NaqlX

Implementation of Trucking Marketplace

Ahmed Darwish
Advisor: Dr. Yasmeen Adel
Chair of Decentralized Systems Engineering
https://dse.in.tum.de/

TUM

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Motivation: Research context

- Study the current trucking market in Egypt and MENA region
- Study the proposed trucking solutions in the MENA region
- Introduce a new trucking solution model that fits the market needs for better matchmaking
- Introduce a cost estimation model to estimate the shipment cost
- Real-life testing of the proposed solution

State-of-the-art

B2B trucking marketplaces trading models

- Fixed-prices (catalog)
- One on-one negotiations (post and search)
- Dynamic pricing (auctions, exchanges)

Research gap

- Lack of flexibility in the current solutions in the MENA region

- Discussing an implementation of trucking marketplace

- Charge rate of the shipment is influenced by multiple of factors

- A cost estimation equation is proposed to calculate the cost of the shipment

Problem statement

- Better matchmaking module between customers and vendors in the trucking industry in Egypt and MENA region.
- Cost estimation module for road transportation in Egypt

Background-topic

A thesis presented on the implementation of trucking marketplace, beginning with

a study about trucking marketplaces globally, and details in the Egyptian market.

Furthermore, it discusses the implementation of the proposed system in the Egyptian

market and the potential solutions it provides for the trucking industry. Furthermore,

a cost estimation equation is proposed to calculate the cost of the shipment. Finally,

general discussion about the advantages and disadvantages of the proposed solution

is mentioned.

System: NaqlX

Introduce the system

System design goals:

- Offers auction based assignment between stakeholders

- Transparency

- Flexibility

- Cost efficiency

Outline

- ~~Motivation~~

- Background
  - Existing solutions
    - On-demand orders models in the existing solutions
    - Contract models in the existing solutions
  - Comparison between different systems

- Design

- Implementation

- Evaluation

Background-topic

Naqla:

Naqla sets a fixed rate with each of its vendors, once the order is placed from the customer side, the operation team contacts the vendors and check if they are able to fulfil the order. Then upon matching a vendor with the respected order the rate of this shipment is sent to the customer.

Contract-based model, Naqla fixes the rates with customers for fixed corridors for fixed duration, and on the other hand, it makes contract with the vendor side to fulfil those contracts.

Background-topic

Trella:

For the On-Demand orders the customers are the ones that define the rates for their shipments. It requires knowledge about the market dynamicity to place the right rate for the right order in the right time

The contact based model is more or less same as Naqla, as they also set the rate with customers for a fixed corridor for a fixed period depending on the customer portfolio.

Background-topic

Comparison:

On-Demand orders in Naqla is considered easier as the customer doesn't have to specify the rate for the shipment. Nevertheless, it somehow guarantee that a rate will be given to the end user and a match making will be proposed to fulfil the order. Nevertheless, it introduces a big hassle if the rates are to be defined from the customer side as Trella has it. Understanding all factors influencing the road transport tariff is less likely to be expected from the customer side.

In Contract based model each of Naqla and Trella are proposing similar solution that is customized manually for the customer needs and requires lots of time and long procedure.
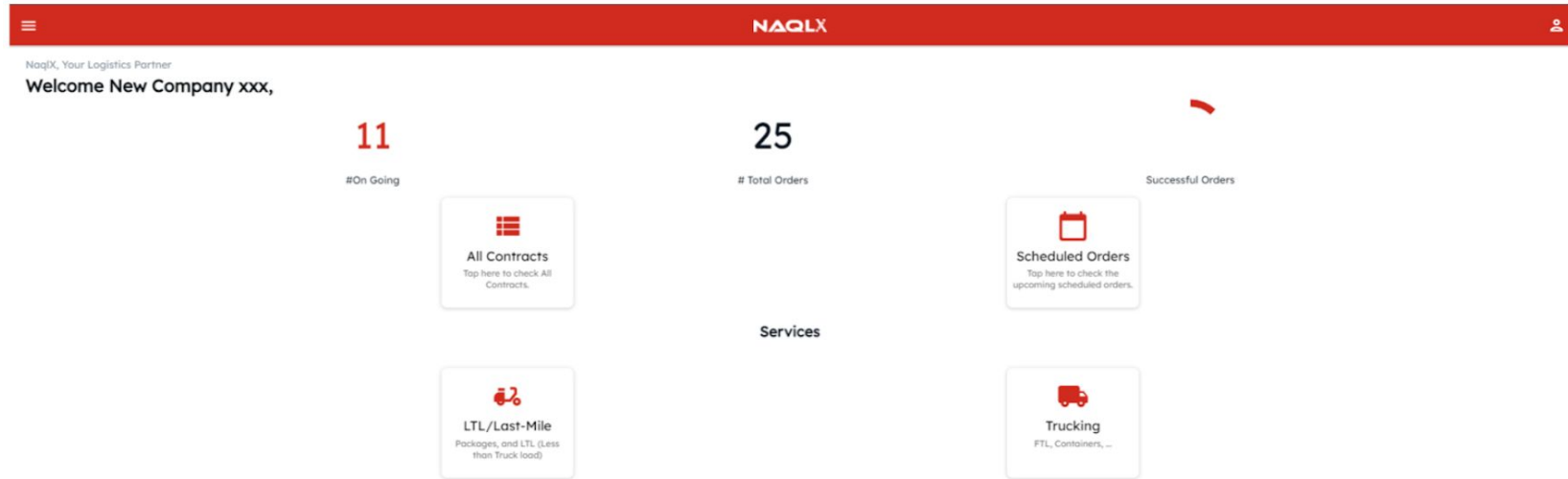
Other Solutions in the Market

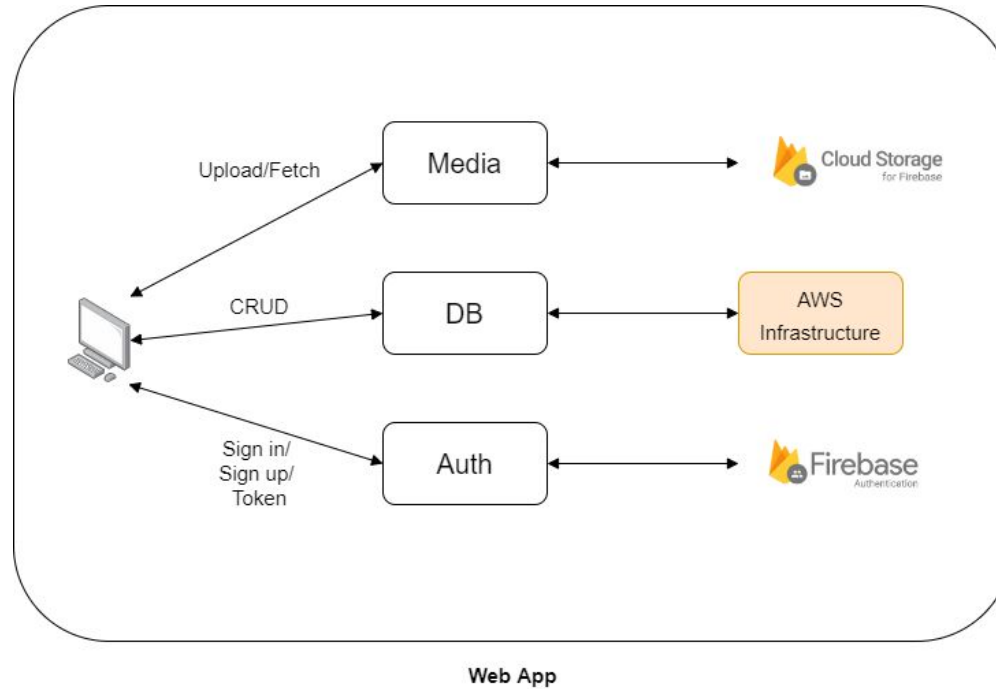|	The Proposed Solution	iD / RADLZ	ILLA	W / HOVO	trella / naqla / TRUKKER / GLOBAL CHAINS
Percentage of Transactions in App	-	-	-	-	< 20%
Fleet Type	Outsourcing	Outsourcing	In house/contract based	In house/contract based	Outsourcing
Target Segment	SMEs, Factories (B2B)	B2B & B2C	FMCG (B2B)	B2B & B2C	B2B
Service Provider	Carrier Companies and Truck Owners	Truck Owners	Truck Owners	Truck Owners	Carrier Companies and Truck Owners
Business Model	Commission Fees	Commission Fees	Double sided contract	Double sided Contract	Double sided Contract
USP	Bidding & Contract	Bidding	Contract	Fixed Fees & Contract	Contract

Outline

- ~~Motivation~~

- ~~Background~~

- Design

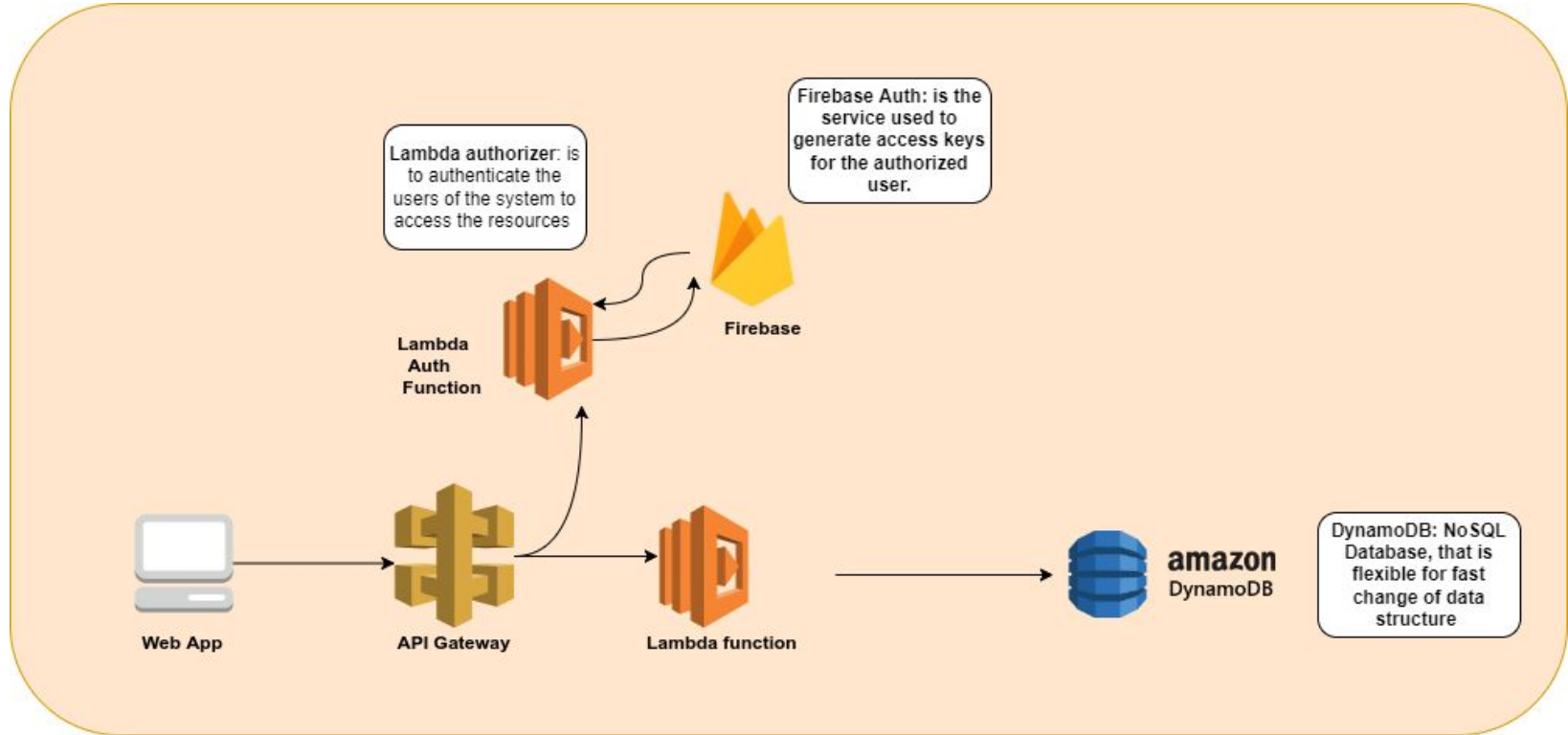 - System design

- Implementation

- Evaluation

System overview

Design overview

Web App

Design overview

Lambda authorizer: is to authenticate the users of the system to access the resources

Firebase Auth: is the service used to generate access keys for the authorized user.

Lambda Auth Function

Firebase

DynamoDB: NoSQL Database, that is flexible for fast change of data structure

Web App

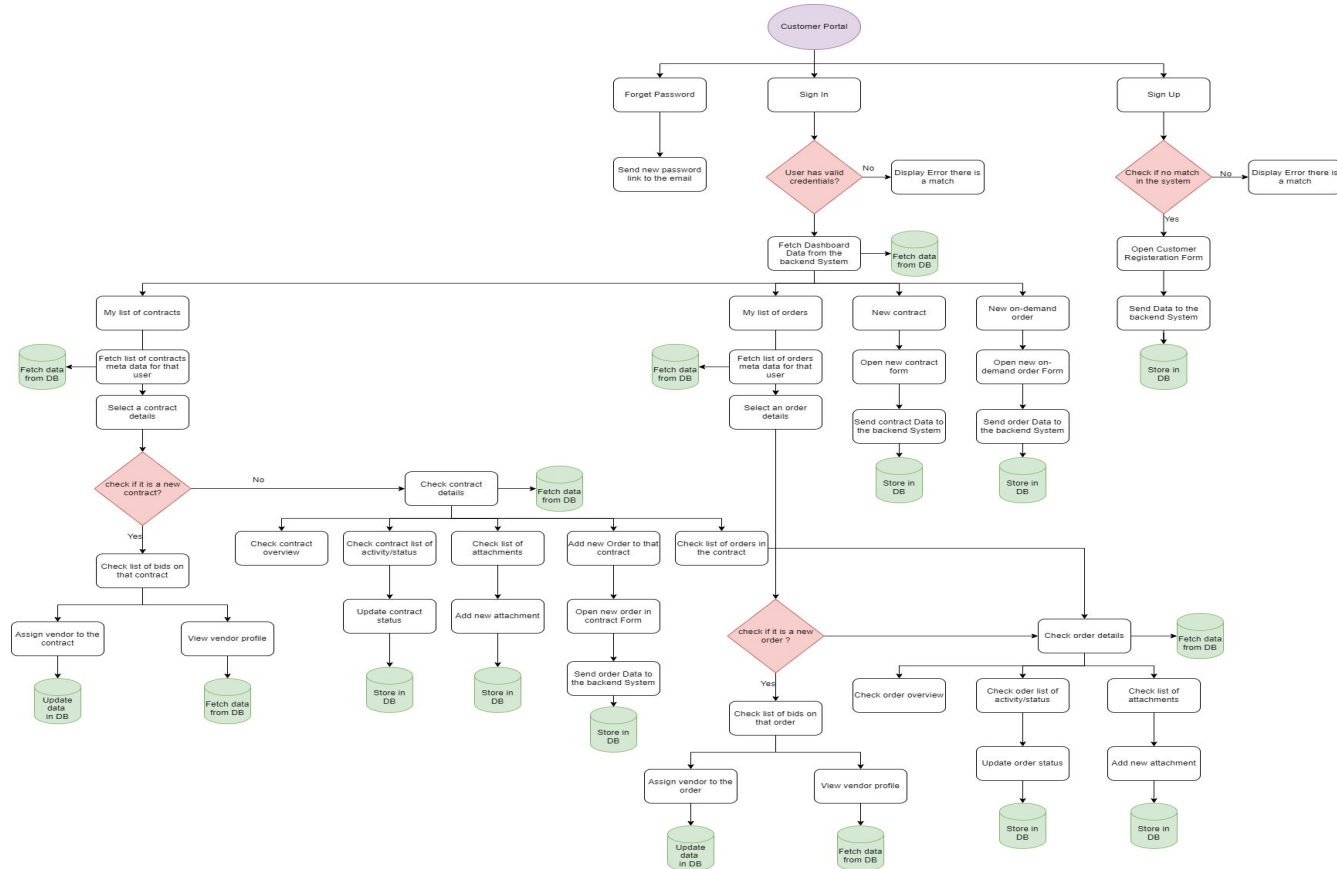API Gateway

Lambda function
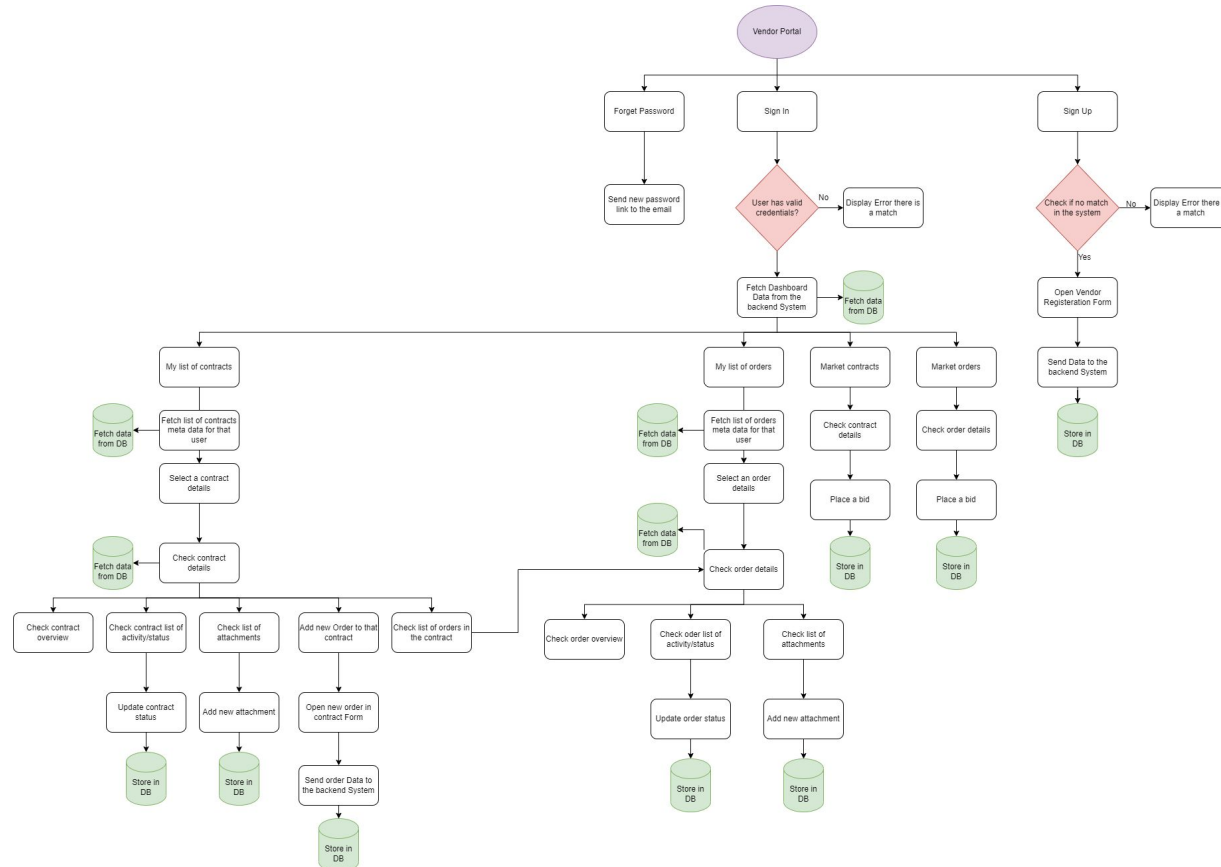
amazon DynamoDB

AWS Infrastructure

Outline

- ~~Motivation~~

- ~~Background~~

- ~~Design~~

- Implementation

- Evaluation

Customer portal workflow

Vendor portal workflow

Cost estimation equation

Minimum charge check equation

$$distanceCheck(distance) = \begin{cases} minimum\_charge, & \text{if } distance \geq minimum\_charge \\ 0, & \text{otherwise} \end{cases}$$

Discount check equation

$$discountCheck(distance) = \begin{cases} discount\_percentage, & \text{if } distance \geq discount\_distance \\ 1, & \text{otherwise} \end{cases}$$

Cost estimation equation from .1 and .2

$$cost\_estimation = ((distance * charging\_rate) + distanceCheck(distance)) * discountCheck(distance)$$

Outline

- ~~Motivation~~

- ~~Background~~

- ~~Design~~

- ~~Implementation~~

- Evaluation

Evaluation

- The proposed solution was adopted by 12 vendors (carrier companies) with total of more than 300 trucks, and 15 customers. Customers that adopted the platform were from different sectors such as wood, furniture, papers, garments, and more. Approximately 50 orders were placed on the platform, some of which were on-demand orders and others were contract based orders.

Cost estimation accuracy

- Cost estimation accuracy is > 90% compared to current existing solutions. The comparison is made with existing apps, and interviews conducted with vendors during the study period.

- All retrieved parameters for the cost estimation were validated during the time the study was conducted.

Summary
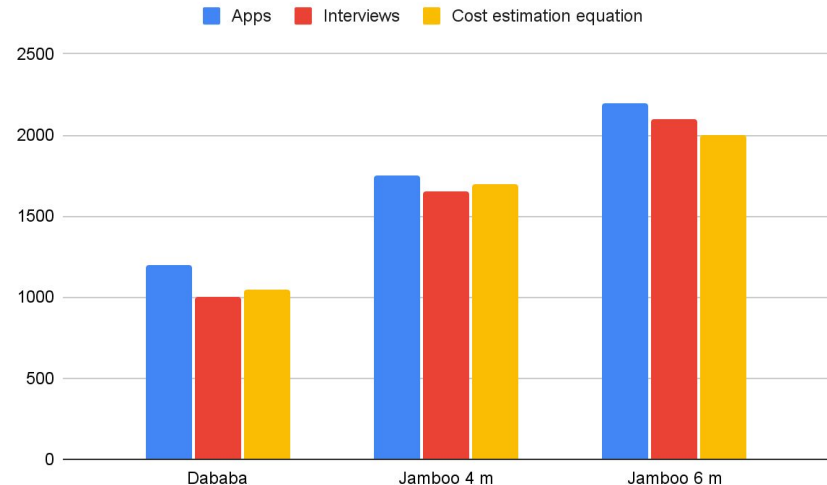
Existing solutions are focusing on one pickup point and one drop off point for on demand orders. Hence, it limits the type of orders that can be placed on the platform. Traditional method are customized to every single order. Bidding based platform allows the customers to have different bids with different terms placed on their orders and contracts and fit and match which is suitable most to their use cases. Nevertheless, it provides dynamicity and flexibility of changing the prices in case any of the influential factors are changing. It is considered as an advantage to the current solution provided by solutions in the region. However, the main drawback of such technique is the reliability on the vendors to place their bids as soon as the order or the order/contract is placed on the platform.

Try it out

The following are the links to the implemented systems,

1) customer-app.naqlx.com (Customer Application)

2) vendor-app.naqlx.com (Vendor Application)

3) admin-app.naqlx.com (Admin Application)

The following credentials are for the testing purposes of the system:

phone number: +20 101 010 1010

verification code: 111111

References

Boyle, M. D. (2000). Business-to-business marketplaces for freight transportation (Doctoral dissertation, Massachusetts Institute of Technology).

Giordani, I., Archetti, F., Djordjevic, D., & Sormani, R. (2018). Towards sustainable urban logistics: the evolution of digital marketplace. Transport and the City, 75.

Backup