

Subject	SWA – CS590
Assignment	Lab 12
Date	9/18/2021
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Professor	Rene de Jong

Lab Assignment 12: Security

Exercise 1: Security

Refer projects:

The screenshot shows the Spring Tool Suite 4 IDE. The Package Explorer on the left displays the project structure for 'AuthenticationService'. The main editor shows the 'pom.xml' file with the following content:

```

<?xml version="1.0" encoding="UTF-8" ?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <parent>
    <groupId>auth</groupId>
    <artifactId>AuthenticationService</artifactId>
    <version>0.0.1-SNAPSHOT</version>
    <name>AuthenticationService</name>
    <description>AuthenticationService</description>
  </parent>
  <properties>
    <java.version>11</java.version>
  </properties>
  <dependencies>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-web</artifactId>
      <version>2.3.1</version>
    </dependency>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-security</artifactId>
      <version>2.3.1</version>
    </dependency>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-test</artifactId>
      <version>2.3.1</version>
    </dependency>
  </dependencies>
</project>

```

The console output shows the following log messages:

```

2021-09-19 09:31:41.781 INFO 22728 --- [main] auth.AuthenticationServiceApplication : Starting AuthenticationServiceApplication on DESKTOP-GT6
2021-09-19 09:31:41.783 INFO 22728 --- [main] auth.AuthenticationServiceApplication : No active profile set, falling back to default profiles:
2021-09-19 09:31:42.537 INFO 22728 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8080 (http)
2021-09-19 09:31:42.555 INFO 22728 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.17]
2021-09-19 09:31:42.555 INFO 22728 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2021-09-19 09:31:42.652 INFO 22728 --- [main] o.s.web.context.ContextLoader : Root WebApplicationContext: initialization completed in
2021-09-19 09:31:42.890 INFO 22728 --- [main] o.s.s.concurrent.ThreadPoolTaskExecutor : Initializing ExecutorService 'applicationTaskExecutor'
2021-09-19 09:31:43.089 INFO 22728 --- [main] o.s.web.DefaultSecurityFilterChain : Creating filter chain: OrRequestMatcher [requestMatchers
2021-09-19 09:31:43.094 INFO 22728 --- [main] o.s.web.DefaultSecurityFilterChain : Creating filter chain: org.springframework.security.oauth
2021-09-19 09:31:43.097 INFO 22728 --- [main] o.s.web.DefaultSecurityFilterChain : Creating filter chain: any request, [org.springframework
2021-09-19 09:31:43.169 INFO 22728 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http) with context path
2021-09-19 09:31:43.172 INFO 22728 --- [main] auth.AuthenticationServiceApplication : Started AuthenticationServiceApplication in 1.587 second

```

The screenshot shows the Spring Tool Suite 4 IDE. The Package Explorer on the left displays the project structure for 'Service_C'. The main editor shows the console output for 'Service_C - SecureServiceBApplication'.

```

2021-09-19 10:52:04.781 INFO 30048 --- [main] o.s.web.context.ContextLoader : Root WebApplicationContext: initialization completed in
2021-09-19 10:52:05.131 INFO 30048 --- [main] o.s.s.concurrent.ThreadPoolTaskExecutor : Initializing ExecutorService 'applicationTaskExecutor'
2021-09-19 10:52:05.317 INFO 30048 --- [main] .s.s.UserDetailsServiceAutoConfiguration :
Using generated security password: 67805454-9210-4a83-9172-d711f54fc526
2021-09-19 10:52:05.532 INFO 30048 --- [main] o.s.web.DefaultSecurityFilterChain : Creating filter chain: any request, [org.springframework
2021-09-19 10:52:05.643 INFO 30048 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8092 (http) with context path
2021-09-19 10:52:05.647 INFO 30048 --- [main] service.SecureServiceBApplication : Started SecureServiceBApplication in 3.137 seconds (JVM
2021-09-19 10:55:47.724 INFO 30048 --- [nio-8092-exec-3] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring DispatcherServlet 'dispatcherServlet'
2021-09-19 10:55:47.724 INFO 30048 --- [nio-8092-exec-3] o.s.web.servlet.DispatcherServlet : Initializing Servlet 'dispatcherServlet'
2021-09-19 10:55:47.728 INFO 30048 --- [nio-8092-exec-3] o.s.web.servlet.DispatcherServlet : Completed initialization in 4 ms

```

And more source codes in attached file

POST http://localhost:8080/oauth/token

Send

Params Authorization Headers (9) Body Pre-request Script Tests Settings

Cookies

☐ none ☐ form-data ☒ x-www-form-urlencoded ☐ raw ☐ binary ☐ GraphQL

	KEY	VALUE	DESCRIPTION	...	Bulk Edit
<input checked="" type="checkbox"/>	grant_type	password			
<input checked="" type="checkbox"/>	scope	webclient			
<input checked="" type="checkbox"/>	username	user1			
<input checked="" type="checkbox"/>	password	password1			
	Key	Value	Description		

Body Cookies Headers (8) Test Results

Status: 200 OK Time: 365 ms Size: 433 B

Save Response

Pretty Raw Preview Visualize JSON

 

```
1 {
2   "access_token": "28dc9867-88c3-4550-9eb9-1c8f7ca65156",
3   "token_type": "bearer",
4   "refresh_token": "e74af716-81b6-4109-b8fa-440a58986b8b",
5   "expires_in": 43199,
6   "scope": "webclient"
7 }
```

POST http://localhost:8080/oauth/token

Send

Params Authorization Headers (9) Body Pre-request Script Tests Settings

Cookies

☐ none ☐ form-data ☒ x-www-form-urlencoded ☐ raw ☐ binary ☐ GraphQL

	KEY	VALUE	DESCRIPTION	...	Bulk Edit
<input checked="" type="checkbox"/>	grant_type	password			
<input checked="" type="checkbox"/>	scope	webclient			
<input checked="" type="checkbox"/>	username	user2			
<input checked="" type="checkbox"/>	password	password1			
	Key	Value	Description		

Body Cookies Headers (8) Test Results

Status: 200 OK Time: 97 ms Size: 433 B

Save Response

Pretty Raw Preview Visualize JSON

 

```
1 {
2   "access_token": "2dcc2dee-b77f-4715-8908-38d49edbfd49",
3   "token_type": "bearer",
4   "refresh_token": "6c6c7302-7a83-4fa2-a49f-086890f5e040",
5   "expires_in": 43164,
6   "scope": "webclient"
7 }
```

SWA / lab12-Auth2 / Request token user3 (customer, emp and manager)

POST http://localhost:8080/oauth/token

Params Authorization Headers (9) Body Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL

KEY	VALUE	DESCRIPTION
grant_type	password	
scope	webclient	
username	user3	
password	password1	
Key	Value	Description

Body Cookies Headers (8) Test Results Status: 200 OK Time: 138 ms Size: 433 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2   "access_token": "b8b5b95f-6637-4562-9016-84d0e7401f72",
3   "token_type": "bearer",
4   "refresh_token": "98d664a0-4ea8-4ca5-9552-2bfa8a5a029e",
5   "expires_in": 43200,
6   "scope": "webclient"
7 }
```

- Get info of user:

SWA / lab12-Auth2 / Get user1 info

GET http://localhost:8080/user

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

Headers 6 hidden

KEY	VALUE	DESCRIPTION
Authorization	Bearer 79786254-e184-402d-8730-bee550ced315	
Key	Value	Description

Body Cookies Headers (9) Test Results Status: 200 OK Time: 9 ms Size: 528 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2   "user": {
3     "password": null,
4     "username": "user1",
5     "authorities": [
6       {
7         "authority": "ROLE_CUSTOMER"
8       }
9     ],
10    "accountNonExpired": true,
11    "accountNonLocked": true,
12    "credentialsNonExpired": true,
13    "enabled": true
14  },
15  "authorities": [
16    "ROLE_CUSTOMER"
17  ]
18 }
```

SWA / lab12-Auth2 / Get user2 info

GET http://localhost:8080/user Send

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

Headers 6 hidden

KEY	VALUE	DESCRIPTION	Bulk Edit	Presets
Authorization	Bearer 57bfb169-ea8b-4824-81d4-f85648e16e0a			
Key	Value	Description		

Body Cookies Headers (9) Test Results Status: 200 OK Time: 10 ms Size: 574 B Save Response

Pretty Raw Preview Visualize JSON

```
5      "authorities": [  
6        {  
7          "authority": "ROLE_CUSTOMER"  
8        },  
9        {  
10         "authority": "ROLE_EMPLOYEE"  
11        }  
12      ],  
13      "accountNonExpired": true,  
14      "accountNonLocked": true,  
15      "credentialsNonExpired": true,  
16      "enabled": true  
17    },  
18    "authorities": [  
19      "ROLE_CUSTOMER",  
20      "ROLE_EMPLOYEE"
```

SWA / lab12-Auth2 / Get user3 info

GET http://localhost:8080/user Send

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

Headers 6 hidden

KEY	VALUE	DESCRIPTION	Bulk Edit	Presets
Authorization	Bearer c205b3f1-baae-4c77-8b9b-f5eff00d9320			
Key	Value	Description		

Body Cookies Headers (9) Test Results Status: 200 OK Time: 8 ms Size: 618 B Save Response

Pretty Raw Preview Visualize JSON

```
4      "username": "user3",  
5      "authorities": [  
6        {  
7          "authority": "ROLE_CUSTOMER"  
8        },  
9        {  
10         "authority": "ROLE_EMPLOYEE"  
11        },  
12        {  
13         "authority": "ROLE_MANAGER"  
14        }  
15      ],  
16      "accountNonExpired": true,  
17      "accountNonLocked": true,  
18      "credentialsNonExpired": true,  
19      "enabled": true
```

- Call ServiceA

SWA / lab12-Auth2 / call ServiceA-name

Save Send

GET http://localhost:8090/name

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

Headers 6 hidden

	KEY	VALUE	DESCRIPTION		Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer 57bfb169-ea8b-4824-81d4-f85648e16e0a				
	Key	Value	Description			

Body Cookies Headers (9) Test Results

Status: 200 OK Time: 18 ms Size: 302 B Save Response

Pretty Raw Preview Visualize Text

1 Userx

SWA / lab12-Auth2 / call ServiceA-employeeinfo

Save Send

GET http://localhost:8090/employeeinfo

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

Headers 6 hidden

	KEY	VALUE	DESCRIPTION		Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer 57bfb169-ea8b-4824-81d4-f85648e16e0a				
	Key	Value	Description			

Body Cookies Headers (9) Test Results

Status: 200 OK Time: 22 ms Size: 327 B Save Response

Pretty Raw Preview Visualize Text

1 This info is for the employee

GET

http://localhost:8090/managerinfo

Send

Params Authorization Headers (7) Body Pre-request Script Tests Settings

Cookies

Headers 6 hidden

	KEY	VALUE	DESCRIPTION	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer 57bfb169-ea8b-4824-81d4-f85648e16e0a				
	Key	Value	Description			

Body Cookies Headers (8) Test Results

Status: 403 Forbidden Time: 24 ms Size: 333 B

Save Response

Pretty

Raw

Preview

Visualize

JSON



```
1 {"error": "access_denied",
2  "error_description": "Access is denied"
3 }
4
```

GET

http://localhost:8090/managerinfo

Send

Params Authorization Headers (7) Body Pre-request Script Tests Settings

Cookies

Query Params

	KEY	VALUE	DESCRIPTION	...	Bulk Edit
<input type="checkbox"/>	authn				
	Key	Value	Description		

Body Cookies Headers (9) Test Results

Status: 200 OK Time: 18 ms Size: 326 B

Save Response

Pretty

Raw

Preview

Visualize

Text



```
1 This info is for the manager
```

- Call Service B

SWA / lab12-Auth2 / call ServiceB-publicinfo

GET http://localhost:8091/publicinfo Send

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

Headers 6 hidden

	KEY	VALUE	DESCRIPTION		Bulk Edit	Presets
<input type="checkbox"/>	Authorization	Bearer c205b3f1-baae-4c77-8b9b-f5eff00d9320				
	Key	Value	Description			

Body Cookies Headers (9) Test Results Status: 200 OK Time: 5 ms Size: 317 B Save Response

Pretty Raw Preview Visualize Text

```
1 This is public info
```

- Call Service C

SWA / lab12-Auth2 / call ServiceC - Salary

GET http://localhost:8090/salary Send

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

Headers 6 hidden

	KEY	VALUE	DESCRIPTION		Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer c205b3f1-baae-4c77-8b9b-f5eff00d9320				
	Key	Value	Description			

Body Cookies Headers (9) Test Results Status: 200 OK Time: 15 ms Size: 303 B Save Response

Pretty Raw Preview Visualize Text

```
1 50.000
```


SWA / lab12-Auth2 / call ServiceC - Salary

GET http://localhost:8092/salary Send

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies

Headers 6 hidden

	KEY	VALUE	DESCRIPTION	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer c205b3f1-baae-4c77-8b9b-f5eff00d9320				
	Key	Value	Description			

Body Cookies Headers (9) Test Results Status: 200 OK Time: 19 ms Size: 303 B Save Response

Pretty Raw Preview Visualize Text ...

```
1 50.000
```

Refer attached file for codes and Postman calls

Exercise 2: Spring Kafka

Run and check for Kafka setting

workspace-spring-tool-suite-4-4.11.0.RELEASE_2 - KafkaProject/pom.xml - Spring Tool Suite 4

File Edit Navigate Search Project Run Window Help

Package Explorer

- Receiver.java
- Sender.java
- src/main/resources
 - application.properties
- src/test/java
 - kafka
- JRE System Library [JavaSE-1.8]
- Maven Dependencies
- src
 - target
 - mvnw
 - mvnw.cmd
 - pom.xml
- Service_A [boot]
 - src/main/java
 - src/main/resources
 - src/test/java
 - JRE System Library [JavaSE-11]
 - Maven Dependencies
 - src
 - target
 - mvnw
 - mvnw.cmd
 - pom.xml
- Service_B [boot]

Authentication... application... KafkaProjec... Receiver.java Sender.java KafkaProjec... Service_A/po...

```

6 <groupId>kafka</groupId>
7 <artifactId>KafkaProject</artifactId>
8 <version>0.0.1-SNAPSHOT</version>
9 <packaging>jar</packaging>
10
11 <name>KafkaProject</name>
12 <description>KafkaProject</description>
13
14 <parent>
15 <groupId>org.springframework.boot</groupId>
16 <artifactId>spring-boot-starter-parent</artifactId>
17 <version>2.5.4</version>
18 <relativePath><!-- lookup parent from repository -->
19 </parent>
20
21 <properties>
22 <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
23 <project.reporting.outputEncoding>UTF-8</project.reporting.outputEncoding>
24 <java.version>1.8</java.version>
25 </properties>
26

```

Outline

- project xmlns=http://maven.apache.org/POM
 - modelVersion 4.0.0
 - groupId kafka
 - artifactId KafkaProject
 - version 0.0.1-SNAPSHOT
 - packaging jar
 - name KafkaProject
 - description KafkaProject
 - parent org.springframework.boot: spring
 - groupId org.springframework.boot
 - artifactId spring-boot-starter-parent
 - version 2.5.4
 - relativePath -- lookup parent from repository
 - properties
 - dependencies
 - build

Overview Dependencies Dependency Hierarchy Effective POM pom.xml

Problems Javadoc Declaration Search Console

KafkaProject - KafkaProjectApplication [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\bin\javaw.exe (Sep 19, 2021)

```

:: Spring Boot ::
(v2.5.4)

sending message=Spring Kafka and Spring Boot Configuration Example to topic=greetingtopic
received message=Spring Kafka and Spring Boot Configuration Example
kafka_offset : 0
kafka_consumer : org.apache.kafka.clients.consumer.KafkaConsumer@74e9023f
kafka_timestampType : CREATE_TIME
kafka_receivedPartitionId : 0
kafka_receivedTopic : greetingtopic
kafka_receivedTimestamp : 1632059259741
kafka_groupId : gid

```

Boot Dashboard

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

- local
 - AuthenticationService
 - KafkaProject [unknown port]
 - Service_A
 - Service_B

3 elements hidden by filter


```

C:\Windows\system32\cmd.exe - zookeeper-server-start.bat C:\kafka\config\zookeeper.properties
2021-09-19 08:40:44,321 INFO Server environment:user.home=C:\Users\nguyue (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:40:44,322 INFO Server environment:user.dir=C:\Users\nguyue (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:40:44,334 INFO tickTime set to 3000 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:40:44,334 INFO minSessionTimeout set to -1 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:40:44,335 INFO maxSessionTimeout set to -1 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:40:44,364 INFO Using org.apache.zookeeper.server.NIOServerCnxnFactory as server connection factory (org.apache.zookeeper.server.NIOServerCnxnFactory)
2021-09-19 08:40:44,367 INFO binding to port 0.0.0.0/0.0.0.0:2181 (org.apache.zookeeper.server.NIOServerCnxnFactory)
2021-09-19 08:42:18,223 INFO Accepted socket connection from /127.0.0.1:65328 (org.apache.zookeeper.server.NIOServerCnxnFactory)
2021-09-19 08:42:18,231 INFO Client attempting to establish new session at /127.0.0.1:65328 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:42:18,236 INFO Creating new log file: log-1 (org.apache.zookeeper.server.persistance.FileTxnLog)
2021-09-19 08:42:18,250 INFO Established session 0x100037590650000 with negotiated timeout 6000 for client /127.0.0.1:65328 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:42:18,299 INFO Got user-level KeeperException when processing sessionid:0x100037590650000 type:create cxid:0x2 zxid:0x3 txntype:-1 reqpath:n/a Error Path:/brokers Error:KeeperErrorCode = NoNode for /brokers (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:42:18,310 INFO Got user-level KeeperException when processing sessionid:0x100037590650000 type:create cxid:0x6 zxid:0x7 txntype:-1 reqpath:n/a Error Path:/admin Error:KeeperErrorCode = NoNode for /admin (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:42:18,318 INFO Got user-level KeeperException when processing sessionid:0x100037590650000 type:create cxid:0x9 zxid:0x7 txntype:-1 reqpath:n/a Error Path:/admin Error:KeeperErrorCode = NoNode for /admin (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:42:18,467 INFO Got user-level KeeperException when processing sessionid:0x100037590650000 type:create cxid:0x15 zxid:0x15 txntype:-1 reqpath:n/a Error Path:/cluster Error:KeeperErrorCode = NoNode for /cluster (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:42:19,012 INFO Got user-level KeeperException when processing sessionid:0x100037590650000 type:setData cxid:0x21 zxid:0x1a txntype:-1 reqpath:n/a Error Path:/controller_epoch Error:KeeperErrorCode = NoNode for /controller_epoch (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:42:19,115 INFO Got user-level KeeperException when processing sessionid:0x100037590650000 type:delete cxid:0x35 zxid:0x1d txntype:-1 reqpath:n/a Error Path:/admin/reassign_partitions Error:KeeperErrorCode = NoNode for /admin/reassign_partitions (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:42:19,126 INFO Got user-level KeeperException when processing sessionid:0x100037590650000 type:delete cxid:0x39 zxid:0x1e txntype:-1 reqpath:n/a Error Path:/admin/preferred_replica_election Error:KeeperErrorCode = NoNode for /admin/preferred_replica_election (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:42:41,055 INFO Accepted socket connection from /0.0.0.0:0.0.0.0:151659 (org.apache.zookeeper.server.NIOServerCnxnFactory)
2021-09-19 08:42:41,058 INFO Client attempting to establish new session at /0.0.0.0:0.0.0.0:151659 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:42:41,062 INFO Established session 0x100037590650001 with negotiated timeout 30000 for client /0.0.0.0:0.0.0.0:151659 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:42:41,590 WARN Exception causing close of session 0x100037590650001: An existing connection was forcibly closed by the remote host (org.apache.zookeeper.server.NIOServerCnxn)
2021-09-19 08:42:41,591 INFO Closed socket connection for client /0.0.0.0:0.0.0.0:151659 which had sessionid 0x100037590650001 (org.apache.zookeeper.server.NIOServerCnxn)
2021-09-19 08:43:05,976 INFO Accepted socket connection from /0.0.0.0:0.0.0.0:164234 (org.apache.zookeeper.server.NIOServerCnxnFactory)
2021-09-19 08:43:05,978 INFO Client attempting to establish new session at /0.0.0.0:0.0.0.0:164234 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:43:05,982 INFO Established session 0x100037590650002 with negotiated timeout 30000 for client /0.0.0.0:0.0.0.0:164234 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:43:06,168 INFO Got user-level KeeperException when processing sessionid:0x100037590650002 type:setData cxid:0x4 zxid:0x21 txntype:-1 reqpath:n/a Error Path:/config/topics/greetingtopic Error:KeeperErrorCode = NoNode for /config/topics/greetingtopic (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:43:06,212 INFO Processed session termination for sessionid:0x100037590650002 (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:43:06,216 INFO Closed socket connection for client /0.0.0.0:0.0.0.0:164234 which had sessionid 0x100037590650002 (org.apache.zookeeper.server.NIOServerCnxn)
2021-09-19 08:43:13,063 INFO Expiring session 0x100037590650001, timeout of 30000ms exceeded (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:43:13,063 INFO Processed session termination for sessionid:0x100037590650001 (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:43:14,788 INFO Accepted socket connection from /0.0.0.0:0.0.0.0:151932 (org.apache.zookeeper.server.NIOServerCnxnFactory)
2021-09-19 08:43:14,791 INFO Client attempting to establish new session at /0.0.0.0:0.0.0.0:151932 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:43:14,794 INFO Established session 0x100037590650003 with negotiated timeout 30000 for client /0.0.0.0:0.0.0.0:151932 (org.apache.zookeeper.server.ZooKeeperServer)
2021-09-19 08:43:14,824 INFO Processed session termination for sessionid:0x100037590650003 (org.apache.zookeeper.server.PreRequestProcessor)
2021-09-19 08:43:14,827 INFO Closed socket connection for client /0.0.0.0:0.0.0.0:151932 which had sessionid 0x100037590650003 (org.apache.zookeeper.server.NIOServerCnxn)
2021-09-19 08:43:39,757 INFO Got user-level KeeperException when processing sessionid:0x100037590650000 type:setData cxid:0x48 zxid:0x2b txntype:-1 reqpath:n/a Error Path:/config/topics/_consumer_offsets Error:KeeperErrorCode = NoNode for /config/topics/_consumer_offsets (org.apache.zookeeper.server.PreRequestProcessor)

```

```

C:\Windows\system32\cmd.exe - kafka-server-start.bat C:\kafka\config\server.properties
2021-09-19 08:42:19,026 INFO [GroupMetadataManager brokerId=0] Removed 0 expired offsets in 4 milliseconds. (kafka.coordinator.group.GroupMetadataManager)
2021-09-19 08:42:19,037 INFO [ProducerId Manager 0]: Acquired new producerId block (brokerId=0,blockStartProducerId=0,blockEndProducerId=999) by writing to Zk with path version 1 (kafka.coordinator.transaction.ProducerIdManager)
2021-09-19 08:42:19,058 INFO [TransactionCoordinator id=0] Starting up. (kafka.coordinator.transaction.TransactionCoordinator)
2021-09-19 08:42:19,060 INFO [Transaction Marker Channel Manager 0]: Starting (kafka.coordinator.transaction.TransactionMarkerChannelManager)
2021-09-19 08:42:19,060 INFO [TransactionCoordinator id=0] Startup complete. (kafka.coordinator.transaction.TransactionCoordinator)
2021-09-19 08:42:19,107 INFO [/config/changes-event-process-thread]: Starting (kafka.common.ZkNodeChangeNotificationListener$ChangeEventProcessThread)
2021-09-19 08:42:19,123 INFO [SocketServer brokerId=0] Started processors for 1 acceptors (kafka.network.SocketServer)
2021-09-19 08:42:19,131 INFO Kafka version : 2.0.0 (org.apache.kafka.common.utils.AppInfoParser)
2021-09-19 08:42:19,132 INFO Kafka commitId : 3402a8361b734732 (org.apache.kafka.common.utils.AppInfoParser)
2021-09-19 08:42:19,134 INFO [KafkaServer id=0] started (kafka.server.KafkaServer)
2021-09-19 08:43:06,269 INFO [ReplicaFetcherManager on broker 0] Removed fetcher for partitions greetingtopic-0 (kafka.server.ReplicaFetcherManager)
2021-09-19 08:43:06,321 INFO [Log partition=greetingtopic-0, dir=C:\Users\nguyue\kafkakafka_logs] Loading producer state till offset 0 with message format version 2 (kafka.log.Log)
2021-09-19 08:43:06,330 INFO [Log partition=greetingtopic-0, dir=C:\Users\nguyue\kafkakafka_logs] Completed load of log with 1 segments, log start offset 0 and log end offset 0 in 37 ms (kafka.log.Log)
2021-09-19 08:43:06,332 INFO Created log for partition greetingtopic-0 in C:\Users\nguyue\kafkakafka_logs with properties [compression.type -> producer, message.format.version -> 2.0-IV1, file.delete.delay.ms -> 60000, max.message.bytes -> 1000012, min.compaction.lag.ms -> 0, message.timestamp.type -> CreateTime, min.insync.replicas -> 1, message.downconversion.enable -> true, segment.jitter.ms -> 0, preallocate -> false, index.interval.bytes -> 4096, min.cleanable.dirty.ratio -> 0.5, unclean.leader.election.enable -> false, retention.bytes -> -1, delete.retention.ms -> 86400000, cleanup.policy -> [delete], flush.ms -> 9223372036854775807, segment.bytes -> 1073741824, segment.ms -> 604800000, retention.ms -> 604800000, message.timestamp.difference.max.ms -> 9223372036854775807, segment.index.bytes -> 10485760, flush.messages -> 9223372036854775807]. (kafka.log.LogManager)
2021-09-19 08:43:06,333 INFO [Partition greetingtopic-0 broker=0] No checkpointed highwatermark is found for partition greetingtopic-0 (kafka.cluster.Partition)
2021-09-19 08:43:06,335 INFO Replica loaded for partition greetingtopic-0 with initial high watermark 0 (kafka.cluster.Replica)
2021-09-19 08:43:06,338 INFO [Partition greetingtopic-0 broker=0] greetingtopic-0 starts at Leader Epoch 0 from offset 0. Previous Leader Epoch was: -1 (kafka.cluster.Partition)
2021-09-19 08:43:06,363 INFO [ReplicaAlterLogDirsManager on broker 0] Added fetcher for partitions List() (kafka.server.ReplicaAlterLogDirsManager)
2021-09-19 08:43:39,767 INFO Topic creation Map(_consumer_offsets-> ArrayBuffer(0)) (kafka.zk.AdminZkClient)
2021-09-19 08:43:39,774 INFO [KafkaApi-0] Auto creation of topic _consumer_offsets with 1 partitions and replication factor 1 is successful (kafka.server.KafkaApis)
2021-09-19 08:43:39,790 INFO [ReplicaFetcherManager on broker 0] Removed fetcher for partitions _consumer_offsets-0 (kafka.server.ReplicaFetcherManager)
2021-09-19 08:43:39,801 INFO [Log partition=_consumer_offsets-0, dir=C:\Users\nguyue\kafkakafka_logs] Loading producer state till offset 0 with message format version 2 (kafka.log.Log)
2021-09-19 08:43:39,803 INFO [Log partition=_consumer_offsets-0, dir=C:\Users\nguyue\kafkakafka_logs] Completed load of log with 1 segments, log start offset 0 and log end offset 0 in 7 ms (kafka.log.Log)
2021-09-19 08:43:39,805 INFO Created log for partition _consumer_offsets-0 in C:\Users\nguyue\kafkakafka_logs with properties [compression.type -> producer, message.format.version -> 2.0-IV1, file.delete.delay.ms -> 60000, max.message.bytes -> 1000012, min.compaction.lag.ms -> 0, message.timestamp.type -> CreateTime, min.insync.replicas -> 1, message.downconversion.enable -> true, segment.jitter.ms -> 0, preallocate -> false, index.interval.bytes -> 4096, min.cleanable.dirty.ratio -> 0.5, unclean.leader.election.enable -> false, retention.bytes -> -1, delete.retention.ms -> 86400000, cleanup.policy -> compact, flush.ms -> 9223372036854775807, segment.bytes -> 10485760, segment.ms -> 604800000, retention.ms -> 604800000, message.timestamp.difference.max.ms -> 9223372036854775807, segment.index.bytes -> 10485760, flush.messages -> 9223372036854775807]. (kafka.log.LogManager)
2021-09-19 08:43:39,806 INFO [Partition _consumer_offsets-0 broker=0] No checkpointed highwatermark is found for partition _consumer_offsets-0 (kafka.cluster.Partition)
2021-09-19 08:43:39,809 INFO Replica loaded for partition _consumer_offsets-0 with initial high watermark 0 (kafka.cluster.Replica)
2021-09-19 08:43:39,810 INFO [Partition _consumer_offsets-0 broker=0] _consumer_offsets-0 starts at Leader Epoch 0 from offset 0. Previous Leader Epoch was: -1 (kafka.cluster.Partition)
2021-09-19 08:43:39,811 INFO [ReplicaAlterLogDirsManager on broker 0] Added fetcher for partitions List() (kafka.server.ReplicaAlterLogDirsManager)
2021-09-19 08:43:39,812 INFO Updated PartitionLeaderEpoch. New: (epoch:0, offset:0), Current: (epoch:-1, offset:-1) for Partition: greetingtopic-0. Cache now contains 0 entries. (kafka.server.epoch.LeaderEpochFileCache)
2021-09-19 08:43:39,812 INFO [GroupMetadataManager brokerId=0] Scheduling loading of offsets and group metadata from _consumer_offsets-0 (kafka.coordinator.group.GroupMetadataManager)
2021-09-19 08:43:39,819 INFO [GroupMetadataManager brokerId=0] Finished loading offsets and group metadata from _consumer_offsets-0 in 6 milliseconds. (kafka.coordinator.group.GroupMetadataManager)
2021-09-19 08:43:39,870 INFO [GroupCoordinator 0]: Preparing to rebalance group gid with old generation 0 (_consumer_offsets-0) (kafka.coordinator.group.GroupCoordinator)
2021-09-19 08:43:39,883 INFO [GroupCoordinator 0]: Stabilized group gid generation 1 (_consumer_offsets-0) (kafka.coordinator.group.GroupCoordinator)
2021-09-19 08:43:39,895 INFO [GroupCoordinator 0]: Assignment received from leader for group gid for generation 1 (kafka.coordinator.group.GroupCoordinator)
2021-09-19 08:43:39,908 INFO Updated PartitionLeaderEpoch. New: (epoch:0, offset:0), Current: (epoch:-1, offset:-1) for Partition: _consumer_offsets-0. Cache now contains 0 entries. (kafka.server.epoch.LeaderEpochFileCache)
2021-09-19 08:52:19,030 INFO [GroupMetadataManager brokerId=0] Removed 0 expired offsets in 5 milliseconds. (kafka.coordinator.group.GroupMetadataManager)

```

To implement Order, Payment and Stock Server:

- Create topic for Kafka:

```

C:\Windows\system32\cmd.exe

(c) Microsoft Corporation. All rights reserved.

C:\Users\nguye>zookeeper-shell.bat localhost:2181 ls /brokers/ids
Connecting to localhost:2181

WATCHER::

WatchedEvent state:SyncConnected type:None path:null
[0]

C:\Users\nguye>kafka-topics.bat --create --zookeeper localhost:2181 --replication-factor 1 --partitions 1 --topic greetingtopic
Created topic "greetingtopic".

C:\Users\nguye>kafka-topics.bat --list --zookeeper localhost:2181
greetingtopic

C:\Users\nguye>kafka-topics.bat --create --zookeeper localhost:2181 --replication-factor 1 --partitions 1 --topic productOutOfStockEvent
Created topic "productOutOfStockEvent".

C:\Users\nguye>kafka-topics.bat --create --zookeeper localhost:2181 --replication-factor 1 --partitions 1 --topic orderCreatedEvent
Created topic "orderCreatedEvent".

C:\Users\nguye>kafka-topics.bat --create --zookeeper localhost:2181 --replication-factor 1 --partitions 1 --topic billedOrderEvent
Created topic "billedOrderEvent".

C:\Users\nguye>

```

- Run 3 services:

The screenshot displays the Spring Tool Suite 4 IDE environment. The Package Explorer on the left shows the project structure for 'KafkaEventsStockService'. The main editor shows the 'KafkaTopicsApplication.java' file with the following properties:

```

1 spring.kafka.bootstrap-servers=localhost:9092
2 spring.kafka.consumer.group-id=gid
3 spring.kafka.consumer.auto-offset-reset=earliest
4 spring.kafka.consumer.key-deserializer=org.apache.kafka.common.serialization.StringDeserializer
5 spring.kafka.consumer.value-deserializer=org.apache.kafka.common.serialization.StringDeserializer
6 spring.kafka.producer.key-serializer=org.apache.kafka.common.serialization.StringSerializer
7 spring.kafka.producer.value-serializer=org.apache.kafka.common.serialization.StringSerializer
8
9 app.topic.greetingtopic=greetingtopic
10 app.topic.orderCreatedEvent=orderCreatedEvent
11 app.topic.billedOrderEvent=billedOrderEvent
12 app.topic.productOutOfStockEvent=productOutOfStockEvent
13
14 logging.level.root=ERROR
15 org.springframework=ERROR
16

```

The Console at the bottom shows the application running and sending/receiving messages:

```

:: Spring Boot :: (v2.5.4)

sending message (productOutOfStockEvent)=Spring Kafka and Spring Boot - send ORDER_CREATED_EVENT to topic=productOutOfStockEvent
received message (billedOrderEvent)=Spring Kafka and Spring Boot - send ORDER_CREATED_EVENT
kafka_offset: 0
kafka_consumer: org.apache.kafka.clients.consumer.KafkaConsumer@7ce88dc
kafka_timestampType: CREATE_TIME
kafka_receivedPartitionId: 0
kafka_receivedTimestamp: 1632060829283
kafka_groupId: gid
received message (billedOrderEvent)=Spring Kafka and Spring Boot - send ORDER_CREATED_EVENT
kafka_offset: 1
kafka_consumer: org.apache.kafka.clients.consumer.KafkaConsumer@7ce88dc
kafka_timestampType: CREATE_TIME
kafka_receivedPartitionId: 0
kafka_receivedTopic: billedOrderEvent
kafka_receivedTimestamp: 1632061079193
kafka_groupId: gid

```

Please refer attached codes.