

Lab 13:

In this lab we are going to design and build a car speed monitoring system. Somewhere on the interstate in Iowa are 2 cameras installed. The distance between camera1 and camera2 is $\frac{1}{2}$ mile. On this interstate the maximum speed is 70 miles/hour.

Both cameras make a picture of every car that passes, and the cameras have build in image recognition software that detects and extracts the license plate. The cameras create the following record for every car that passes the camera:

```
public class SensorRecord {  
    public String licencePlate;  
    public int minute;  
    public int second;  
    public int cameraId;
```

The cameras are connected to a kafka messaging system.

Camera1 publishes its SensorRecords into the topic **cameratopic1**

Camera2 publishes its SensorRecords into the topic **cameratopic2**

Given is the project **InterstateTrafficSensor** that simulates both cameras. If you run it, it will publish many SensorRecords into kafka.

Our first job is to calculate the speed of every car.

(speed in miles per hour = $0.5 / \text{time in seconds} * 3600$).

Then we only need to handle the cars that drive more than 72 miles/hour. Because our detection systems are not 100% accurate, we allow a maximum speed of 72 miles/hour.

Once we know which cars drive more than 72 miles/hour, we need to know the owner information that is registered with the particular license plate. Of we know the owner information, then we have to calculate the fee that this owner has to pay. The formula is as follows:

72 – 77 miles/hour = \$ 25

77 - 82 miles/hour = \$ 45

82 – 90 miles/hour = \$ 80

> 90 miles/hour = \$ 125

Implement this system in a stream based microservice architecture.