iCity – ITSoS:
New Generation (NG) Smart City Apps Platform

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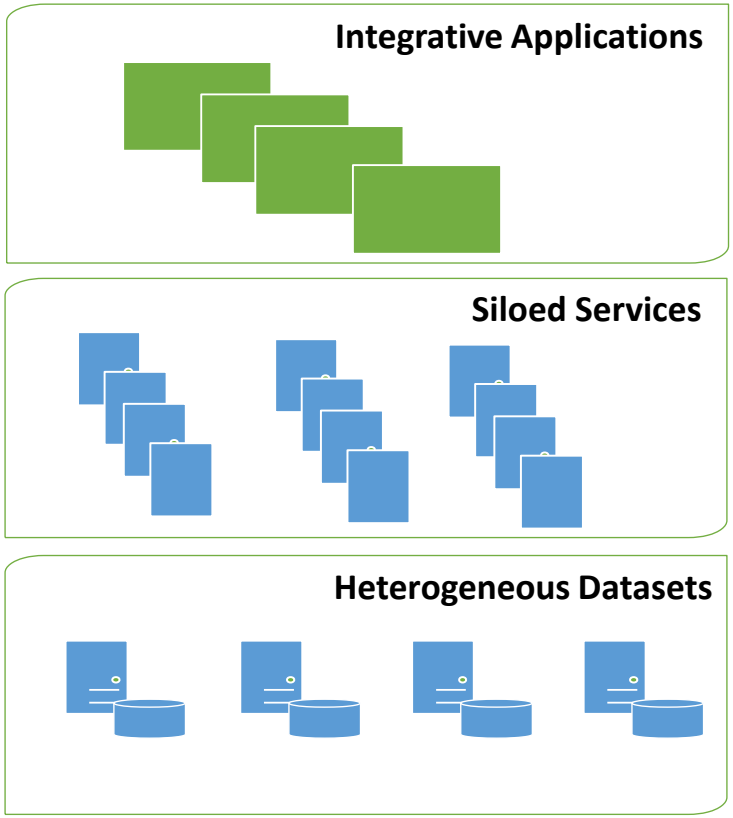
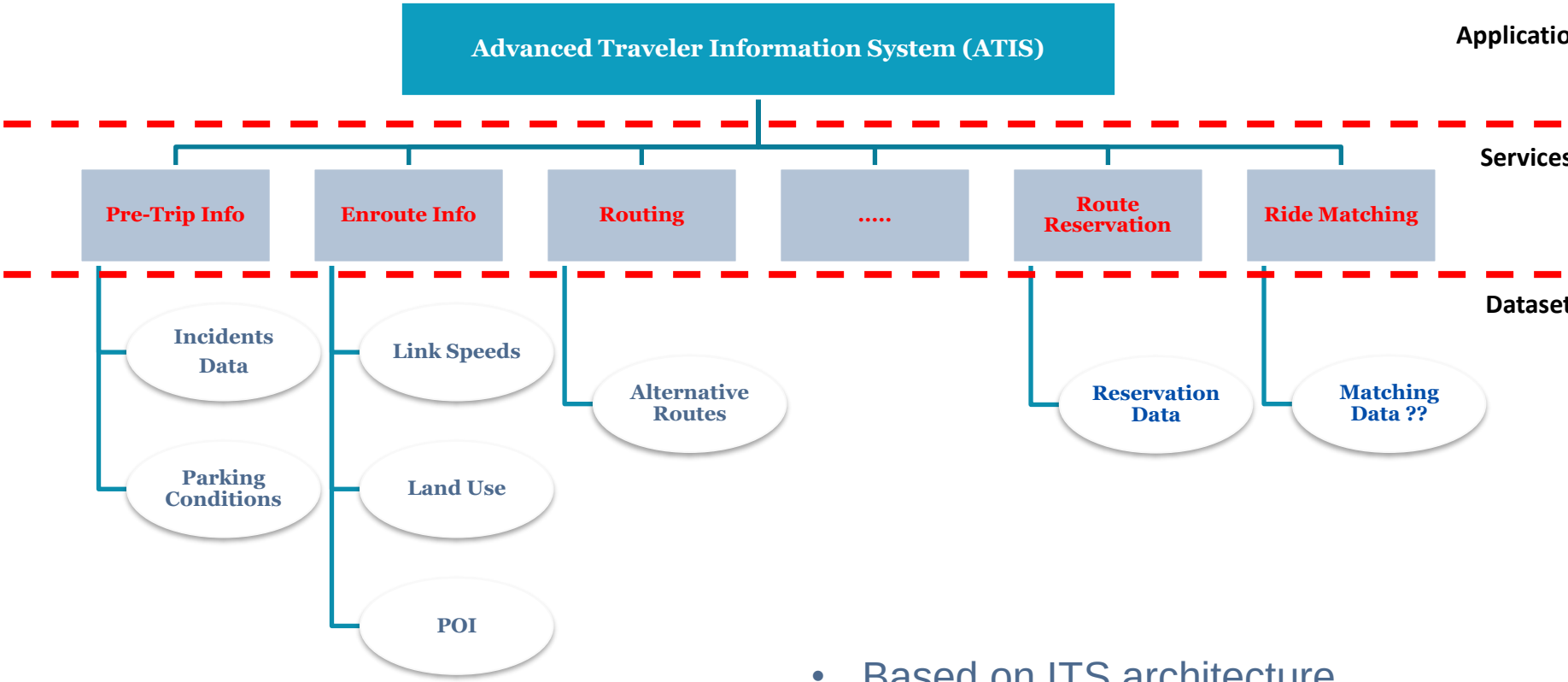
Challenges

- **Smart City Apps are:**
  - Developed in-house / Siloed
  - Comprised of 1/ 2 services
  - Processes 1 / 2 datasets

- **New Generation (NG) Apps will:**
  - Be complex workflows of **services**.
  - A service process a multitude of **data.**
  - Different providers:
    - Siloed services
    - Heterogeneous datasets
  - Need to scale to **a Mega-city size**

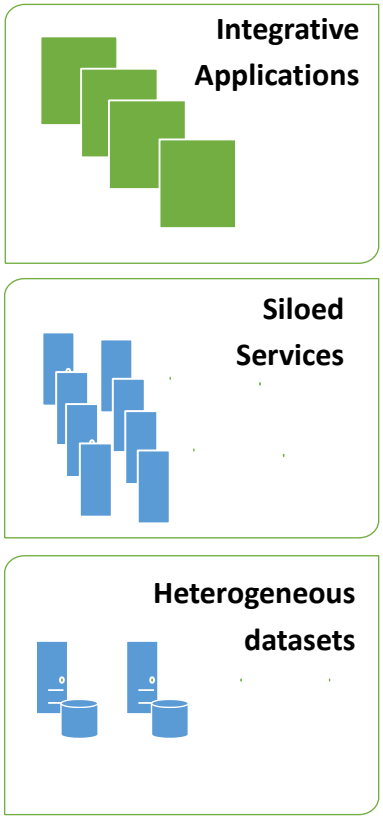


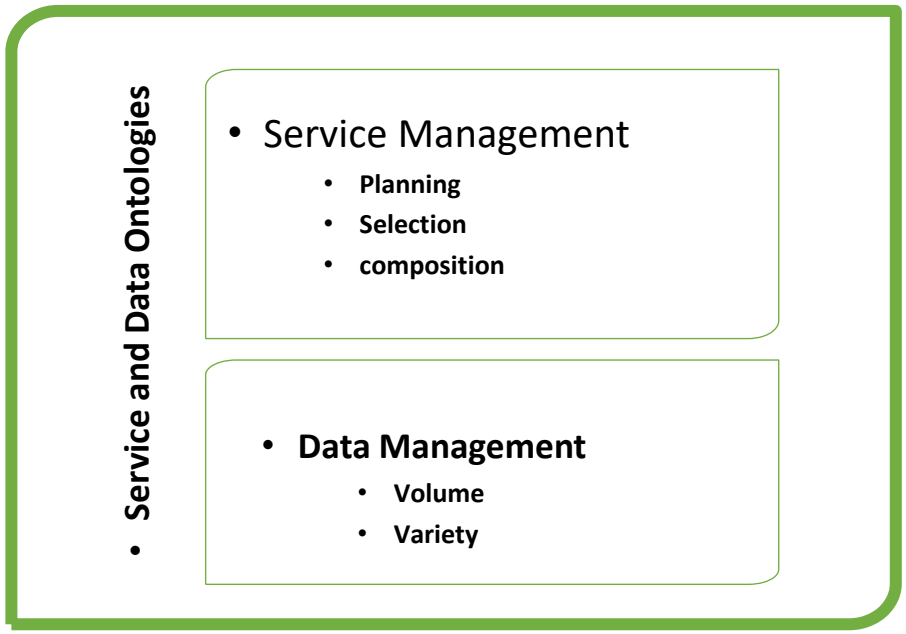
NG App Example



- Based on ITS architecture
- Compare to current ATIS offerings

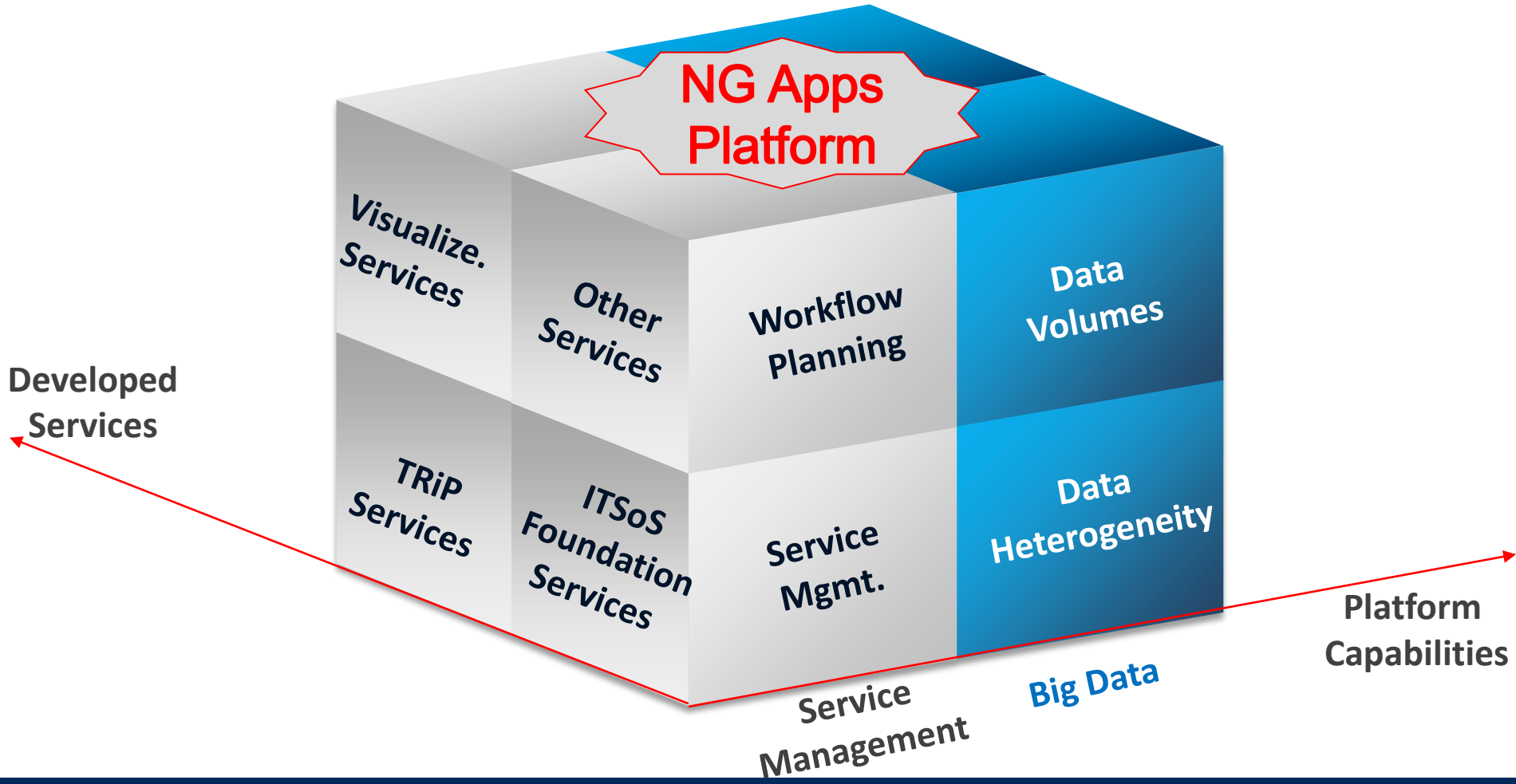
Research Objective: Platform





Application **Platform Capabilities**

NG Smart City Apps Platform



ITSoS-iCity Services

GIS Visualization Services

1- Pedestrian Safety Index

2- GTA O-D Travel Time

3- Service: Traffic Bottleneck Visualization

TRiP Services

1- TRiP Routing

2- TRiP Link Level State Tracking

3- TRiP Trip Level Reservation

4- Performance Management

More Service

OTP Transit Services

OTP Ontology Data Integration

Highway Traffic Macroscopic Characteristics Estimation using CNN

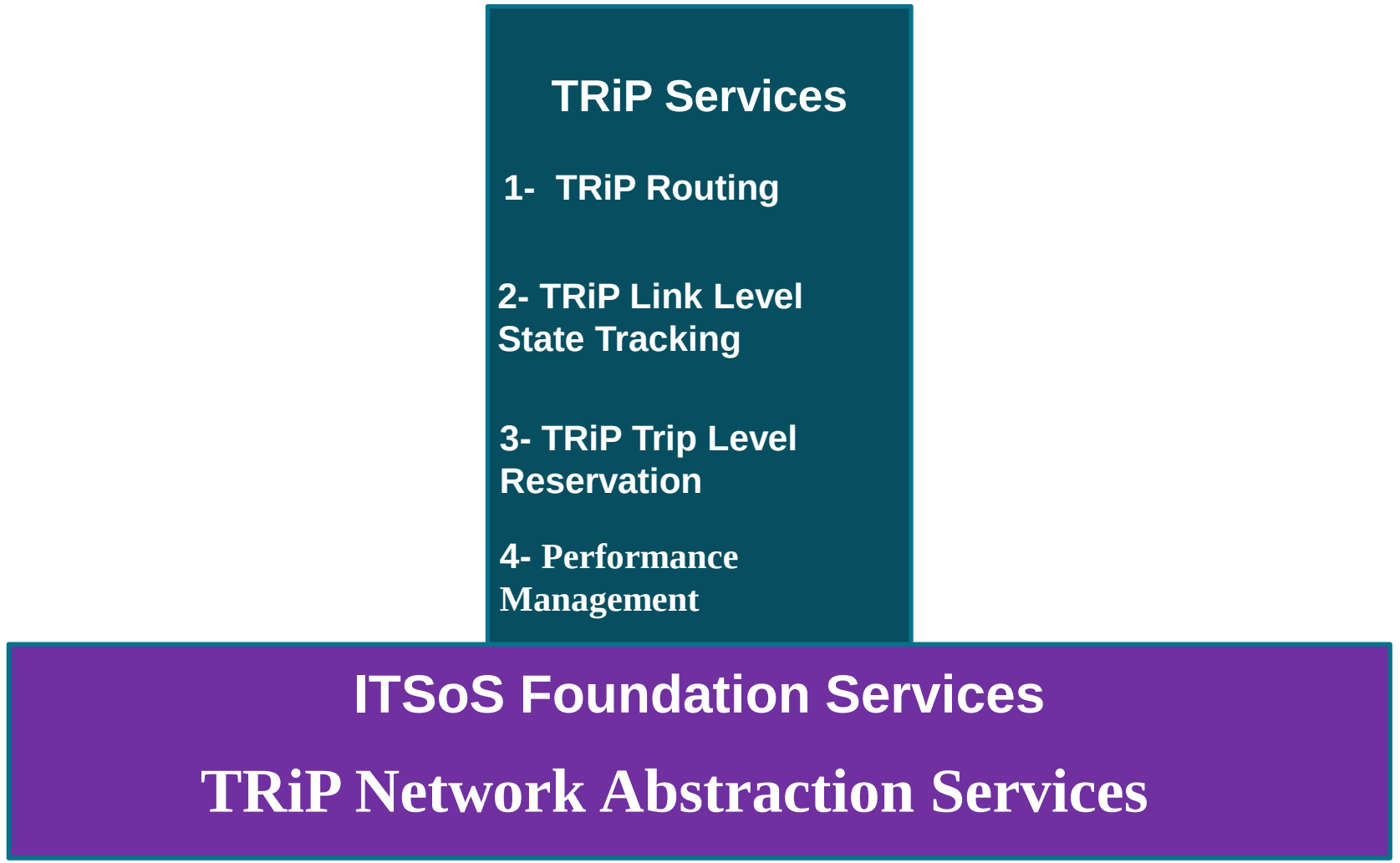
ITSoS Foundation Services

Traffic Data as a Service

TRiP Network Abstraction Services

GTFS Data as a Service

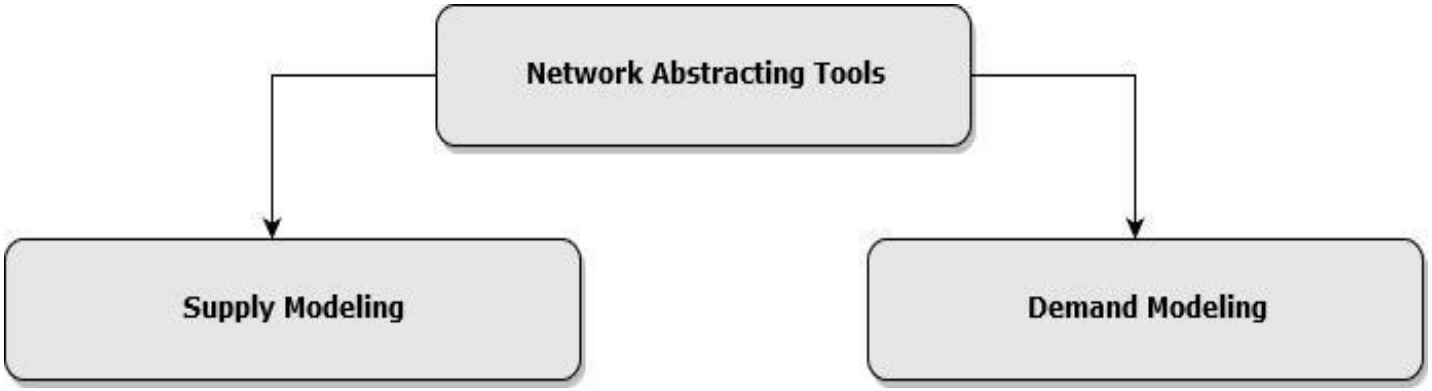
ITSoS-iCity Services



iCity- TRiP Network Abstraction Services

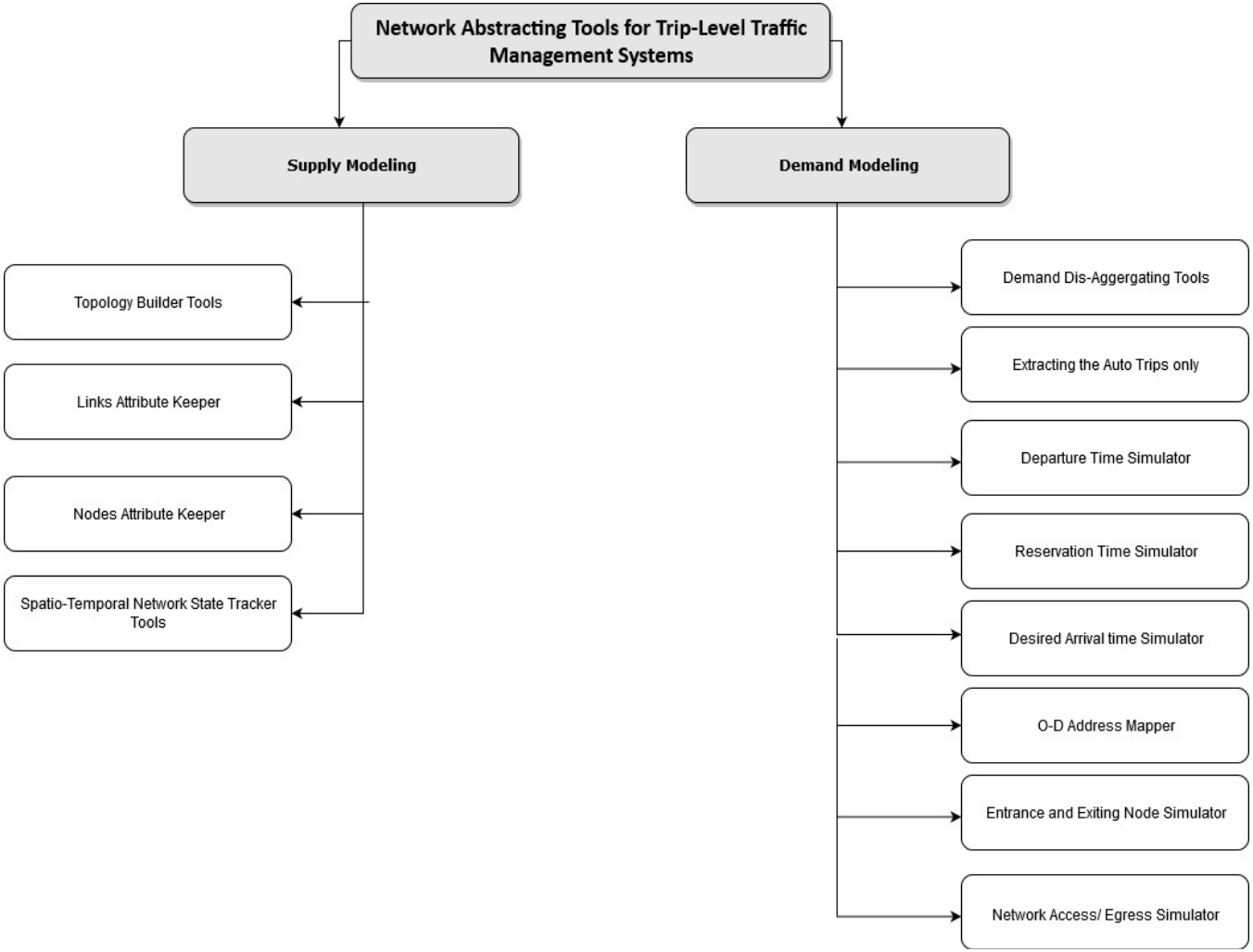
- A comprehensive Framework for trip level and link level network abstraction tools.

- In this presentation, I will present a brief about customizable software for supply and demand abstraction tools only.

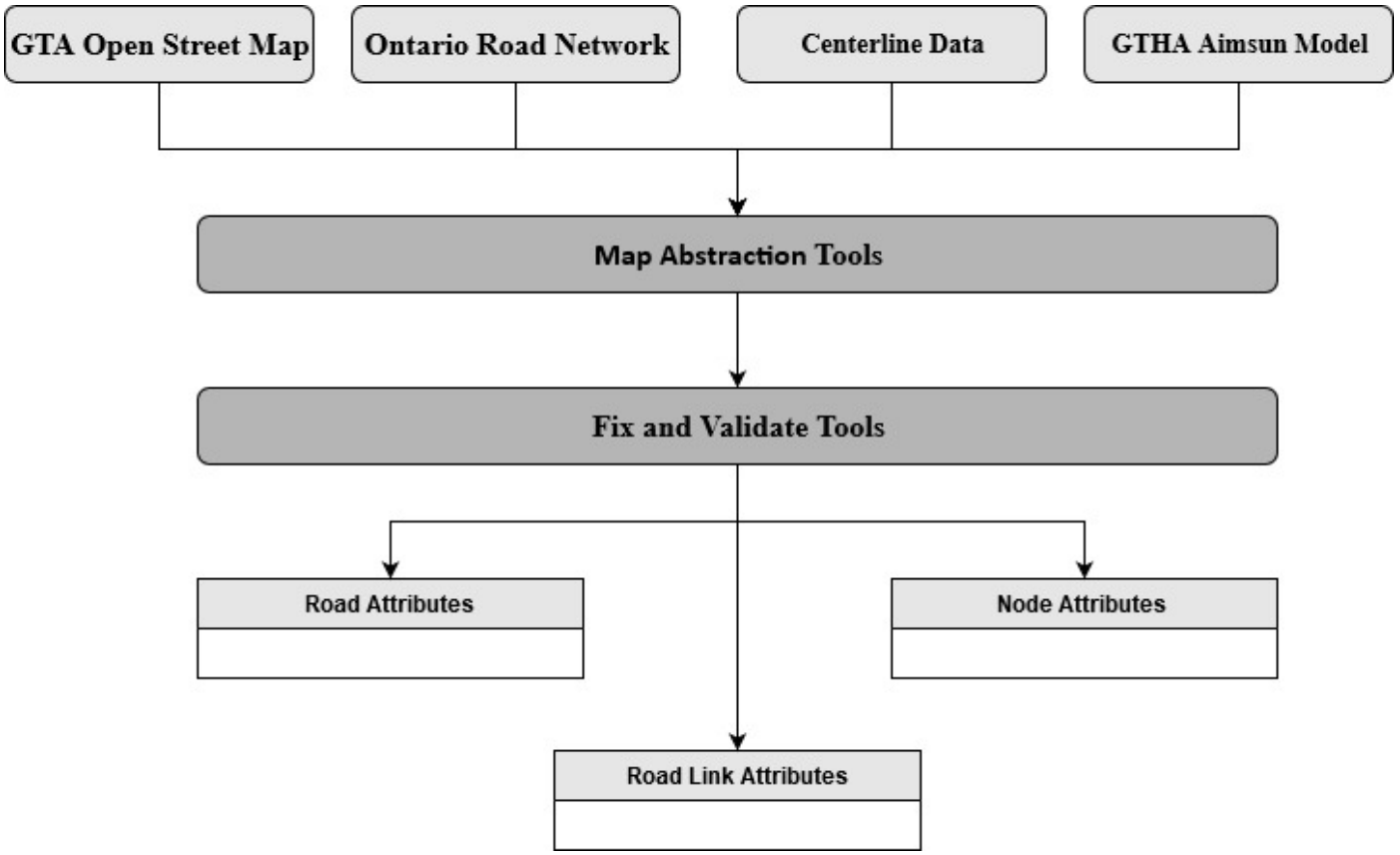


- This is ready-to-integrate tools with both trip level traffic management solutions and transportation simulation platforms.

ITSoS-iCity Network Abstraction Services(TRiP)

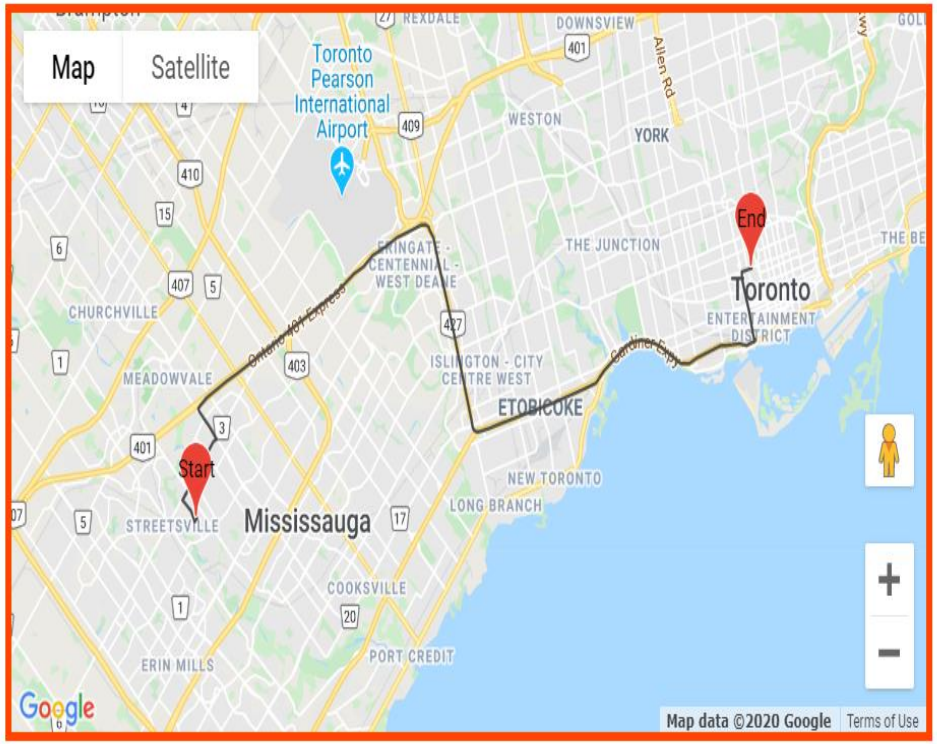


Example: Topology Building Tools

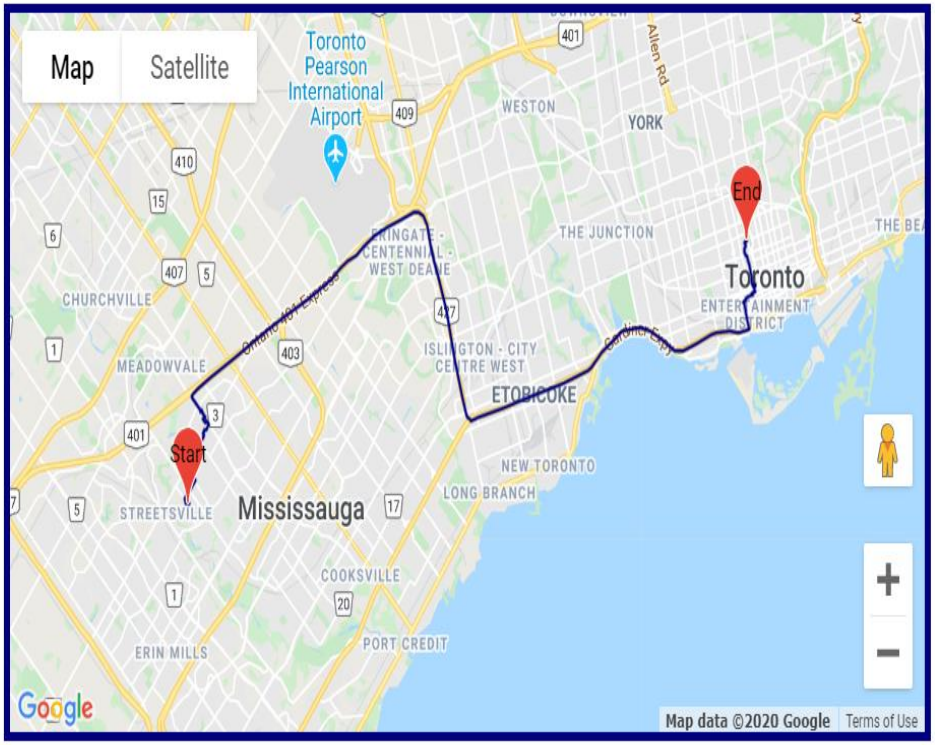


Application TRiP as an Advanced Traveller Information System

Google Maps



TRiP



Application: Reservation-based Traffic Control System

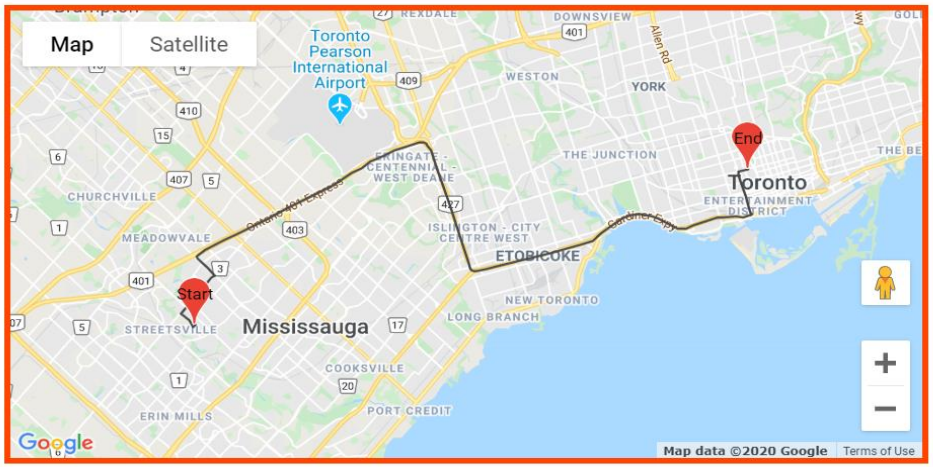
- Link Level & Trip Level Control

- Can traffic be managed by a reservation system?

Advanced Travelers Information System

Re-planned your trip!

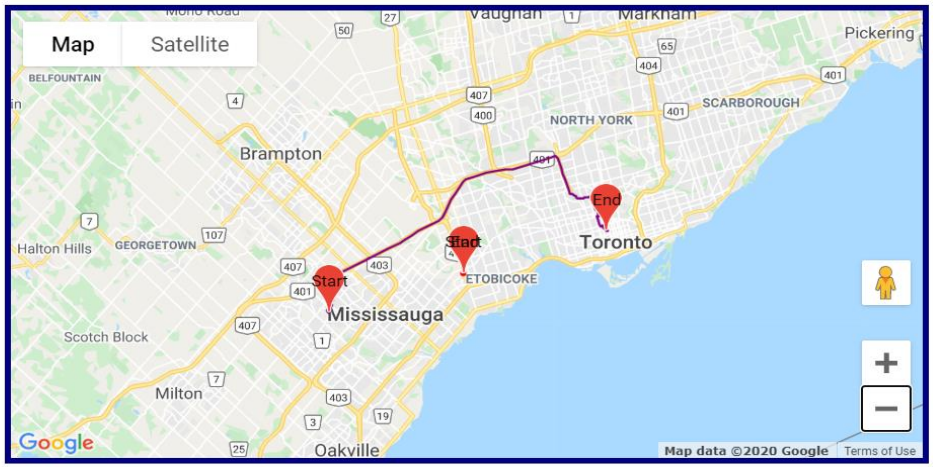
Google Maps



The total travel time is: 40.083 minutes.

The total distance is: 39.761 km.

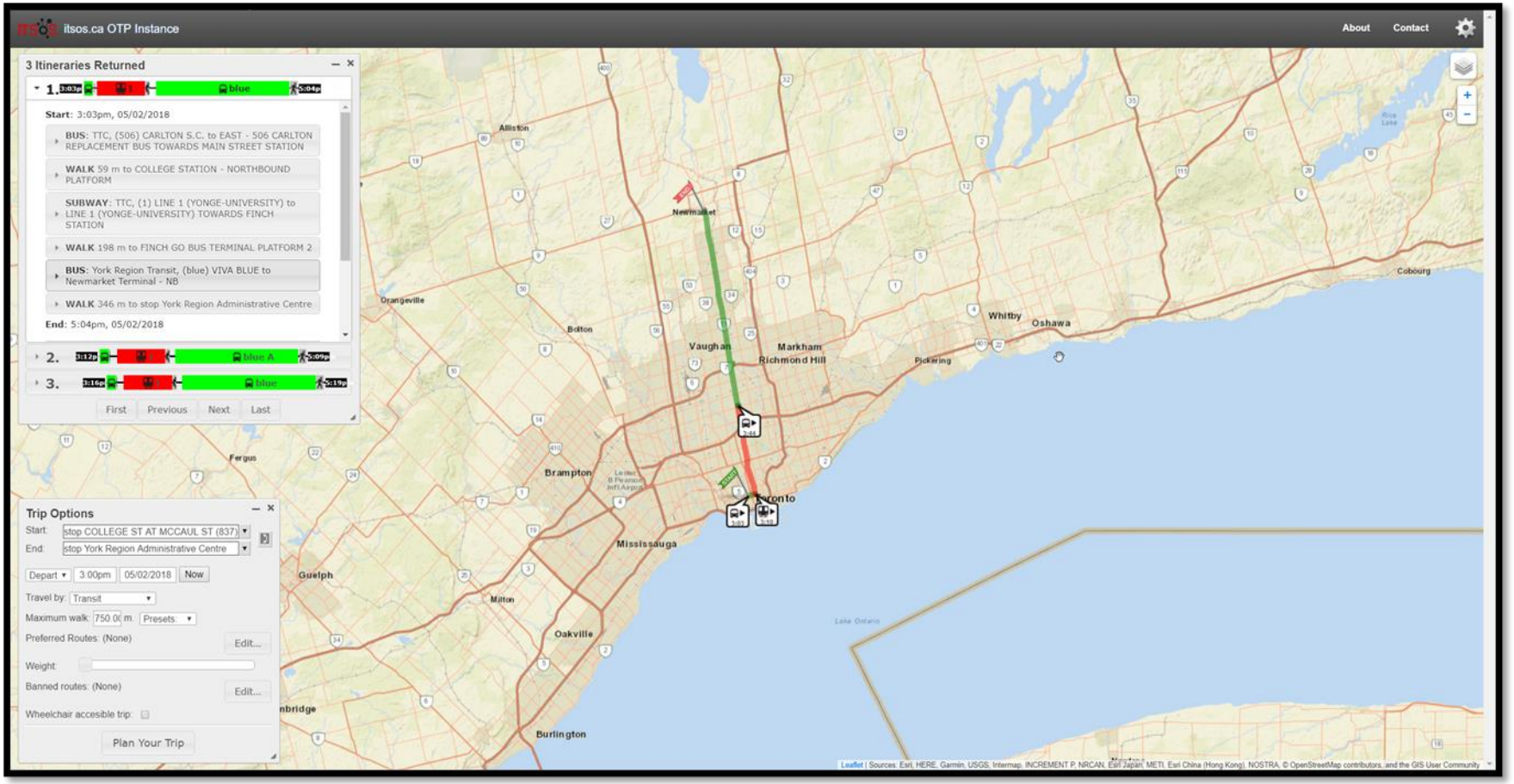
TRiP



The total travel time is: 43.487 minutes.

The total distance is: 40.632 km.

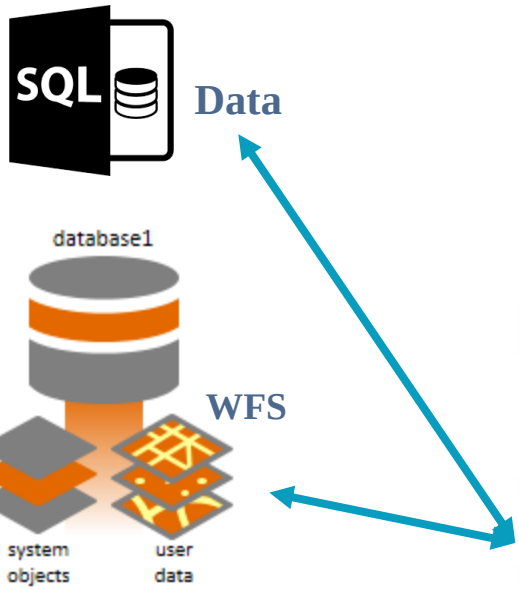
Application: OTP Transit (GTHA)

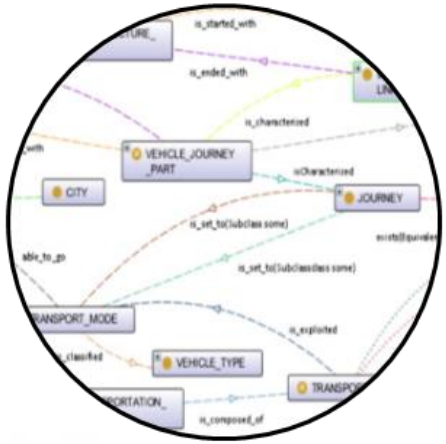


Semantic ATIS Architecture

SQL DB

Use Interface



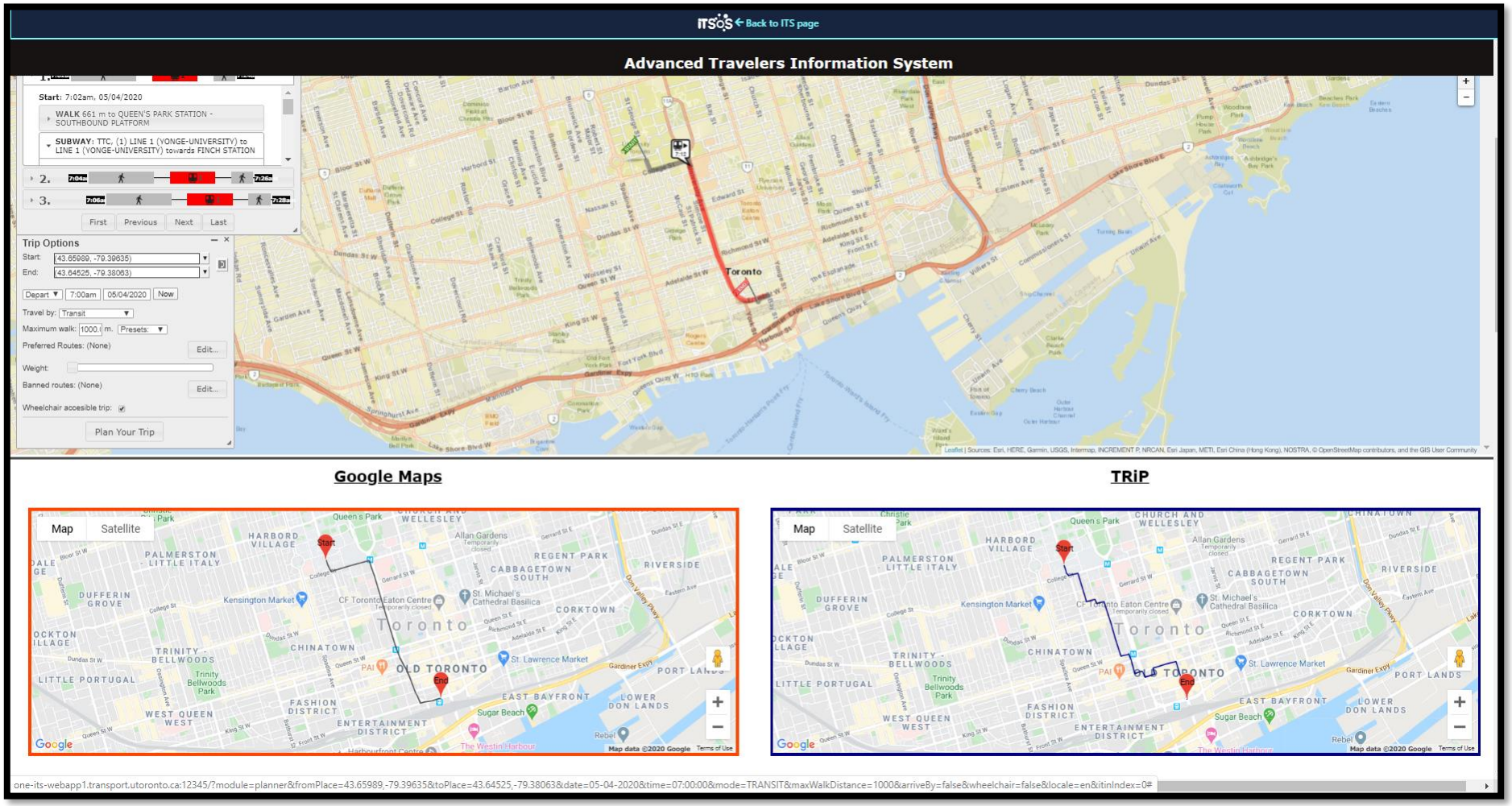


Data

Ontology Engine

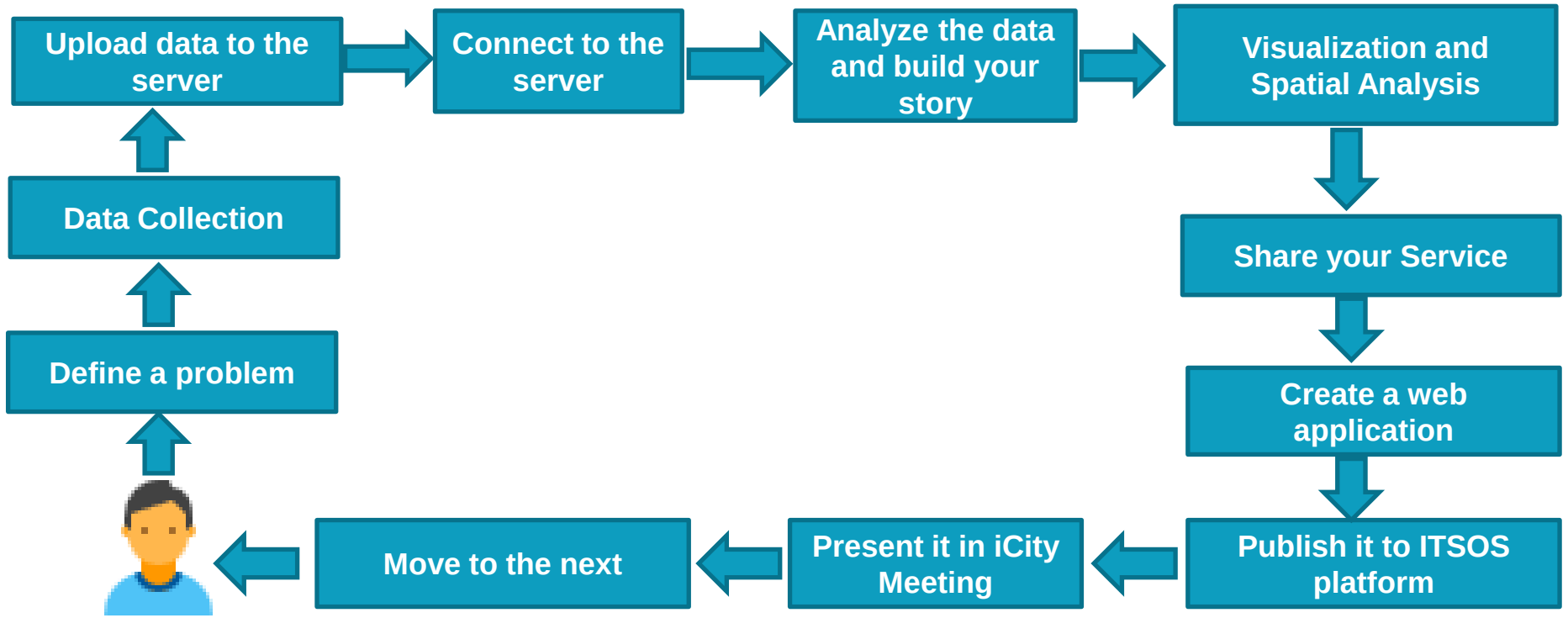
OTP Server

Application (3): Advanced Traveler Information System



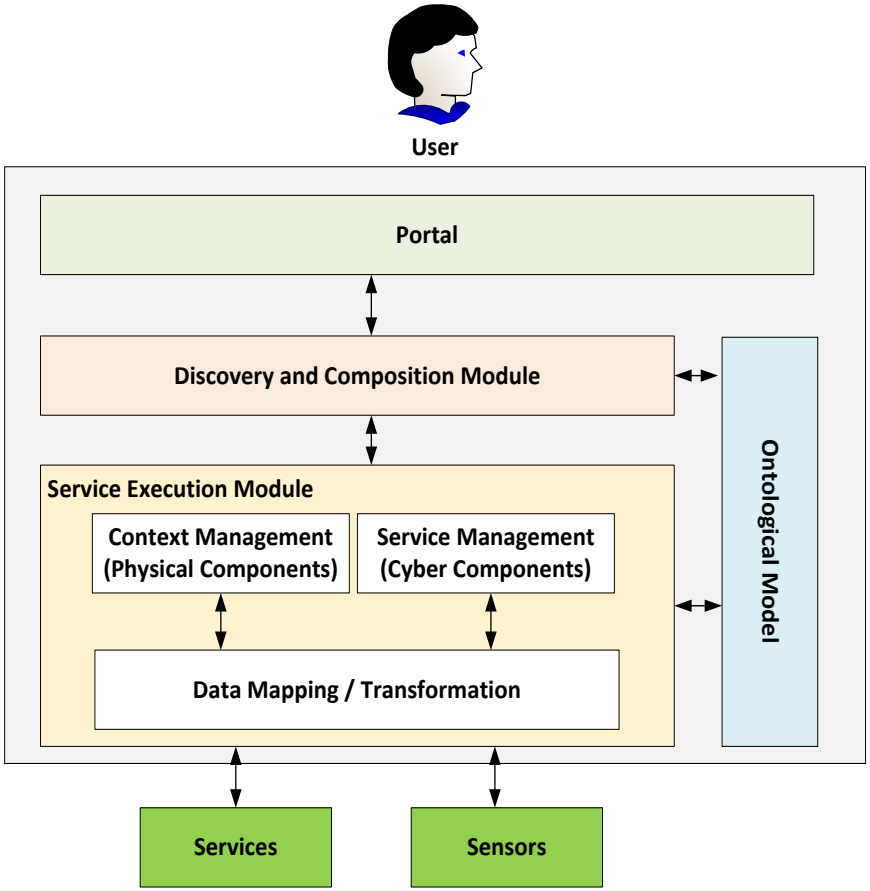
How to contribute to ITSoS?

- Explore transportation data and publish new services through ITSoS platform.
- Build the innovation hub and the collaborative ecosystem that will be used to build the new **generation (NG) of the Smart City Apps** through shared data and services

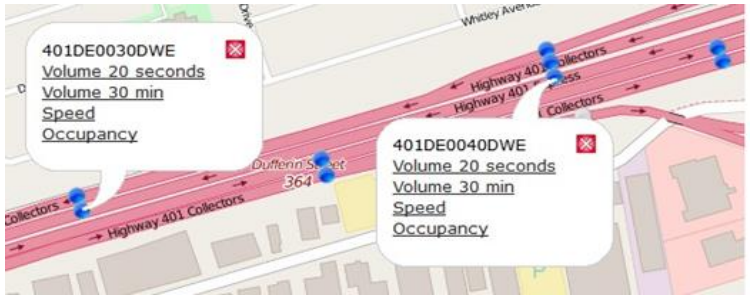


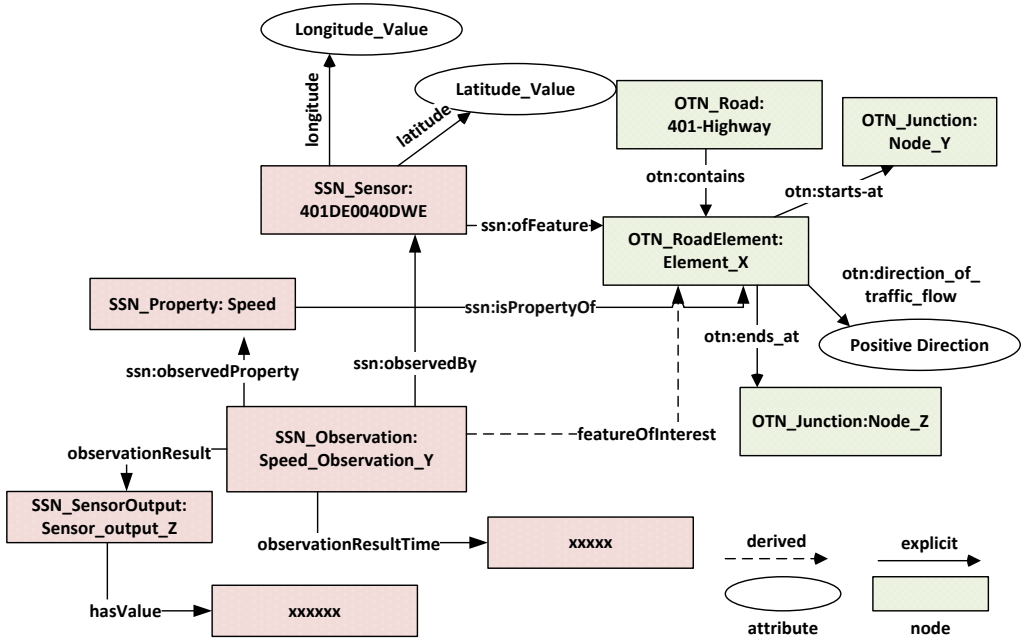
Challenge: Service Management

- **Ontological Models**
  - Service and Data
- **Service Management**
  - Planning
  - Discovery
  - Selection
  - Composition
- **Data Integration**
  - Mapping
- **Context management**



Challenge: Data Heterogeneity





- Designed data linking/ integrating ontologies
- In collaboration with iCity Project **

Google

511

Ontario MINISTRY OF TRANSPORTATION

here

transportationtomorrow SURVEY 2016

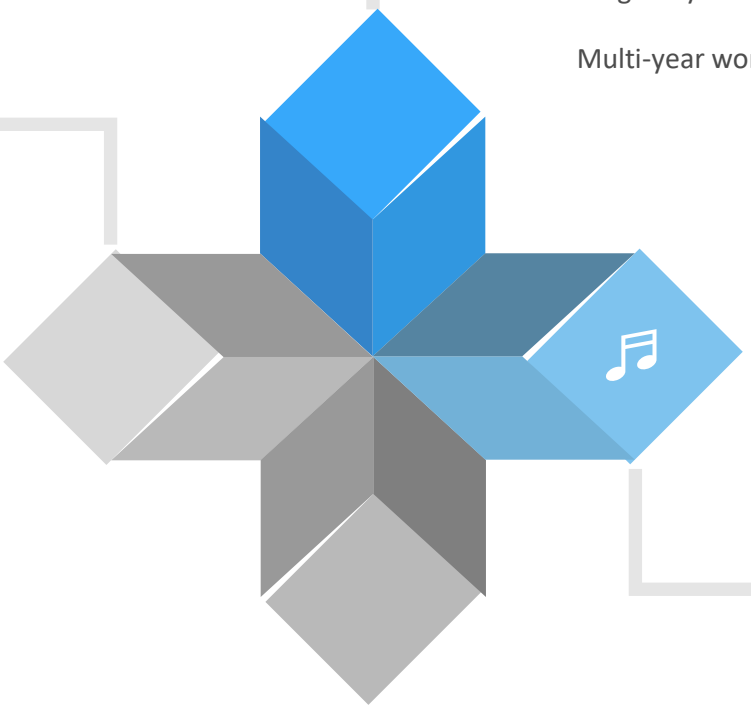
mXpress: Example

Challenge 3: Scale to a Mega City

- **Scalable architecture**
  - Smaller Processing delays
  - in spite of increases in data volume.

- **Parallelization**
  - In-memory processing

NG Smart City Apps Platform



Performant Platform

Mega-city scale datasets

Multi-year worth of data

Intelligent Platform

Knowledge representations
Of data and service

AI-based planning of data processing

Integrative Platform

Heterogeneous Data

Siloed service

Developed Services


Nandi
Спасибо
Thank you
धन्यवाद
Tack
Хвала
Köszönöm
Takk
Gracias
Grazie
Obrigado
感謝您
Děkujeme
Merci
धन्यवाद
Kiitos
شكرا
תודה
Teşekkürler
Dziękuję
ありがとうございます
Děkuji
Terima kasih
Danke
谢谢您
Dank u
감사합니다
Tak