, end to terminate:
dad
Message successfully sent.
Enter Msg, end to terminate:
give up
Message successfully sent.
Enter Msg, end to terminate:
```

(a) Sender

```
MyReceive [Java Application] /usr/lib/jvm/java-8-openjdk-amd64/bin/java (Apr 2, 2020, 11:44:09 PM)
Apr 02, 2020 11:44:11 PM com.sun.enterprise.v3.server.CommonClassLoaderServiceImpl findDerbyClient
INFO: Cannot find javadb client jar file, derby jdbc driver will not be available by default.
Apr 02, 2020 11:44:15 PM org.hibernate.validator.internal.util.Version <clinit>
INFO: HV000001: Hibernate Validator 5.1.2.Final
Apr 02, 2020 11:44:16 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter: Version:  5.1.1  (Build 2-c) Compile:  March 17 2015 1045
Apr 02, 2020 11:44:16 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter starting: broker is REMOTE, connection mode is TCP
Apr 02, 2020 11:44:16 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter Started:REMOTE
Subscriber1 is ready, waiting for messages...
press Ctrl+c to shutdown...
following message is received:dad
following message is received:give up
```

(b) Receiver

Figure 4: Result of running MySender and MyReceiver

Explanation:

1. The Sender get the topic object named ”myTopic”
2. It creates a publisher to register that event
3. It creates buffer to store user input and publish the message to subscribers of event ”myTopic”
4. In regard to the Receiver, it subscriber to ”myTopic” and be able to receive the Senders message
5. When the Sender publishes the message, since the Receiver has already subscribed to that event and get that message

7 Compare the JMS and DDS

JMS	DDS
Java Messaging Service	Data Distributed Service
Used for sending messages between two or more clients	DDS is networking middleware that simplifies complex network programming. It implements a publish/subscribe model for sending and receiving data, events, and commands among nodes.
Centralized	Decentralized
Allows the communication between different components of a distribute application	Automatically handles all aspects of message delivery