

MaaS4EU Virtual Final Conference  
October 29<sup>th</sup>, 2020



**MaaS4EU**

# Platform and Technology

**Panos Georgakis**

University of Wolverhampton, UK

# Agenda

- MaaS4EU Integrated Technology Platform
- MaaS4EU Platform – Components
  - API of APIs
  - Journey Planner & Supply/Demand optimisation
  - Recommendation Services
- MaaS4EU App Demo

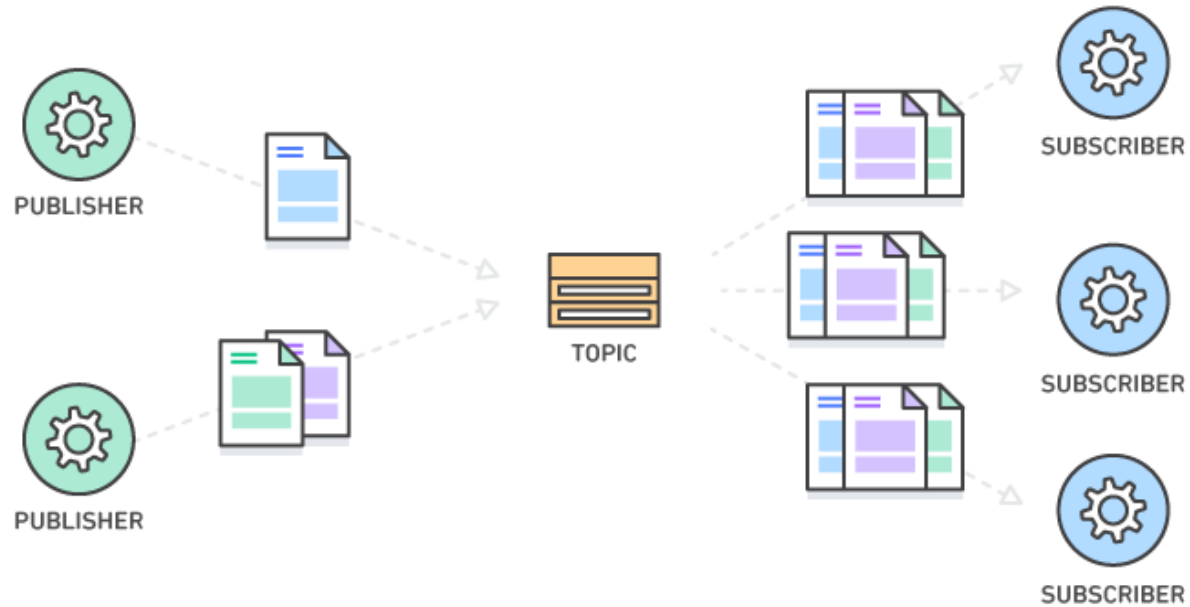


**MaaS4EU**

**Integrated Technology Platform**



# MaaS4EU Platform – Internal Interfacing



RabbitMQ

Overview Connections Channels Exchanges **Queues** Admin

Queues

▼ All queues

Filter:   Regex (?)

Overview			Messages			Message rates		
Name	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack
MaaSPlansRequests	D	idle	0	2	2	0.00/s	0.00/s	0.00/s
NotificationAnswers	D	idle	0	0	0	0.00/s	0.00/s	
ScreenVisit	D	idle	16	0	16	0.00/s	0.00/s	
ToMobilityHub	D	idle	0	0	0	0.00/s	0.00/s	
maas4eu.account.proof.request	D	idle	0	0	0			
maas4eu.confirm.booking.ns.request	D	idle	0	0	0			
maas4eu.confirm.booking.request	D	idle	0	0	0			
maas4eu.get.user.request	D	idle	0	0	0			
maas4eu.msp.get	D	idle	0	0	0			
maas4eu.order.request	D	idle	0	0	0			
maas4eu.signing.ticket.request	D	idle	0	0	0			
maas4eu.stripe.charge.request	D	idle	0	0	0			
maas4eu.subscription.proof.request	D	idle	0	0	0			
maas4eu.subscription.request	D	idle	0	0	0			
maas4eu.ticket.proof.request	D	idle	0	0	0			
maas4eu.user.booking.request	D	idle	0	0	0			
maas4eu.user.charge.request	D	idle	0	0	0			
maas4eu.user.tap.request	D	idle	0	0	0			
maas4eu.user.ticket.request	D	idle	0	0	0			
maas4eu.validate.account.request	D	idle	0	0	0			
maas4eu.validate.booking.ns.request	D	idle	0	0	0			
maas4eu.validate.booking.request	D	idle	0	0	0			
maas4eu.validate.signature.request	D	idle	0	0	0			
routeRequest	D	idle	0	0	0	0.00/s	0.00/s	

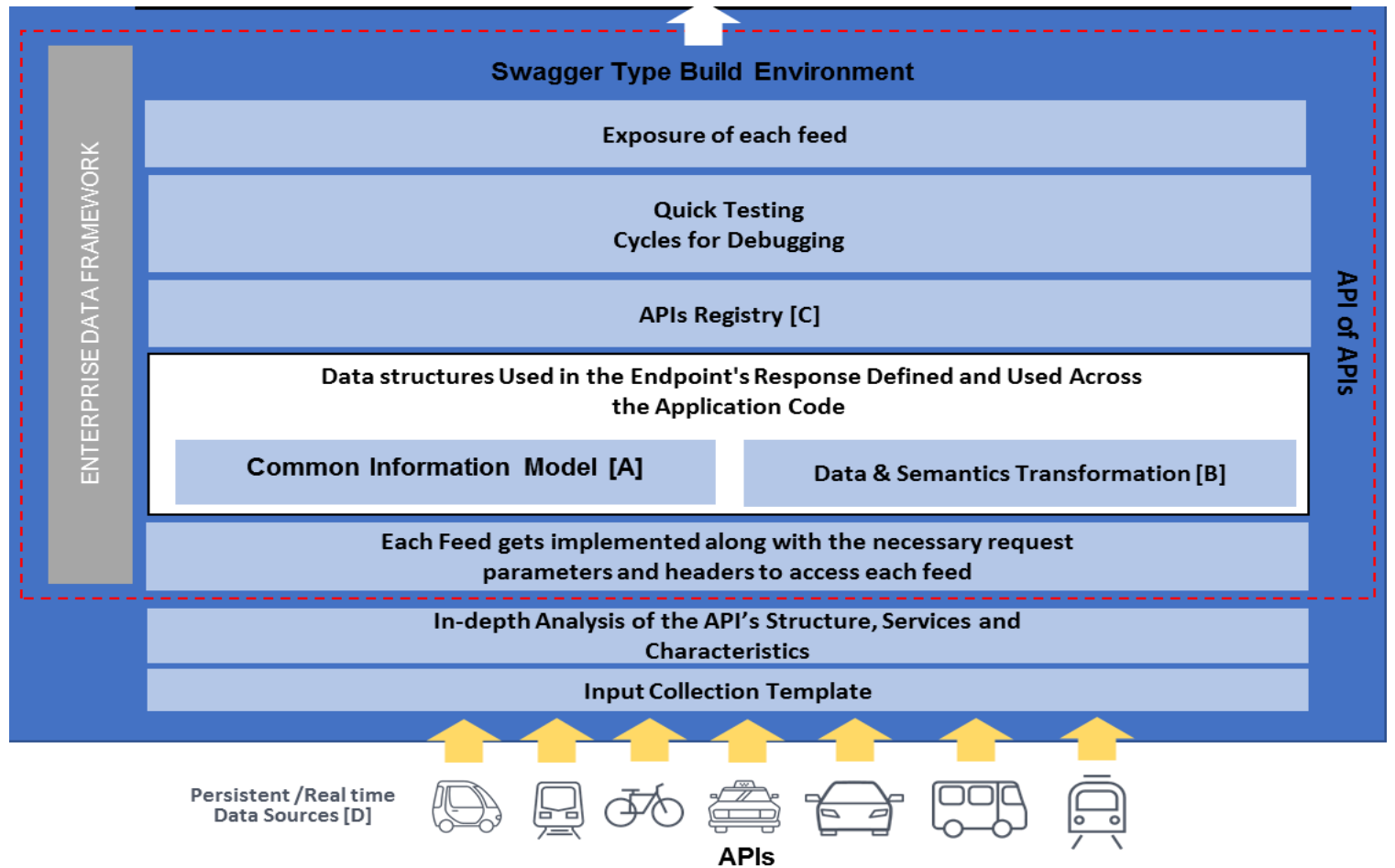


MaaS4EU

API of APIs

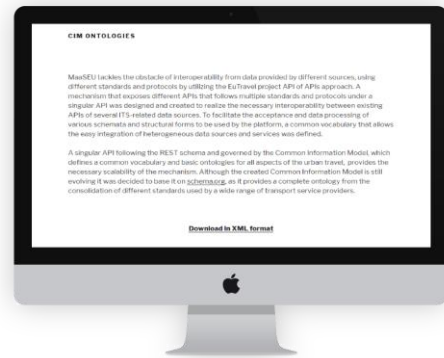
# API of APIs

- A unique interface for accessing multiple Mobility Services from different MSPs in a unified consistent manner
- Provides the capability to bridge mobility services and tackles the obstacle of interoperability



# Common Information Model

A disciplined method for consistently describing business objects and their relationships and establishes a common vocabulary and basic ontologies for aspects of the urban travel



CIM : <http://www.maas4eu.eu/cim-ontologies/>



# CIM Mapping and Data Transformation

 **GeoCoordinates**  
*Domain.GeoCoordinates*

Id  
*int*

Latitude  
*double*

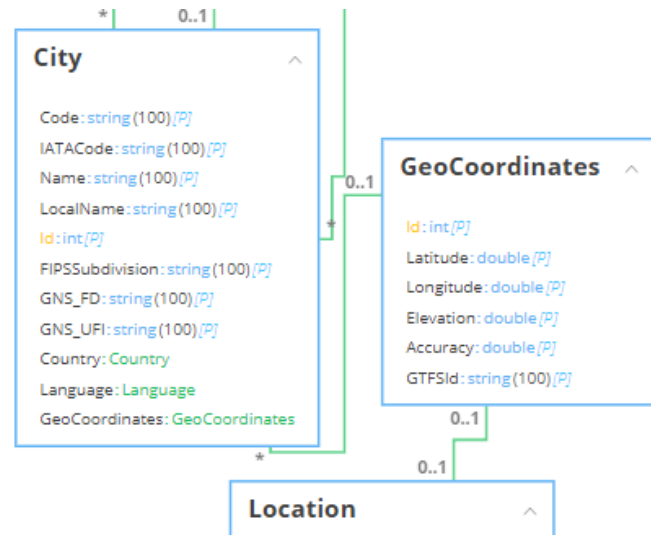
Longitude  
*double*

 **cities**  
*Interfaces.nextbike.cities*

uid  
*int*

lat  
*float*

lng  
*float*

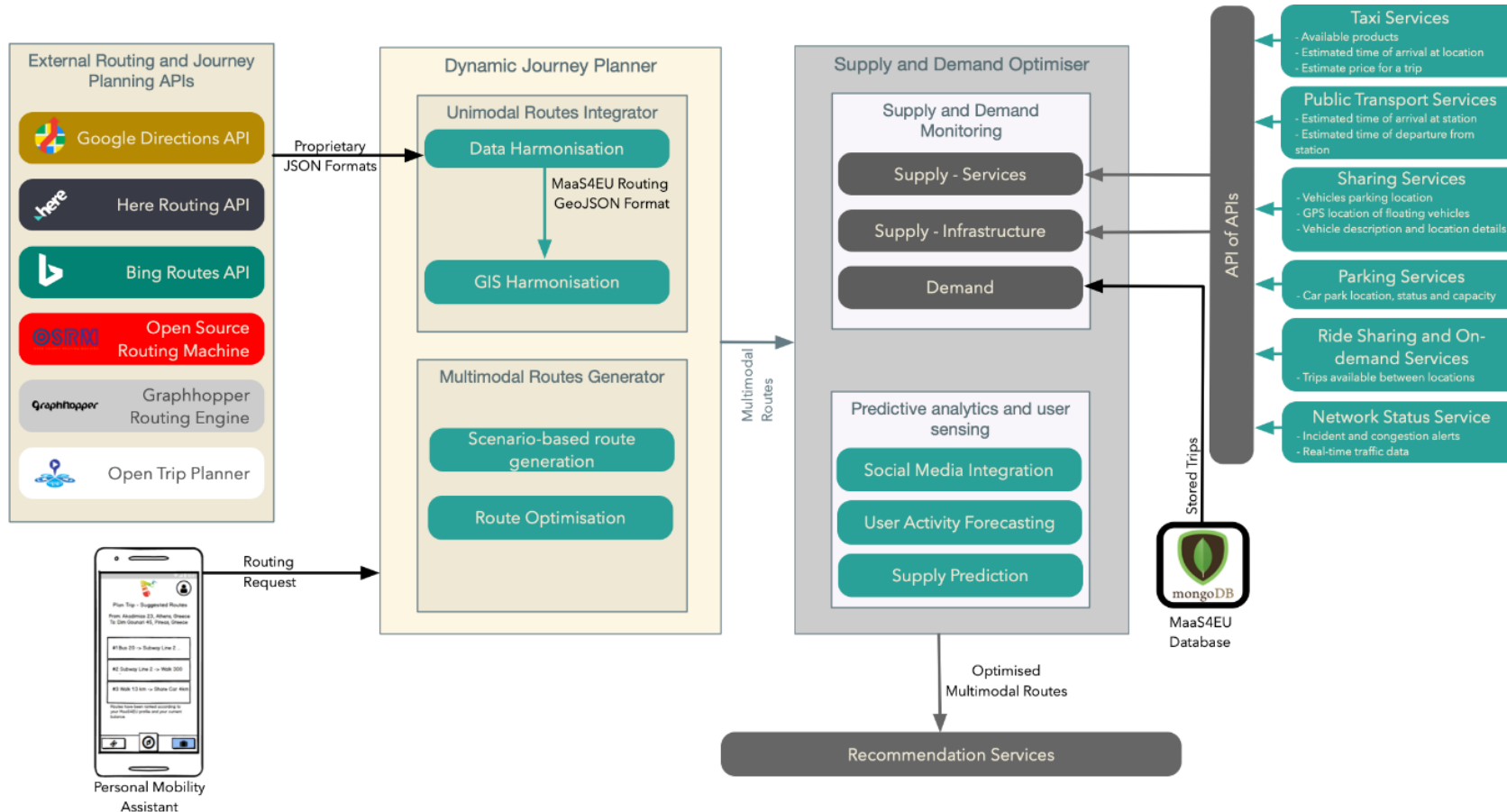




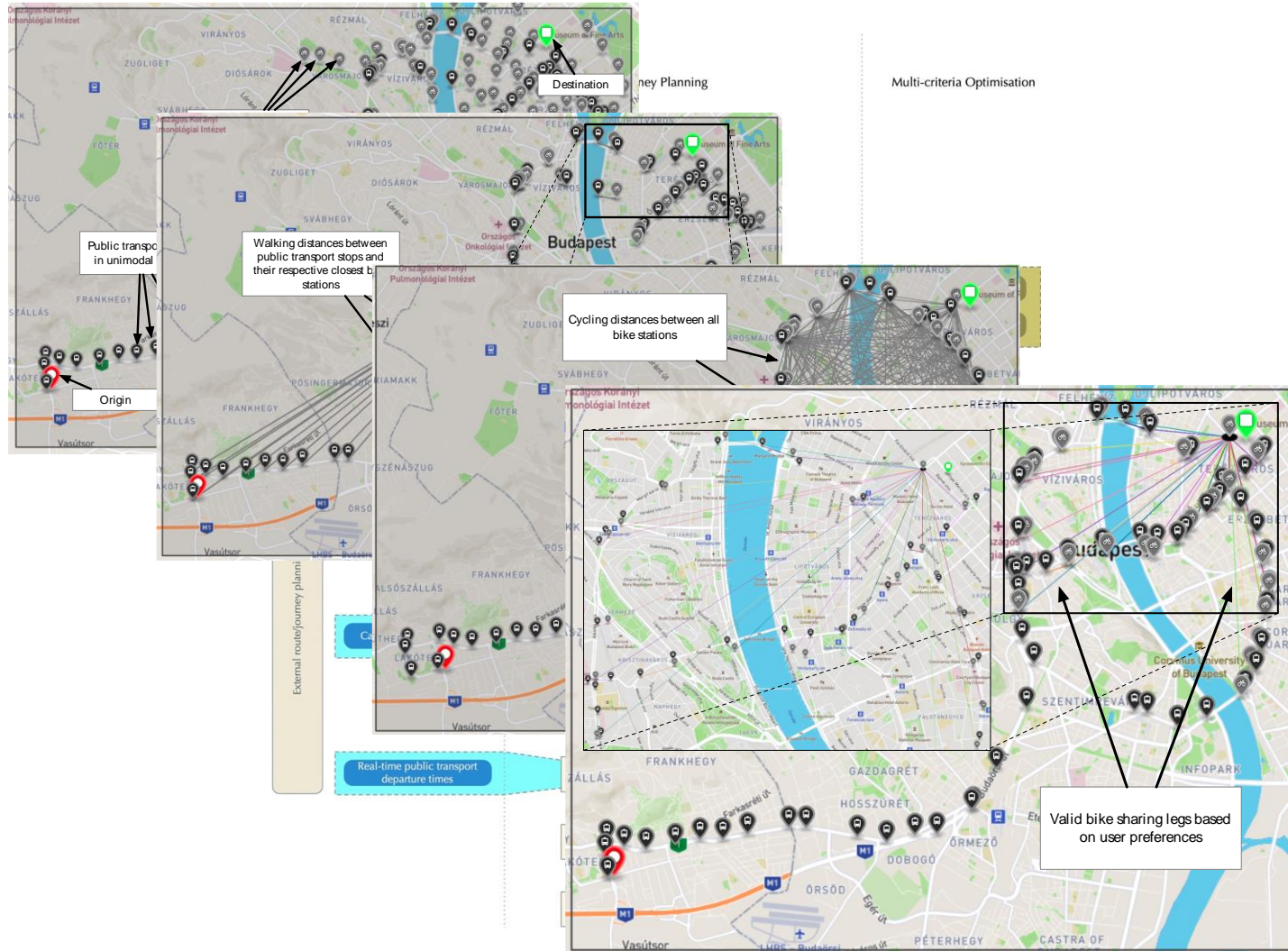
**MaaS4EU**

**Dynamic Journey Planner  
Supply/Demand Optimiser**

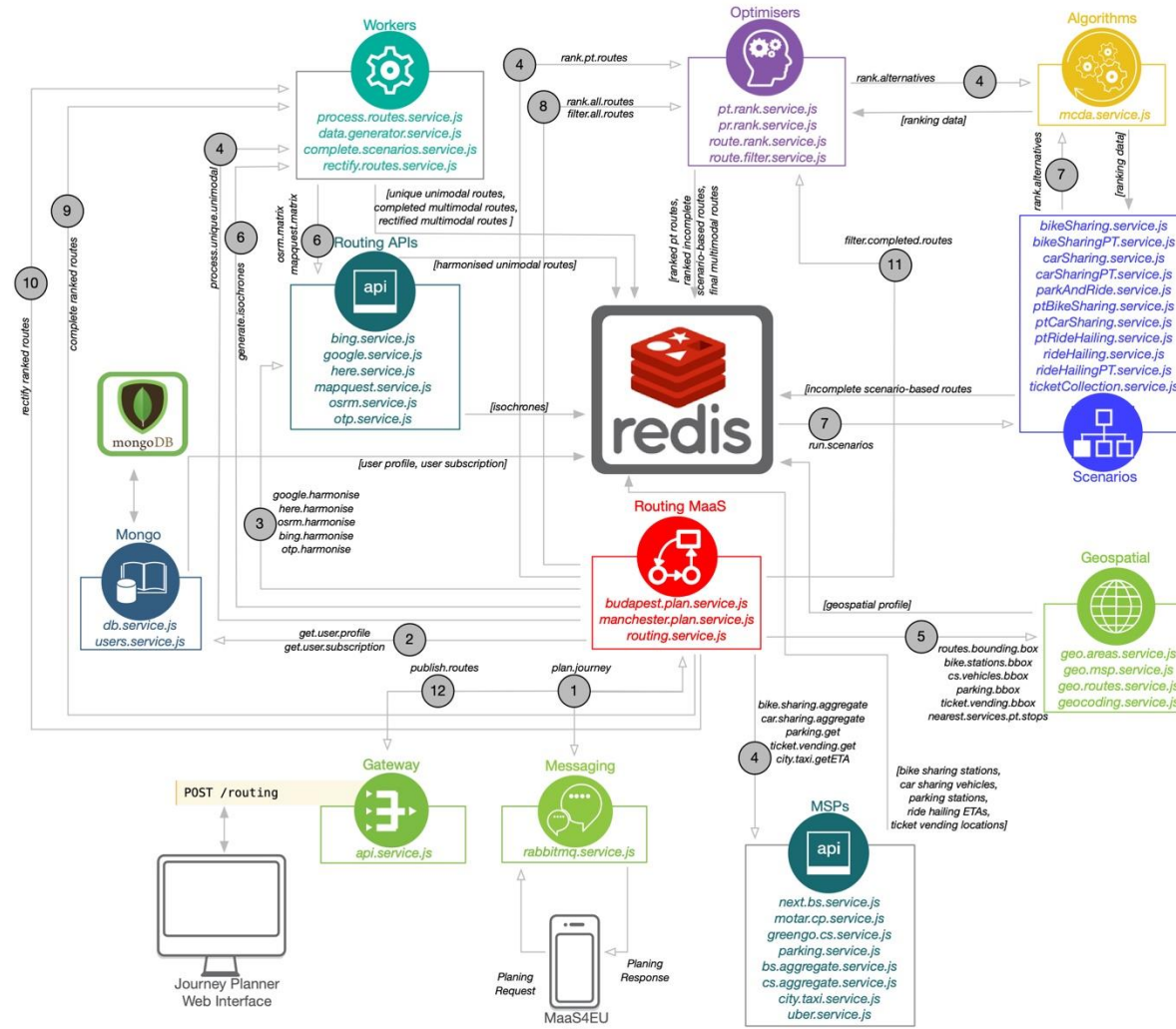
# MaaS Dynamic Journey Planner & Mobility Services Demand Supply Optimizer



# MaaS Dynamic Journey Planner - Approach

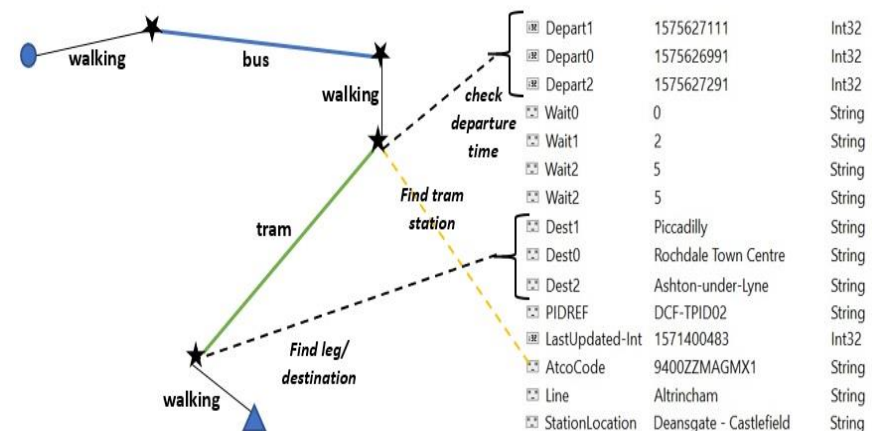
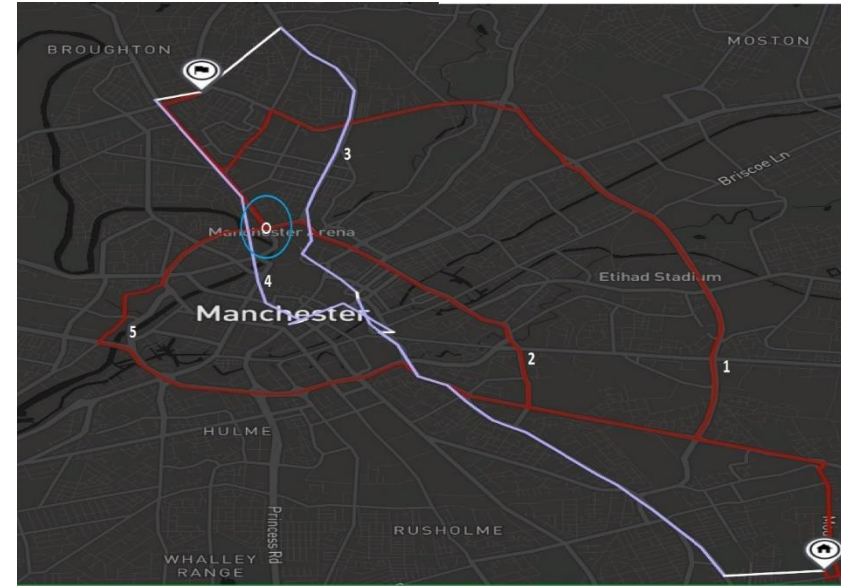


# MaaS Dynamic Journey Planner - Implementation



# Supply and Demand Optimiser

- **Incidents and Accidents Data Integration:**
  - Three generated routes have been affected and will be deleted (2, 4, and 5).
  - Data of social media may identify accidents locations to be avoided!
- **Tram and Train Services Data Integration:**
  - Tram and Train legs in the generated multimodal routes will be updated according to real time data collected.
- **Travel Plan Recommendation:**
  - Social media data of a user analysed may affect the travel plan used as a new recommended plan may be suggested (user's sentiment).
- **Balancing Supply and Demand:**
  - Imbalances between mobility services supply and their demand are detected.

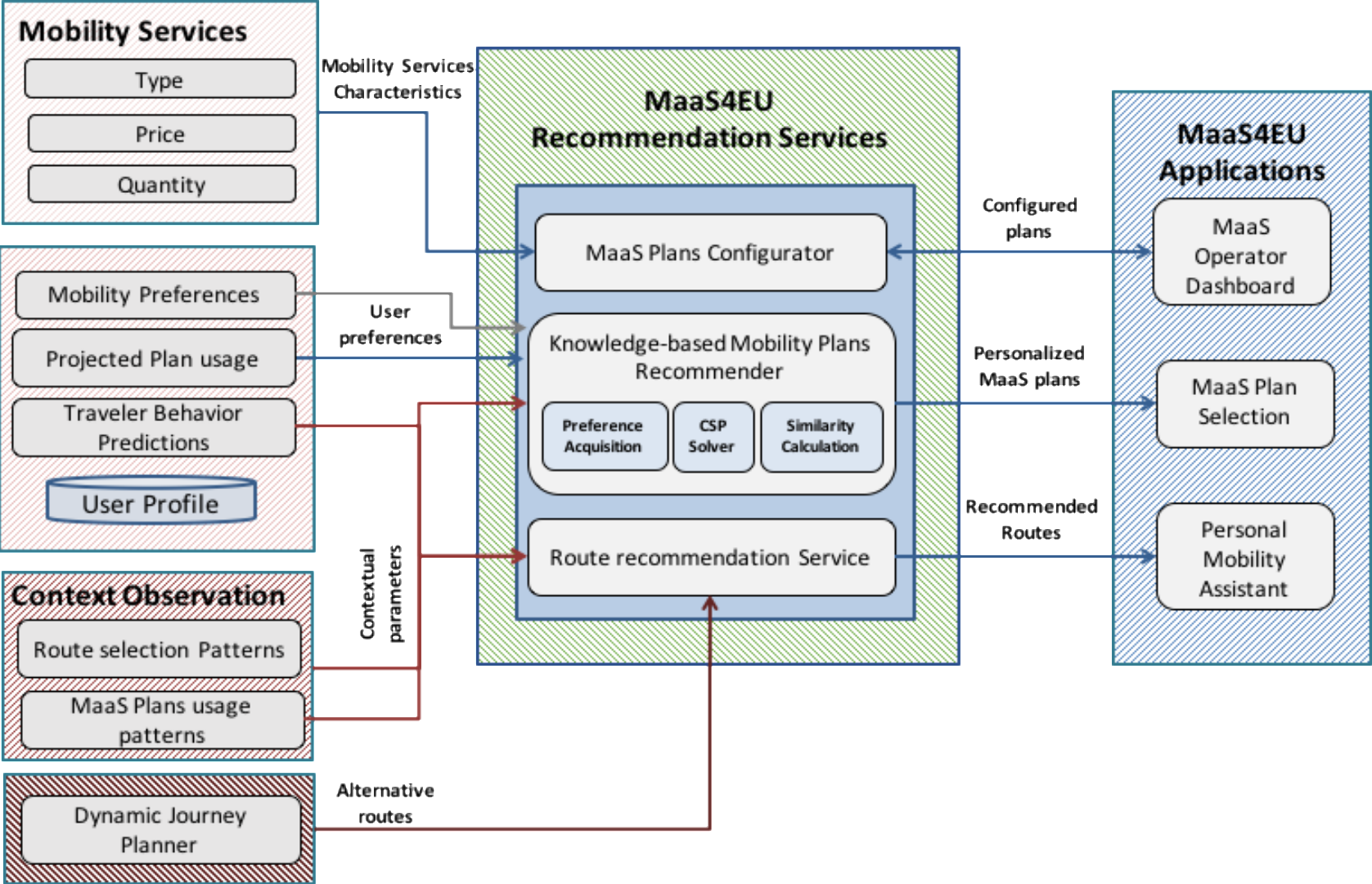




**MaaS4EU**

**Recommendation Services**

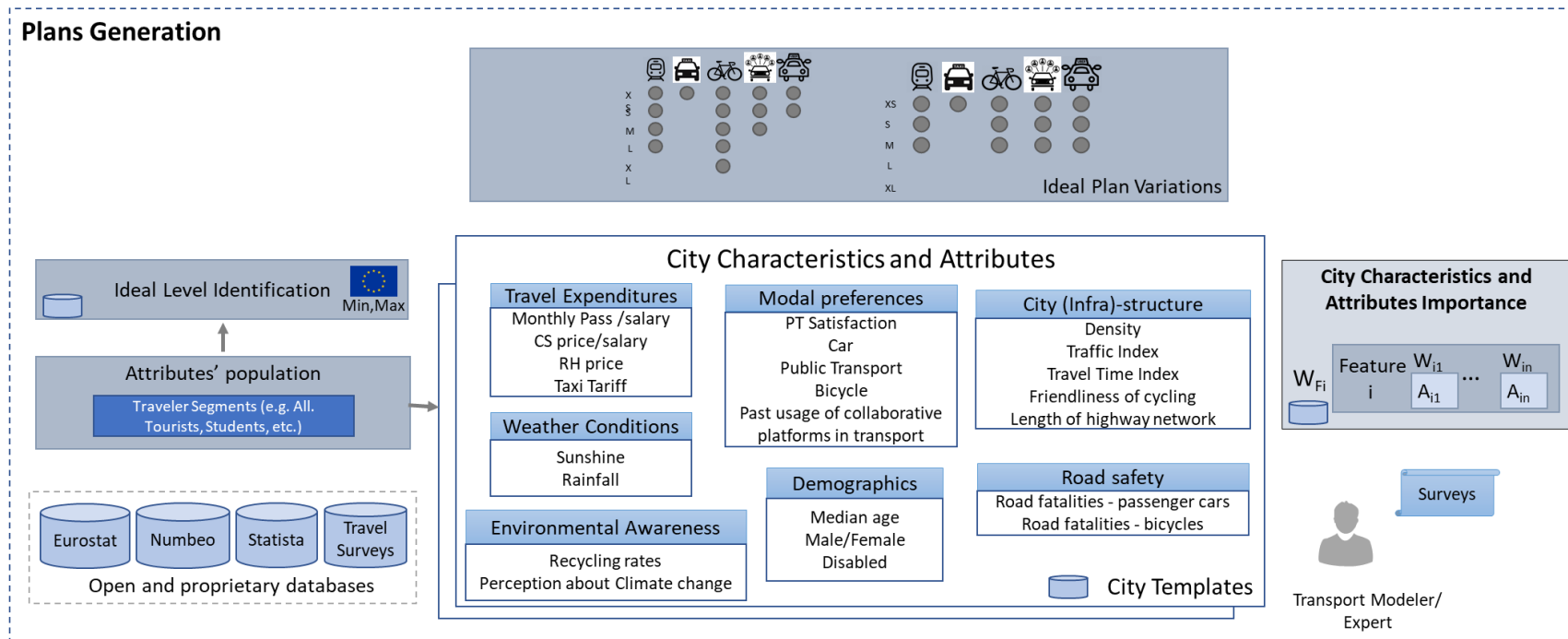
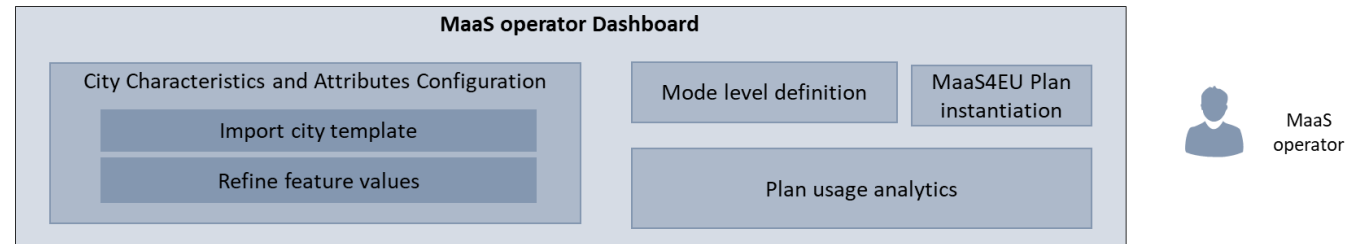
# Recommendation Services





# MaaS plans Configuration Recommender

- Goal: To derive the ideal sets of MaaS plans by considering the characteristics of a city



# Configuration Recommender Dashboard

MaaS Plans Designer
☰

Options

Select a City:  Select a Scenario:

| 
  |

Configuration

Data View: Budapest - Basic

MaaS Plans Levels

Weather Conditions

Sunshine (hour)

Rainfall (mm)

Environmental Awareness

Recycling rates (%)

Perception about Climate change (%)

Weather Conditions

Sunshine (hour)

Rainfall (mm)

Environmental Awareness

Recycling rates (%)

Perception about Climate change (%)

Travel Expenditures

Monthly Pass cost

Car Sharing costs

Ride Hailing costs

Taxi fares

City (Infra)-structure

Density (inhabitants/km2)

Traffic Index (%)

Travel Time Index (min)

Length of cycling lanes (km)

Length of highway network

Modal preferences

PT Satisfaction (%)

Car (%)

Public Transport (%)

Bicycle (%)

Past usage of collaborative platforms in transport (e.g carsharing) (%)

Demographics

Median age (years)

Male/Female (proportion)

Disabled(%)

Physical Activity (%)

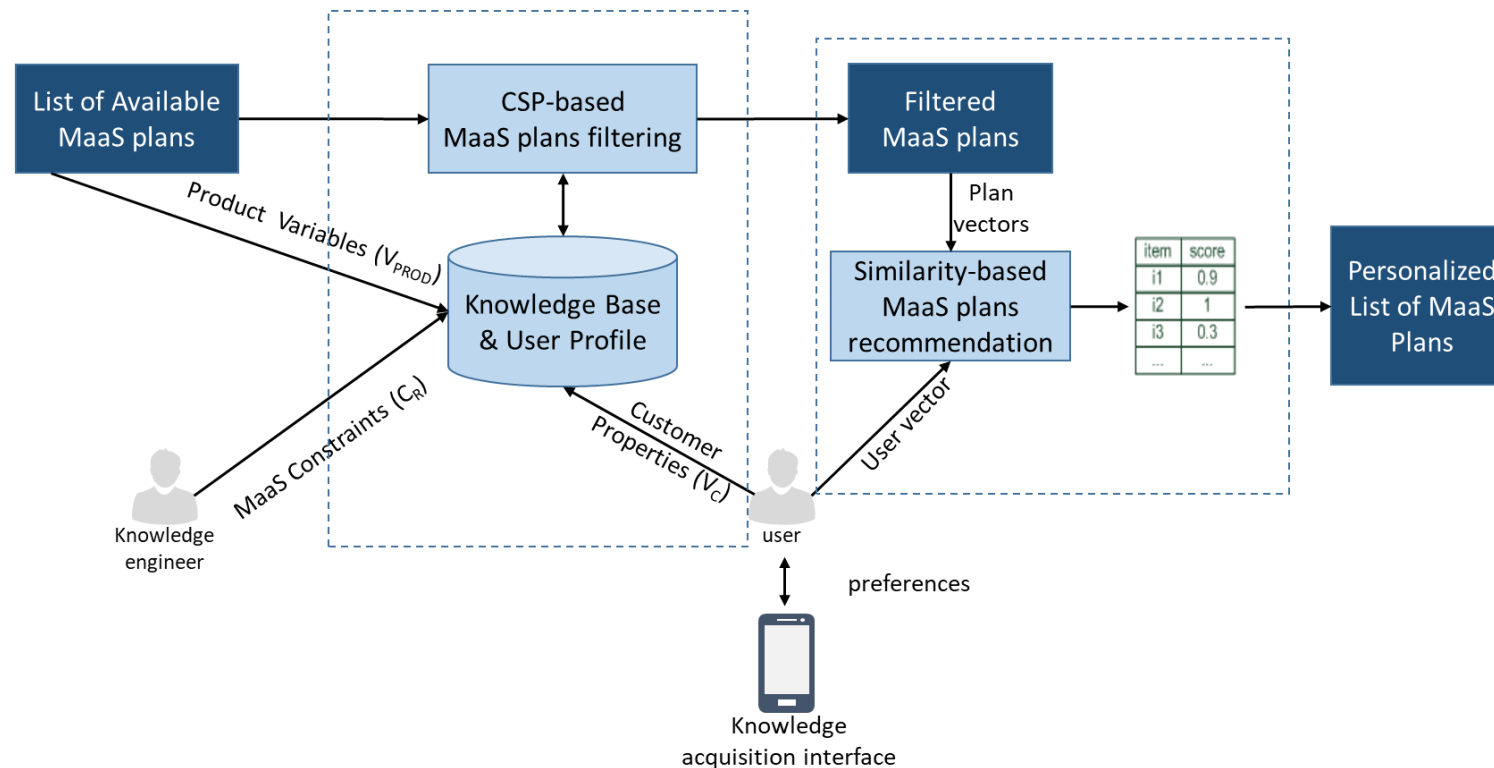
Road safety

Road fatalities - passenger cars

Road fatalities - bicycles

# Knowledge Based Mobility Plans Recommender

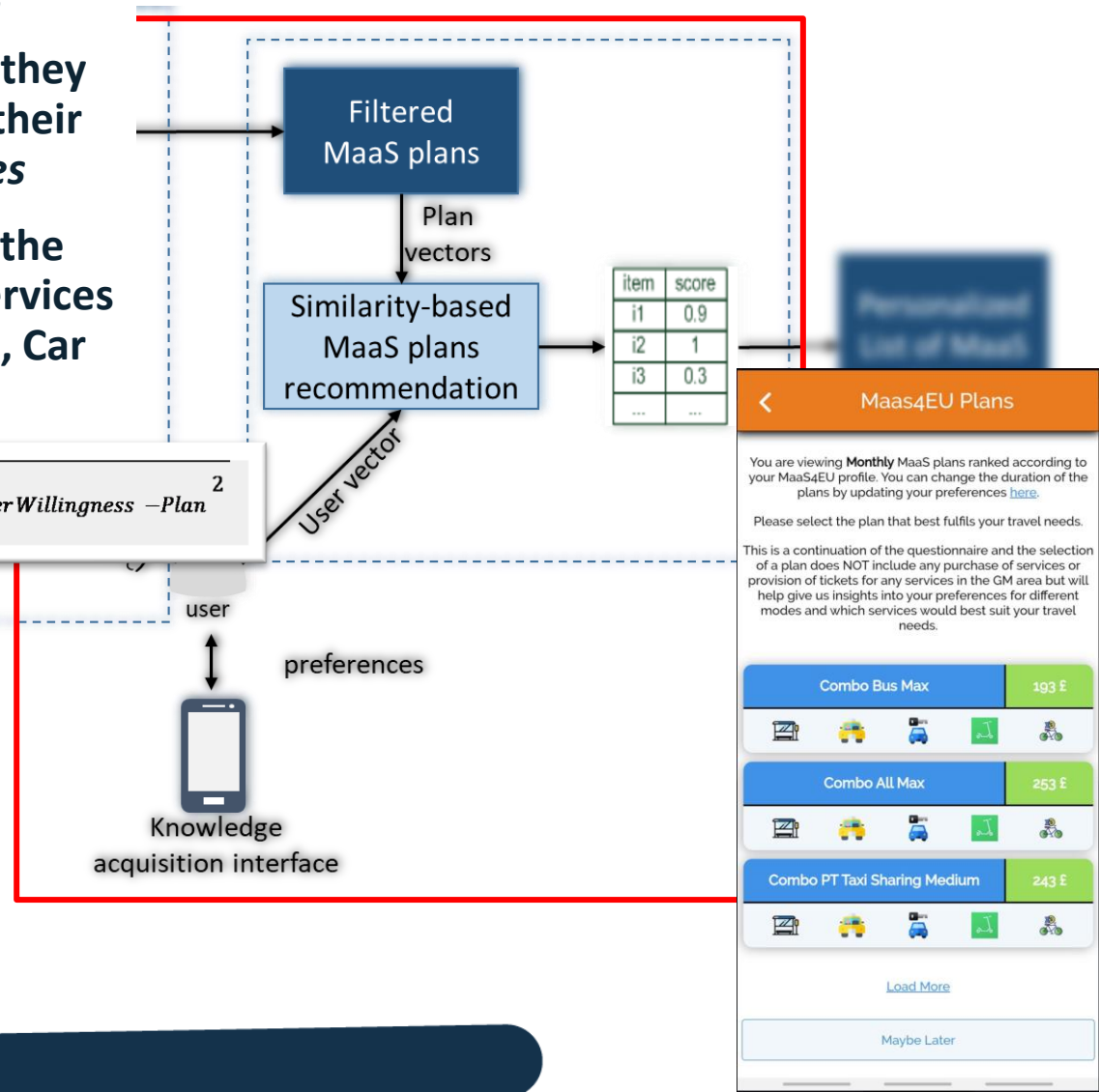
- **Goal: To provide a personalized approach capable of solving the task of the MaaS plans selection among the range of the available plans, while addressing the cold start problem**



# Knowledge Based Mobility Plans Recommender

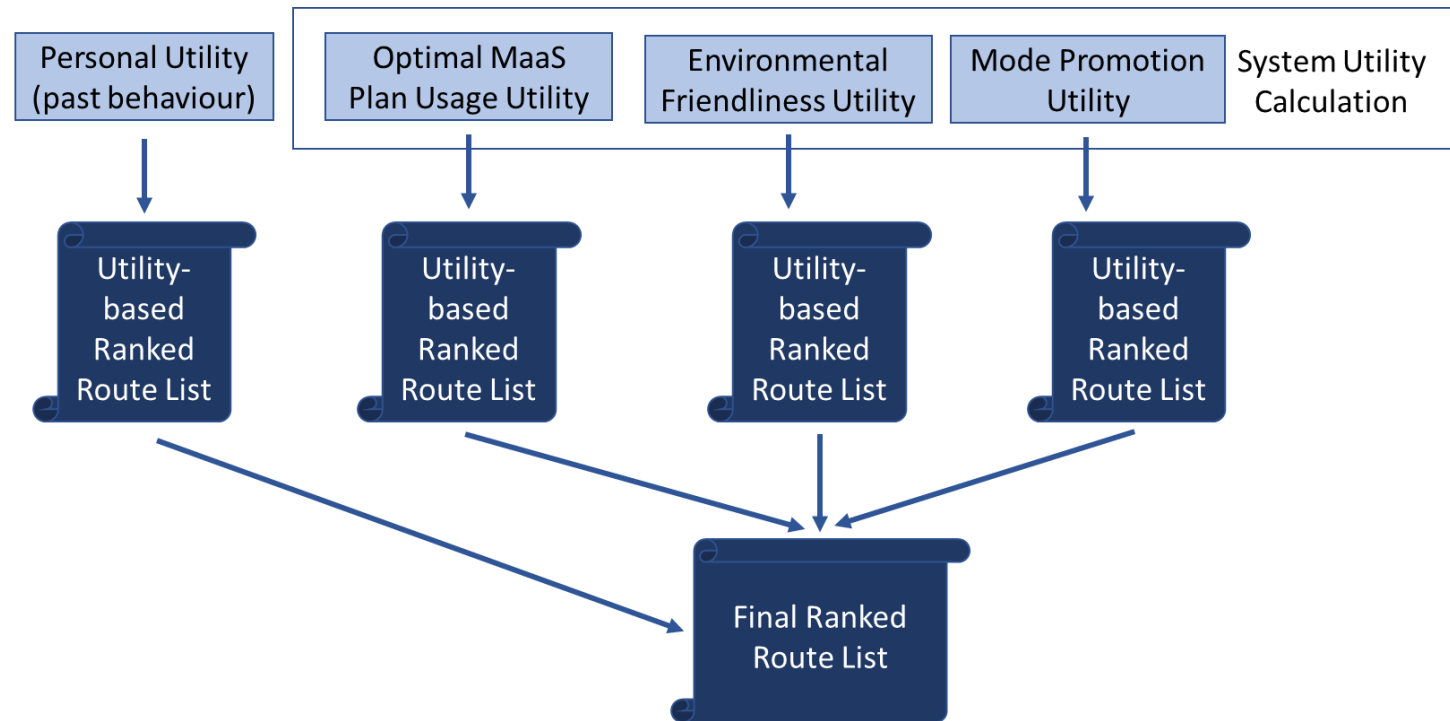
- User Vector created from the users' profile where they state how often they use different transport modes and their *willingness to use the various modes*
- MaaSPlan Vector created based on the values of the amount of mobility services (Public Transport, Taxi, Bike sharing, Car sharing) included in the plan

$$similarity_{Aggregated} = \sqrt{similarity_{UserHabits - Plan}^2 + similarity_{UserWillingness - Plan}^2}$$



# Route Recommendation Service

- Different route lists are consolidated using the Borda count algorithm to obtain the fused / final ranked list of routes





**MaaS4EU**

**Mobile Application**

# MaaS4EU Mobile Application



## Maas4EU

Intrasoft S.A. RID Ταξίδια και τοπικές πληροφορίες

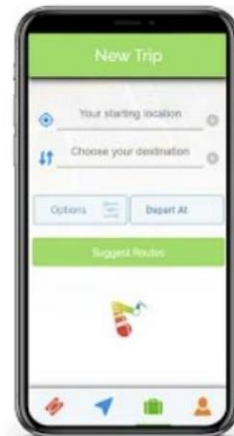
★★★★★ 25

1 PEGI 3

Αυτή η εφαρμογή είναι συμβατή με κάποιες από τις συσκευές σας.

Εγκαταστάθηκε

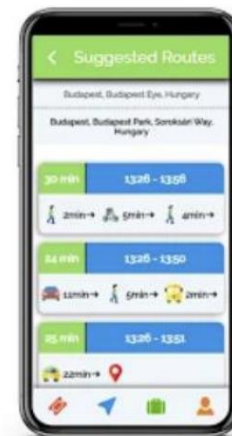
select your destination



choose between different plans



choose among a variety of routes



follow the route you see



# MaaS4EU Mobile Application - Demo





# THANK YOU

