Transportation Digital Transformation

CEBD 1261 - November 2020 - Michael D'Itri

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Why change? Why Now?

IoT Device Availability

- Long lasting cheap batteries
- Relatively inexpensive device cost

Platforms, libraries and more….

- Open source community busting down the door to collaboration
- More and more platforms and tools to support digital transformation

4G-5G Wireless Networks

- Ultra fast, Ultra reliable networks
- Ability to provide dedicated IoT networks with ultra low latency

Chicago Transit & IoT

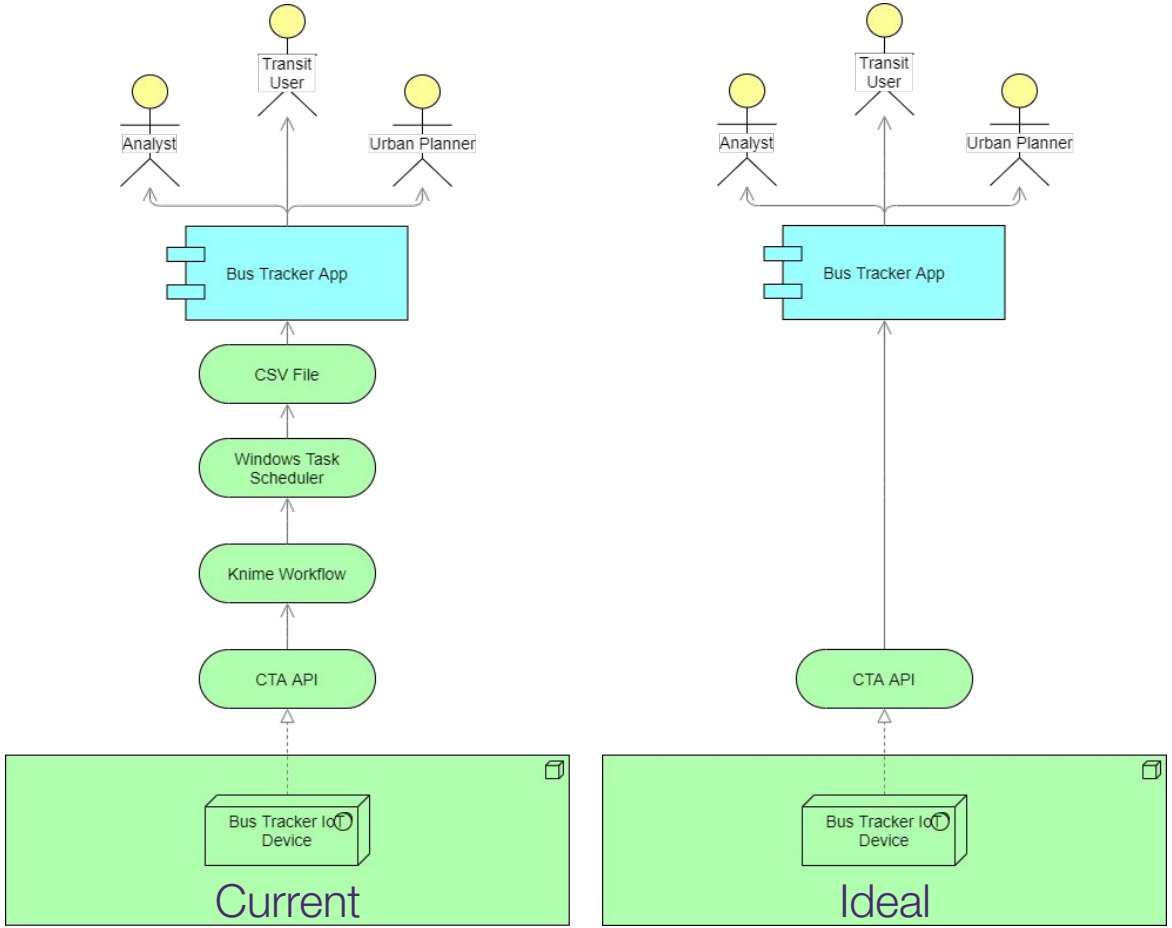
Opportunity

- Like many cities around the world, Chicago has exposed API access to some of their city data
- They installed IoT devices on their city buses and provide location + metadata.

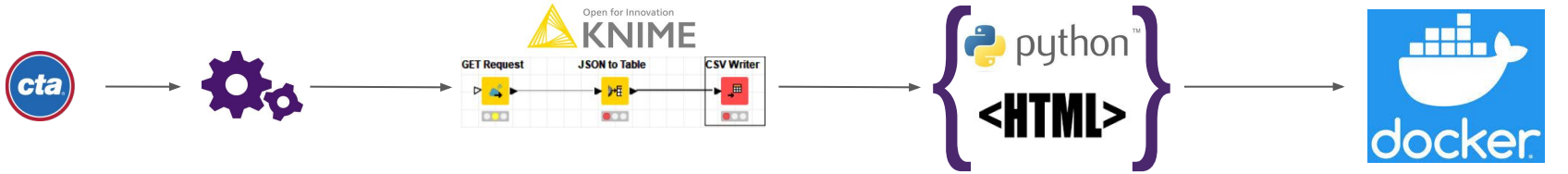
Concept

- The idea was to consume their API's, perform some ETL, add some features and visualize a sample of what can be done with this data.

Data Flow Diagram



Design Architecture Diagram - Current



API

Windows Task Scheduler
Run job every 5 min

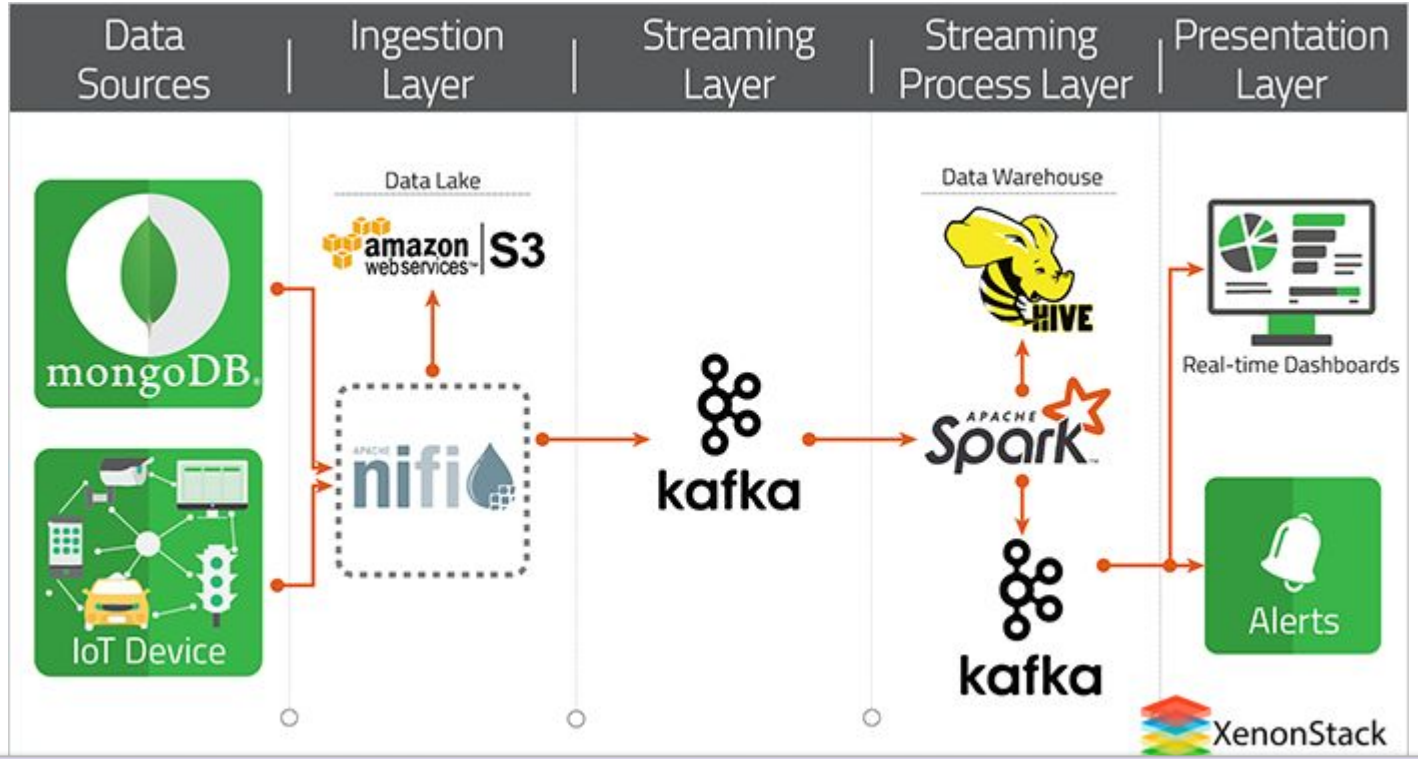
Knime workflow to convert to table and append to csv

Python to read the data, clean it, map it and create features + HTML to display the results in a user friendly UI

Contain the application and its dependencies to ensure reliability and simplification of installation

Quick and easy setup

Design Architecture Diagram - Ideal



Much more involved setup however provides scalability and stability

How to run the app!

Clone Repository

- Git clone https://github.com/mikeditri/bustracker.git

Build the Docker Image & run it

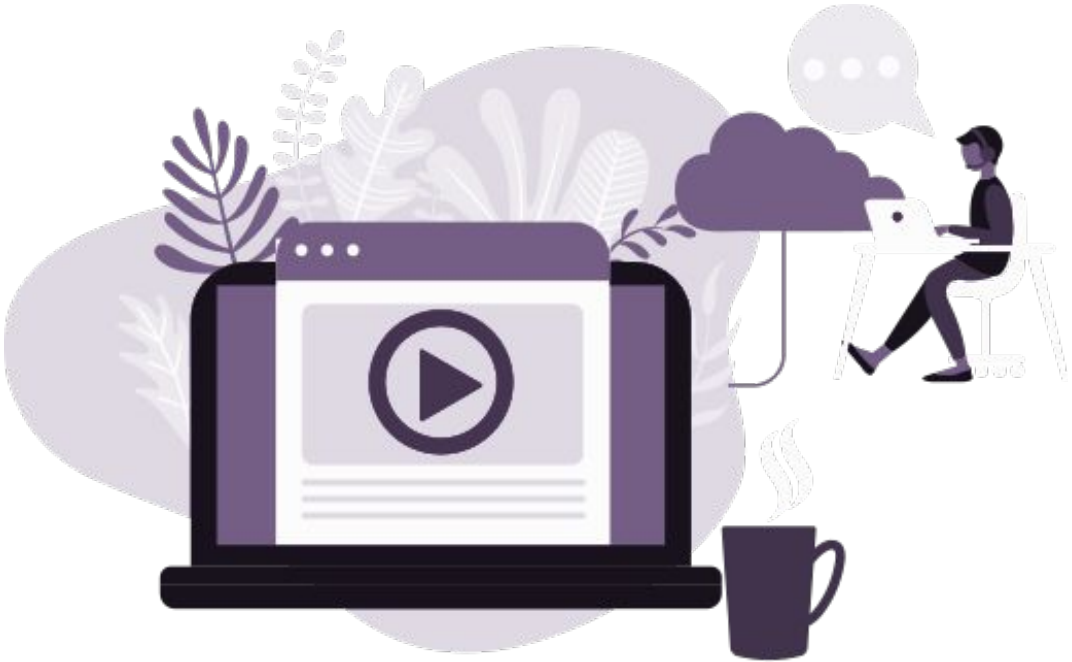
- docker build . -t bustracker
- winpty docker run -it -p 5000:5000 --rm bustracker

(nb winpty used on windows machines only)

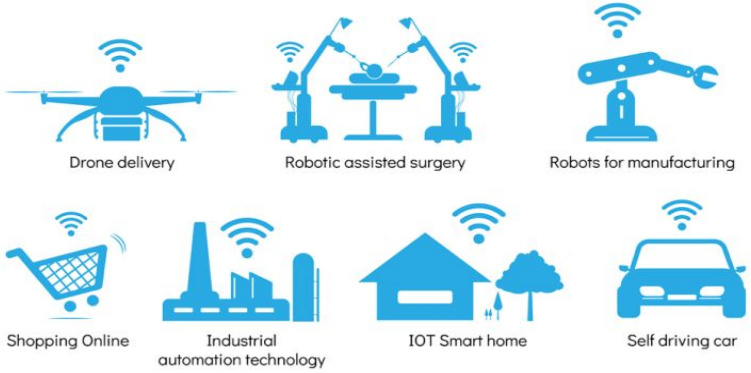
Open in browser

- Open browser and navigate to http://localhost:5000/

Code Demo



5G & IoT



Access to tons of real time data

Critical need for network densification, new spectrum, wireless and core network innovation

5G network fuels IoT which in turn fuels big data

Speed Signal Big Data Internet Network Technology Internet of things Traffic

5G is the backbone of IoT - Speed - Low Latency - Reliability