Mini Project Proposal:
Real-time logistics information platform

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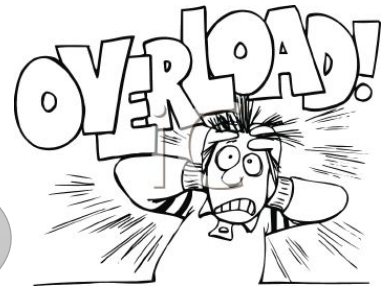
Advanced Services Engineering SS18

Current Situation

… supplier



In the morning nobody comes and on 11:00 all come at once!

A

B

C

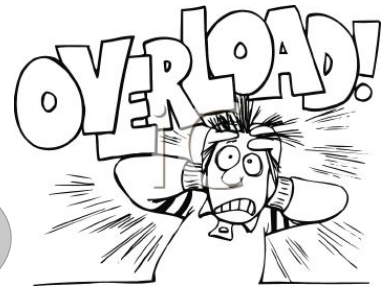
customer

D

E

Current Situation

… supplier



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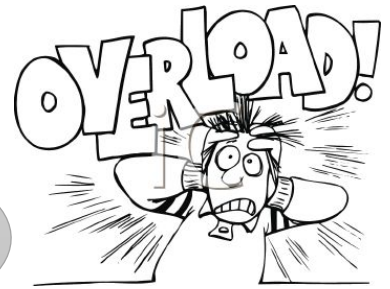


In the morning nobody comes and on 11:00 all come at once!

Whatever.

customer

bold … to implement in prototype

Features

- Open-source, Blockchain-based real-time logistic information system with suppliers and customer all participating
  - Open, cheap, on-demand, collaborative instead of competitive, trusted, evidence of good will

- Route suggestions (VRP)
  - … considering live traffic, **predicted waiting times at customer locations** & more
  - … pay more for better accuracy & faster computation

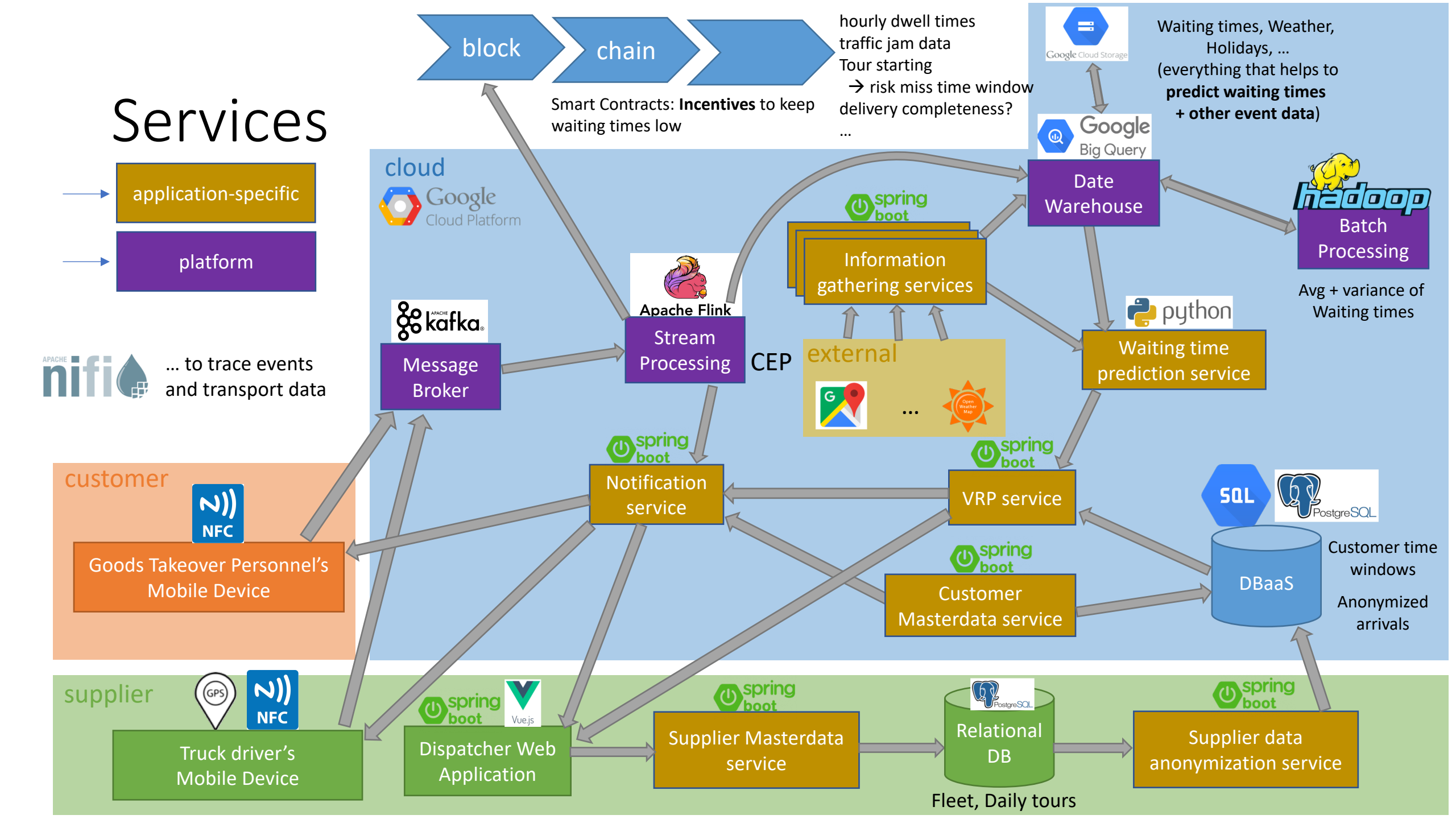
Routing & Traffic APIs,
Machine Learning,
Batch Processing,
Elasticity Management

- Notifications
  - … when supplier approaching and arrives
  - … when customer service time window in danger (change route?)

GPS sensor,
Stream Processing,
Human Services

- Evidence of good will & Incentives
  - Blockchain stores data to reason about delivery delays
  - Pay cryptocurrencies for customers for keeping waiting times low

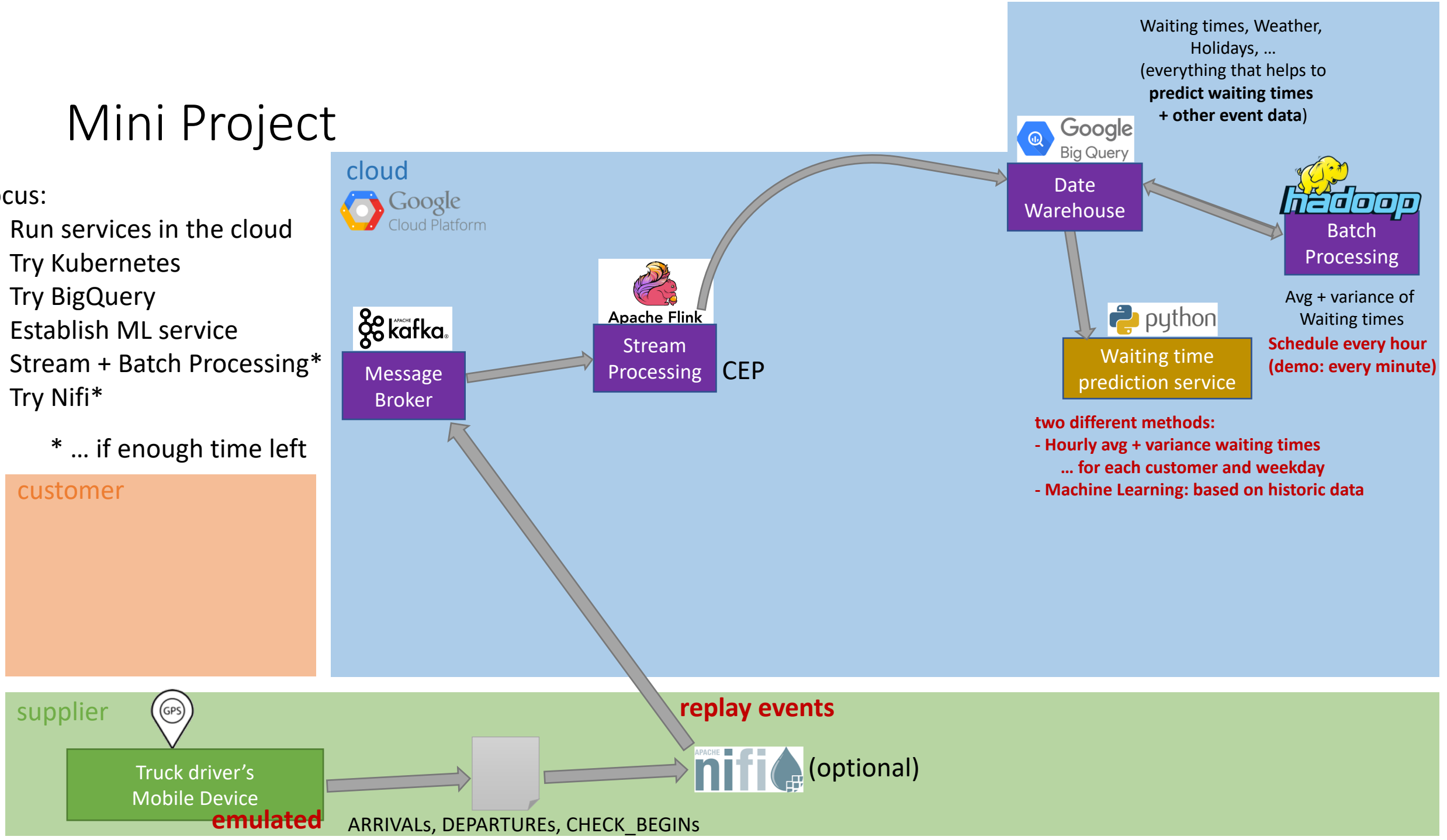
Blockchain,
Cryptocurrencies,
Smart Contracts


Services
application-specific
platform
block
chain
Smart Contracts: Incentives to keep waiting times low
hourly dwell times
traffic jam data
Tour starting
→ risk miss time window
delivery completeness?
...
Google Cloud Storage
Waiting times, Weather, Holidays, ...
(everything that helps to predict waiting times + other event data)
Google Big Query
Date Warehouse
Batch Processing
Avg + variance of Waiting times
cloud
Google Cloud Platform
spring boot
Information gathering services
Apache Flink
Stream Processing
CEP
Message Broker
kafka
external
...
python
Waiting time prediction service
spring boot
Notification service
spring boot
VRP service
SQL
PostgreSQL
DBaaS
Customer time windows
Anonymized arrivals
customer
NFC
Goods Takeover Personnel's Mobile Device
spring boot
Customer Masterdata service
supplier
GPS
NFC
Truck driver's Mobile Device
spring boot
Vue.js
Dispatcher Web Application
spring boot
Supplier Masterdata service
PostgreSQL
Relational DB
Fleet, Daily tours
spring boot
Supplier data anonymization service
nifi
... to trace events and transport data

Mini Project

Focus:
- Run services in the cloud
- Try Kubernetes
- Try BigQuery
- Establish ML service
- Stream + Batch Processing*
- Try Nifi*

* … if enough time left



Data Concerns

- Privacy
  - Truck driver
    - GPS data
  - Supplier
    - Their customers, goods delivered
    - Fleet, routes taken
    - …

→ Let data not leave the Edge
or
Anonymize data and then send it to the Cloud

- Data Quality
  - GPS sensor data accuracy
  - External service data accuracy
    - Maps API, Weather Forecast API, …
  - Customer/Supplier provided data up-to-dateness

→ Monitor data quality
Different data sources/types → different ways to reason about data quality
visualize with ElasticSearch/Logstash/Kibana stack

- Pricing
  - Waiting time prediction accuracy
  - VRP service response time

→ 3 methods:
- **Batch processing: avg + variance of waiting times**
- **Machine Learning: based on historic data**
- Machine Learning: based on historic and live data

→ Kubernetes: resources and utilization-based autoscaling

Thank you for the attention!