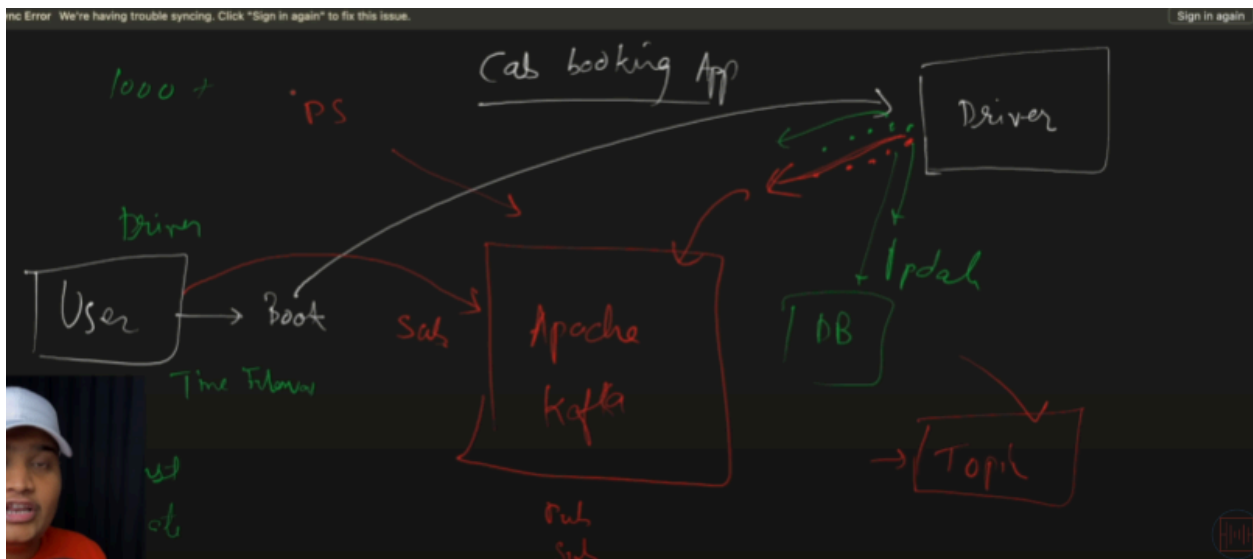


## Apache Kafka

```
graph LR; Sender[Sender] -- Publish --> Kafka[Kafka]; Receiver[Receiver] -- Subscribe --> Kafka;
```

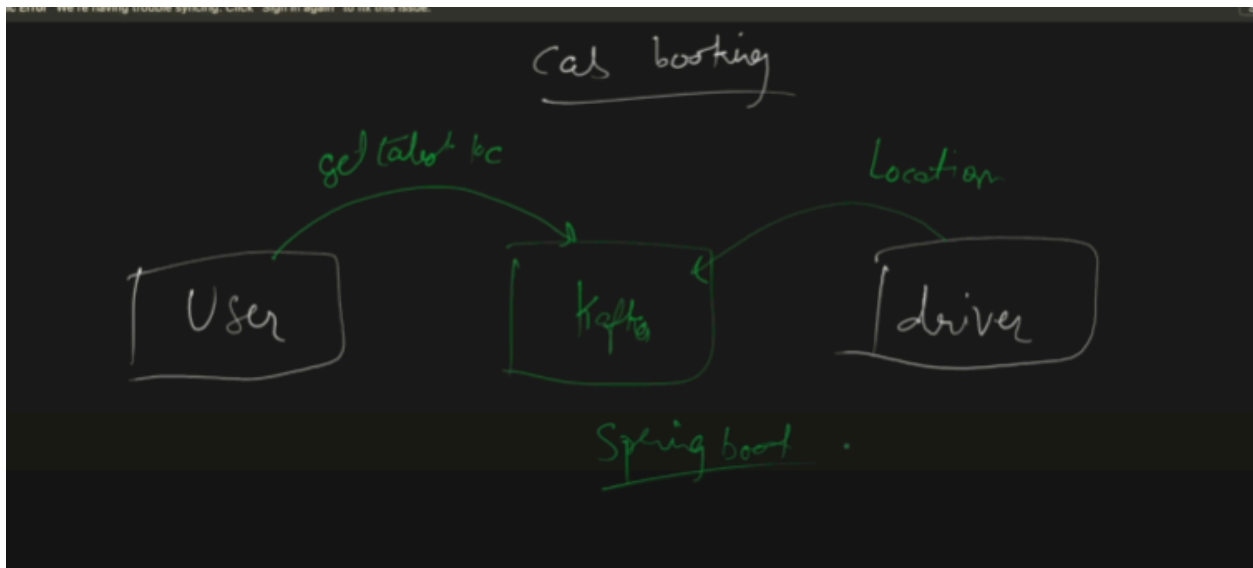
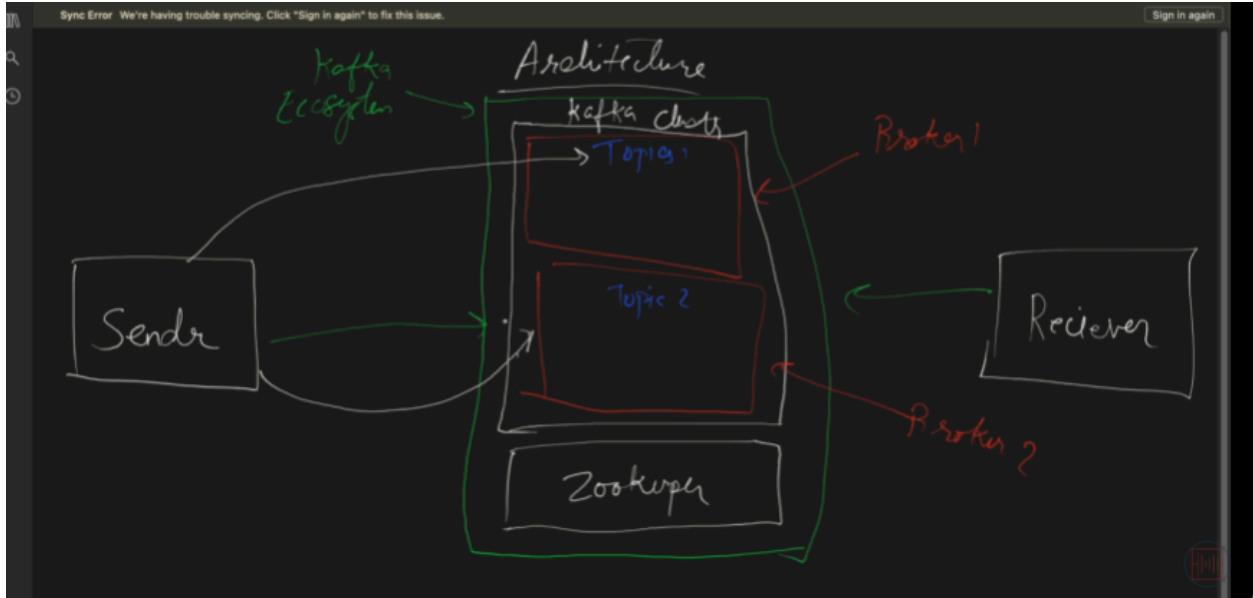
The diagram illustrates the basic flow of data in Apache Kafka. It consists of three main components: a **Sender**, a **Kafka** cluster, and a **Receiver**. The **Sender** publishes data to the **Kafka** cluster, and the **Receiver** subscribes to the **Kafka** cluster to receive the data.



Why

- High Throughput
- Fault Tolerant (Replicas)
- Scalable.

- High Throughput
- Fault Tolerant (Replicas)
- Scalable.





## Project

☐ Gradle - Groovy ☐ Gradle - Kotlin ☒ Maven

## Language

☒ Java ☐ Kotlin ☐ Groovy

## Spring Boot

☐ 3.4.1 (SNAPSHOT) ☒ 3.4.0 ☐ 3.3.7 (SNAPSHOT) ☐ 3.3.6

## Project Metadata

Group

Artifact

Name

Description

Package name

Packaging ☒ Jar ☐ War

Java ☐ 23 ☐ 21 ☒ 17

## Dependencies

ADD ...

## Dependencies

ADD ...

### Spring Web WEB

Build web, including RESTful, applications using Spring MVC. Uses Apache Tomcat as the default embedded container.



### Spring for Apache Kafka MESSAGING

Publish, subscribe, store, and process streams of records.



### Lombok DEVELOPER TOOLS

Java annotation library which helps to reduce boilerplate code.



**Project**

☐ Gradle - Groovy ☐ Gradle - Kotlin ☒ Maven

**Language**

☒ Java ☐ Kotlin ☐ Groovy

**Spring Boot**

☐ 3.4.1 (SNAPSHOT) ☒ 3.4.0 ☐ 3.3.7 (SNAPSHOT) ☐ 3.3.6

**Project Metadata**

Group

Artifact

Name

Description

Package name

Packaging ☒ Jar ☐ War

Java ☐ 23 ☐ 21 ☒ 17

**Dependencies**[ADD ...](#)

**ADD ...**

**WEB**



## MESSAGING



## DEVELOPER TOOLS



```

C:\kafka\bin\windows>zookeeper-server-start.bat C:\kafka\config\zookeeper.properties
[2024-12-17 10:48:07,275] INFO Reading configuration from: C://kafka/config/zookeeper.properties (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,296] WARN tmp/zookeeper is relative. Prepend \ to indicate that you're sure! (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,298] INFO clientPortAddress is 0.0.0.0:2181 (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,299] INFO secureClientPort is not set (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,299] INFO observerMasterPort is not set (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,300] INFO metricsProvider.className is org.apache.zookeeper.metrics.impl.DefaultMetricsProvider (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,301] INFO autopurge.snapshotCount is set to 3 (org.apache.zookeeper.server.DatadirCleanManager)
[2024-12-17 10:48:07,304] INFO autopurge.purgeInterval is set to 0 (org.apache.zookeeper.server.DatadirCleanManager)
[2024-12-17 10:48:07,304] INFO Purge task is not scheduled. (org.apache.zookeeper.server.DatadirCleanManager)
[2024-12-17 10:48:07,304] WARN Either no config or no quorum defined in config, running in standalone mode (org.apache.zookeeper.server.quorum.QuorumPeerMain)
[2024-12-17 10:48:07,306] INFO Log4j 1.2 jmx support not found; jmx disabled. (org.apache.zookeeper.jmx.ManagedUtil)
[2024-12-17 10:48:07,308] INFO Reading configuration from: C://kafka/config/zookeeper.properties (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,309] WARN tmp/zookeeper is relative. Prepend \ to indicate that you're sure! (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,310] INFO metricsProvider.className is 0.0.0.0:2181 (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,309] INFO secureClientPort is not set (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,312] INFO observerMasterPort is not set (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,312] INFO metricsProvider.className is org.apache.zookeeper.metrics.impl.DefaultMetricsProvider (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2024-12-17 10:48:07,312] INFO Starting server (org.apache.zookeeper.server.ZooKeeperServerMain)
[2024-12-17 10:48:07,311] INFO ServerMetrics initialized with provider org.apache.zookeeper.metrics.impl.DefaultMetricsProvider@3b5047d3 (org.apache.zookeeper.server.ServerMetrics)
[2024-12-17 10:48:07,335] INFO ACL digest algorithm is: SHA1 (org.apache.zookeeper.server.auth.DigestAuthenticationProvider)
[2024-12-17 10:48:07,335] INFO ZooKeeper authenticationProvider.enabled = true (org.apache.zookeeper.server.auth.DigestAuthenticationProvider)
[2024-12-17 10:48:07,339] INFO zookeeper.snapshot.trust.empty = false (org.apache.zookeeper.server.persistence.FileTxnSnapLog)
[2024-12-17 10:48:07,364] INFO (org.apache.zookeeper.server.ZooKeeperServer)
[2024-12-17 10:48:07,365] INFO (org.apache.zookeeper.server.ZooKeeperServer)
[2024-12-17 10:48:07,365] INFO (org.apache.zookeeper.server.ZooKeeperServer)
[2024-12-17 10:48:07,365] INFO (org.apache.zookeeper.server.ZooKeeperServer)
[2024-12-17 10:48:07,366] INFO (org.apache.zookeeper.server.ZooKeeperServer)
[2024-12-17 10:48:07,366] INFO (org.apache.zookeeper.server.ZooKeeperServer)
[2024-12-17 10:48:07,366] INFO (org.apache.zookeeper.server.ZooKeeperServer)
[2024-12-17 10:48:07,366] INFO (org.apache.zookeeper.server.ZooKeeperServer)

```

```
C:\kafka\bin\windows>kafka-server-start.bat C://kafka//config//server.properties
```

```

member to rejoin with this id. (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:11,922] INFO [GroupCoordinator 0]: Preparing to rebalance group console-consumer-19002 in state PreparingRebalance with old generation 0 (__consumer_offsets-33) (reason: Adding new member console-consumer-b95a47b4-5a6d-4783-ab88-684a2e881618 with group instance id none; client reason: need to re-join with the given member id: console-consumer-b95a47b4-5a6d-4783-ab88-684a2e881618) (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:11,923] INFO [ReplicaFetcherManager on broker 0] Removed fetcher for partitions Set(DriverLocation-0) (kafka.server.ReplicaFetcherManager)
[2024-12-17 11:20:11,927] INFO [GroupCoordinator 0]: Stabilized group console-consumer-19002 generation 1 (__consumer_offsets-33) with 1 members (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:11,931] INFO [LogLoader partition=DriverLocation-0, dir=C:\tmp\kafka-logs] Loading producer state till offset 0 with message format version 2 (kafka.log.UnifiedLog)
[2024-12-17 11:20:11,934] INFO Created log for partition DriverLocation-0 in C:\tmp\kafka-logs\DriverLocation-0 with properties {} (kafka.log.LogManager)
[2024-12-17 11:20:11,938] INFO [Partition DriverLocation-0 broker=0] No checkpointed highwatermark is found for partition DriverLocation-0 (kafka.cluster.Partition)
[2024-12-17 11:20:11,938] INFO [Partition DriverLocation-0 broker=0] Log loaded for partition DriverLocation-0 with initial high watermark 0 (kafka.cluster.Partition)
[2024-12-17 11:20:12,020] INFO [GroupCoordinator 0]: Assignment received from leader console-consumer-b95a47b4-5a6d-4783-ab88-684a2e881618 for group console-consumer-19002 for generation 1. The group has 1 members, 0 of which are stable. (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:12,271] INFO [GroupCoordinator 0]: Preparing to rebalance group console-consumer-19002 in state PreparingRebalance with old generation 1 (__consumer_offsets-33) (reason: Leader console-consumer-b95a47b4-5a6d-4783-ab88-684a2e881618 re-joining group during Stable; client reason: cached metadata has changed) (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:12,273] INFO [GroupCoordinator 0]: Stabilized group console-consumer-19002 generation 2 (__consumer_offsets-33) with 1 members (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:12,455] INFO [GroupCoordinator 0]: Assignment received from leader console-consumer-b95a47b4-5a6d-4783-ab88-684a2e881618 for group console-consumer-19002 for generation 2. The group has 1 members, 0 of which are stable. (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:39,780] INFO [GroupCoordinator 0]: Member console-consumer-baa84b99-bd6d-457a-ab29-43c67dd38a75 in group console-consumer-53127 has failed, removing it from the group (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:39,787] INFO [GroupCoordinator 0]: Preparing to rebalance group console-consumer-53127 in state PreparingRebalance with old generation 3 (__consumer_offsets-49) (reason: removing member console-consumer-baa84b99-bd6d-457a-ab29-43c67dd38a75 on heartbeat expiration) (kafka.coordinator.group.GroupCoordinator)
[2024-12-17 11:20:39,789] INFO [GroupCoordinator 0]: Group console-consumer-53127 with generation 4 is now empty (__consumer_offsets-49) (kafka.coordinator.group.GroupCoordinator)

```

Start the consumer and listen the broker 9092 and topic DiverLocation

C:\kafka\bin\windows>kafka-console-consumer.bat --bootstrap-server localhost:9092 --topic DriverLocation --from-beginning

```

C:\kafka\bin\windows>kafka-console-consumer.bat --bootstrap-server localhost:9092 --topic DriverLocation --from-beginning
[2024-12-17 11:20:11,868] WARN [Consumer clientId=console-consumer, groupId=console-consumer-19002] Error while fetching metadata with correlation id 2 : (DriverLocation=LEADER_NOT_AVAILABLE) (org.apache.kafka.clients.NetworkClient)
[2024-12-17 11:20:12,005] WARN [Consumer clientId=console-consumer, groupId=console-consumer-19002] Error while fetching metadata with correlation id 8 : (DriverLocation=LEADER_NOT_AVAILABLE) (org.apache.kafka.clients.NetworkClient)

```

Creating producer in springboot

Create bean for topic creation in config package under the kafkaconfig class

```

package com.cab_book_driver_kafka.cab_book_driver_kafka.config;

import org.apache.kafka.clients.admin.NewTopic;
import org.springframework.beans.factory.annotation.Configurable;
import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.kafka.config.TopicBuilder;
import org.springframework.stereotype.Component;

import com.cab_book_driver_kafka.cab_book_driver_kafka.constants.CabBookDriverConstants;

@Component
@Configuration
public class KafkaConfig {

    //creating kafka topic with default configurations
    @Bean
    public NewTopic topic() {
        return TopicBuilder
            .name(CabBookDriverConstants.DRIVER_LOCATION_TOPIC)
            .build();
    }
}

```

Write below properties in application.properties

```

CabBookDriverConstants.java  KafkaConfig.java  Cabbookcontroller.java  application.properties  Cabbookservice.java  CabBookDriverKafkaApplication.java
1 spring.application.name=cab-book-driver-kafka
2 |
3 server.port=8081
4 spring.kafka.producer.bootstrap-servers=localhost:9092
5 spring.kafka.producer.key-serializer=org.apache.kafka.common.serialization.StringSerializer
6 spring.kafka.producer.value-serializer=org.apache.kafka.common.serialization.StringSerializer

```

## Controller

```

@RestController
@RequestMapping("/driver-location")
public class Cabbookcontroller {

    @Autowired
    public Cabbookservice cabbookservice;

    @GetMapping("/get-location")
    public ResponseEntity updateDriverLocationValue() throws InterruptedException {

        int range = 100;
        while (range > 0) {
            cabbookservice.updateDriverLocationValue(Math.random()+" "+Math.random());
            Thread.sleep(1000);
            range--;
        }

        return new ResponseEntity<>(Map.of("message", "Location Updated")
        , HttpStatus.OK);
    }
}

```

## Constants class for topics

```

package com.cab_book_driver_kafka.cab_book_driver_kafka.constants;

public class CabBookDriverConstants {

    public static final String DRIVER_LOCATION_TOPIC="DriverLocation";
}

```

## Service class



```

package com.cab_book_driver_kafka.cab_book_driver_kafka.services;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.kafka.core.KafkaTemplate;
import org.springframework.stereotype.Service;

import com.cab_book_driver_kafka.cab_book_driver_kafka.constants.CabBookDriverConstants;

@Service
public class Cabbookservice {
    @Autowired
    KafkaTemplate<String, Object> kafkaTemplate;

    public boolean updateDriverLocationValue(String location) {
        //sending message to kafka broker with topic and message
        kafkaTemplate.send(CabBookDriverConstants.DRIVER_LOCATION_TOPIC,location);
        return true;
    }
}

```

## Run the spring boot application

```

.truststore.location = null
.truststore.password = null
.truststore.type = JKS

11:31:31.411+05:30 INFO 8648 --- [cab-book-driver-kafka] [main] o.a.kafka.common.utils.AppInfoParser : Kafka version: 3.8.1
11:31:31.412+05:30 INFO 8648 --- [cab-book-driver-kafka] [main] o.a.kafka.common.utils.AppInfoParser : Kafka commitId: 70d6ff42debf
11:31:31.412+05:30 INFO 8648 --- [cab-book-driver-kafka] [main] o.a.kafka.common.utils.AppInfoParser : Kafka startTimeMs: 173441529
11:31:31.698+05:30 WARN 8648 --- [cab-book-driver-kafka] [r-kafka-admin-0] o.a.k.clients.admin.KafkaAdminClient : [AdminClient clientId=cab-bo
11:31:31.703+05:30 INFO 8648 --- [cab-book-driver-kafka] [r-kafka-admin-0] o.a.kafka.common.utils.AppInfoParser : App info kafka.admin.client
11:31:31.708+05:30 INFO 8648 --- [cab-book-driver-kafka] [r-kafka-admin-0] o.apache.kafka.common.metrics.Metrics : Metrics scheduler closed
11:31:31.708+05:30 INFO 8648 --- [cab-book-driver-kafka] [r-kafka-admin-0] o.apache.kafka.common.metrics.Metrics : Closing reporter org.apache.l
11:31:31.708+05:30 INFO 8648 --- [cab-book-driver-kafka] [r-kafka-admin-0] o.apache.kafka.common.metrics.Metrics : Metrics reporters closed
11:31:31.722+05:30 INFO 8648 --- [cab-book-driver-kafka] [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8081
11:31:31.730+05:30 INFO 8648 --- [cab-book-driver-kafka] [main] c.c.c.CabBookDriverKafkaApplication : Started CabBookDriverKafkaAp

```

Go to Settings to activate Windows.

## Run the api in post man

http://localhost:8081/driver-location/get-location

GET http://localhost:8081/driver-location/get-location

Params Authorization Headers (6) Body Scripts Tests Settings Cookies

Query Params

Key	Value	Description
Key	Value	Description

## See the consumer in console

```
0.23909335356473793 0.7825976759788888
0.9946789581628615 0.5917942357968645
0.5620840244135408 0.7591921656880118
0.805452066787083144 0.5544154485088718
0.7310500934190503 0.2646143605102219
0.6459611389478556 0.011150791654462311
0.872185252811486 0.5313907297279305
0.3327458272895726 0.35924712842650486
0.429563154869214856 0.7022407736265678
0.6217483801734355 0.04723899150888805
0.23536739677701735 0.07907512904882814
0.6052351118165803 0.50748716652768
0.0318060808033239 0.275552583391514
0.8634609812767827 0.13758875685671807
0.8162268933520252 0.5724517218880202
0.4443646861978551 0.8617273695988323
0.22445286738395575 0.055901174758590355
```

http://localhost:8081/driver-location/get-location

GET http://localhost:8081/driver-location/get-location

Params Authorization Headers (6) Body Scripts Tests Settings

Query Params

Key	Value	Description
Key	Value	Description

Body Cookies Headers (5) Test Results

200 OK 1 m 41.22 s 194 B

Pretty Raw Preview Visualize JSON

```
1 {
2   "message": "Location Updated"
3 }
```

## Creating consumer applications

Project Explorer

- cab-book-driver-kafka [boot]
- cab-book-user-kafka [boot]
  - src/main/java
    - com.cab\_book\_user\_kafka.cab\_book\_user\_kafka
      - com.cab\_book\_user\_kafka.cab\_book\_user\_kafka.services
        - CabBookUserKafkaApplication.java
  - src/main/resources
    - static
    - templates
    - application.properties
  - src/test/java
    - JRE System Library [JavacSE-17]
    - Maven Dependencies
    - target/generated-sources/annotations
    - target/generated-test-sources/test-annotations
    - src
    - target
    - HELP.md
    - mvnw
    - mvnw.cmd
    - pom.xml
  - javacomperts [boot]
  - junipractice [boot] [devtools]
  - merchantfeedbackmanagementsystembackend [boot] [devtools]
  - springbootdemo [boot] [devtools]

```
1 spring.application.name=cab-book-user-kafka
2 server.port=8082
3 spring.kafka.consumer.bootstrap-servers=localhost:9992
4 spring.kafka.consumer.key-serializer=org.apache.kafka.common.serialization.StringSerializer
5 spring.kafka.consumer.value-serializer=org.apache.kafka.common.serialization.StringSerializer
6 spring.kafka.consumer.group-id=user-group
7 spring.kafka.consumer.auto-offset-reset=earliest
```

Console Problems Debug Shell

cab-book-driver-kafka - CabBookDriverKafkaApplication [Spring Boot App] C:\Program Files\Java\jdk-21\bin\javaw.exe (Dec 17, 2024, 11:31:28 AM) [pid: 8648]

## Service

```

1 package com.cab_book_user_kafka.cab_book_user_kafka.services;
2
3 import org.springframework.kafka.annotation.KafkaListener;
4 import org.springframework.stereotype.Service;
5
6 @Service
7 public class LocationService {
8
9     @KafkaListener(topics = "DriverLocation", groupId = "user-group")
10    public void cabLocation(String location) {
11        System.out.println(location);
12    }
13 }

```

## Output for consumer

```

cab-book-user-kafka - CabBookUserKafkaApplication [Spring Boot App] C:\Program Files\Java\jdk-21\bin\javaw.exe (Dec 17, 2024, 11:43:42 AM) [pid: 6180]
2024-12-17T11:43:45.637+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=
2024-12-17T11:43:45.637+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=
2024-12-17T11:43:45.640+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=
2024-12-17T11:43:45.645+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=
2024-12-17T11:43:45.651+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=
2024-12-17T11:43:45.652+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerCoordinator : [Consumer clientId=
2024-12-17T11:43:45.654+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] k.c.c.i.ConsumerRebalanceListenerInvoker : [Consumer clientId=
2024-12-17T11:43:45.660+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] o.a.k.c.c.internals.ConsumerUtils : Setting offset for
2024-12-17T11:43:45.661+05:30 INFO 6180 --- [cab-book-user-kafka] [ntainer#0-0-C-1] o.s.k.l.KafkaMessageListenerContainer : user-group: partiti
0.8109246962516506 0.13427071117993727
0.7545896306286933 0.5779911800052049
0.699060881243009 0.022145335310139846
0.25783692055748386 0.5962947381171261
0.8544037786734225 0.13312715476785042
0.7430099088842546 0.8207191017794631

```

Activate Windows  
Go to Settings to activate Windows.