Software Development Cooperative Carrier Network

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1. Problem description

- Carriers want to optimize their profit of their daily “pickup and delivery“ transport business
- Current decreasing profit
- Solution:
  - Cooperate with other carriers to optimize their profit
  - Implement a system for transport requests and calculate profit
  - Using auction-based model to support privacy of agents

2. Tech stack

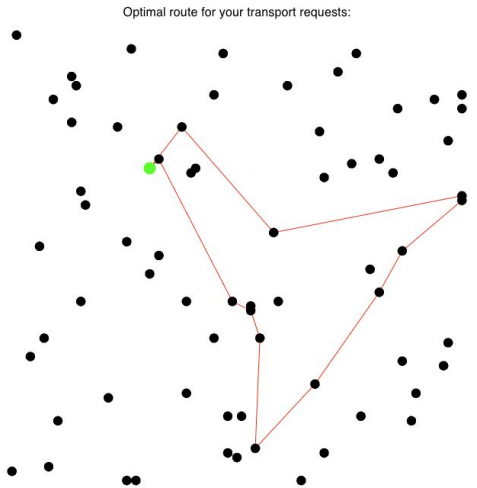
- Backend: Microservice architecture
  - Subsidiary microservice for tour planning -> Flask - Python
  - Main microservice for everything else -> Laravel - PHP
  - Database -> MySQL
- Frontend:
  - React.js
  - CSS for styling

3. Completed tasks

- Agent infrastructure
  - Users: auctioneer and carrier agent -> Using database and tokens for authentication
  - User Interface -> Frontend: Login Page and Register Page
- Selecting transport requests for auction
  - Cost model -> Revenue = Total earnings - Total cost
  - Setting page -> Customizing the cost model (Distance, costs, price, minimum revenue)
- Simple auctions
  - Collect bids from carriers -> Each carrier selects transport request
  - Criterion for bidding -> Only beneficial transport requests
  - Apply Vickery auction
  - End of auction -> No more incoming bids from carriers

3. Completed tasks

- Evaluation
  - For each auction that is done
  - Revenue before and after auction are compared and difference is displayed to carrier agent
  - Along with the price of the auctioned transport requests
- Tour planning
  - OR-Tools (Python package)
- Gitlab & CI
  - Separate CI pipelines for frontend and backend
  - Building the application
  - Linting, code style checks
  - Static analysis, tests



3. Missing tasks

- Auctions with bundles
- Minor UI/UX improvements

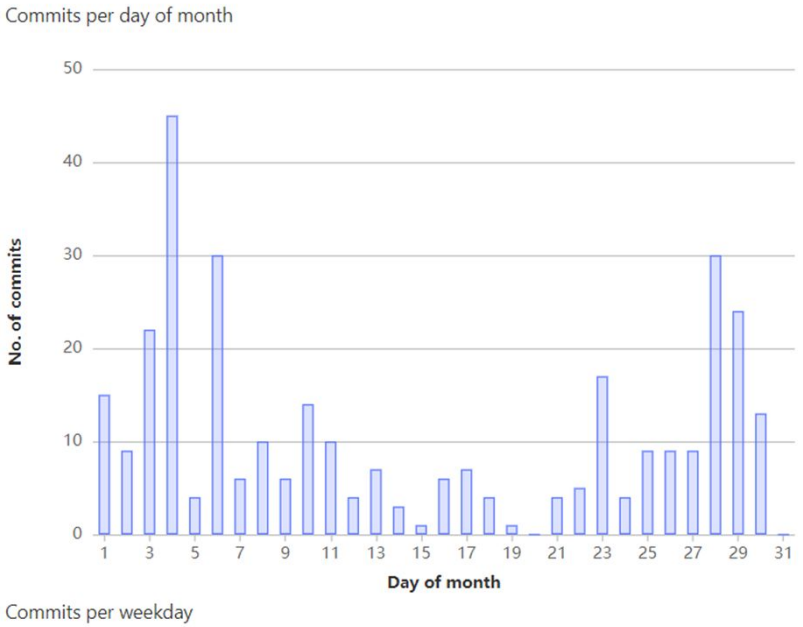
4. Quality of solution

- sell transport requests that are non profitable for the carriers.
- Idea: bid until a certain margin so they can still gain from it instead of losing money.

5. Demo of the application

6. Evaluation of the SCRUM process

- Each Sprint:
  - Backlog: create issues, assign them to team members, estimate working hours…
  - Work on the taks
  - Sprint review
- 4 Sprints
- 37 Issues
- Commit statistics
  - Total: **328 commits**
  - Average per day: **4.6 commits**
  - Authors: **3**



Thank you for your attention!