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Online Vehicle Rental System

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Abstract: The main objective of the paper is to discuss a customer-centric vehicle rental process with state-of-the-art technology. By digitalizing the manual process of document verification, selecting a vehicle and also the payment process the end user will have a smooth experience of renting a vehicle.Digitalizing the service will give the customer a choice of booking from anywhere and any time.The system is very convenient in case where the customer is new to a city or a place and when customer prefers to checkout himself rather than using agents to avail the benefit of booking and renting a vehicle.The system will also be providing various features like additional driver,protections etc for the customer and thus enriching the rental experience.

Keywords: kafka; OTP; microservice; java; spring boot

1. INTRODUCTION

We certainly consider online shopping,online banking etc.Similarly,the project aims in digitalizing the rental system thus adding to the digitalization of world.Currently there are various vehicle rental giants who offer online services of vehicle booking and renting,but those either involve manual interaction with agents or consumes a lot of time.Even though there are public services available in almost all places the joy of having own vehicle will give high degree of freedom to move.Considering users who are new to places, its difficult to cope up with public transportation and timings associated with it.This would greatly restrict the freedom of user.Providing users with a service which can help them overcome these various challenges is need of an hour.The proposed system is designed to address these issues faced by users and give them a rich experience.Here user need not own a vehicle instead user can rent a vehicle on demand by booking it. Presently all the steps are manual,hence time consuming and it's really difficult to track each vehicle. Logging and searching is difficult in manual records.

The proposed system digitalizes the manual process of document verification,vehicle selection ,payment and renting a vehicle thus improving existing systems and significant decrease in the time consumed.The system is different from existing ones,here once the booking is done the customer need not wait in a queue for his turn to verify the booking by agent before handing over the vehicle.The user can verify all the details online using proposed system and directly go to the key booth,give the OTP and start renting.This even has major impact on tourism industry.Tourists need not worry about transportation in new places,they can rent the vehicle wherever they want.This eliminates a major constraints on tourism

2. LITERATURE REVIEW

The proposed model depends on the Vehicle Renting System, which is a service we inspected the present working circumstance of the renting technique. Considering the vehicle rental industry and proposing a self drive online car renting system,the procedure of booking a vehicle for the rental reason is manually done[1]. At current renting, users are dependent on a manual system which provides deals to them as a human resource. Nowadays we find Cab Services very easy to book, pay, or drop as they have formed their structures into helpful applications similarly as locales. So there is a need to change the arrangement of the vehicle Renting Service. But the vehicle rental system still works on older systems ,which includes manual interaction, waiting in queue, and waiting for confirmation,allotment of vehicle at a particular location etc. Creating a system where customers can book their automobile for rental and request services across the world[3]. Our system reflects on these problems and brings out a solution of self-driving cars where the whole system would be digitized.

3. METHODOLOGY

The Microservice architecture is being followed where instead of the system being monolithic,we decompose it to independent pieces called services and those are being called on demand, it also is highly maintainable,easily testable,loosely coupled,independently deployable and can be owned by small teams thus making it much easier for debugging and feature changes if any that might arise in future, thus the whole system is being designed.

The project is built using Java and Spring Boot. Considering the features of spring-boot for the microservice architecture it's been used in the development process,Spring-Boot is of great help to create a new service as it gives us features like auto code generation , third party libraries and minimal configuration.It also helps to create a stand alone application.

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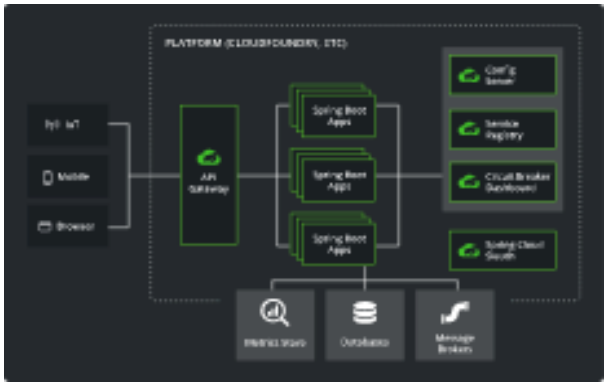

fig.1 Spring-boot architecture[6]

The microservices in the proposed system are booking management service, checkout management service, customer management service and configuration management service.

3.1 Booking

This service will take care of the user making a booking for a vehicle,this phase would be usually done in advance, this includes creating a user trip details so that when the user comes for renting. Booking details will have beginning and ending details of the trip, preference for vehicle, extra protections or features needed that are essential for the trip , and the payment for the trip which will be paid as an advance for booking.

3.2 Checkout

This service is the continuation of the booking service, where he will enter the flow when he would be starting his rental journey, Here users would still be given a freedom to modify some of the booking details. The actual vehicle selection would be happening here, because in the booking, only a group of vehicle identifiers (acriss code) will be considered ,now depending on the identifier and the vehicle availability at that point of time and location, the vehicles would be shown to the user,who will select his choice.The final payment needs to be done here along with refundable cash deposit for security purposes . Once he completes the flow , he can collect the vehicle from the garage , where he would need to show the one time password (OTP) to the agent to collect his vehicle.

3.3 Configuration Management service

As we are considering the microservice architecture and there are many things that will be changing over time , the features would be set configurable. To maintain the configuration the configuration management service is used , which would give all the necessary configs needed,like details of a car,details of a branch etc.

4. CUSTOMER MANAGEMENT SERVICE

This service would collect all the booking details for a user and be used for future trips. Once the user is logged in all the details would be automatically synced and help him rent a vehicle faster and easier. It would also act as a customer care when the user rents a car. Any help in case of emergency needed during the rental will be taken care of by the service.

5. KAFKA

It is used to integrate all the above mentioned services because of its ease of solving the problem of scaling and reliability issues.Its a publish-subscribe model where events are sent by various services when they are available and listened by other services asynchronously.

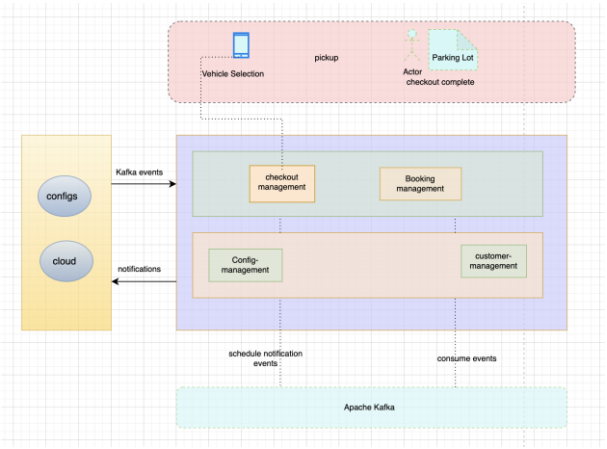

fig.2 System architecture of proposed model

The above diagram describes the work done in a detailed manner.Various services used are depicted. Users will go through the booking and checkout management system which are using other services. The services communicate with each other using kafka events

6· CONCLUSION

The developed system was able to achieve most of the objectives that were considered to be solved, the user is having a smooth flow and there is no middle-man involved which eradicates the communication barrier in different geographical locations.It's time saving since all steps starting from documentation and ending on getting vehicle keys can be done online and gives the freedom of booking/renting a vehicle anytime and anywhere in the world.The system is a self-service model hence customer is the main actor which gives him all power in rental-experience.In coming days this system can also be integrated with new services like delivery and collection service,which would deliver the vehicle to user to preferred location and pickup the same,thus giving user a good rental experience.

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