

AUTOMATION AND DIGITIZATION OF COMMERCIAL LAUNDRIES

Student: Eker Deniz

Project Supervisor: S.L Eng. Claudiu Domuta , PhD

Technical University of Cluj-Napoca

TABLE OF CONTENTS

- Problem Definition
- Objectives
- System Overview
- What can the customer do?
- OTP Verification
- Customer “MyOrder” page
- Online Scheduling for Customers
- Customer Route Tracking/ETA
- Staff Operations
- Driver App
- Routing- Hybrid Algorithm
- Dynamic Route Reconfiguration
- Testing and Verification
- Results/Impact

PROBLEM DEFINITION

- Manual intake, handwritten labels, phone-call-based status updates → bottlenecks
- Time lost with phone calls
- Errors, lost items, slow handovers;
- High delays/errors during peak season(eg. Christmas period)
- No real-time visibility for customers or staff

OBJECTIVES

- Digitize intake and identification (QR Codes)
- Digitize Customers Orders to be Online (not in Agendas)
- Customer self-service with OTP login and live tracking
- Pickup/Delivery with optimized routes and reliable ETAs



State of the Art

Kalsero

- Auto pricing/invoicing, 'Ready' SMS
- Gaps: manual routing;
- No customer visibility

TotalCarpet

- Optimizes route order;
- Gaps: fixed routes (no real-time recalibration)
- No live tracking; single SMS ETA only

Zarpet

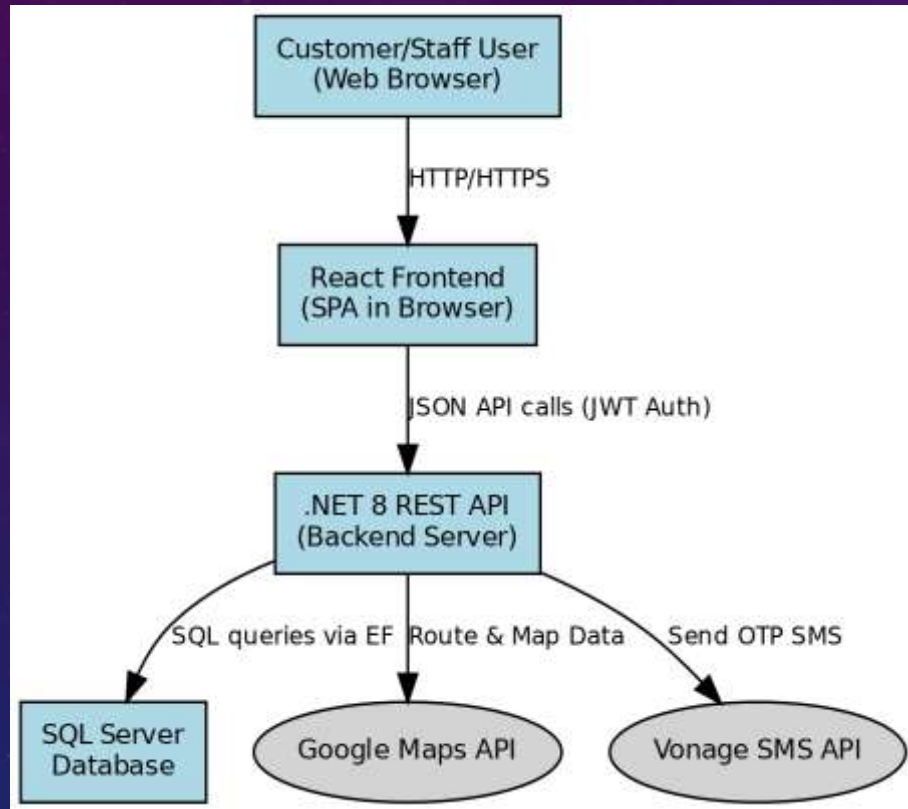
- Customer status via SMS link;
- Gaps: **Appears limited to basic routing**; no evidence of traffic-aware ETAs or mid-route updates

Common Gaps Observed

- No dynamic re-optimization
- No live driver tracking or updating ETAs
- Scheduling, Order management still rely on calls

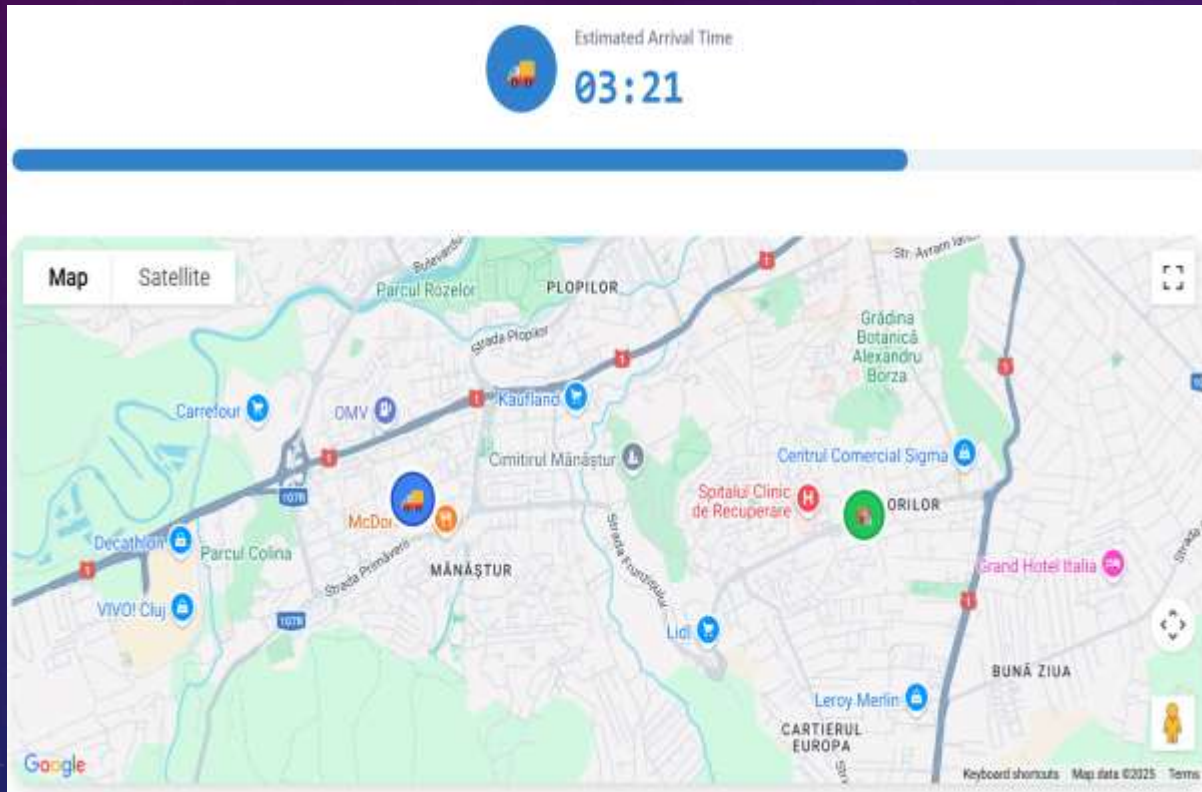
Summary based on vendor materials and observed workflows.

SYSTEM OVERVIEW



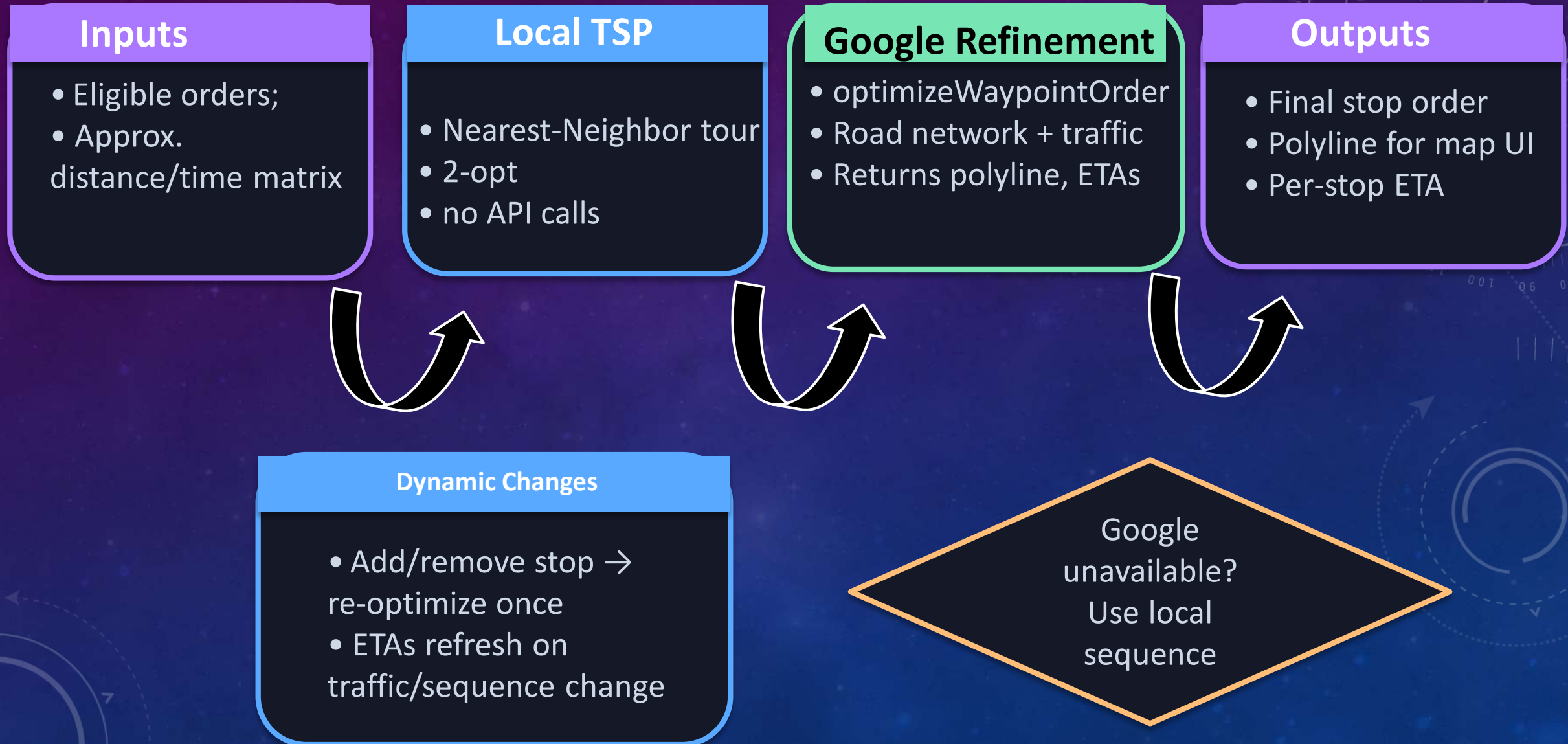
- Frontend: React
- Backend : .NET 8 REST API
- Database: SQL Server
- Google Maps APIs
- Vonage SMS API
- Roles: Customer , Staff , Driver, Admin

CUSTOMER ROUTE TRACKING / ETA

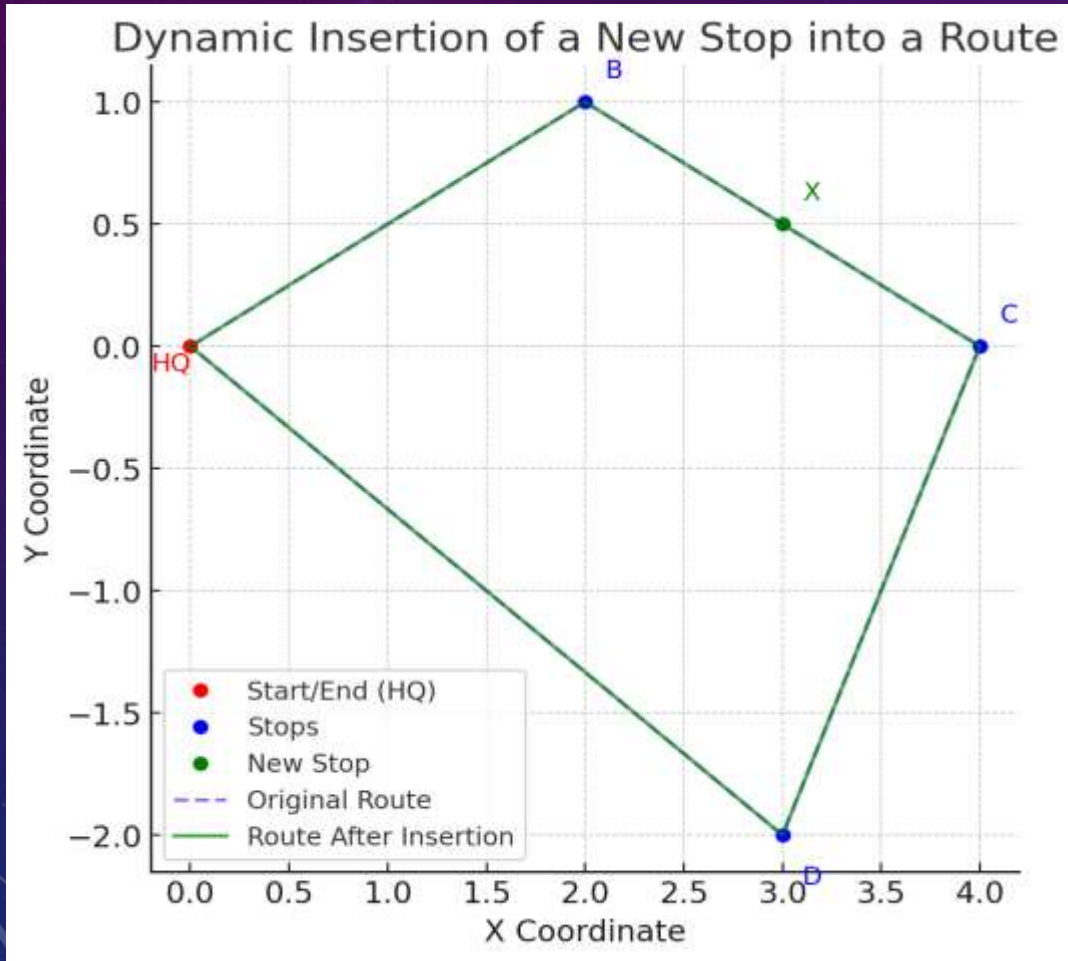


- **Driver location** updates every 5 seconds
- **Live ETA**
- **Privacy:** customer sees **only their stop**

ROUTING — HYBRID ALGORITHM



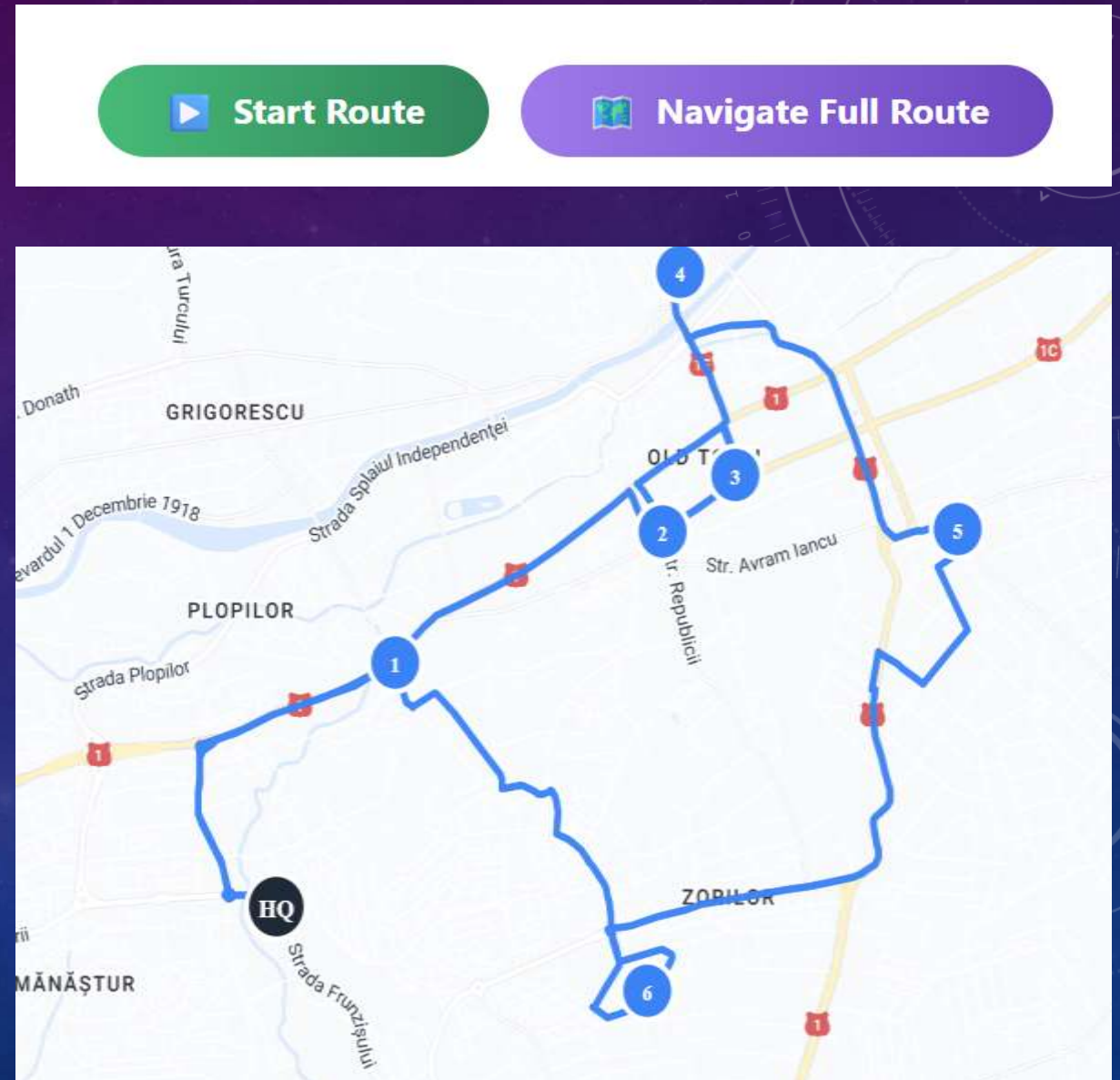
DYNAMIC ROUTE RECONFIGURATION



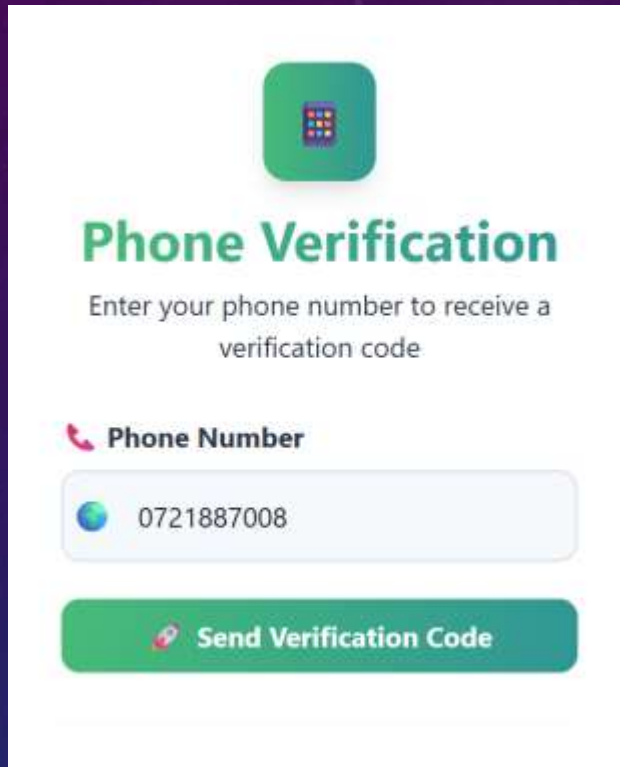
- Add/remove stops → frontend re-optimizes waypoints order
- ETAs refresh on traffic or sequence changes
- Driver app updates stop list

DRIVER APP

- Optimized route
- Start Route -> Start tracking+ETAs
- Add/Remove orders --> reorder stop sequence



OTP VERIFICATION (CUSTOMER LOGIN)



Phone Verification

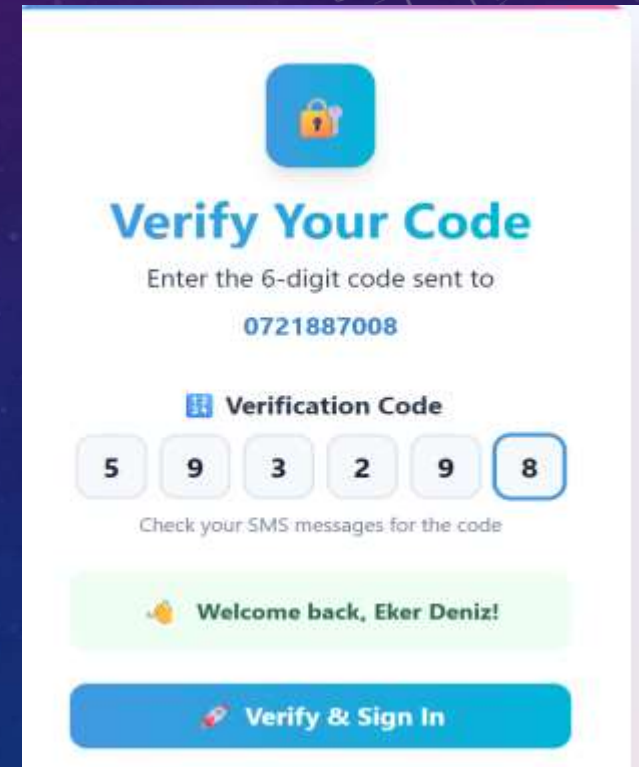
Enter your phone number to receive a verification code

Phone Number

0721887008

Send Verification Code

- OTP login via SMS
- Secure: rate-limited attempts



Verify Your Code

Enter the 6-digit code sent to
0721887008

Verification Code

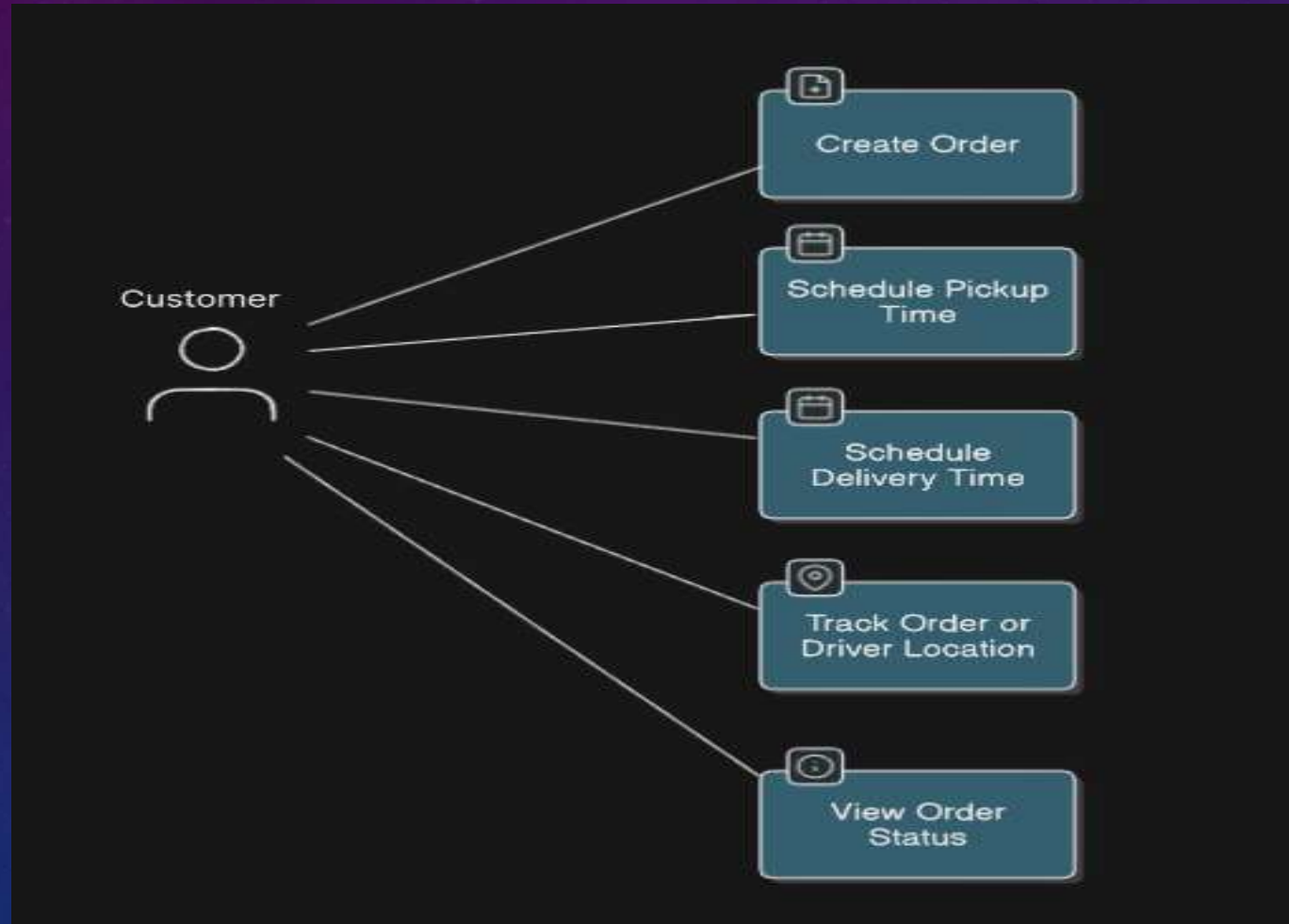
5 9 3 2 9 8

Check your SMS messages for the code

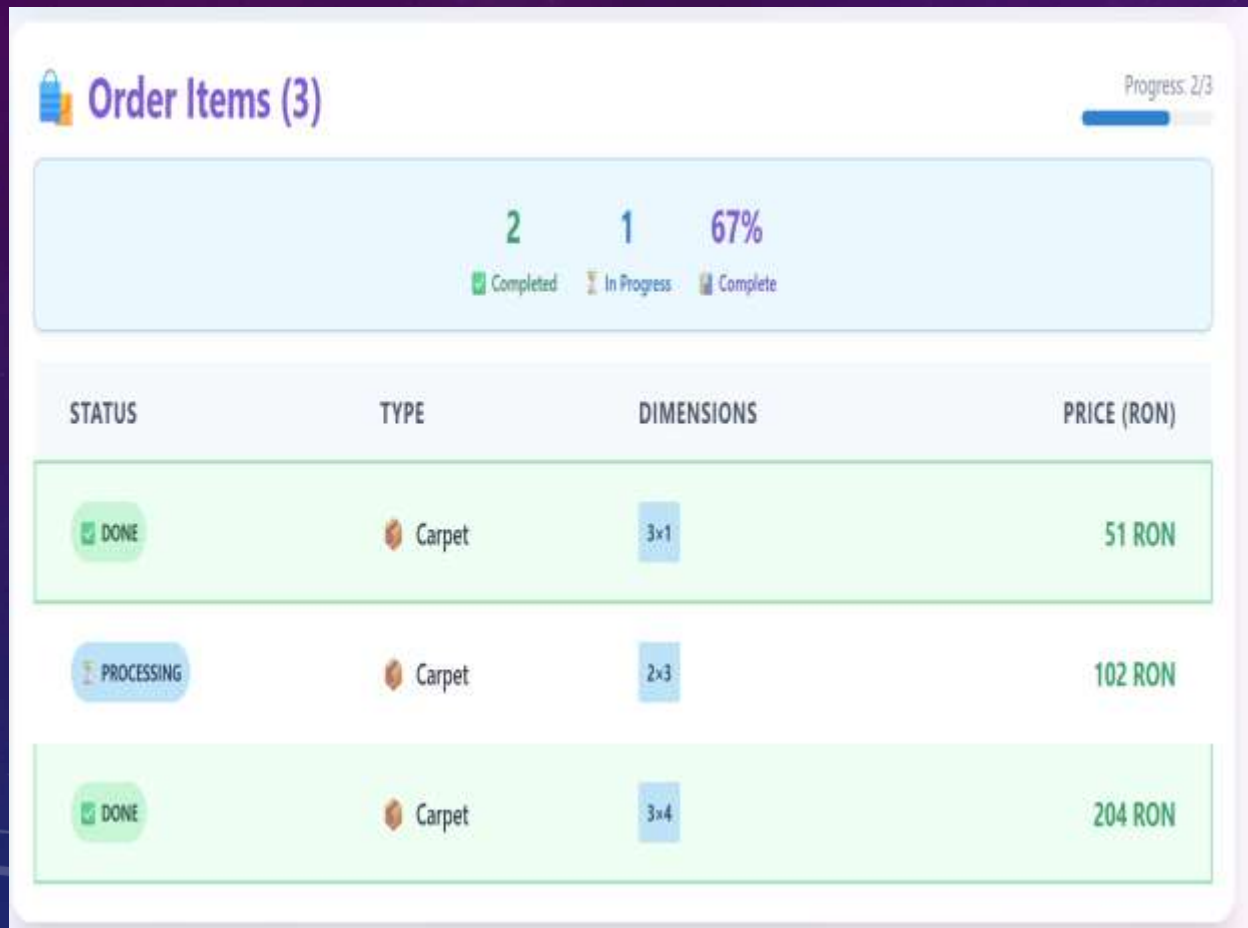
Welcome back, Eker Deniz!

Verify & Sign In

CUSTOMER USE CASE DIAGRAM



CUSTOMER “MY ORDER “ PAGE



- Progress overview
- Per-item status
- Details per item: type, dimensions, price;
- Delivery info: when a route starts, page shows **live ETA and driver's location**

ONLINE SCHEDULING FOR CUSTOMERS

Service Type *

Pickup from your location

Select Pickup Time

Choose Date

Friday, July 11

Available Time Slots for 7/11/2025

09:00 - 11:00 5 SPOTS AVAILABLE Morning slot	11:00 - 13:00 ✓ SELECTED 4 SPOTS AVAILABLE Late morning slot
14:00 - 16:00 5 SPOTS AVAILABLE Afternoon slot	16:00 - 18:00 5 SPOTS AVAILABLE Evening slot

Need a different time?

Don't see a suitable time slot? You can request a custom time and we'll do our best to accommodate you.

[Request Custom Time](#)

- Choose date & time-slot
- Request Custom Time (staff approval via SMS)

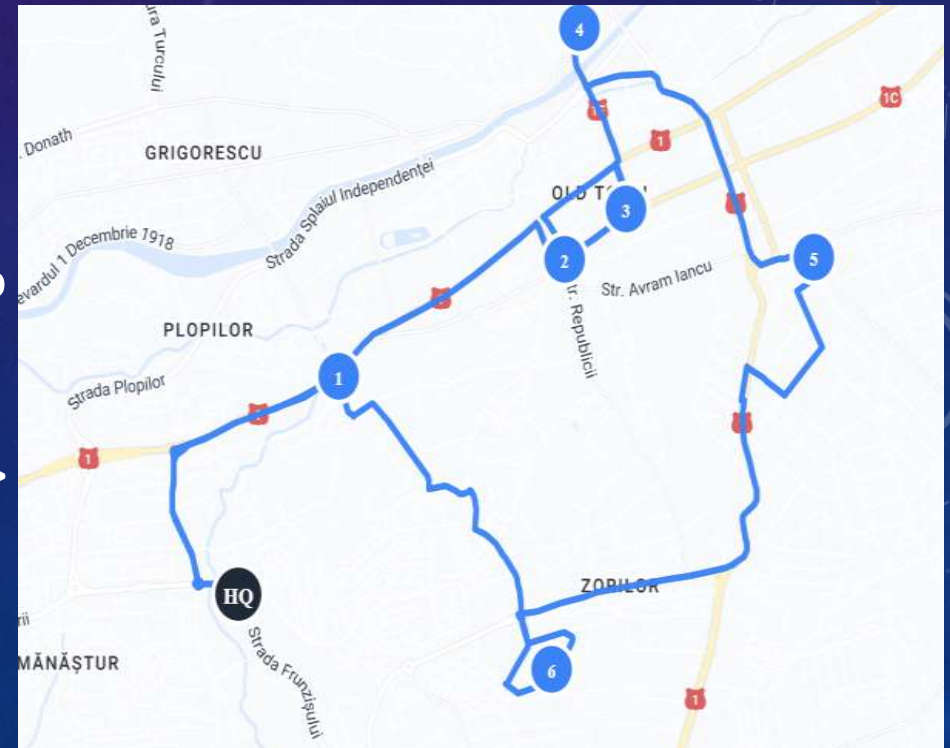
TESTING AND VERIFICATION

- Backend (Swagger): CRUD actions
- Client: map & ETA update on add/remove; OTP + SMS;

initial ->



Adding 1 order to
the existing
route->
reconfiguring ->





Infomessage >

Mesaj text • SMS
vin., 11 iul., 12:52 a.m.

Your code is 746033

Your order #4120 was created! We'll be in touch soon.

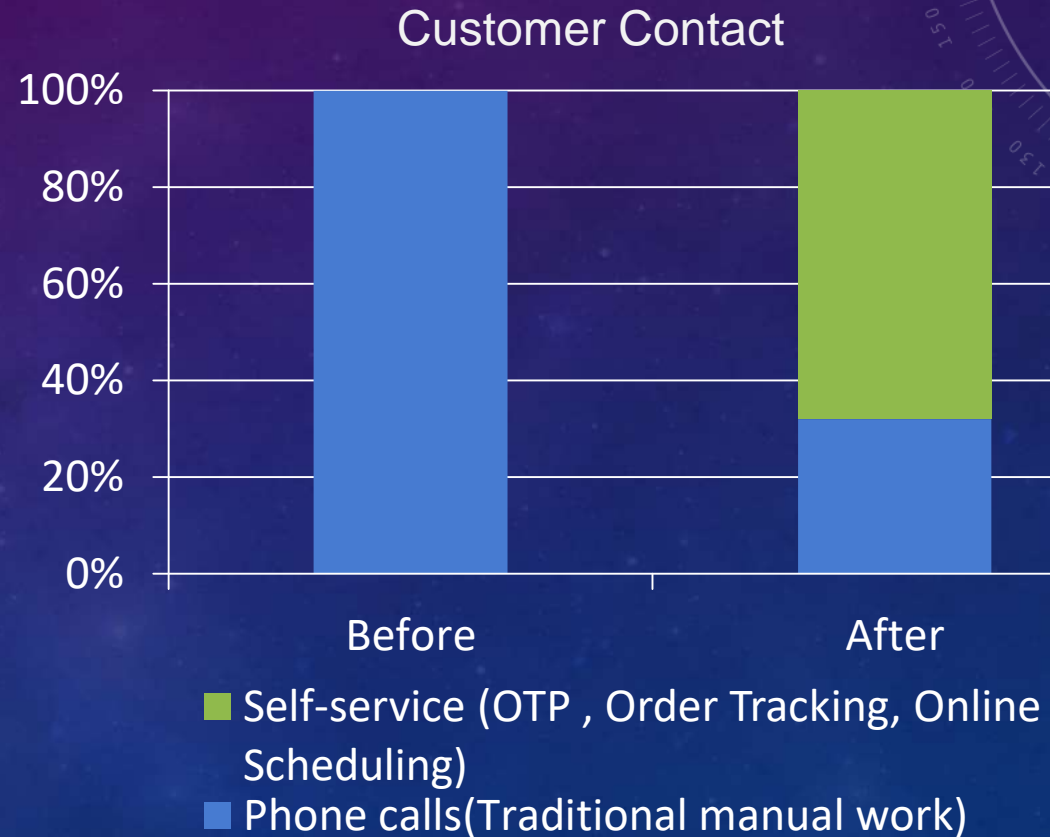
Hello Deniz Eker! Your pickup request for Jul 14, 08:00 has been received. We'll confirm shortly. - Spalatorie

Great news Deniz Eker! Your pickup is confirmed for Jul 14, 08:00. We'll see you then! - Spalatorie

Your order #4120 is on the way! You can track the order live here: <https://www.licentaDemo.com/my-orders/4120>

RESULTS/IMPACT

- OTP login is faster and more comfortable
- Customers check order status online (per-carpet + ETA).
- Routes are visible and trackable → fewer status calls.
- Result: less desk time, quicker handovers, happier customers.



The background is a gradient of deep purple and blue, filled with numerous out-of-focus circular light spots (bokeh) in various shades. Overlaid on this are several faint, white geometric patterns. A prominent feature is a large circular arc on the left side, marked with a degree scale from 40 to 260 in increments of 10. Other smaller circular patterns, some with arrows indicating direction, are scattered across the frame. The overall aesthetic is modern and technical.

THANK YOU!