Real-Time Traffic Data Visualization

System Architecture

Date	Author	Changes
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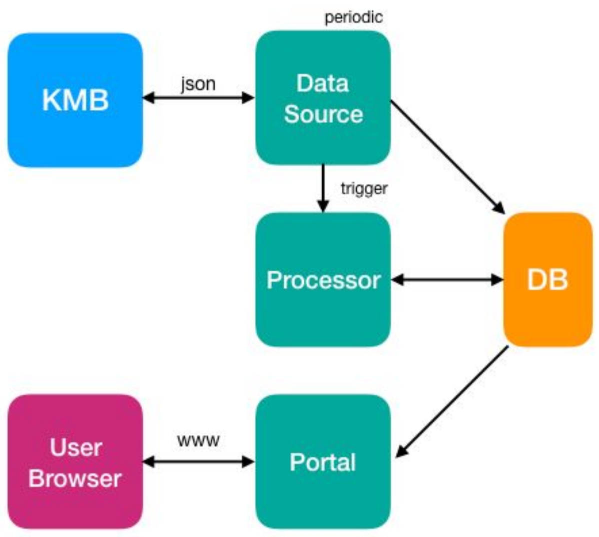
System Overview

The platform consists of four components:

1. Database
2. Data Source
3. Processor
4. Portal



Database

The database consists of two main tables: data source raw data, and generic processed data.

Data Source

The module fetch raw data from KMB(or other origin) and store on internal database. Every data source might have different method to extract data from a particular source, and consolidate the data into an generic database schema.

Processor

The module process the raw data stored on database and perform data processing like location estimation. The processed results, which are generic, are stored to database. Processor is depends on data source and thus every different origin require a different, yet similar, processor.

Portal

The portal display a map to user and let user do filtering.

Components

Database

We use MySQL here, while maintain compatibility with PgSQL and Oracle.

The database consists of two main tables:

1. KMB raw data, that is, the data we fetch without any processing. If we support other origin we shall add a table for that.
2. Generic data used for portal to display bus location. This schema should be independent of data source.

Data Source

The data source module is a batch program and run periodically. It fetch data from origin with origin-specific method, for instant, KMB returns data in json over multiple end-points. The program store the raw data into database and notify processor.

Processor

The processor will do the estimation using raw data. For instant, KMB provide arrival time but no bus location, we will need to invent a formula to estimate location based on such data.

Portal

The portal should be a static page hosted on nginx and do client-side (javascript) ajax update on the bus locations. In the proof of concept we return a full list of locations per ajax call, while in future we might optimize and give a diff instead.

Scaling & Redundancy

Database

Database should use standard scaling and redundancy technique.

Data Source

As there are many bus routes and each raw data query about a route is independent, we can make multiple instance of *Data Source* each responsible to fetch data from a particular set of routes. We may also design a controller to dispatch/assign works dynamically.

Data Source redundancy can be implemented with heartbeat and cold restart or stand-by.

Processor

We expect Data Processing should be relative fast and thus there is no requirement on multiple processor, but by design the processor should not care how many instance exists on the platform.

Processor redundancy can be implemented with heartbeat and cold restart or stand-by.

Portal

The portal should use standard web scaling and redundancy techniques.