

Subject	SWA – CS590
Assignment	Lab 9
Date	8/28/2021
Students	Vo Ngoc Huy Nguyen - 611066
Professor	Rene de Jong

Lab Assignment 9: Microservice

Exercise 1: Service registry with Eureka

- Config and start EurekaServer

The screenshot shows the Eclipse IDE interface. On the left, the Package Explorer displays the project structure for 'workspace-spring-tool-suite-4-4.11.0.RELEASE_1 - EurekaServer/src/main/resources/application.yml - Spring Tool Suite 4'. The main editor shows the 'application.yml' file with the following configuration:

```

1 server:
2   port: 8761
3
4
5 eureka:
6   client:
7     #registerWithEureka: false #telling the server not to register himself
8     #fetchRegistry: false
9     register-with-eureka: false
10    fetch-registry: false
11
12

```

At the bottom, the Console window displays the EurekaServer logs. The logs show the server starting and registering instances of ACCOUNTSERVICE and CUSTOMERSERVICE. The logs include timestamps, log levels (INFO, WARN), and the names of the instances being registered.

```

EurekaServer - EurekaServerApplication [Spring Boot App] D:\sources\Eclipse\sts-4.11.0.RELEASE\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64.16.0.1.v20210528-1205\jre\
2021-08-28 19:20:01.358 INFO 3228 --- [nio-8761-exec-2] c.n.e.registry.AbstractInstanceRegistry : DS: Registry: lease doesn't exist,
registering resource: ACCOUNTSERVICE - 192.168.0.20:AccountService:8090
2021-08-28 19:20:01.358 WARN 3228 --- [nio-8761-exec-2] c.n.eureka.resources.InstanceResource : Not Found (Renew): ACCOUNTSERVICE
- 192.168.0.20:AccountService:8090
2021-08-28 19:20:01.445 INFO 3228 --- [nio-8761-exec-3] c.n.e.registry.AbstractInstanceRegistry : Registered instance
ACCOUNTSERVICE/192.168.0.20:AccountService:8090 with status UP (replication=false)
2021-08-28 19:20:02.048 INFO 3228 --- [nio-8761-exec-5] c.n.e.registry.AbstractInstanceRegistry : Registered instance
ACCOUNTSERVICE/192.168.0.20:AccountService:8090 with status UP (replication=true)
2021-08-28 19:20:03.134 WARN 3228 --- [nio-8761-exec-6] c.n.e.registry.AbstractInstanceRegistry : DS: Registry: lease doesn't exist,
registering resource: CUSTOMERSERVICE - 192.168.0.20:CustomerService:8091
2021-08-28 19:20:03.134 WARN 3228 --- [nio-8761-exec-6] c.n.eureka.resources.InstanceResource : Not Found (Renew): CUSTOMERSERVICE
- 192.168.0.20:CustomerService:8091
2021-08-28 19:20:03.146 INFO 3228 --- [nio-8761-exec-9] c.n.e.registry.AbstractInstanceRegistry : Registered instance
CUSTOMERSERVICE/192.168.0.20:CustomerService:8091 with status UP (replication=false)
2021-08-28 19:20:03.654 INFO 3228 --- [nio-8761-exec-10] c.n.e.registry.AbstractInstanceRegistry : Registered instance
CUSTOMERSERVICE/192.168.0.20:CustomerService:8091 with status UP (replication=true)

```

The Boot Dashboard at the bottom left shows the status of the local instances:

- AccountService [8090]
- CustomerService [8091]
- EurekaServer [8761]

MUM Global Online Education : X Eureka x +

localhost:8761

spring Eureka

HOME LAST 1000 SINCE STARTUP

System Status

Environment	N/A	Current time	2021-08-28T18:01:11 -0500
Data center	N/A	Uptime	00:02
		Lease expiration enabled	false
		Renews threshold	1
		Renews (last min)	0

DS Replicas

localhost

Instances currently registered with Eureka

Application	AMIs	Availability Zones	Status
No instances available			

General Info

Name	Value
total-avail-memory	128mb

- Config and start Account Client and Customer Client

Package Explorer

- Other Projects
- Lab8
- lab9
 - AccountService [boot]
 - src/main/java
 - com
 - controller
 - AccountController.java
 - domain
 - Account.java
 - AccountServiceApplication.java
 - src/main/resources
 - static
 - templates
 - application.yml
 - bootstrap.yml
 - src/test/java
 - JRE System Library [JavaSE-11]
 - Maven Dependencies
 - src
 - target
 - HELP.md
 - mvnw
 - mvnw.cmd
 - CustomerService [boot]
 - EurekaServer [boot]

application.yml

```

1 server:
2   port: 8090
3
4 eureka:
5   client:
6     serviceUrl:
7       defaultZone: http://localhost:8761/eureka/
8
9
10
11

```

Problems Javadoc Declaration Console Debug

EurekaServer - EurekaServerApplication [Spring Boot App] D:\sources\Eclipse\sts-4.11.0.RELEASE\plugins\org.eclipse.justopenjdk.hotspot.jre.full.win32.x86_64.16.0.1.v20210528-1205\jre\bin\java.exe

```

2021-08-28 19:21:00.175 INFO 3228 --- [nio-8761-exec-5] c.n.e.registry.AbstractInstanceRegistry : Registered instance
ACCOUNTSERVICE/192.168.0.20:AccountService:8090 with status DOWN (replication=true)
2021-08-28 19:21:08.722 INFO 3228 --- [nio-8761-exec-5] c.n.e.registry.AbstractInstanceRegistry : Cancelled instance
ACCOUNTSERVICE/192.168.0.20:AccountService:8090 (replication=false)
2021-08-28 19:21:09.225 WARN 3228 --- [nio-8761-exec-7] c.n.e.registry.AbstractInstanceRegistry : DS: Registry: cancel failed
because Lease is not registered for: ACCOUNTSERVICE/192.168.0.20:AccountService:8090
2021-08-28 19:21:09.225 INFO 3228 --- [nio-8761-exec-7] c.n.eureka.resources.InstanceResource : Not Found (Cancel): ACCOUNTSERVICE
- 192.168.0.20:AccountService:8090
2021-08-28 19:21:09.227 WARN 3228 --- [get_localhost-6] c.n.eureka.cluster.ReplicationTask : The replication of task
ACCOUNTSERVICE/192.168.0.20:AccountService:8090:Cancel@localhost failed with response code 404
2021-08-28 19:21:09.227 WARN 3228 --- [get_localhost-6] c.netflix.eureka.cluster.PeerEurekaNode :
ACCOUNTSERVICE/192.168.0.20:AccountService:8090:Cancel@localhost: missing entry.
2021-08-28 19:21:16.088 INFO 3228 --- [nio-8761-exec-2] c.n.e.registry.AbstractInstanceRegistry : Registered instance
ACCOUNTSERVICE/192.168.0.20:AccountService:8090 with status UP (replication=false)
2021-08-28 19:21:16.599 INFO 3228 --- [io-8761-exec-10] c.n.e.registry.AbstractInstanceRegistry : Registered instance
ACCOUNTSERVICE/192.168.0.20:AccountService:8090 with status UP (replication=true)

```

Boot Dashboard

Type tags, projects, or working set names to match (incl. * ar

- local
 - AccountService [8090]
 - CustomerService [8091]
 - EurekaServer [8761]

3 elements hidden by filter

Package Explorer

- Other Projects
- Lab8
- lab9
 - AccountService [boot]
 - CustomerService [boot]
 - src/main/java
 - com
 - controller
 - CustomerController.java
 - domain
 - Account.java
 - CustomerServiceApplication.java
 - src/main/resources
 - static
 - templates
 - application.yml
 - bootstrap.yml
 - src/test/java
 - JRE System Library [JavaSE-11]
 - Maven Dependencies
 - src
 - target
 - HELP.md
 - mvnw
 - mvnw.cmd
 - pom.xml
 - EurekaServer [boot]

application.yml

```

1 server:
2   port: 8091
3
4 eureka:
5   client:
6     serviceUrl:
7       defaultZone: http://localhost:8761/eureka/
8

```

Problems | Javadoc | Declaration | Console | Debug

```

EurekaServer - EurekaServerApplication [Spring Boot App] D:\sources\Eclipse\workspace\4.11.0.RELEASE\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64.jre\bin\java.exe
2021-08-28 19:21:42.947 INFO 3228 --- [nio-8761-exec-7] c.n.e.registry.AbstractInstanceRegistry : Registered instance
CUSTOMERSERVICE/192.168.0.20:CustomerService:8091 with status DOWN (replication=true)
2021-08-28 19:21:48.500 INFO 3228 --- [nio-8761-exec-2] c.n.e.registry.AbstractInstanceRegistry : Cancelled instance
CUSTOMERSERVICE/192.168.0.20:CustomerService:8091 (replication=false)
2021-08-28 19:21:49.008 WARN 3228 --- [io-8761-exec-10] c.n.e.registry.AbstractInstanceRegistry : DS: Registry: cancel failed
because Lease is not registered for: CUSTOMERSERVICE/192.168.0.20:CustomerService:8091
2021-08-28 19:21:49.008 INFO 3228 --- [io-8761-exec-10] c.n.eureka.resources.InstanceResource : Not Found (Cancel):
CUSTOMERSERVICE - 192.168.0.20:CustomerService:8091
2021-08-28 19:21:49.009 WARN 3228 --- [get-localhost-0] c.n.eureka.cluster.ReplicationTask : The replication of task
CUSTOMERSERVICE/192.168.0.20:CustomerService:8091:Cancel@localhost failed with response code 404
2021-08-28 19:21:49.009 WARN 3228 --- [get-localhost-0] c.netflix.eureka.cluster.PeerEurekaNode :
CUSTOMERSERVICE/192.168.0.20:CustomerService:8091:Cancel@localhost: missing entry.
2021-08-28 19:21:57.468 INFO 3228 --- [nio-8761-exec-5] c.n.e.registry.AbstractInstanceRegistry : Registered instance
CUSTOMERSERVICE/192.168.0.20:CustomerService:8091 with status UP (replication=false)
2021-08-28 19:21:57.975 INFO 3228 --- [nio-8761-exec-7] c.n.e.registry.AbstractInstanceRegistry : Registered instance
CUSTOMERSERVICE/192.168.0.20:CustomerService:8091 with status UP (replication=true)

```

Boot Dashboard

Type tags, projects, or working set names to match (incl. * ar)

- local
 - AccountService [8090]
 - CustomerService [8091]
 - EurekaServer [8761]

3 elements hidden by filter

localhost:8761

spring Eureka

HOME LAST 1000 SINCE STARTUP

System Status

Environment	N/A	Current time	2021-08-28T19:22:19 -0500
Data center	N/A	Uptime	00:02
		Lease expiration enabled	true
		Renews threshold	5
		Renews (last min)	6

DS Replicas

localhost

Instances currently registered with Eureka

Application	AMIs	Availability Zones	Status
ACCOUNTSERVICE	n/a (1)	(1)	UP (1) - 192.168.0.20:AccountService:8090
CUSTOMERSERVICE	n/a (1)	(1)	UP (1) - 192.168.0.20:CustomerService:8091

General Info

Name	Value
total-avail-memory	94mb

Call GET to test

localhost:8090/account/1

```

{"accountNumber":"1234","balance":"1000.00"}

```

← → ↻ ⓘ localhost:8091/customer/1

```
{"accountNumber": "1234", "balance": "1000.00"}
```

Refer attached source codes for more details

Exercise 2: Using Ribbon

Project as below:

The screenshot shows an IDE with a project named 'lab9'. The project structure includes 'AccountService' and 'CustomerService' modules. The 'CustomerService' module contains a 'CustomerController' and a 'CustomerFeignClient' interface. The 'CustomerController' has a 'getName' method that uses the 'CustomerFeignClient' to fetch data from 'localhost:8091/customer/{customerId}'. The 'CustomerFeignClient' has a 'getName' method that uses 'RibbonClient' to call the 'AccountService'.

```
import com.domain.Account;

@RestController
public class CustomerController {
    @Autowired
    AccountFeignClient accountClient;


    @RequestMapping("/customer/{customerId}")
    public Account getName(@PathVariable("customerId") String customerId) {
        Account account = accountClient.getName(customerId);
        return account;
    }
}

@FeignClient("AccountService")
RibbonClient(name = "AccountService")
interface AccountFeignClient {
    @RequestMapping("/account/{customerId}")
    public Account getName(@PathVariable("customerId") String customerId);
}
```

The debug console shows the following log messages:

```
2021-08-29 18:02:00.380 DEBUG 20512 --- [freshExecutor-0] o.s.web.client.RestTemplate : Reading to
[org.springframework.cloud.netflix.eureka.http.EurekaApplications]
2021-08-29 18:02:00.381 DEBUG 20512 --- [freshExecutor-0] o.s.web.client.RestTemplate : HTTP GET
http://localhost:8091/eureka/apps/
2021-08-29 18:02:00.381 DEBUG 20512 --- [freshExecutor-0] o.s.web.client.RestTemplate : Accept=[application/json,
application/*+json]
2021-08-29 18:02:00.386 DEBUG 20512 --- [freshExecutor-0] o.s.web.client.RestTemplate : Response 200 OK
2021-08-29 18:02:00.386 DEBUG 20512 --- [freshExecutor-0] o.s.web.client.RestTemplate : Reading to
[org.springframework.cloud.netflix.eureka.http.EurekaApplications]
2021-08-29 18:02:03.527 DEBUG 20512 --- [nio-8090-exec-7] o.s.web.servlet.DispatcherServlet : GET "/account/1", parameters={}
2021-08-29 18:02:03.528 DEBUG 20512 --- [nio-8090-exec-7] s.w.s.m.a.RequestMappingHandlerMapping : Mapped to
com.controller.AccountController1#getName(String)
getName() on AccountController1 is called
2021-08-29 18:02:03.529 DEBUG 20512 --- [nio-8090-exec-7] m.m.a.RequestMappingHandlerMapping : Using 'application/json;q=0.8',
given [text/html, application/xhtml+xml, image/avif, image/webp, image/apng, application/xml;q=0.9, application/signed-
exchange;q=0.9, */*;q=0.8] and supported [application/json, application/*+json, application/json, application/*+json]
2021-08-29 18:02:03.529 DEBUG 20512 --- [nio-8090-exec-7] m.m.a.RequestMappingHandlerMapping : Writing
from domain.Account@2456b3b01
```


← → ↺ localhost:8761

HOME LAST 1000 SINCE STARTUP

System Status

Environment	N/A	Current time	2021-08-29T18:30:07 -0500
Data center	N/A	Uptime	00:00
		Lease expiration enabled	false
		Renews threshold	6
		Renews (last min)	0

DS Replicas

localhost

Instances currently registered with Eureka

Application	AMIs	Availability Zones	Status
ACCOUNTSERVICE	n/a (2)	(2)	UP (2) - 192.168.0.20:AccountService:8090 , 192.168.0.20:AccountService:8092
CUSTOMERSERVICE	n/a (1)	(1)	UP (1) - 192.168.0.20:CustomerService:8091

General Info

Name	Value
total-avail-memory	106mb

Exercise 3: Apply to WebShop

workspace-spring-tool-suite-4-4.11.0.RELEASE_1 - WebShopComponentsShopping/src/main/java/shop/shopping/integration/OrderProxy.java - Spring Tool Suite 4

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer

- mvnw
- mvnw.cmd
- pom.xml
- WebShopComponentsShopping [boot]
- src/main/java
- shop
- shopping
- domain
- integration
 - CheckoutListener.java
 - Logger.java
 - OrderProxy.java
 - ProductCatalogProxy.java
- repository
- service
 - CartLineDTO.java
 - ProductAdapter.java
 - ProductDTO.java
 - ShoppingCartAdapter.java
 - ShoppingCartDTO.java
 - ShoppingService.java

application.yml bootstrap.yml ProductController.java ProductCatalogProxy.java OrderProxy.java

```
21 private RestOperations restTemplate;  
22 @Value("${ordersURL}")  
23 String ordersURL;  
24  
25 public void createOrder(ShoppingCartDTO shoppingCartDTO) {  
26     restTemplate.postForLocation(ordersURL+"/order/create", shoppingCartDTO);  
27 }  
28  
29 */  
30  
31  
32 @Autowired  
33 OrderFeignClient orderClient;  
34  
35 public void createOrder(ShoppingCartDTO shoppingCartDTO) {  
36     //OrderCustomerDTO customer = restTemplate.getForObject(customersURL+"/order/customer/"+customerNumber, OrderCustomerDTO.class);  
37     orderClient.createOrder(shoppingCartDTO);  
38 }  
39  
40  
41  
42 @FeignClient("orderservice")
```

Problems Javadoc Declaration Search Console Debug

WebShopComponentsOrder - WebShopApplication [Spring Boot App] D:\sources\Eclipse\sts-4.11.0.RELEASE\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64.16.0.1.v2021052

```
2021-08-29 20:40:38.625 INFO 14628 --- [main] shop.WebShopApplication : Started WebShopApplication in  
4.52 seconds (JVM running for 5.215)  
2021-08-29 20:41:29.905 INFO 14628 --- [nio-8094-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring  
DispatcherServlet 'dispatcherServlet'  
2021-08-29 20:41:29.905 INFO 14628 --- [nio-8094-exec-1] o.s.web.servlet.DispatcherServlet : Initializing Servlet  
'dispatcherServlet'  
2021-08-29 20:41:29.906 INFO 14628 --- [nio-8094-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 1 ms  
2021-08-29 20:41:30.000 INFO 14628 --- [nio-8094-exec-1] org.mongodb.driver.connection : Opened connection [connectionId  
{localValue:3, serverValue:73}] to localhost:27017  
Sending email to customer@gmail.com with message: Thank you for your order with order number 1  
Logging ----- Sun Aug 29 20:42:23 CDT 2021 new order with order number 1  
Sending email to fBrown@hotmail.com with message: Order is confirmed, orderNumber=1  
Logging ----- Sun Aug 29 20:43:08 CDT 2021 new order with order number 1  
Sending email to customer@gmail.com with message: Thank you for your order with order number 1  
Sending email to fBrown@hotmail.com with message: Order is confirmed, orderNumber=1  
Logging ----- Sun Aug 29 20:44:55 CDT 2021 new order with order number 1  
Sending email to customer@gmail.com with message: Thank you for your order with order number 1  
Sending email to fBrown@hotmail.com with message: Order is confirmed, orderNumber=1
```

Boot Dashboard

Type tags, projects, or working set names to match (incl. * and ?)

local

- EurekaServer [8761]
- WebShopComponentsClient [8090]
- WebShopComponentsCustomers [8092]
- WebShopComponentsOrder [8094]
- WebShopComponentsProducts [8091]
- WebShopComponentsShopping [8093]

6 elements hidden by filter

springEureka

HOME LAST 1000 SINCE STARTUP

System Status

Environment	N/A	Current time	2021-08-29T20:45:51 -0500
Data center	N/A	Uptime	01:34
		Lease expiration enabled	true
		Renews threshold	8
		Renews (last min)	14

DS Replicas

localhost

Instances currently registered with Eureka

Application	AMIs	Availability Zones	Status
CUSTOMERSERVICE	n/a (1)	(1)	UP (1) - 192.168.0.20:customerservice:8092
ORDERSERVICE	n/a (1)	(1)	UP (1) - 192.168.0.20:orderservice:8094
PRODUCTSERVICE	n/a (1)	(1)	UP (1) - 192.168.0.20:productservice:8091
SHOPPINGCARTSERVICE	n/a (1)	(1)	UP (1) - 192.168.0.20:shoppingcartservice:8093

General Info

ShoppingCartOrder.java
ShoppingService.java

Boot Dashboard

Type tags, projects, or working set names to match (incl. * and ?)

local

- EurekaServer [8761]
- WebShopComponentsClient [8090]
- WebShopComponentsCustomers [8092]
- WebShopComponentsOrder [8094]
- WebShopComponentsProducts [8091]
- WebShopComponentsShopping [8093]

6 elements hidden by filter

Problems Javadoc Declaration Search Console Debug

WebShopComponentsOrder - WebShopApplication [Spring Boot App] D:\sources\Eclipse\sts-4.11.0.RELEASE\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_16.0.1.v20210521\jre\bin\java.exe

2021-08-29 20:41:29.906 INFO 14628 --- [nio-8094-exec-1] o.s.web.servlet.DispatcherServlet : Completed initialization in 1 ms
2021-08-29 20:41:30.000 INFO 14628 --- [nio-8094-exec-1] org.mongodb.driver.connection : Opened connection [connectionId=1]
'dispatcherServlet'
{localValue:3, serverValue:73} to localhost:27017
Sending email to customer@gmail.com with message: Thank you for your order with order number 1
Logging ----- Sun Aug 29 20:42:23 CDT 2021 new order with order number 1
Sending email to fBrown@hotmail.com with message: Order is confirmed, orderNumber=1
Sending email to customer@gmail.com with message: Thank you for your order with order number 1
Logging ----- Sun Aug 29 20:43:08 CDT 2021 new order with order number 1
Sending email to fBrown@hotmail.com with message: Order is confirmed, orderNumber=1
Sending email to customer@gmail.com with message: Thank you for your order with order number 1
Logging ----- Sun Aug 29 20:44:55 CDT 2021 new order with order number 1
Sending email to fBrown@hotmail.com with message: Order is confirmed, orderNumber=1
2021-08-29 20:45:38.234 INFO 14628 --- [trap-executor-0] c.n.d.s.r.aws.ConfigClusterResolver : Resolving eureka endpoints via configuration
Sending email to customer@gmail.com with message: Thank you for your order with order number 1
Logging ----- Sun Aug 29 20:46:20 CDT 2021 new order with order number 1
Sending email to fBrown@hotmail.com with message: Order is confirmed, orderNumber=1