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THE DESIGN OF AN AUTOMATIC STREAMING ANALYTICAL WORKFLOW FOR PROCESSING MASSIVE TRANSIT FEEDS

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Outline

- Introduction
- Related work
- Streaming analytical workflow
- Stream processing architecture
- Conclusion and Future research

Introduction

What is a streaming analytical workflow?

- Pre-build connector
- Low-latency database
- Streaming processing environment.

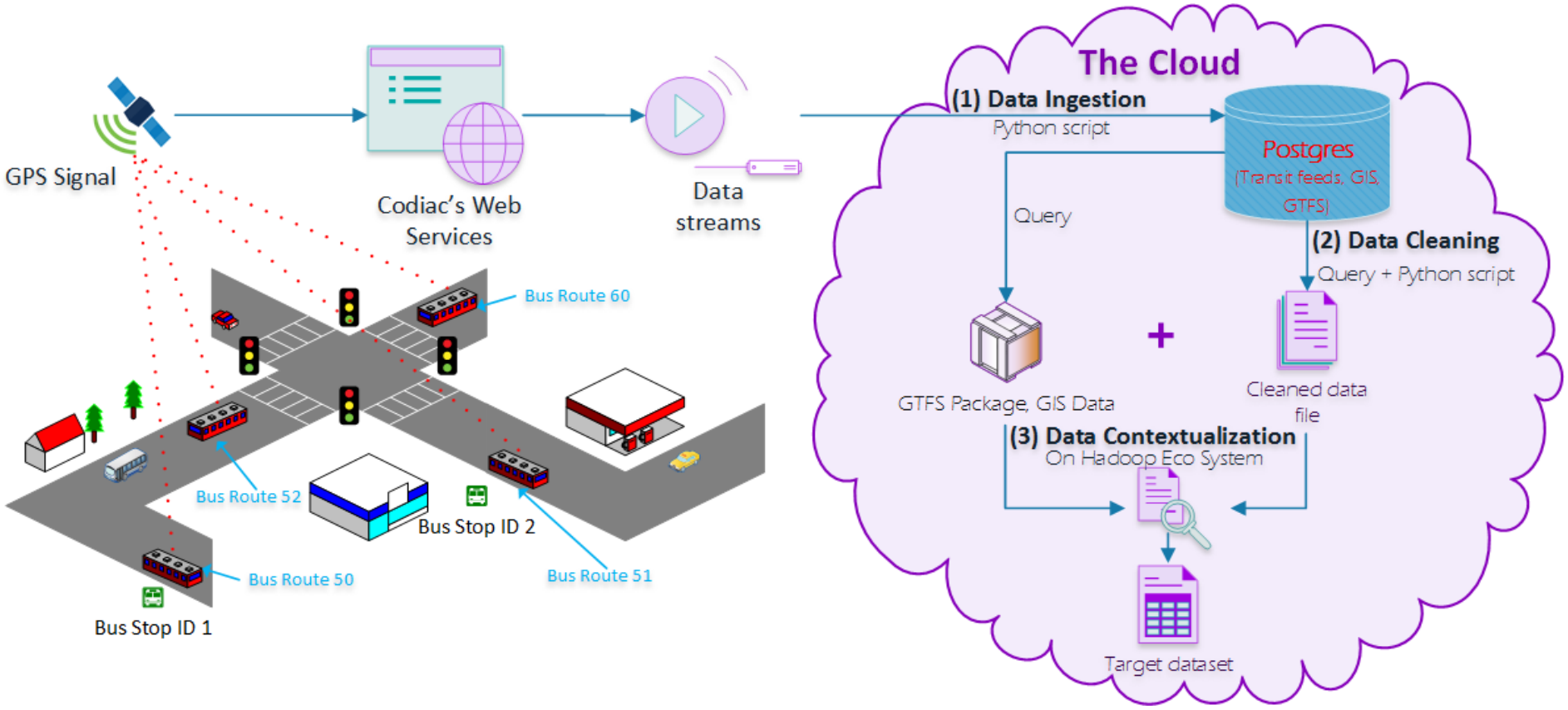
Why do we need them for?

- Support the processing of continuous computation of data streams such as transit feeds and IoT streams.

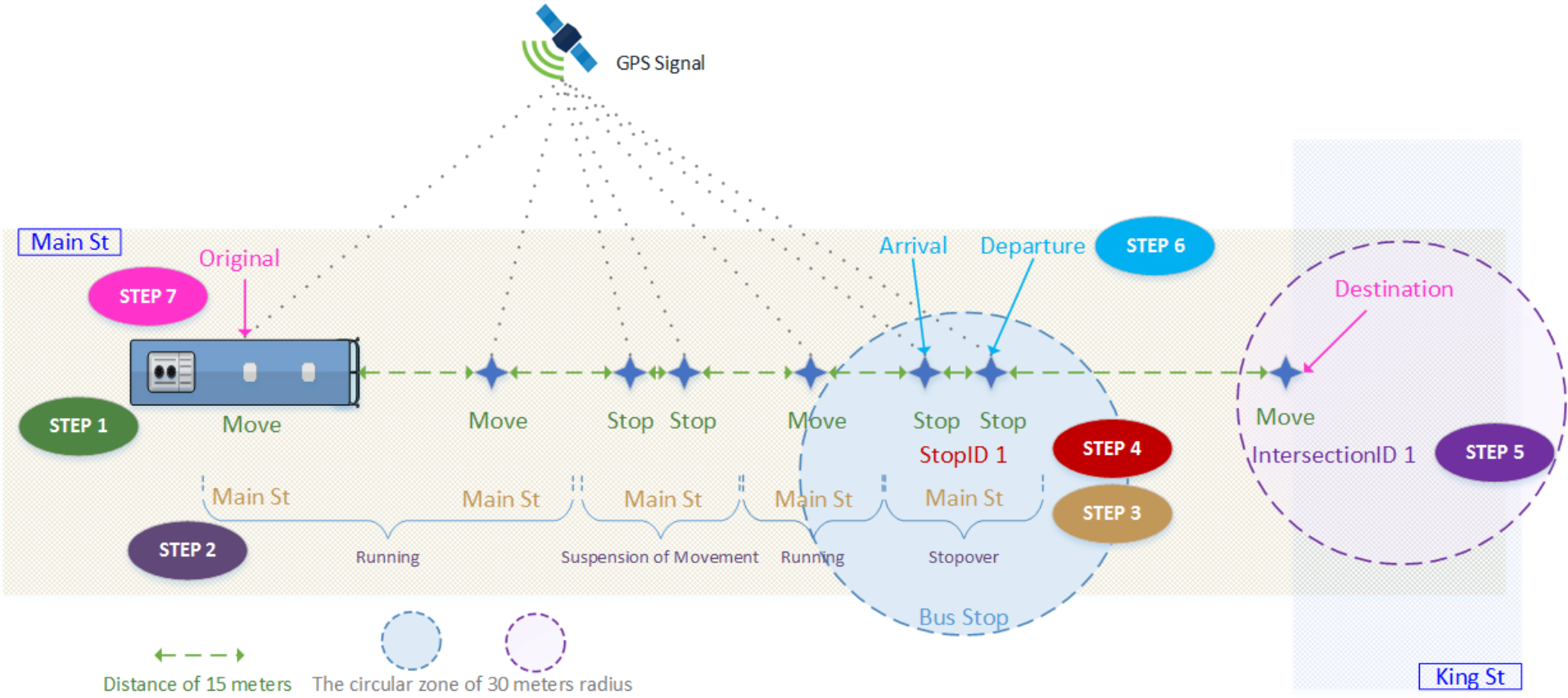
Related work

- Most of the research work found in analyzing transit feeds (e.g. AVL and GPS) is based on manually batch processing using a cloud platform.
- Huang *et al.* (2014) proposes the use of descriptive analytics for the Beijing Transportation Department that is already reaching a data ingestion of 15,000 GPS records per second for 30,000 buses.

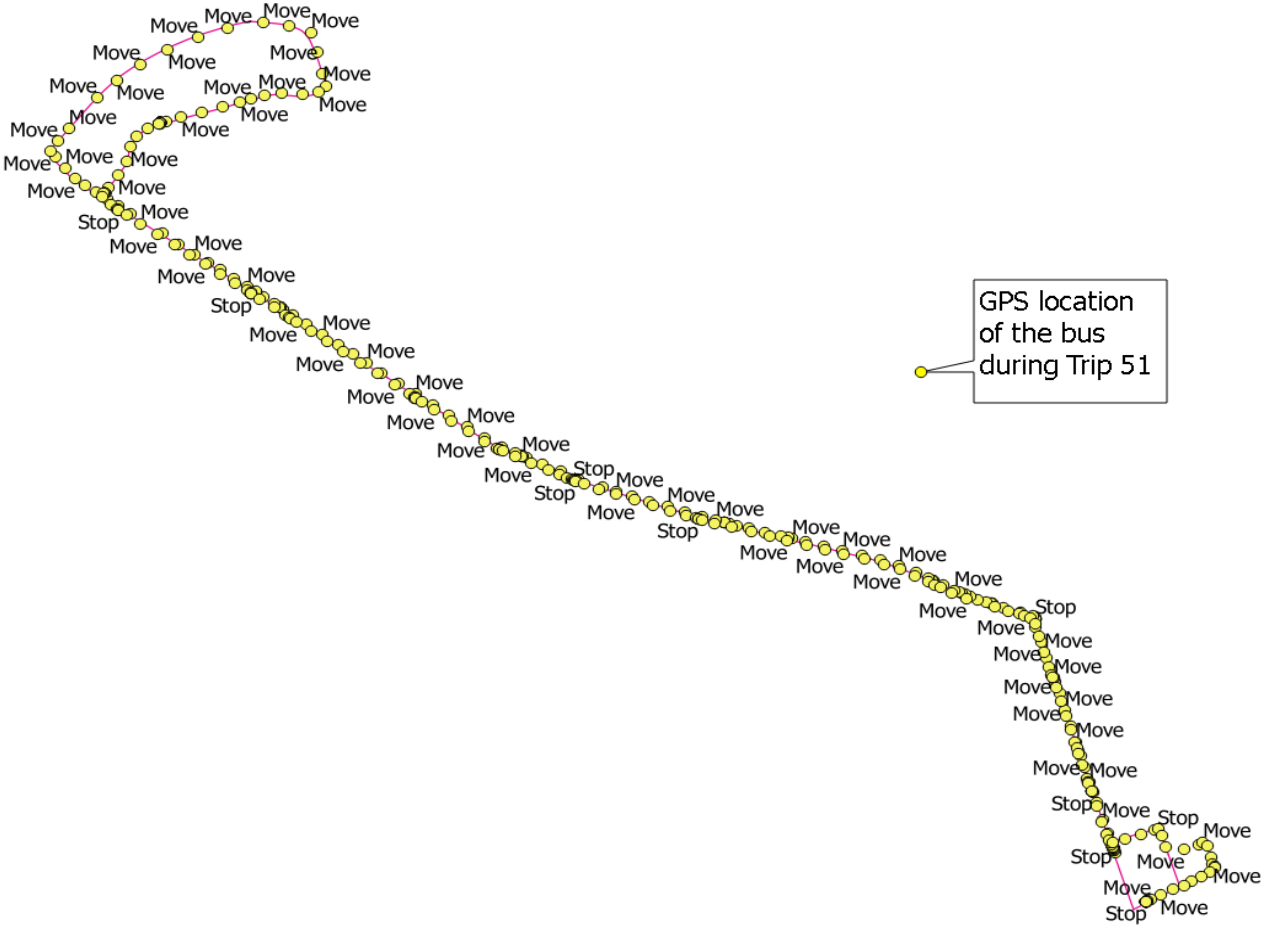
Our Streaming Analytical Workflow



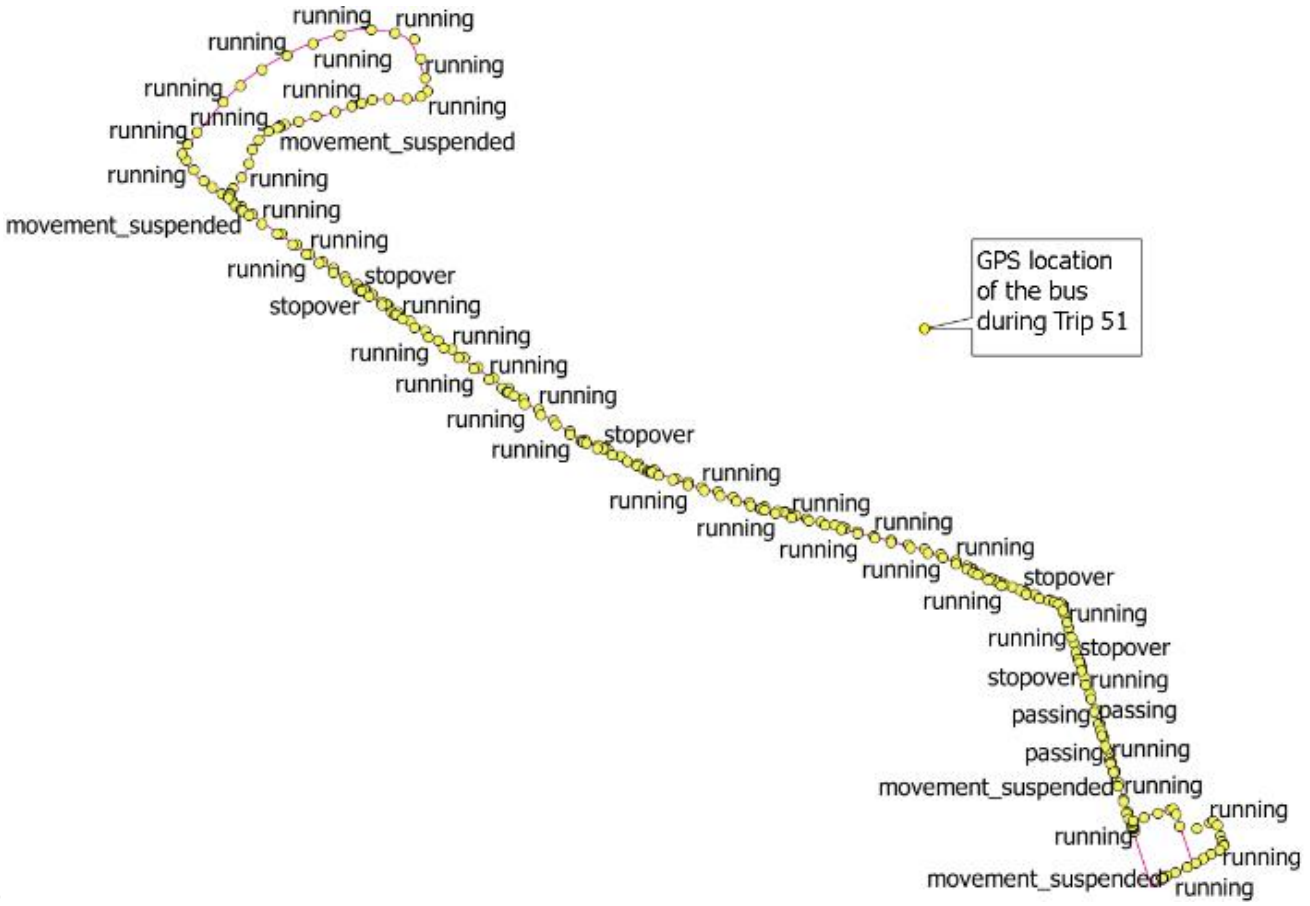
Data contextualization



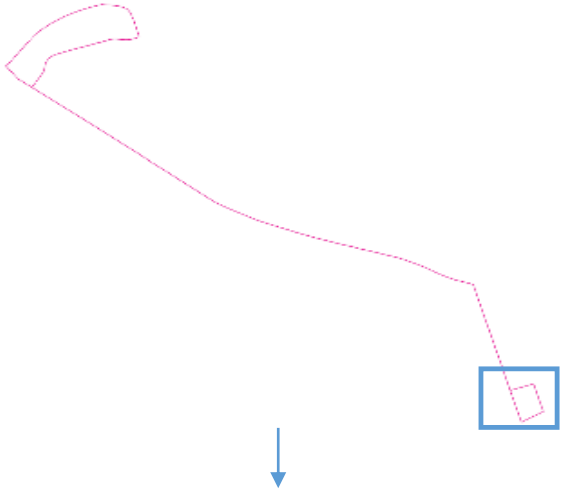
Step 1: Stop/Move Detection

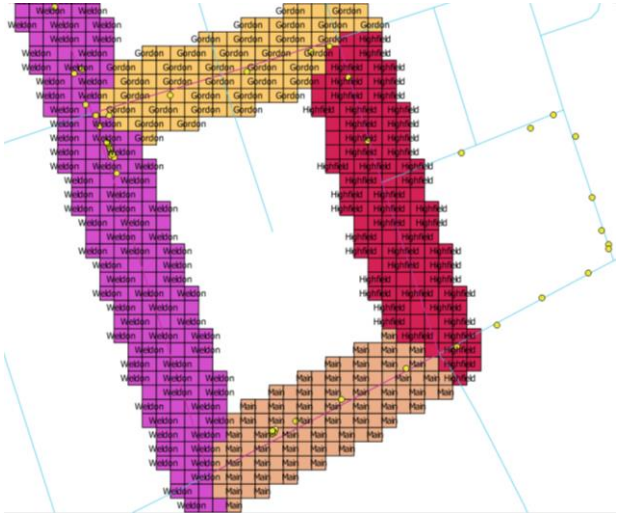


Step 2: Stop/Move Classification

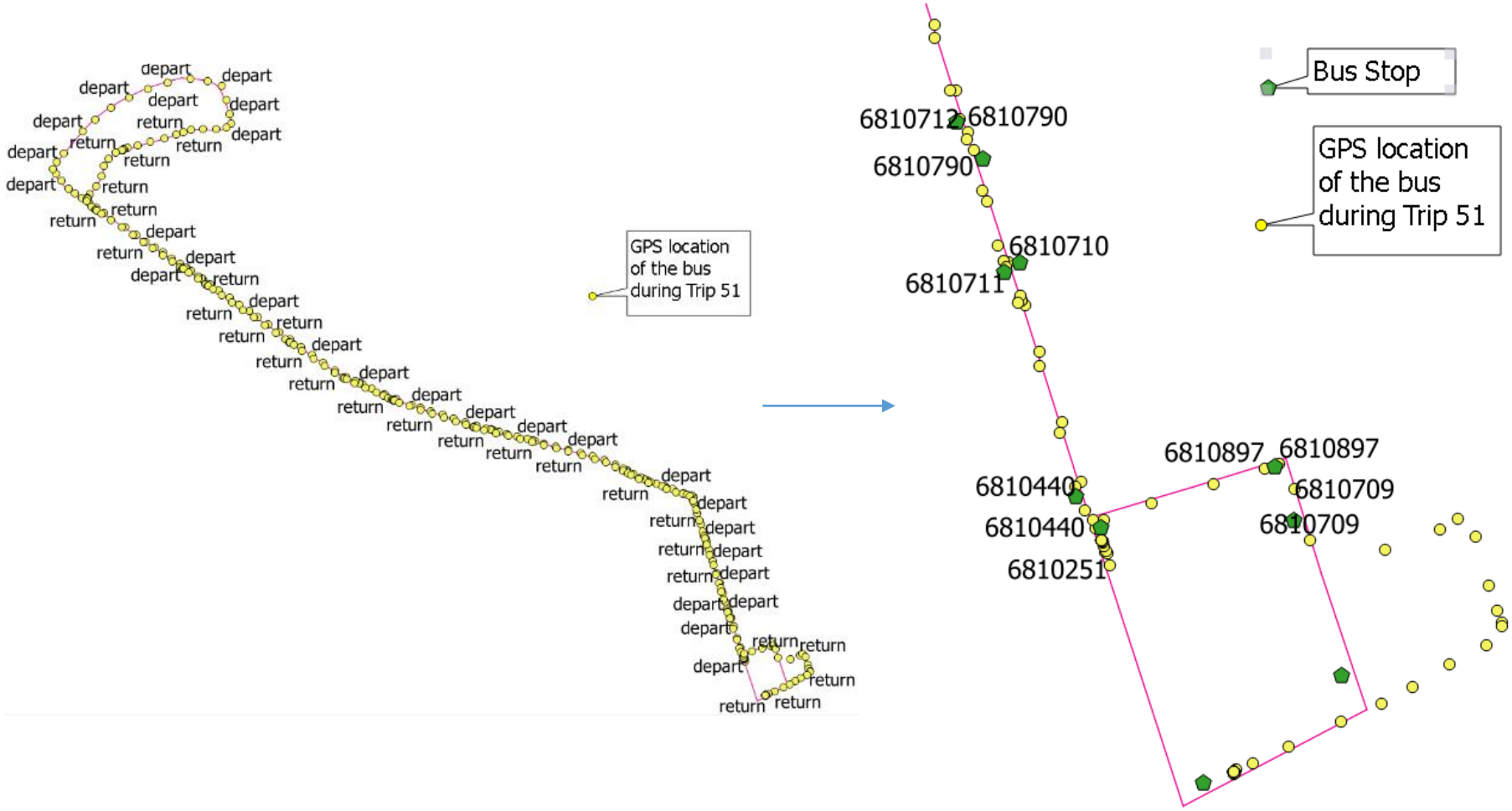


Step 3: Street Name Annotation

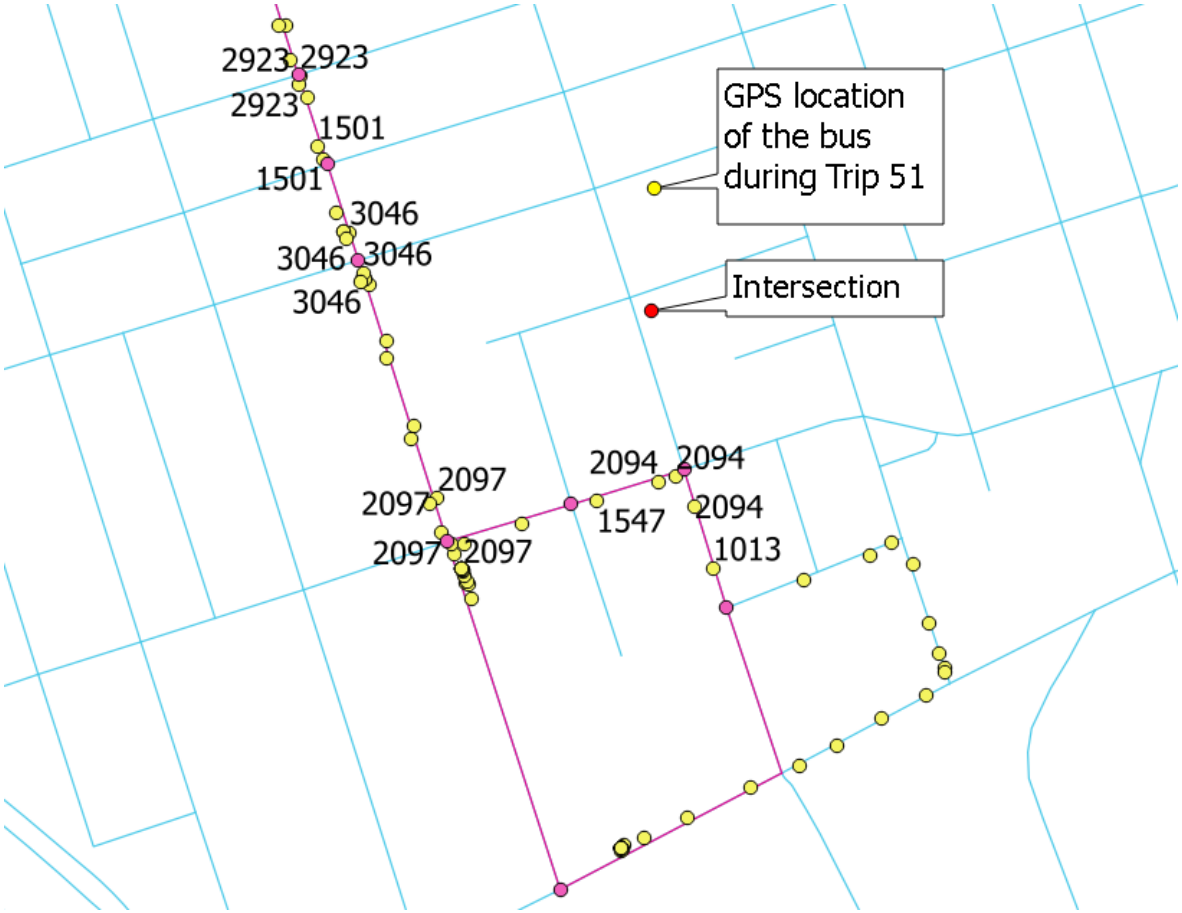




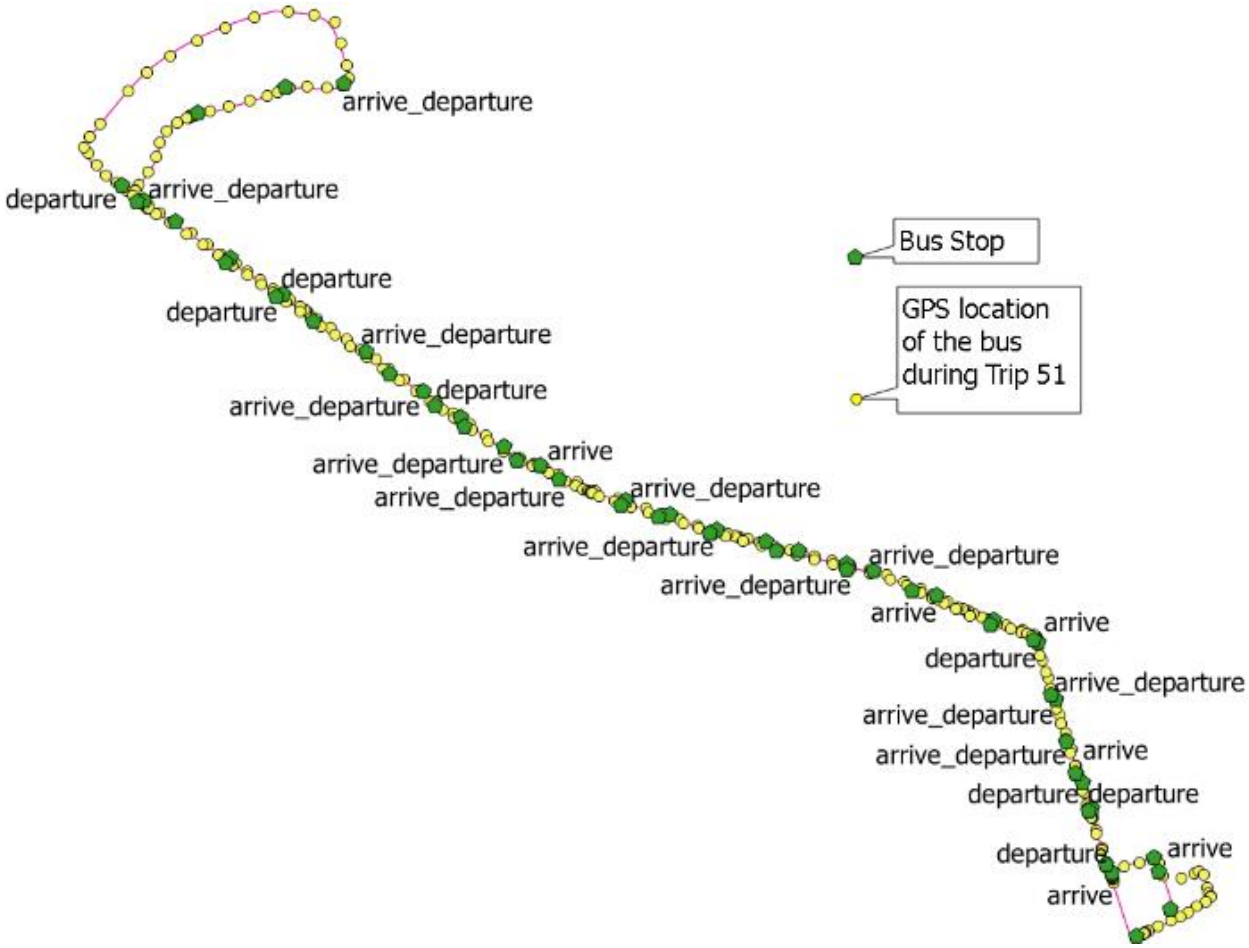
Step 4: Bus Station Identification



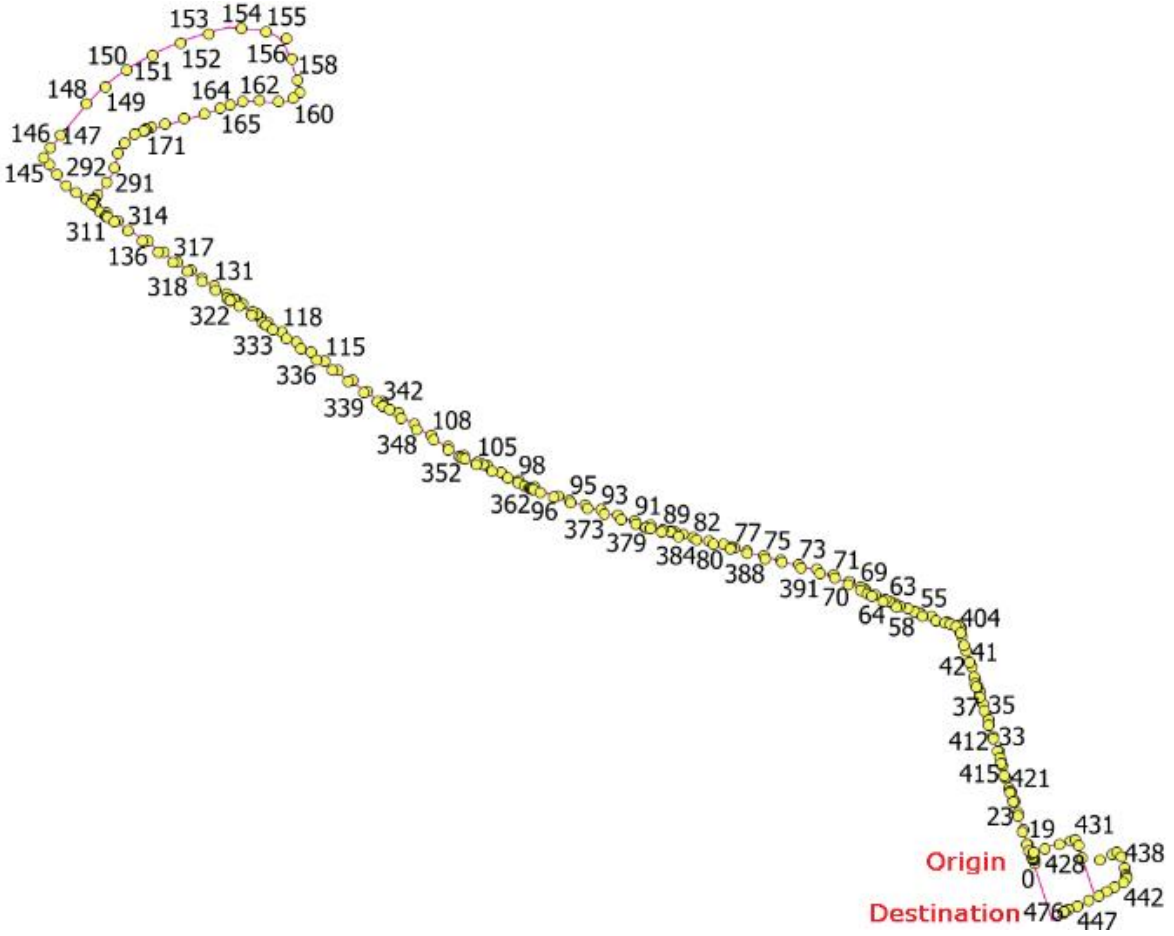
Step 5: Street Intersection Identification



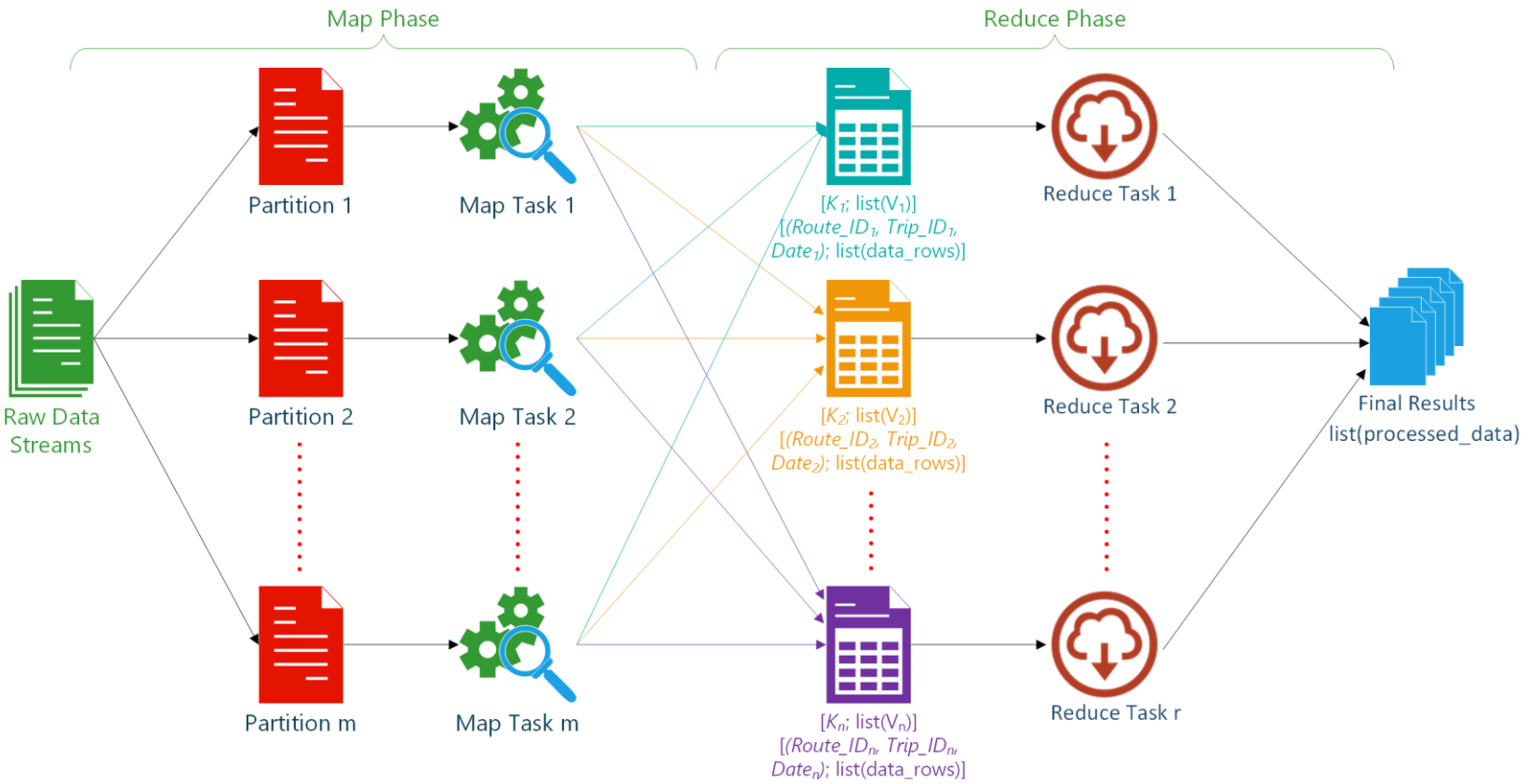
Step 6: Arrival/Departure Times Identification



Step 7: Origin/Destination Trip Identification



Stream processing architecture



Conclusions

- Analytics performed over contextualized transit feeds could potentially revolutionize transit network services.
- The outcomes from the data cleaning task indicate that it is not worth it to send all the data streams to the cloud (from a total of 65.1 million tuples, 38.1 million tuples have been deleted).
- Other computing architectures such as mobile fog computing.

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