
Hellenic Institute
of Transport
Thessaloniki smart
mobility living lab
Θεσσαλονικη
www.imet.gr

Hellenic Institute of Transport

Who we are

HIT is a part of a greater team CERTH which consists of 5 INSTITUTES
www.certh.gr

HIT
established in 2000
scientific team: 80 members

No1 in the top list of research organizations in terms of EU Funding in Greece

No 17 in EU

Our Institute consists of 3 sectors

Vehicle Safety
Accessibility

Smart
Sustainability
Freight Transport
Networks

Transport Economics
Environment
Non-Land Transport

Research on sustainable mobility, with emphasis on land transport networks.

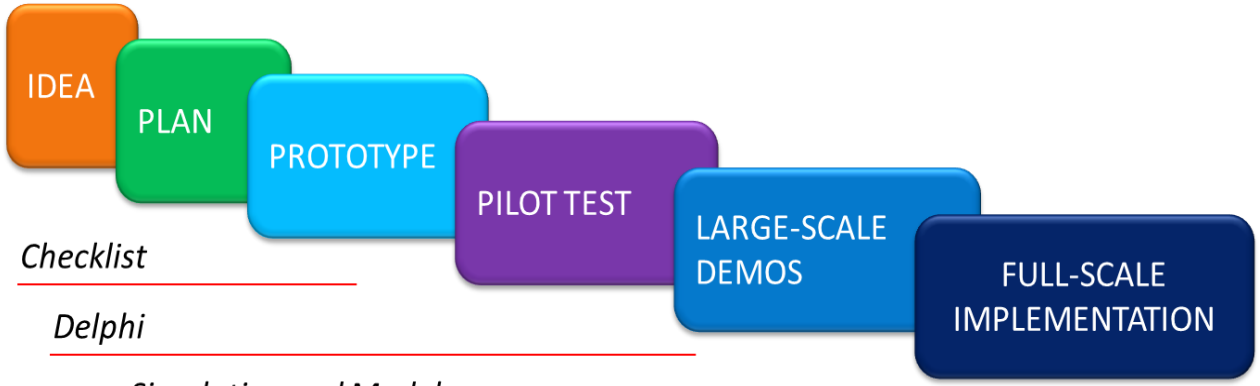
What we do

We develop technologies and techniques for collecting, managing and certifying data from multiple sources. We also develop algorithms for solving specific transportation problems, such as managing fleets and providing routing services

Data collection and processing
Algorithm design
Data analytics and Data models
Data visualization

Develop, Implement, Deploy, Test and assess mobility solutions and services in a real-world environment


Θεσσαλονικη
Funded projects
H2020
ERDF
...
www.imet.gr



SEVENTH FRAMEWORK PROGRAMME

SIXTH FRAMEWORK PROGRAMME

Source: EEG TEMPO Euro-Regional Evaluation Guidelines, 2005

Interreg Mediterranean

Interreg Greece-Bulgaria

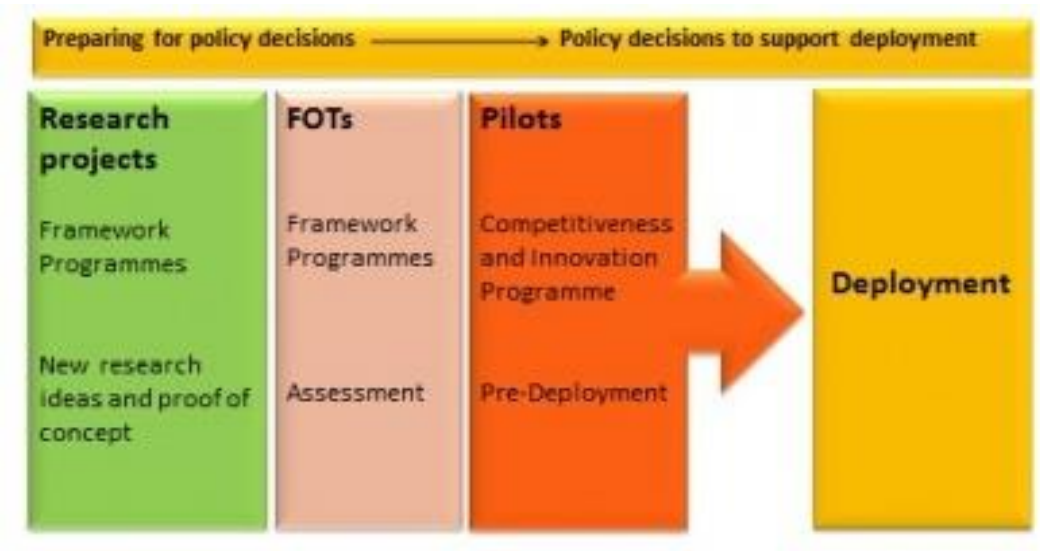
Interreg Atlantic Area

Interreg Greece-Italy

Interreg Danube Transnational Programme

NETWORLD

Interreg Ελλάδα-Κύπρος




HIT portal
Thessaloniki Mobility Living Lab
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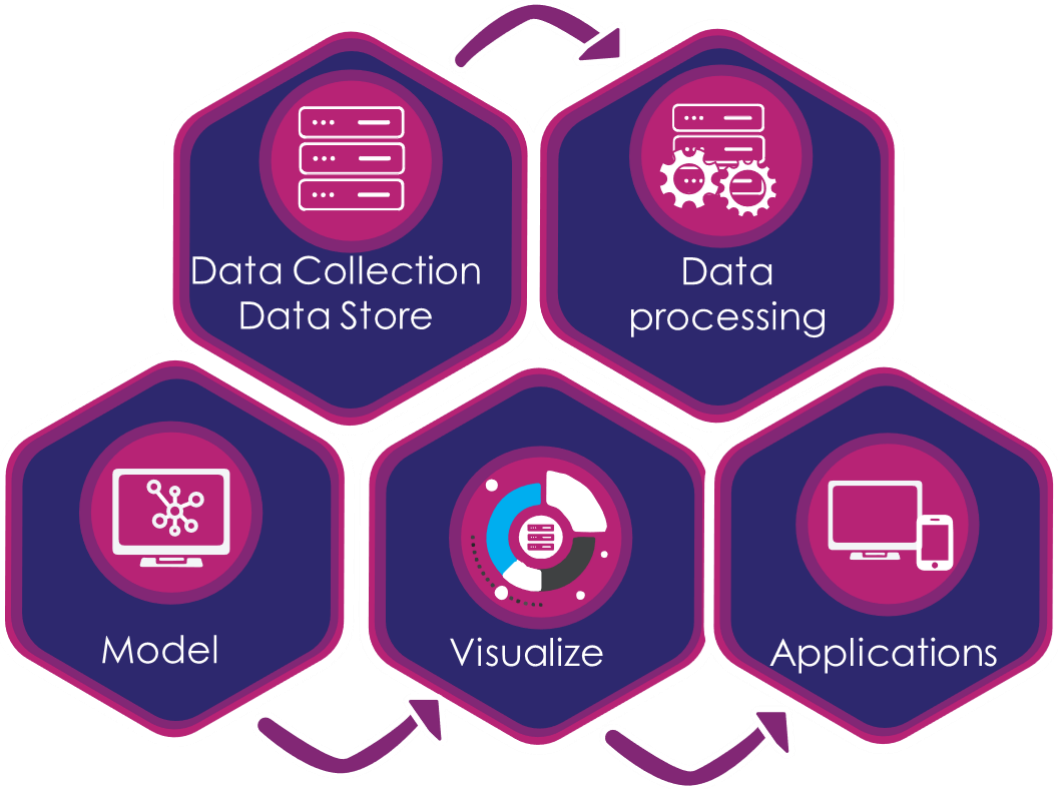
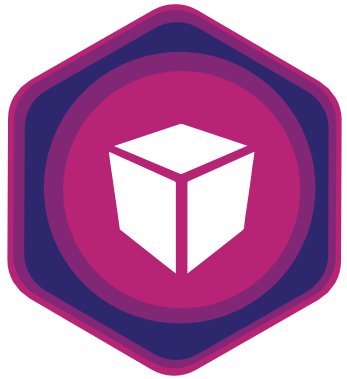
The Hit Portal

The H.I.T. Portal is a web-based data collection, management and aggregation provisioning platform designed, developed and maintained since 2008.



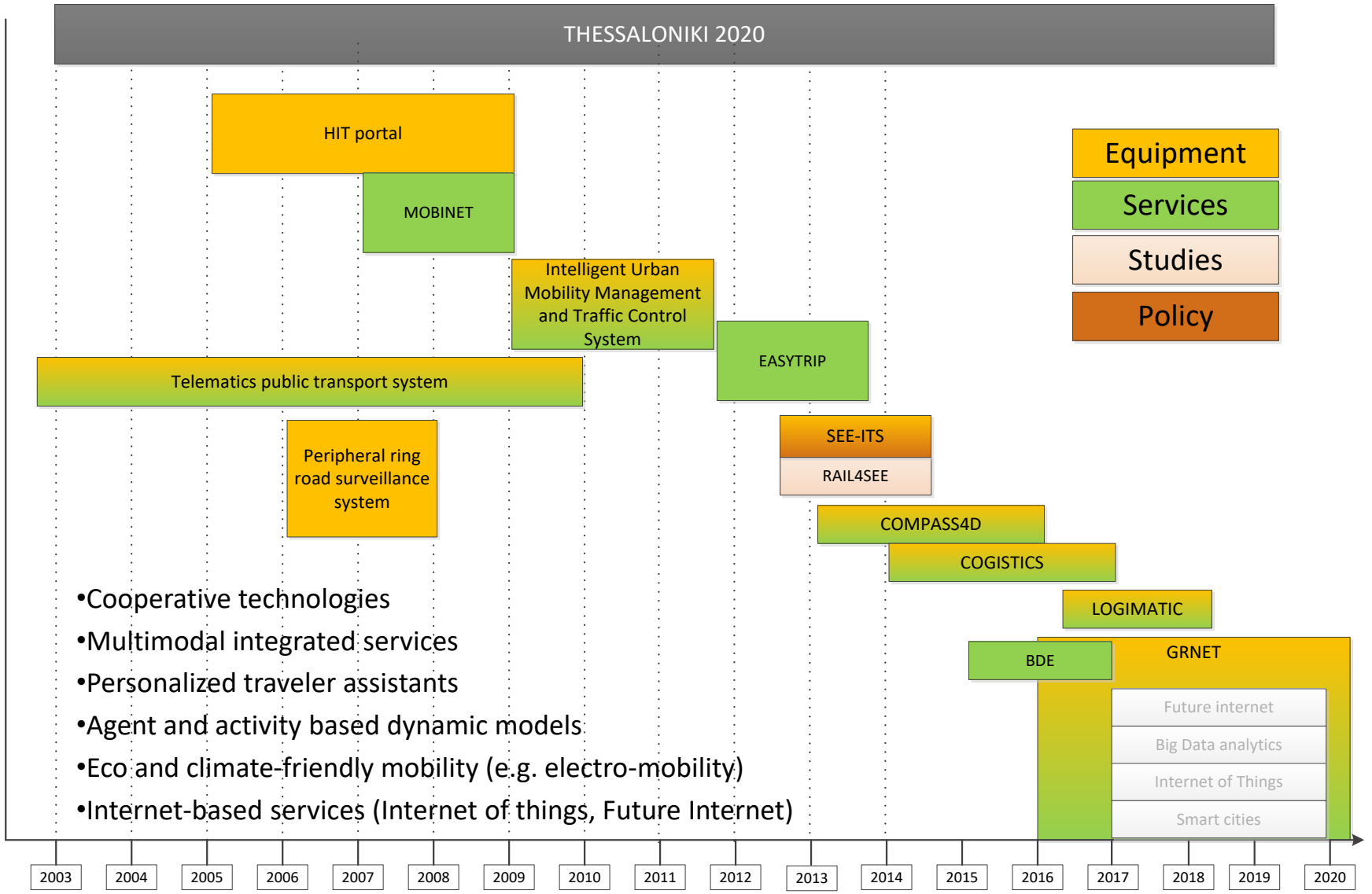
Infrastructure

- **Physical (hardware - Sensing)**
  - Research infrastructure (owned by HIT)
  - Public infrastructure open research
- **Digital (software - Knowledge creation)**
  - Modeling and simulation environments
  - Big data analytics tools
- **Test beds**
  - C-ITS (COMPASS4D and C-Mobile projects)
  - Big data analytics (Big Data Europe project)
  - Traffic Management Systems interoperability [future]
  - National Access Point (CEF – Crocodile2) [future]
  - i-mile [future]

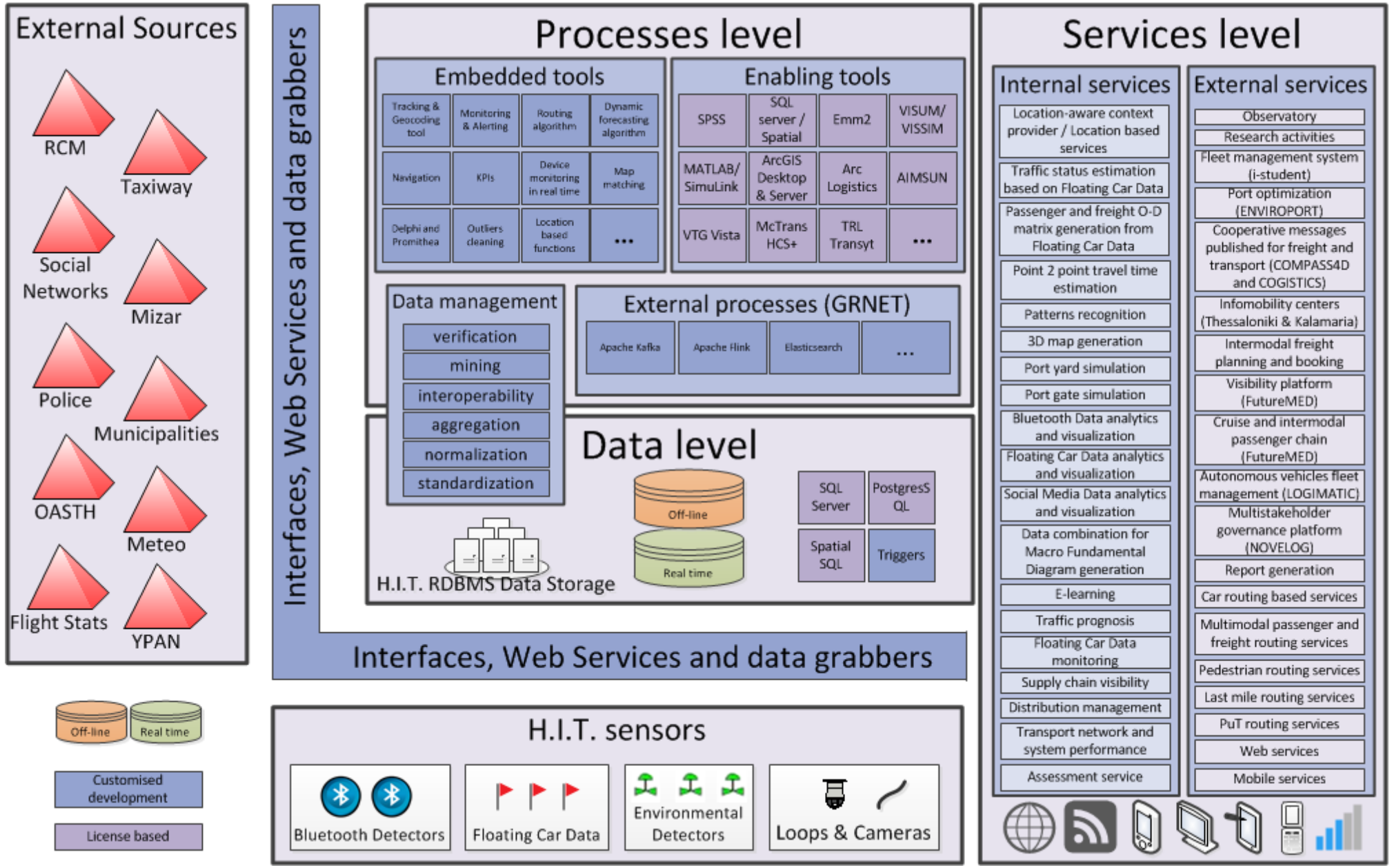


Role of HIT PORTAL in

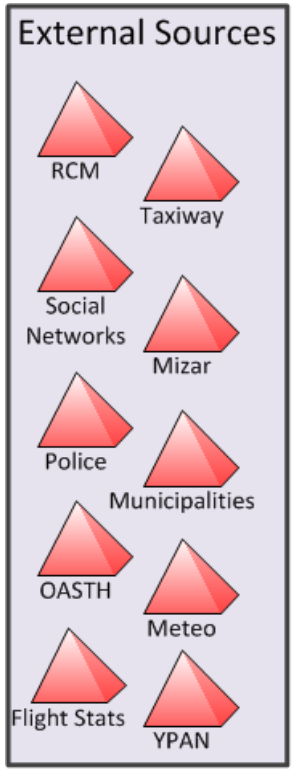
mobility open lab



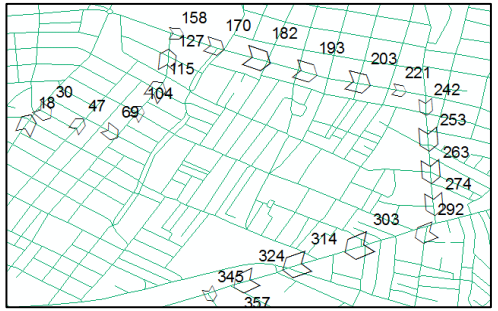
PORTAL SYSTEM

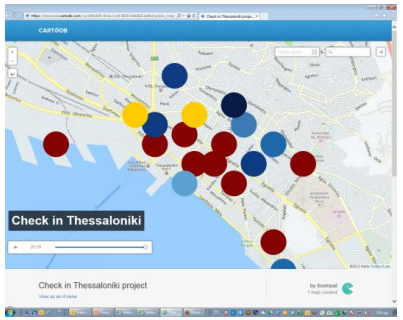


HIT PORTAL Sources and interfaces

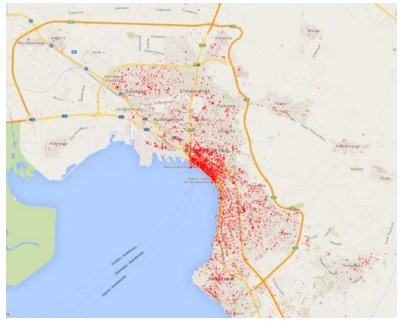


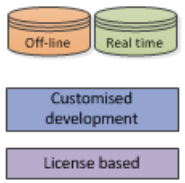
Interfaces, Web Services and data grabbers

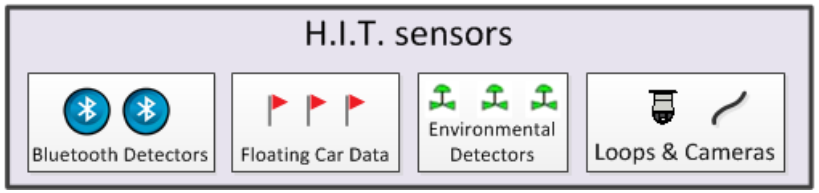




iTravelID	DataDatetime	MacAddress
63	7/15/14 12:25 AM	84:25:DB:56:3B:4C
63	7/15/14 12:25 AM	FC:92:3B:91:E9:F8
64	7/15/14 12:13 AM	00:10:81:E8:B0:2E
64	7/15/14 12:13 AM	00:80:25:18:29:78
64	7/15/14 12:13 AM	D0:C1:B1:F1:3A:31
64	7/15/14 12:14 AM	00:10:81:E8:B0:2E
64	7/15/14 12:15 AM	00:0E:9F:12:74:89
64	7/15/14 12:15 AM	D0:17:6A:9E:88:22
64	7/15/14 12:15 AM	00:10:81:E8:B0:2E



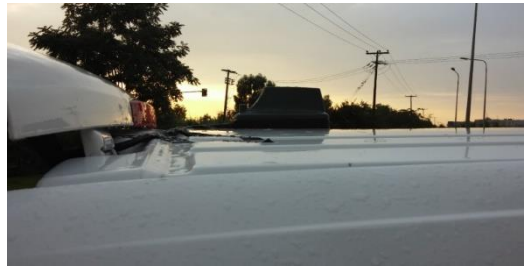




HIT PORTAL external infrastructure

Low cost smart city sensors: 43 Bluetooth Devices Detectors

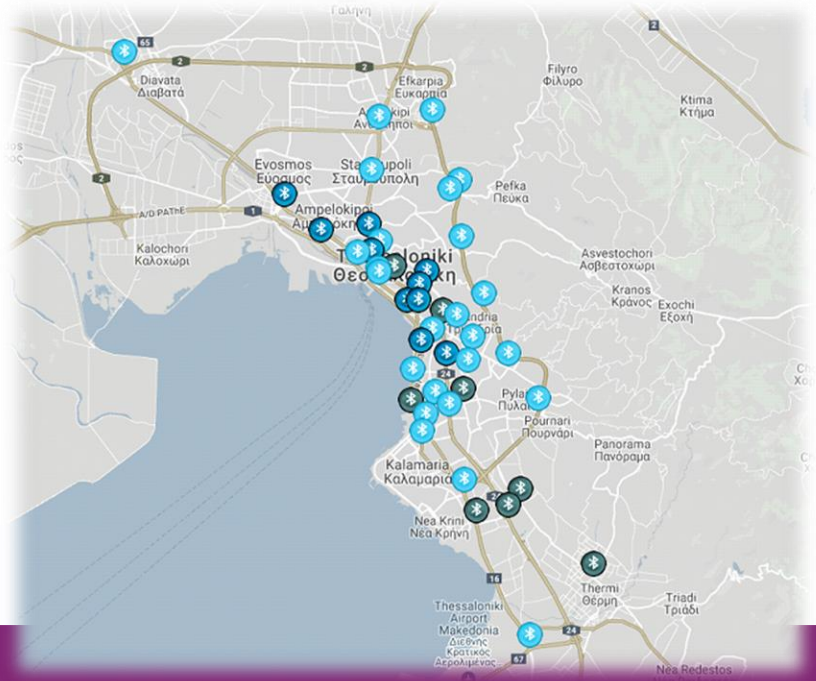
Cooperative Intelligent Transport Systems: 7 Cooperative Road Side Units and 4 Cooperative On Board Units



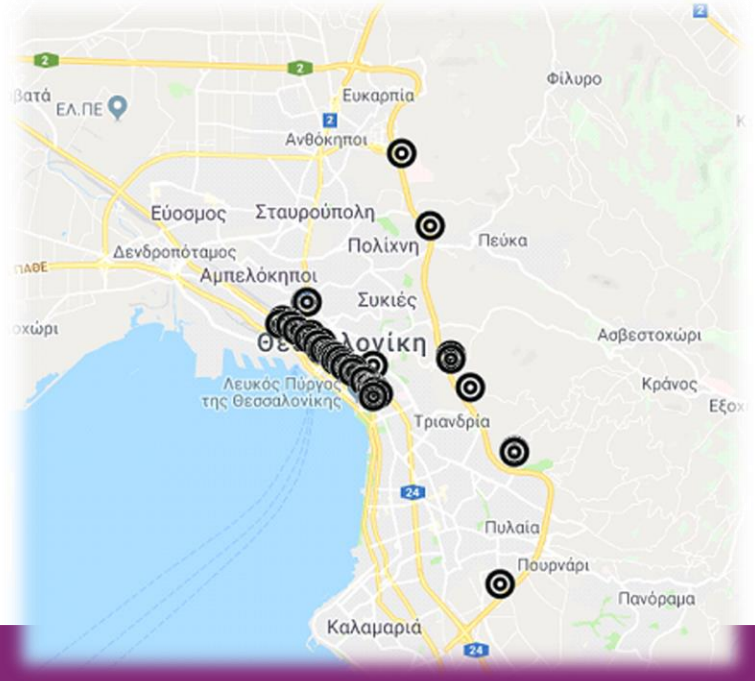
Datasets at a glance

We aggregate data from our eco system with different types of Detectors.

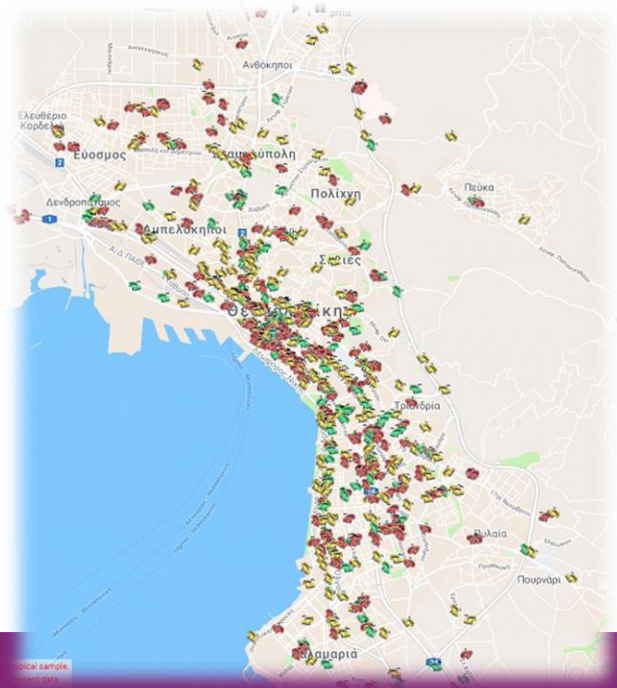
Bluetooth Detectors



Loops and Cameras



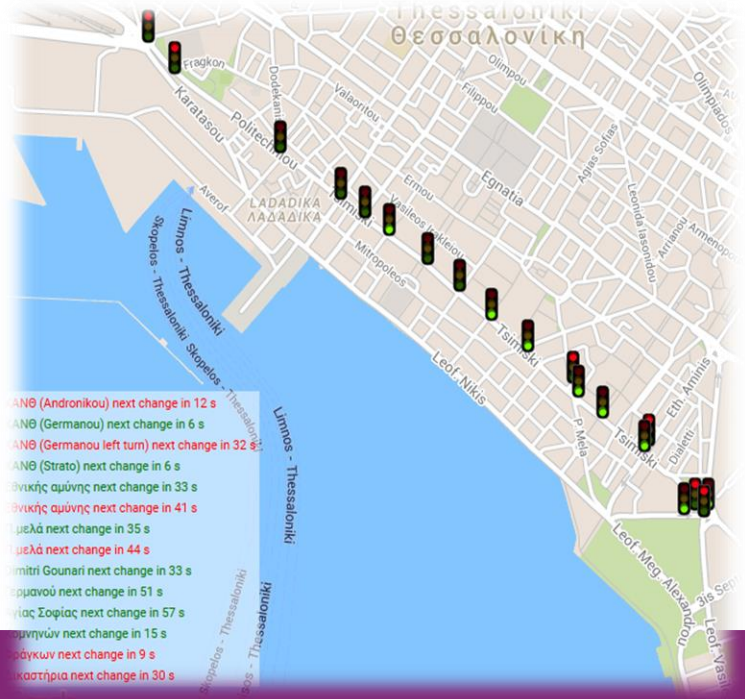
Floating Car Data



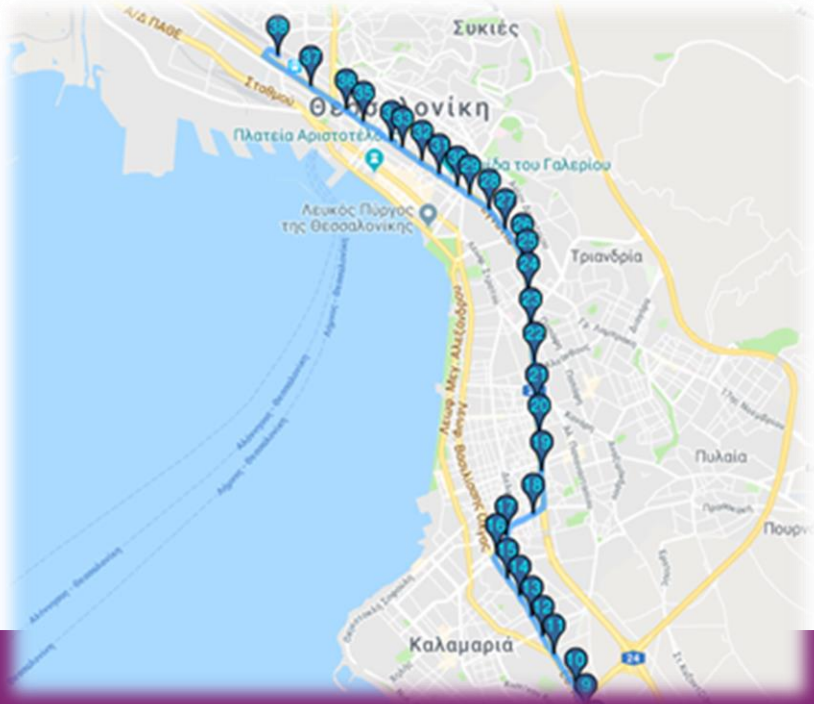
Datasets at a glance

The processing of these data can lead to useful conclusions about current land use and may also reveal mobile mobility patterns that can be used to predict traffic conditions.

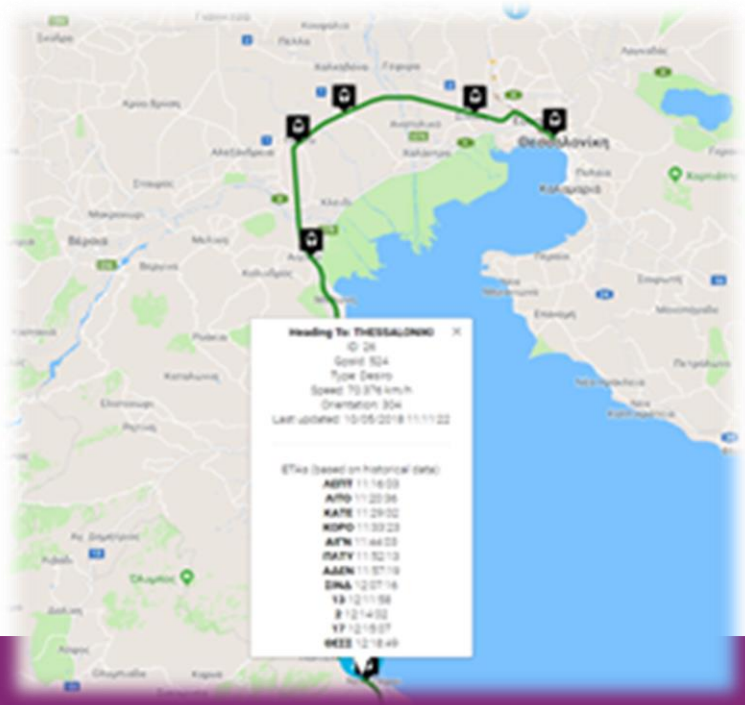
Smart Traffic Lights



Urban Buses Information



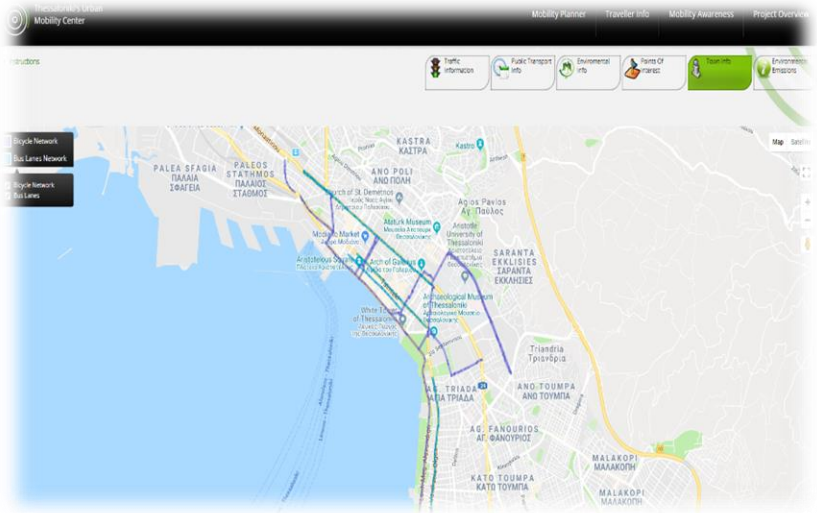
Floating Train Data



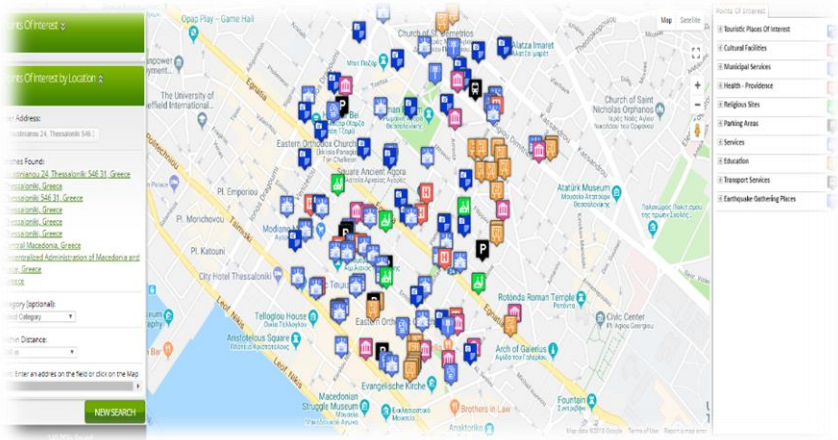
Datasets at a glance

Data from multiple sources are combined to better understand any correlation and dependencies among them

Digitized networks

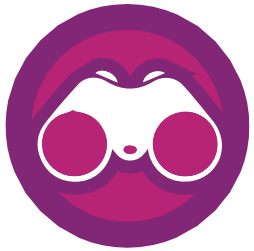


Points of Interest



Facebook Graph API

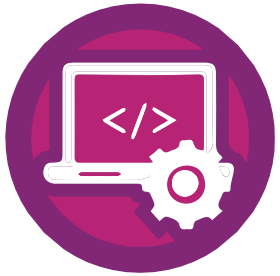
Services and Applications



Transport Observatory
Search and retrieve transportation related content.

Traffic & Routing Management
Provides information about traffic status in a region. Gives the ability to schedule a route from one point to another by different means of transport.

Network modeling and simulation
Provides tools to model and simulate transportation networks.



Application Development & Testing Platform
Enables users to develop and test their own applications using H.I.T. Portal.

Freight routing and logistics fleet management algorithms

HIT PORTAL Processes Layer

Processes level

Embedded tools

Tracking & Geocoding tool	Monitoring & Alerting	Routing algorithm	Dynamic forecasting algorithm
Navigation	KPIs	Device monitoring in real time	Map matching
Delphi and Promithea	Outliers cleaning	Location based functions	...

Enabling tools

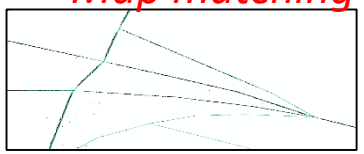
SPSS	SQL server / Spatial	Emm2	VISUM/ VISSIM
MATLAB/ SimuLink	ArcGIS Desktop & Server	Arc Logistics	AIMSUN
VTG Vista	McTrans HCS+	TRL Transyt	...

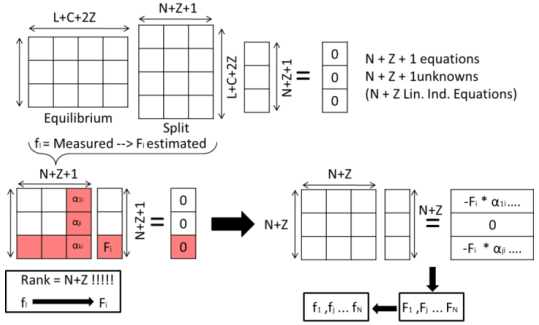
Data management

verification	interoperability	normalization
mining	aggregation	standardization

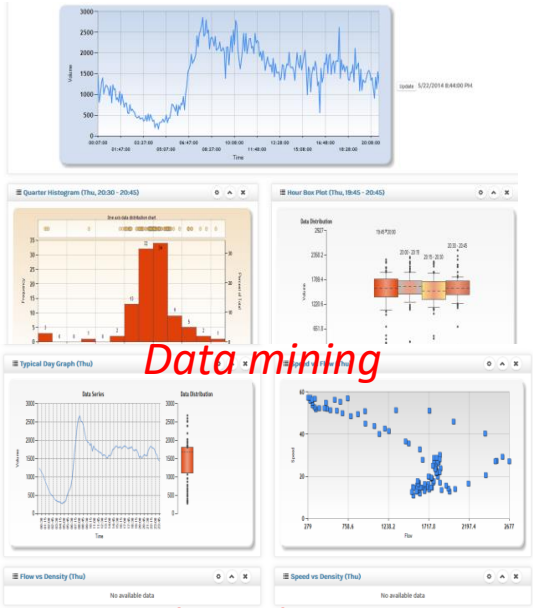
Automation functions

Map matching





Data mining

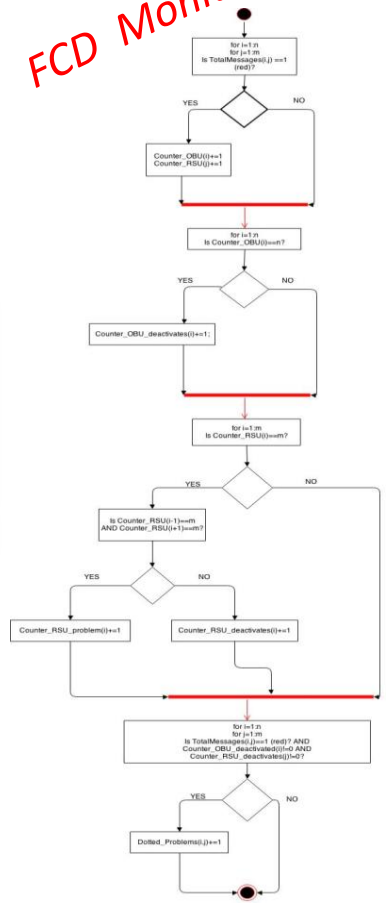


algorithms

Algorithm 1 Boosted K Nearest Neighbour

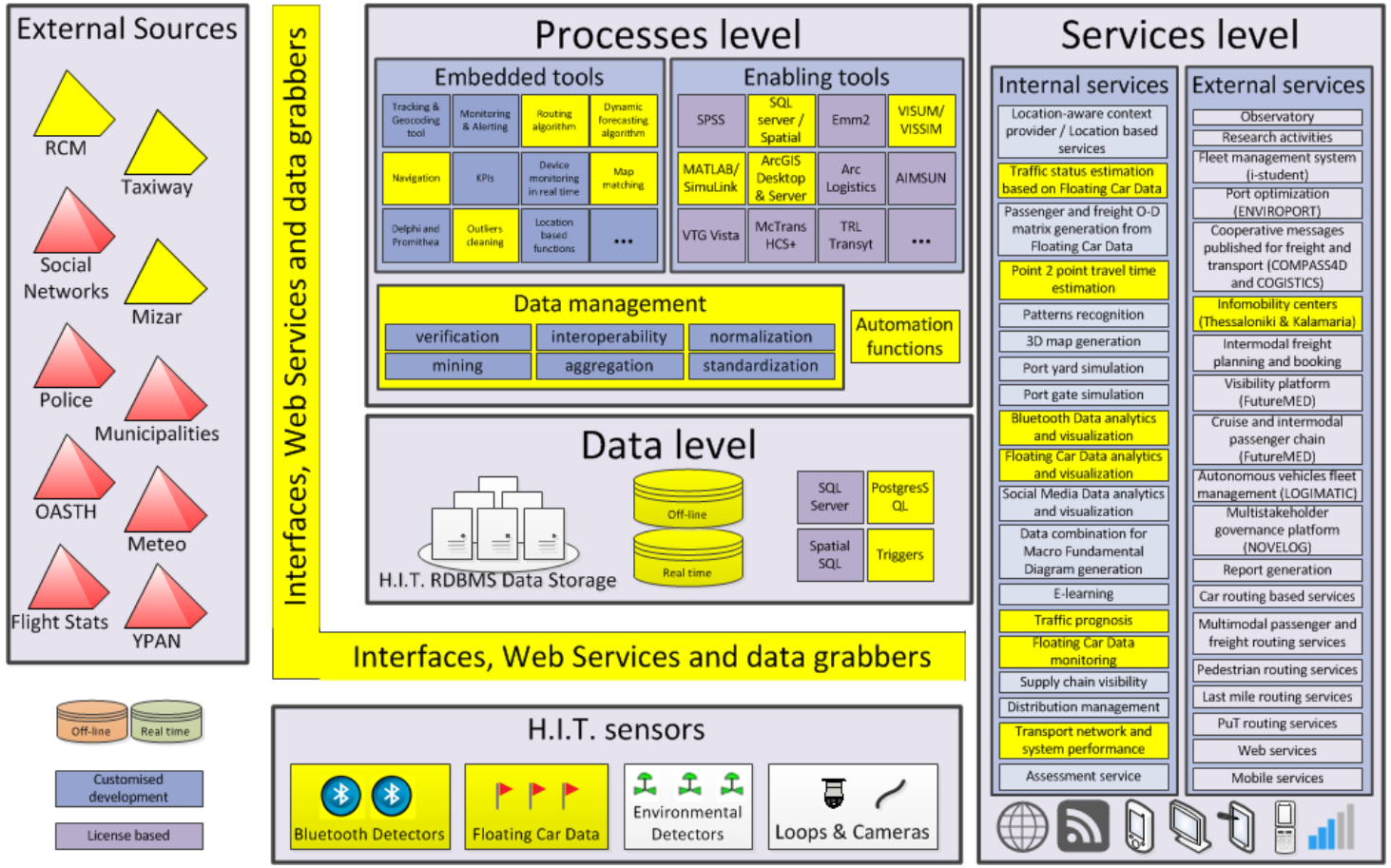
Inputs:
  $S = s_i = (x_i, y_i)$
Initialize:
  $w_i^0 \leftarrow 0,\ i = 1, \ldots, n$
  $S_0 \leftarrow S$
for t = 1 to T **do**
  $S_t \leftarrow S_{t-1}$
  for $s_q \in S_t$ **do**
    $N_q \leftarrow$ k nearest neighbors
    of s_q using $D(s_q, s_i)$
    label$(s_q) = argmax \sum_{s_i \in N_q} D(s_q, s_i)$;
    if label$(s_q) \neq y_q$ **then**
      for $s_i \in N_i$ **do**
        if $y_i \neq y_q$ **then**
          $w_i^t \leftarrow w_i^t - \lambda / d(x_q, x_i)$;
        else
          $w_i^t \leftarrow w_i^t + \lambda / d(x_q, x_i)$;
        end if
      end for
    end if
  end for
  if label$(s_q) = y_q \forall_{s_q}$ **then**
    break
  end if
end for

FCD Monitoring



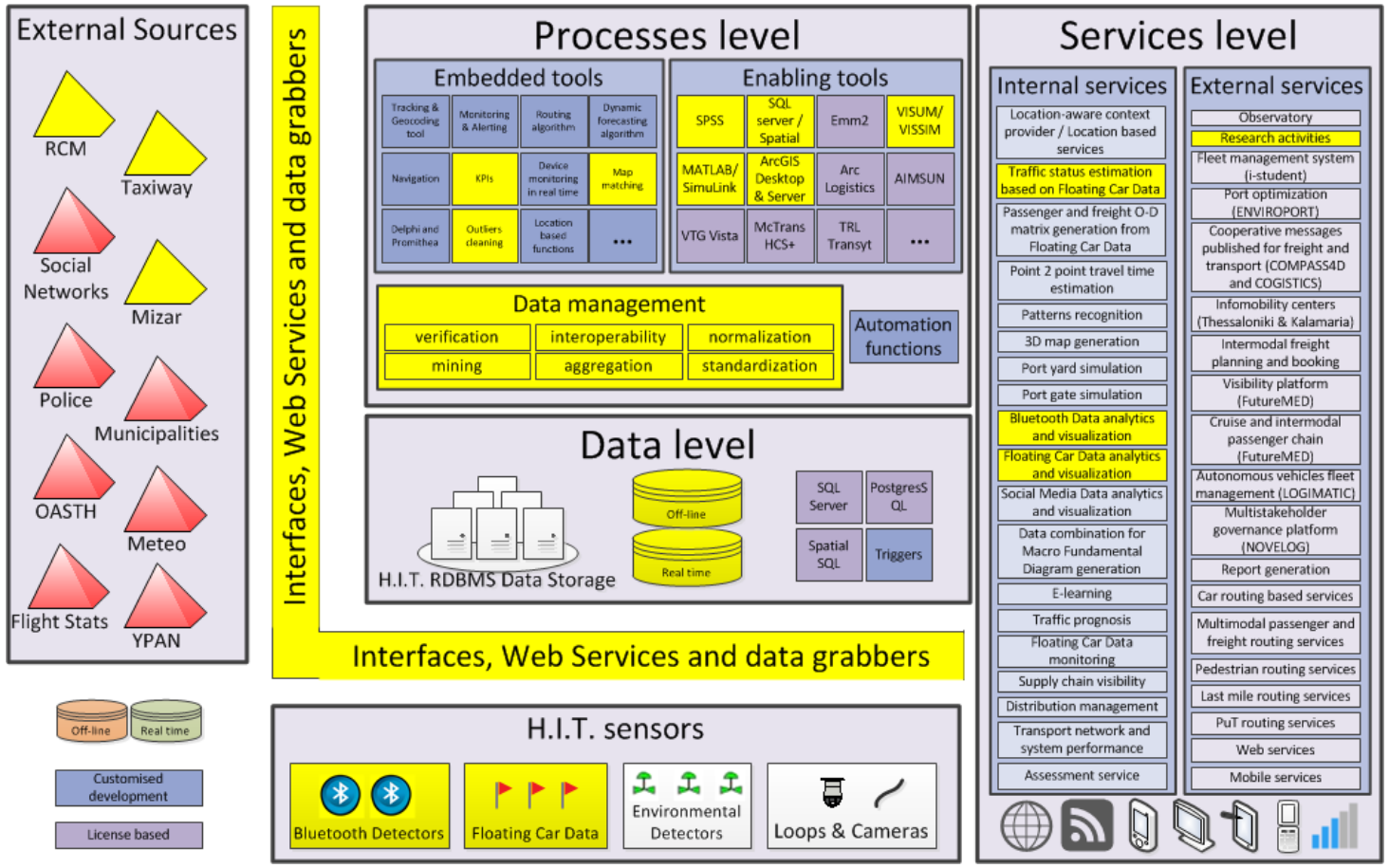
HIT PORTAL (Project sample)

www.mobithess.gr

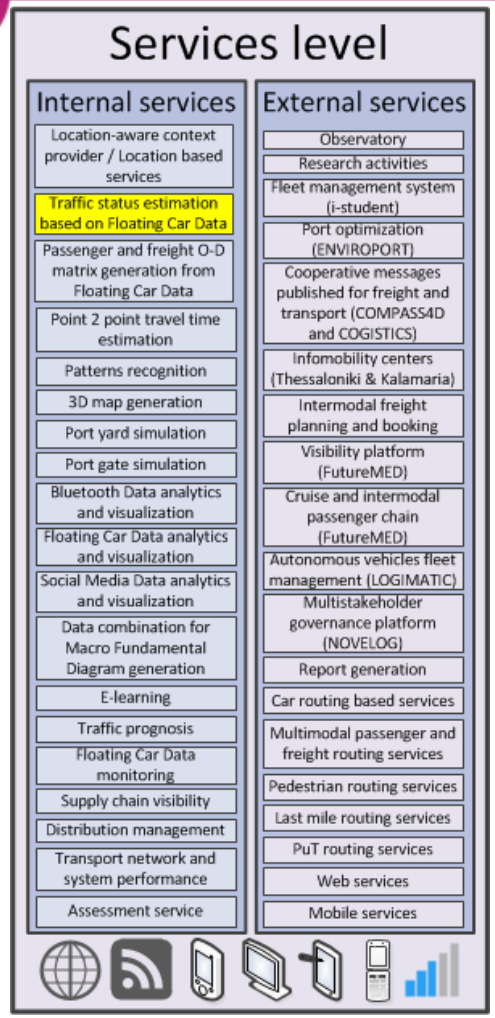


HIT PORTAL (Research sample)

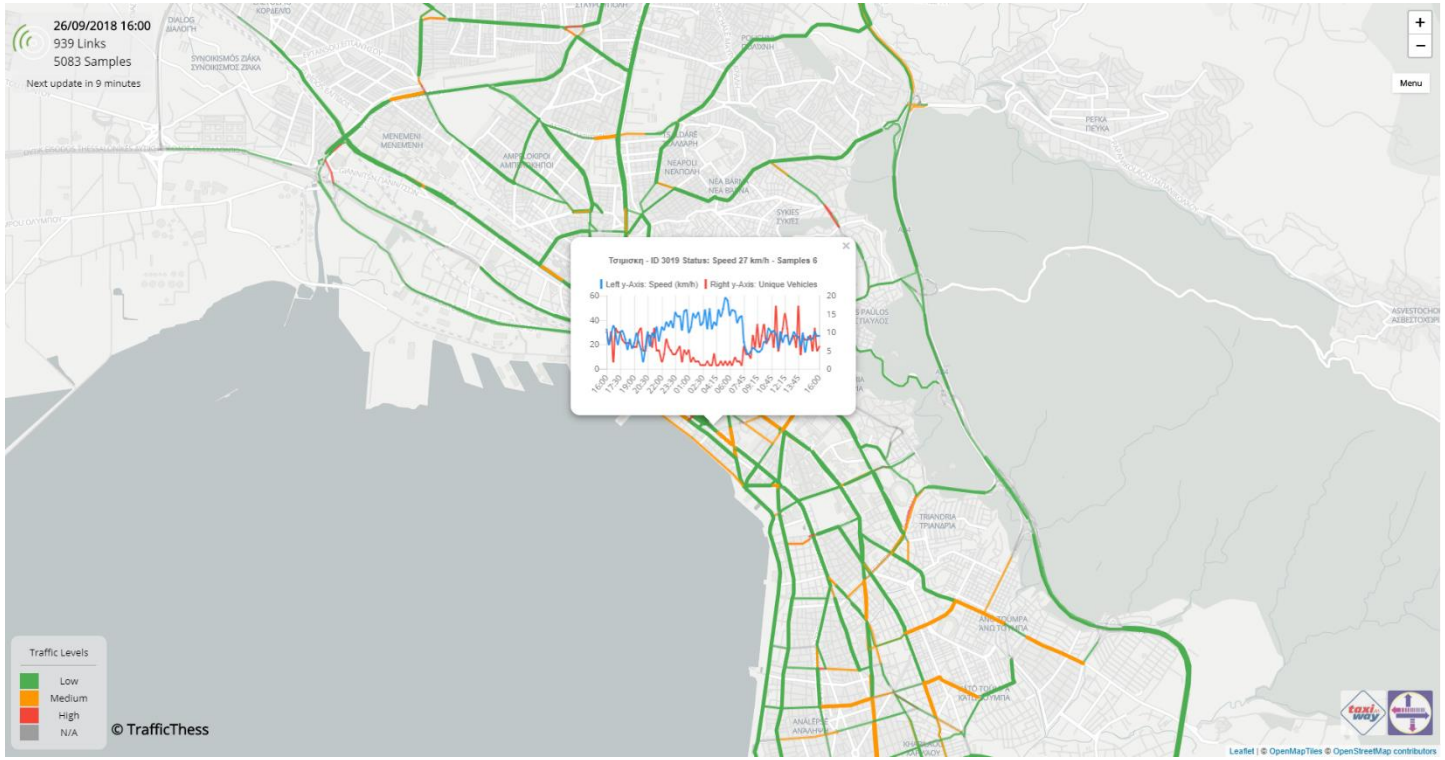
E. Mitsakis, I. Stamos, Diakakis M., J.M. Salanova Grau, (2014) **Impacts of high intensity storms on urban transportation: Applying traffic flow control methodologies for quantifying the effects**, International Journal of Environmental Science and Technology, November 2014, Volume 11, Issue 8, pp. 2145-2154 - DOI 10.1007/s13762-014-0573-4.



HIT PORTAL Services layer (internal)



Traffic status estimation based on Floating Car Data



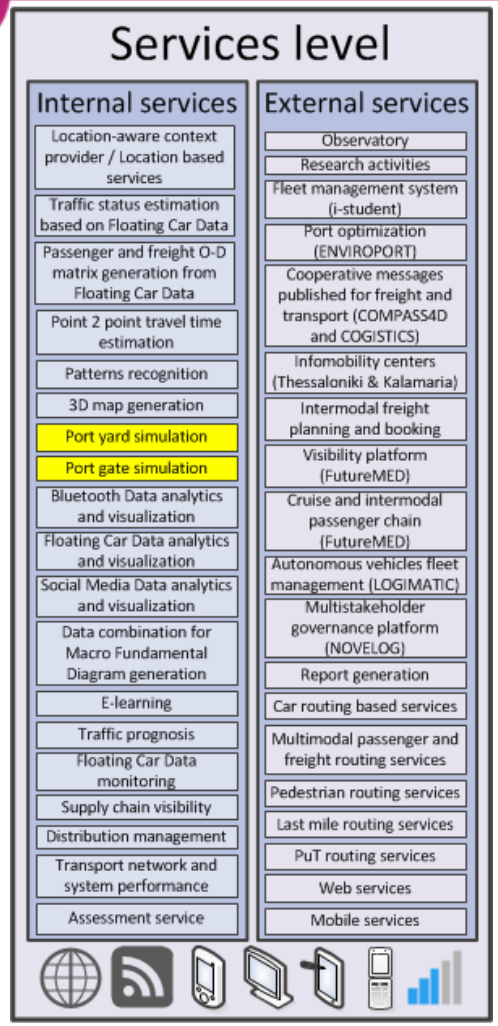
HIT PORTAL Services layer (internal)

Services level

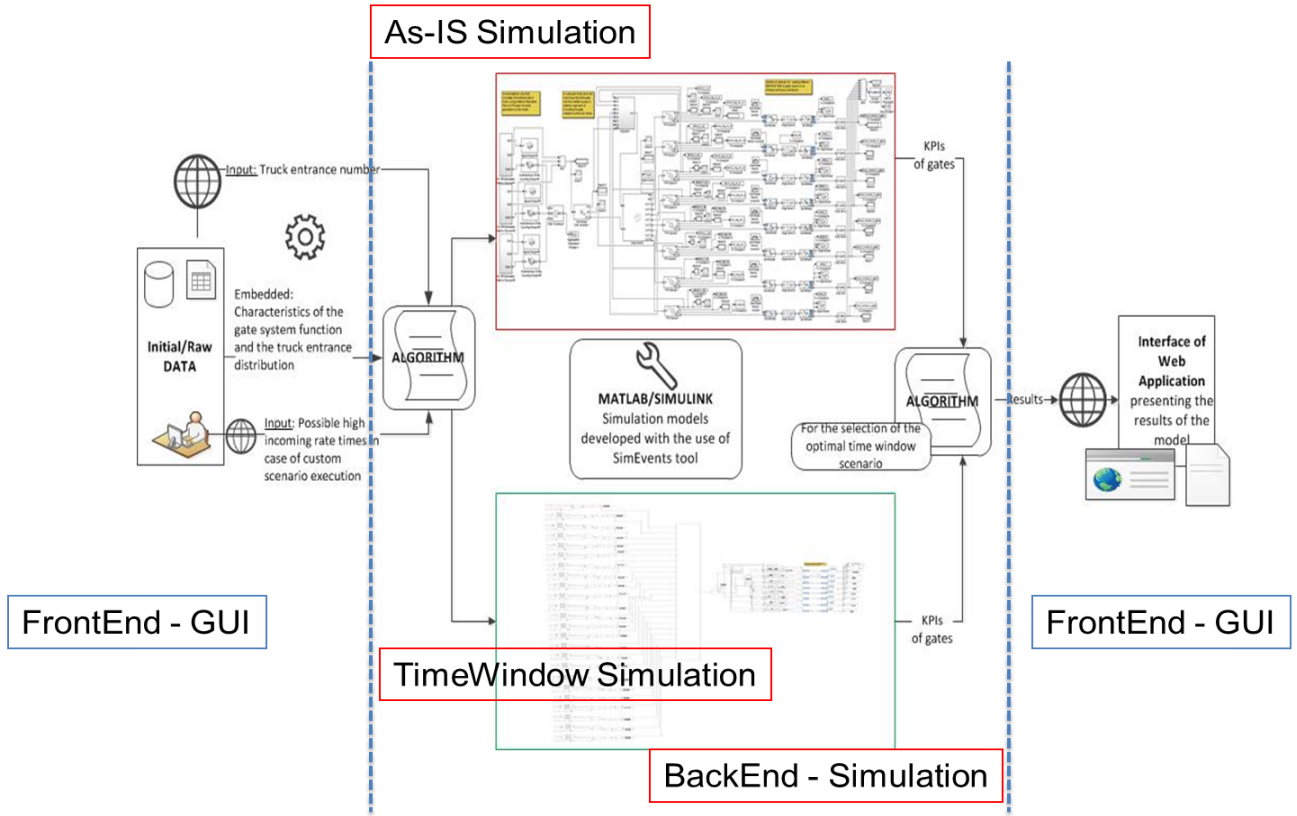
Internal services	External services
Location-aware context provider / Location based services	Observatory
Traffic status estimation based on Floating Car Data	Research activities
Passenger and freight O-D matrix generation from Floating Car Data	Fleet management system (i-student)
Point 2 point travel time estimation	Port optimization (ENVIROPORT)
Patterns recognition	Cooperative messages published for freight and transport (COMPASS4D and COGISTICS)
3D map generation	Infomobility centers (Thessaloniki & Kalamaria)
Port yard simulation	Intermodal freight planning and booking
Port gate simulation	Visibility platform (FutureMED)
Bluetooth Data analytics and visualization	Cruise and intermodal passenger chain (FutureMED)
Floating Car Data analytics and visualization	Autonomous vehicles fleet management (LOGIMATIC)
Social Media Data analytics and visualization	Multistakeholder governance platform (NOVELOG)
Data combination for Macro Fundamental Diagram generation	Report generation
E-learning	Car routing based services
Traffic prognosis	Multimodal passenger and freight routing services
Floating Car Data monitoring	Pedestrian routing services
Supply chain visibility	Last mile routing services
Distribution management	PuT routing services
Transport network and system performance	Web services
Assessment service	Mobile services

Point 2 point travel time estimation

HIT PORTAL Services layer (internal)



Port and yard simulation



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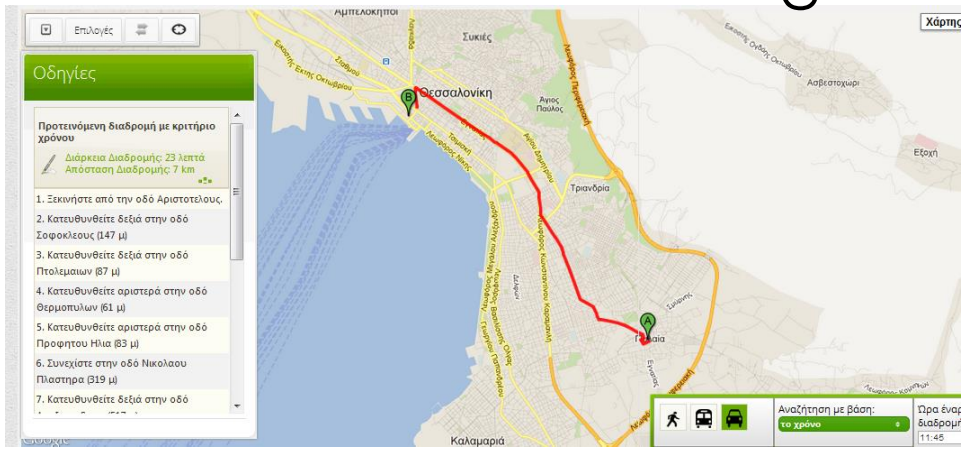
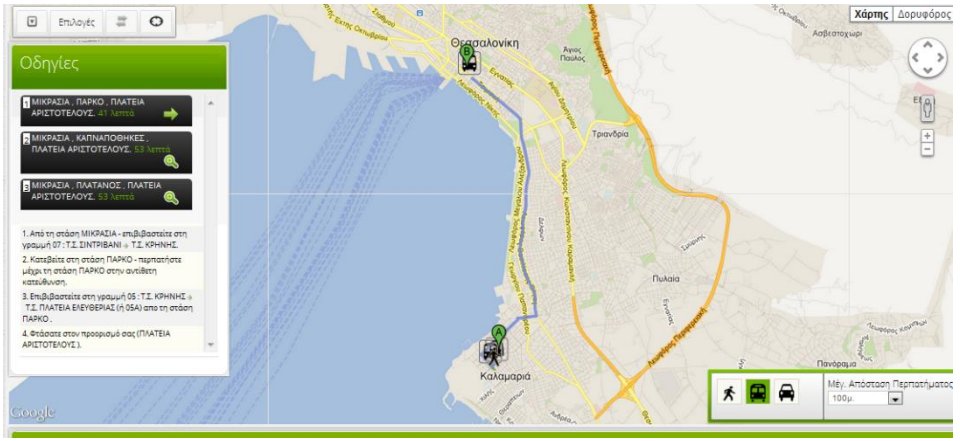
Car and PuT routing services





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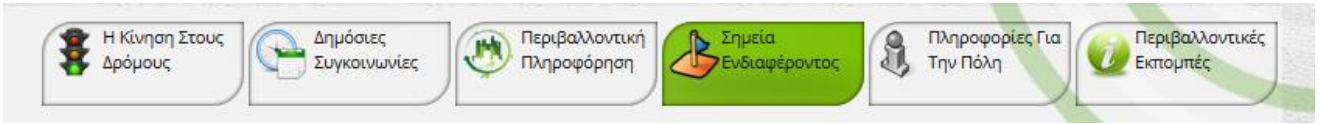
Infomobility services



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Cruise and intermodal passenger

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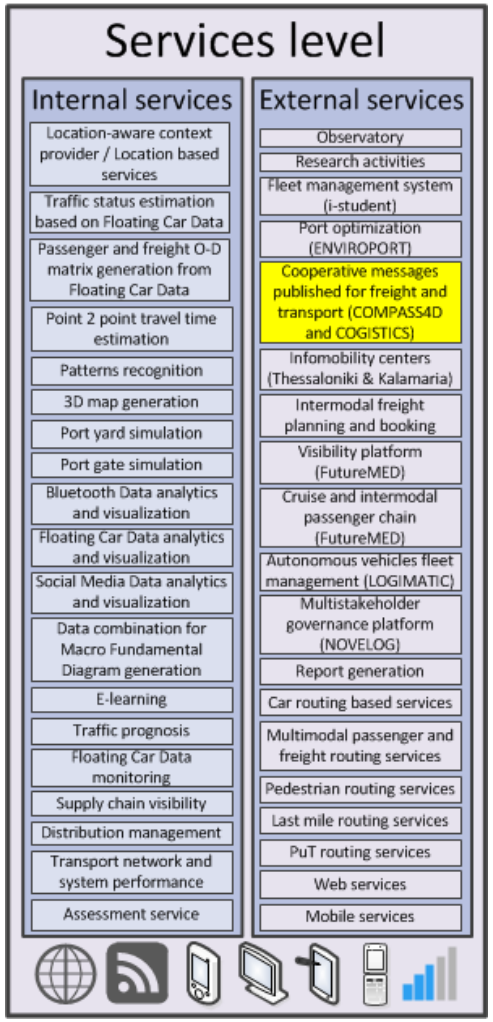
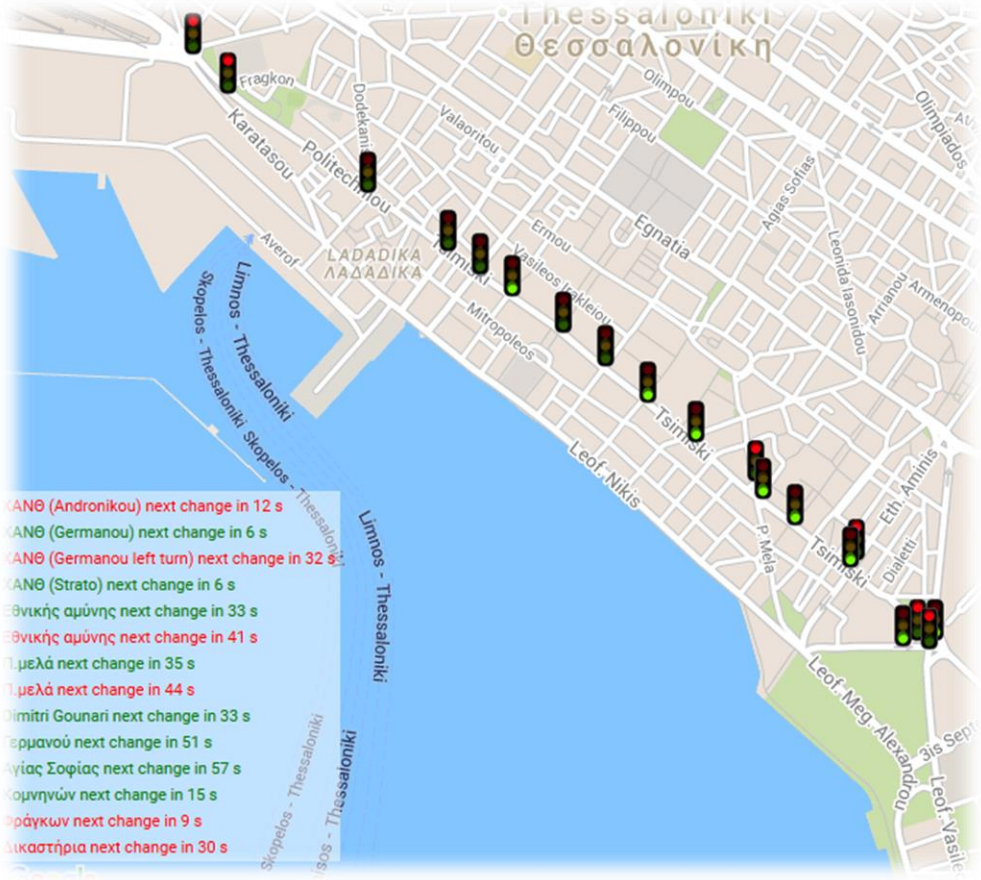


Cooperative messages published for freight and passenger transport

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Mobility Living Lab
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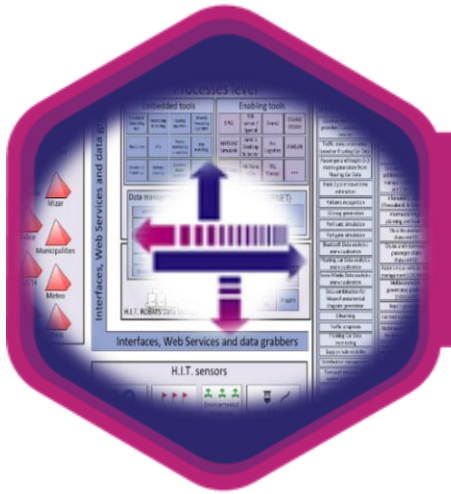
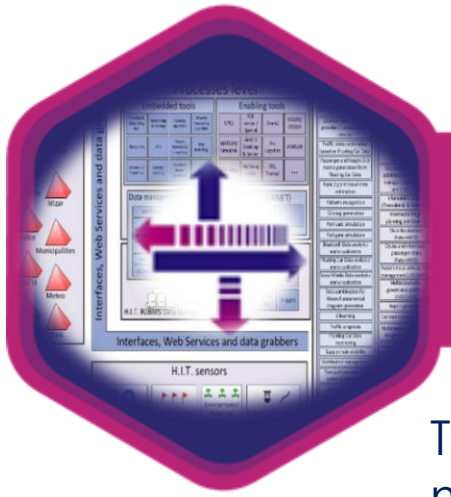


Community

- Region of Central Macedonia (MoU)
- Taxiway association (MoU)
- TRAINOSE
- Open Knowledge foundation Greece (MoU)
- NEC laboratories (MoU)
- Municipality of Thessaloniki (MoU)
- Local police
- Student transportation operators / schools
- Other organizations
- Citizens



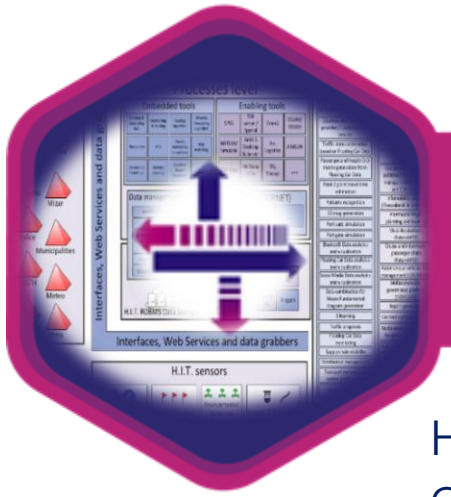
Build components and technologies

Transportation and mobility datasets coming from multiple traditional and modern data sources, consist of both structured as well as unstructured data

Datasets are generated by machines at high rates and are typically of high density

Modern algorithms require the collection, transformation, combination and processing of such datasets in almost real time and in an efficient way

The need for constant improvement of the building component types, procedures and data pipelines used by the corresponding backend data storing and processing systems arises

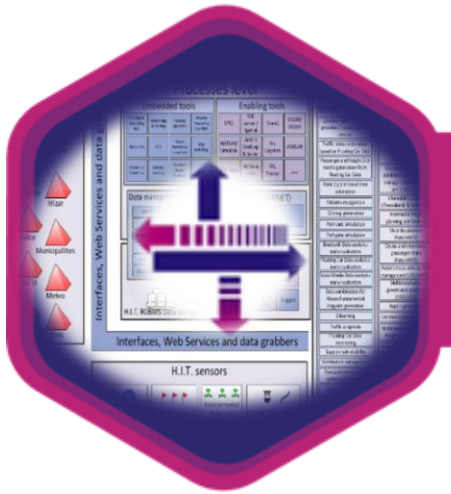


Build components and technologies

H.I.T. as a leading Transport Research Institute, is always open to adopting cutting edge tools and technologies

H.I.T. Portal provides services to end users, companies and organizations and thus, the system's overall stability, continuity and reliability levels must be guaranteed

Both mature and cutting edge technologies are used side-by-side in order to handle efficiently the data streams and to export the maximum possible value



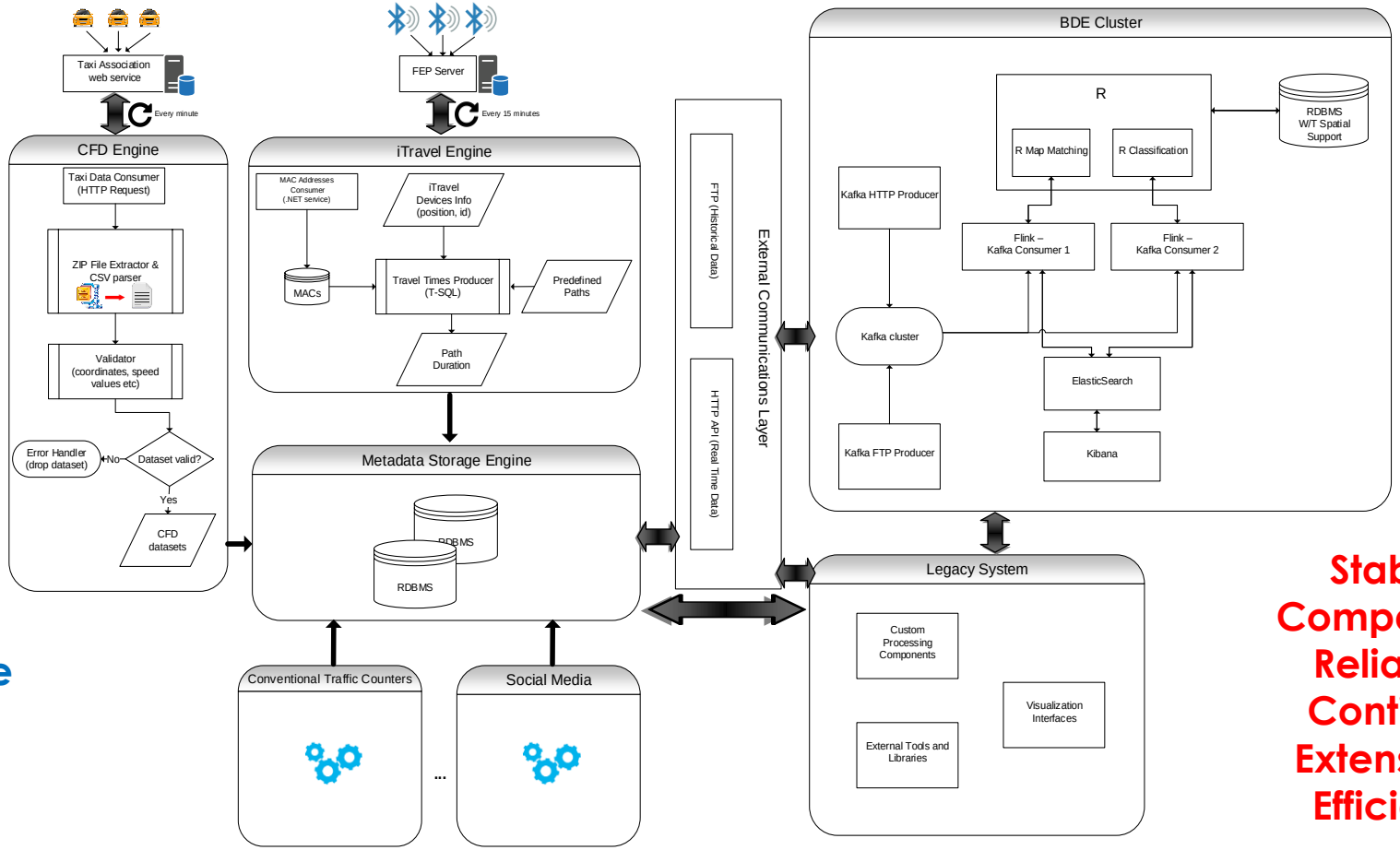
Build components and technologies

Sample illustration of the transport data management and processing framework components

n-tier software development patterns

Raw floating and stationary probe data are continuously being retrieved, parsed, filtered and stored into RDBMS

Pushed to processing software components via unified, compatible and secure APIs



BDE Cluster

State-of-the-art tools

Built on top of Docker images

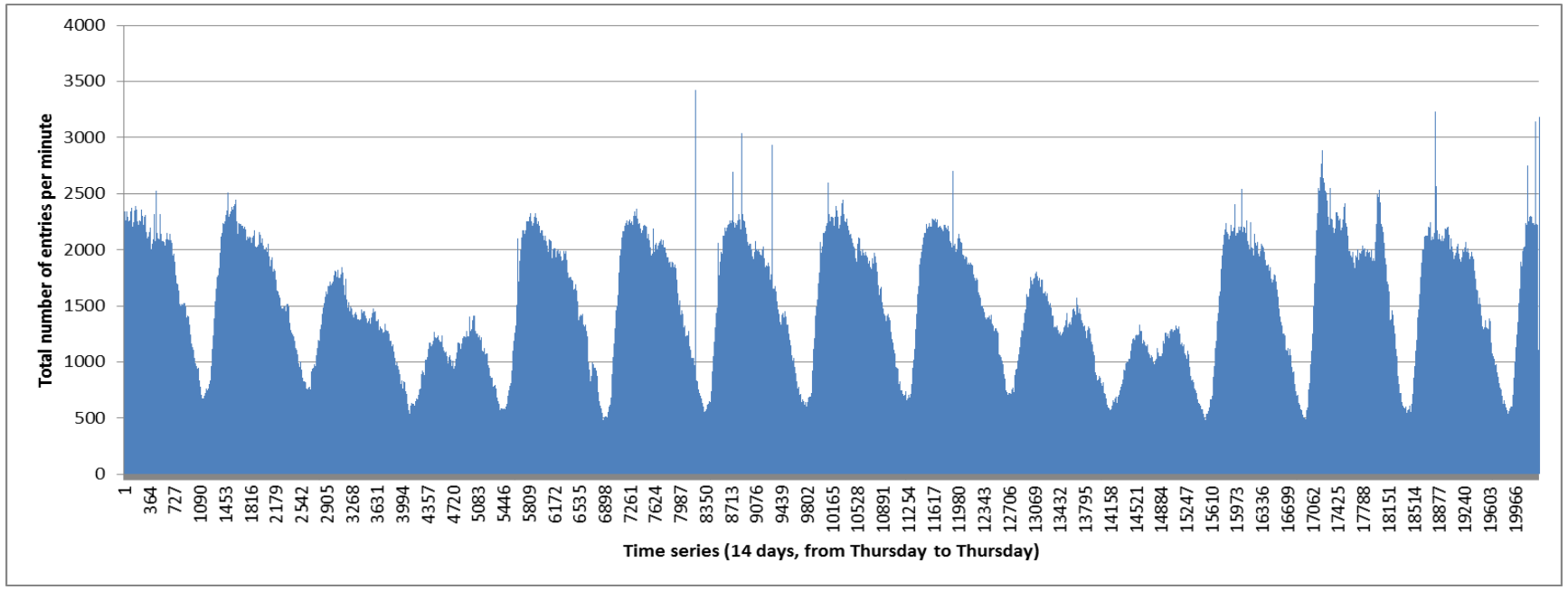
Stability
Compatibility
Reliability
Continuity
Extensibility
Efficiency

Floating Car Data

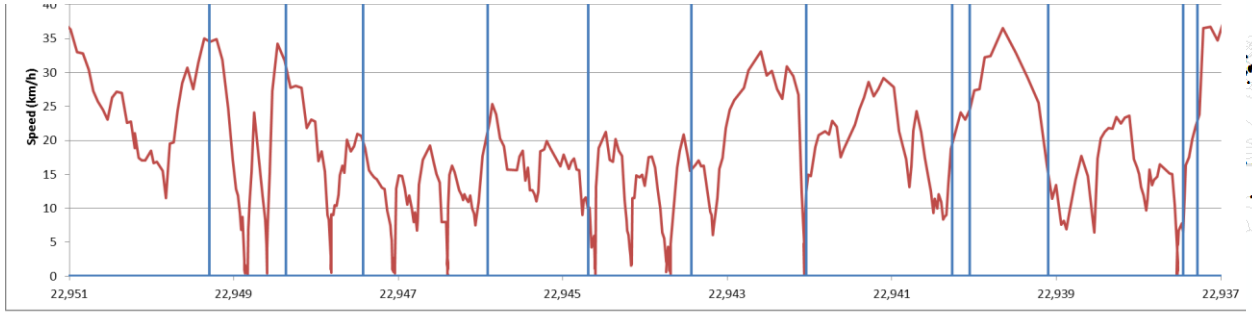
- Device ID
- GPS position (X, Y, Z)
- Orientation (degrees)
- Speed (km/h)
- Timestamp
- Zone

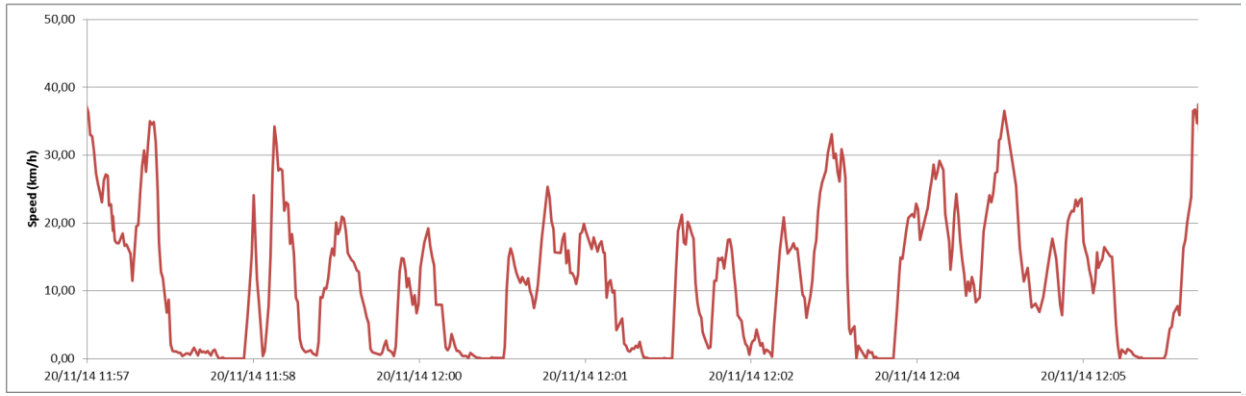
Floating Car Data

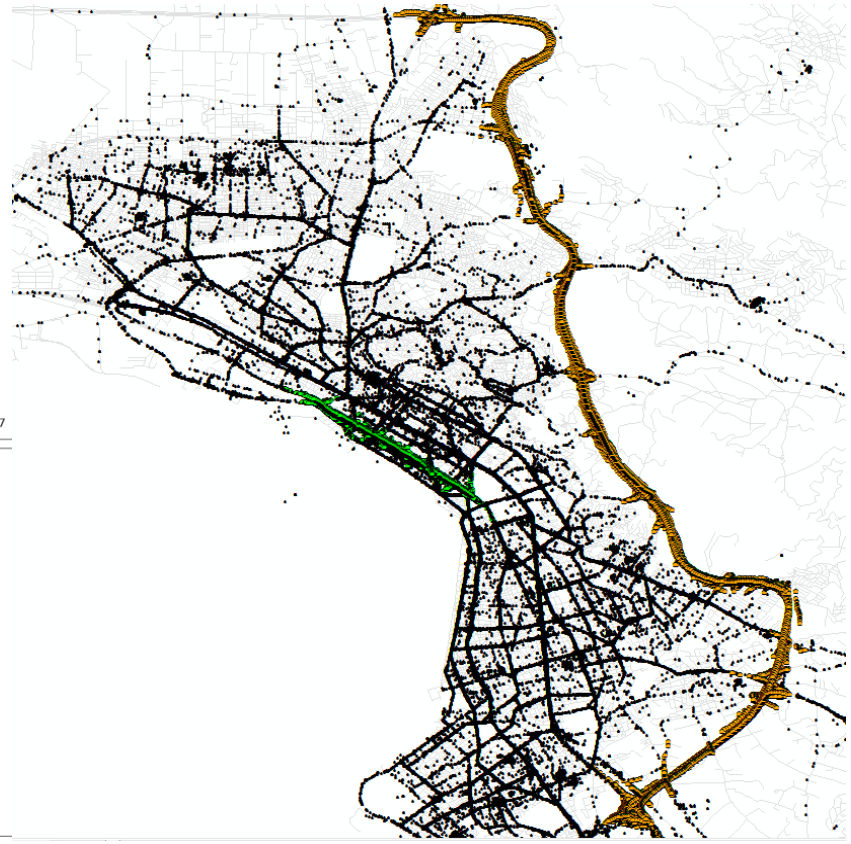
- 1.200 vehicles (dispatching application)
  - Circulating 16-24 hours per day
  - Pulse generated each 100 meters (10-12 seconds)
  - 500-2.500 pulses per minute



Floating Car Data





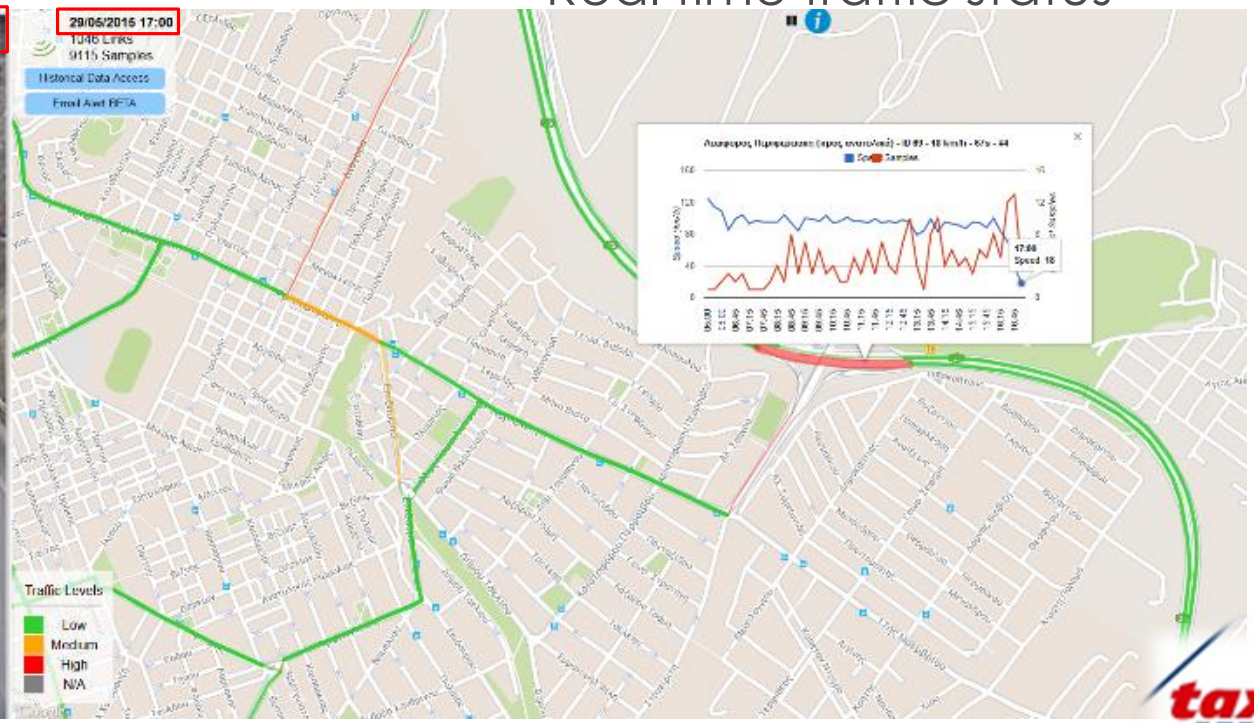


Floating Car Data

Just another ring road traffic congestion…

https://trafficthess.imet.gr

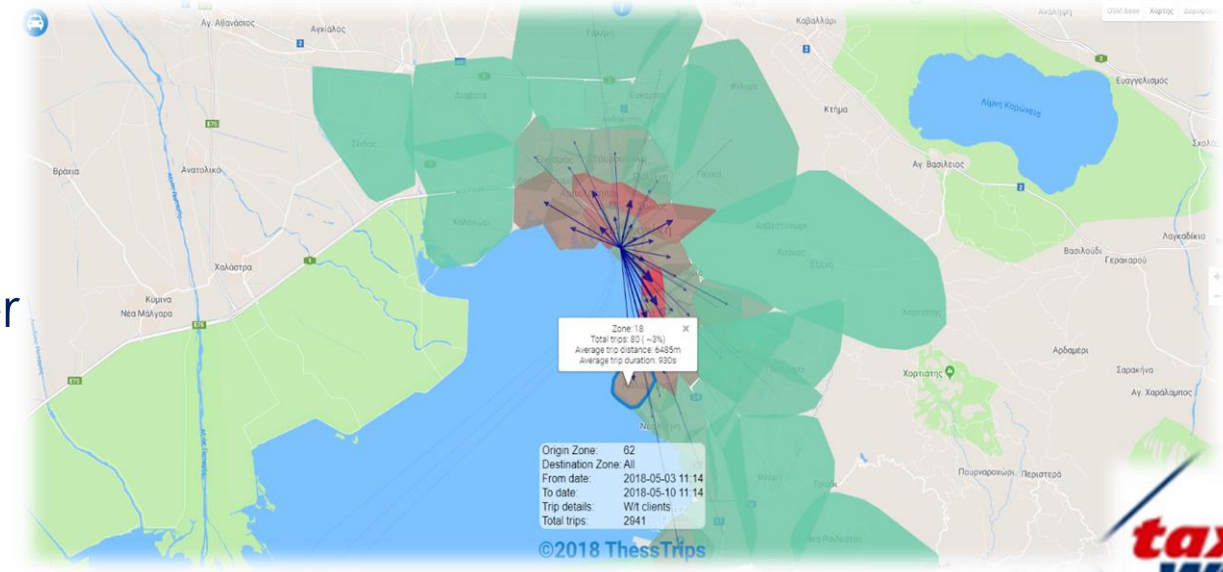
Real time traffic status



Floating Car Data

Trips, origins, destinations and additional quality characteristics (i.e. the total duration and distance travelled).

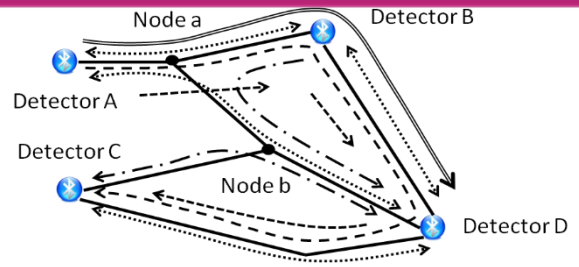
- Valuable information about passenger transport dynamics
- Feed transportation modelling scenarios and relevant studies

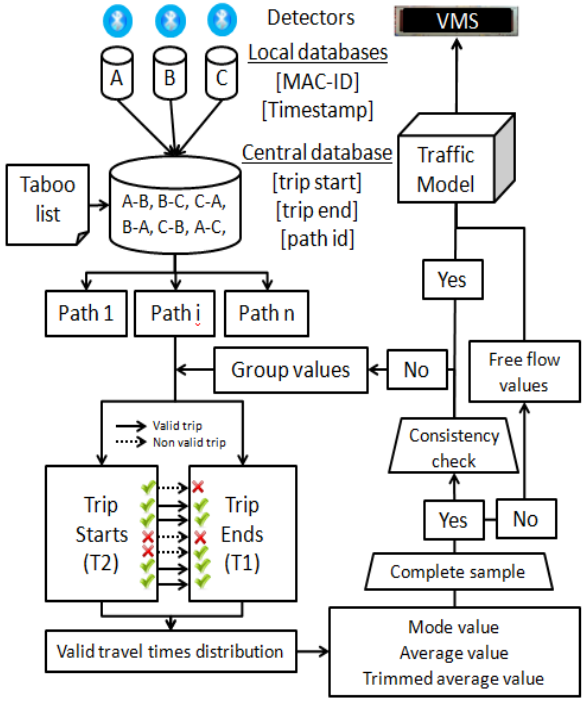


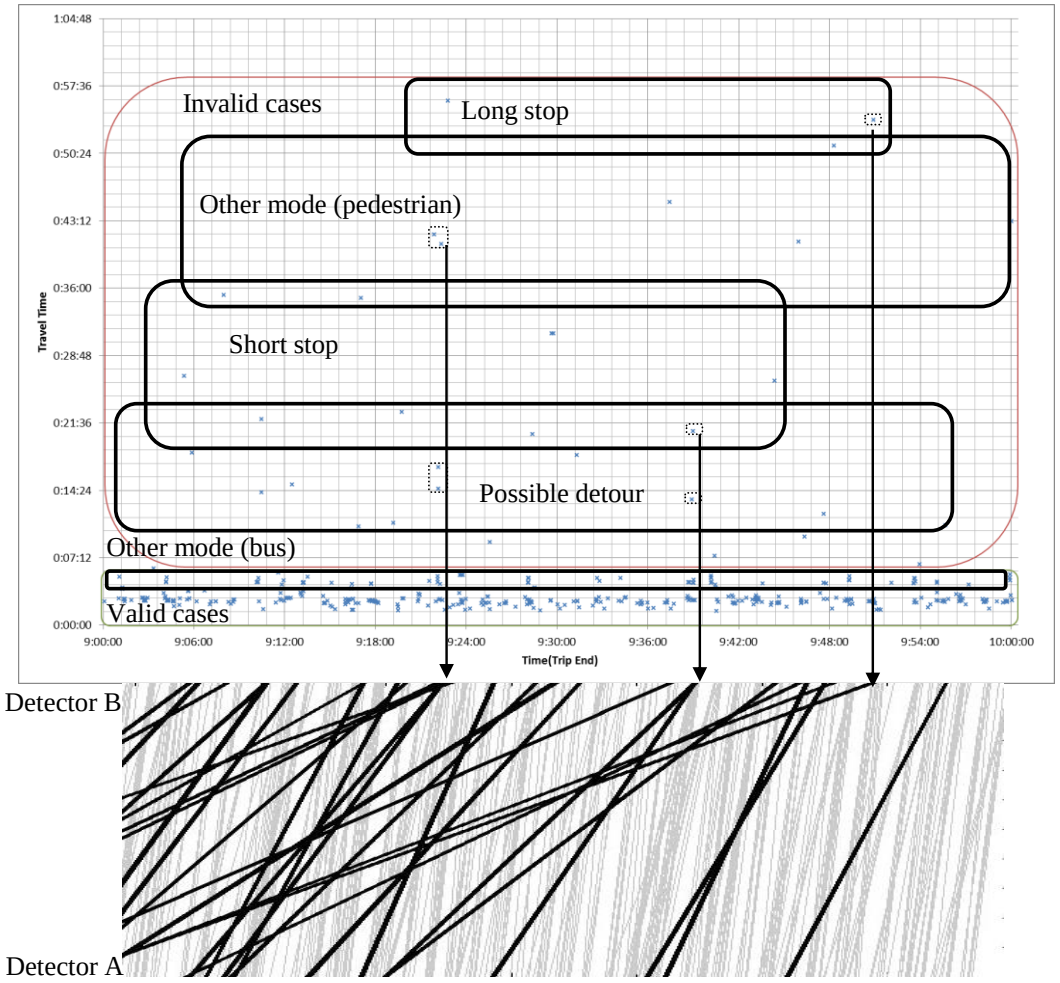
Bluetooth detectors (BT)

- 43 detectors (EEA, SEE-ITS & EASYTRIP)
  - 4 million detections per week (peak period)
  - 25.000 unique devices detected per day (one intersection)
  - 1 million “tracked” trips per week
  - 20.000 “tracked” trips per day (one path)
- More detectors installed in other cities and in Bulgaria

Bluetooth detectors (BT)





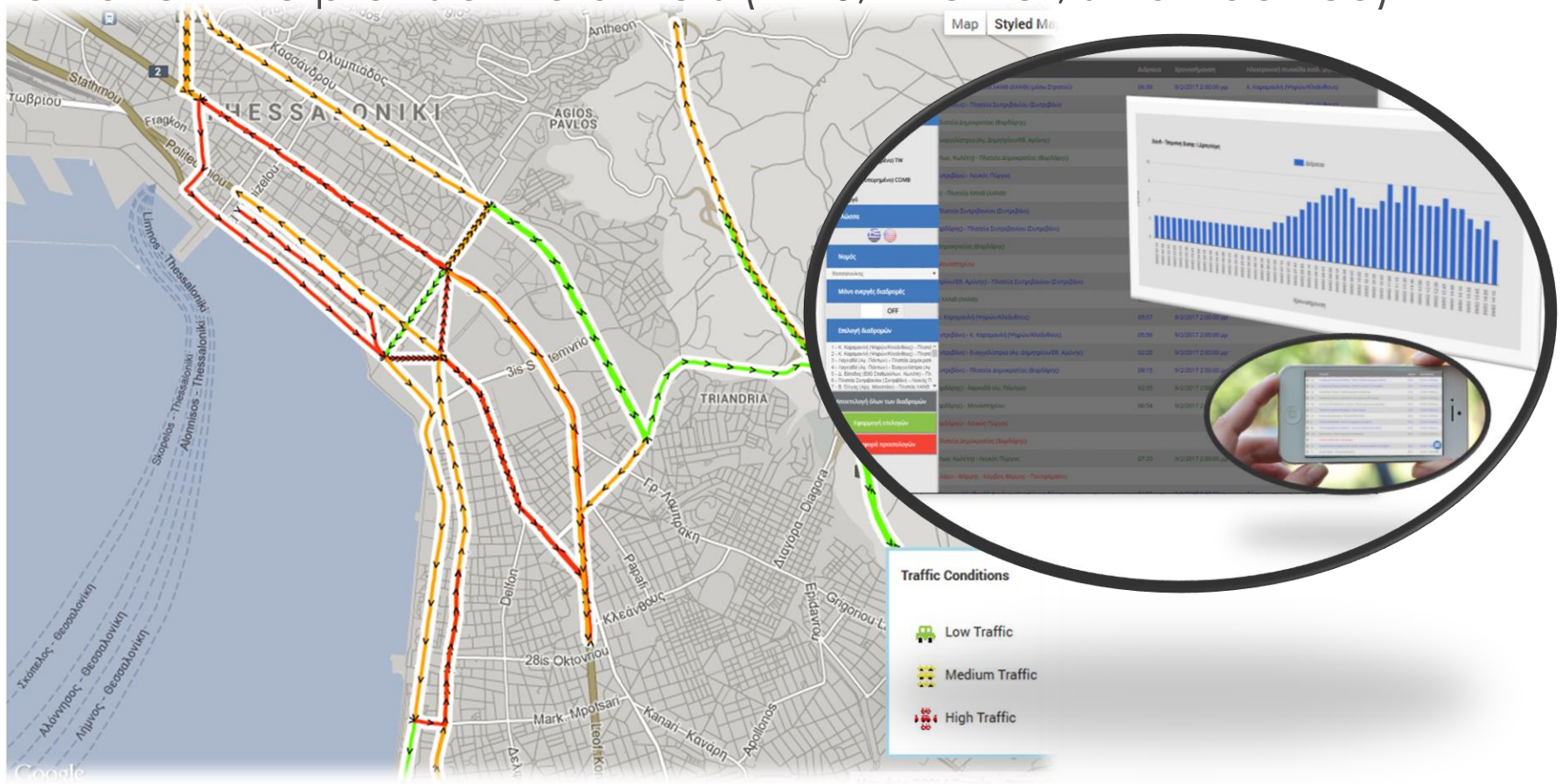


Bluetooth detectors (BT)

http://trafficpaths.imet.gr

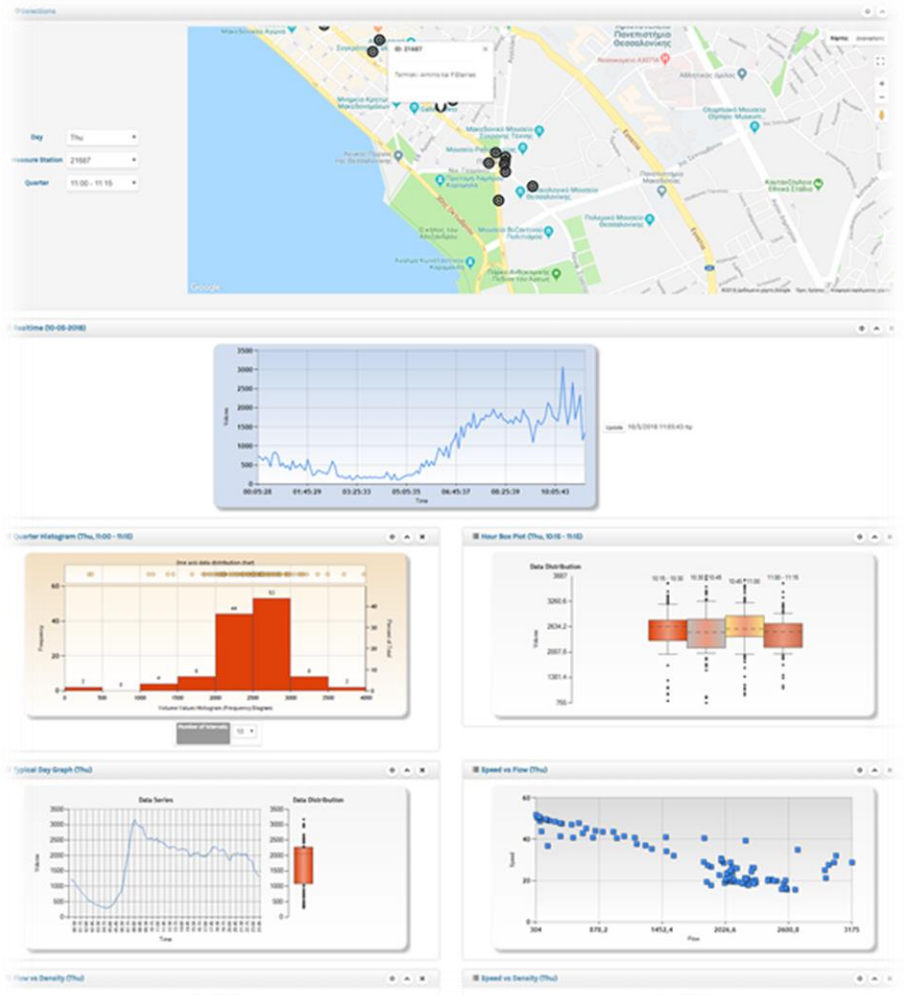
Real time travel time provision to drivers (VMS, internet, smart device)

K. Karamanli (Psaron/Kleanthous) - Platia CHANTH (CHANTH)	20'
K. Karamanli (Psaron/Kleanthous) - Platia Sintrivaniou (Sintrivani)	17'
Lagada (Ag. Panton) - Platia Dimokratias (Vardaris)	03'
Platia Sintrivaniou (Sintrivani) - Lefkos Pyrgos	02'
V. Olgas (Arch. Mousiou) - Platia CHANTH (CHANTH)	03'
Platia CHANTH (CHANTH) - Platia Sintrivaniou (Sintrivani)	04'
Platia Dimokratias (Vardaris) - Platia Sintrivaniou (Sintrivani)	07'
Evangelistria (Ag. Dimitriou/Ethn. Aminis) - Platia Sintrivaniou (Sintrivani)	02'
Lefkos Pyrgos - Platia CHANTH (CHANTH)	03'
Platia CHANTH (CHANTH) - K. Karamanli (Psaron/Kleanthous)	12'
Platia Sintrivaniou (Sintrivani) - K. Karamanli (Psaron/Kleanthous)	05'
Platia Sintrivaniou (Sintrivani) - Evangelistria (Ag. Dimitriou/Ethn. Aminis)	02'
Platia Sintrivaniou (Sintrivani) - Platia Dimokratias (Vardaris)	08'
Platia Dimokratias (Vardaris) - Lagada	03'



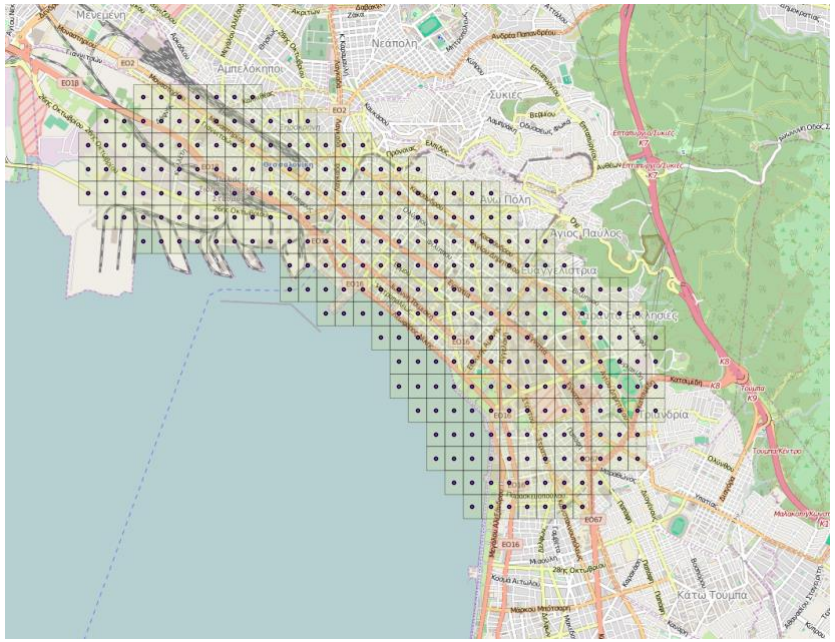
Loops and Cameras

- Average moving speed
- Traffic volume
- Road occupation percentage

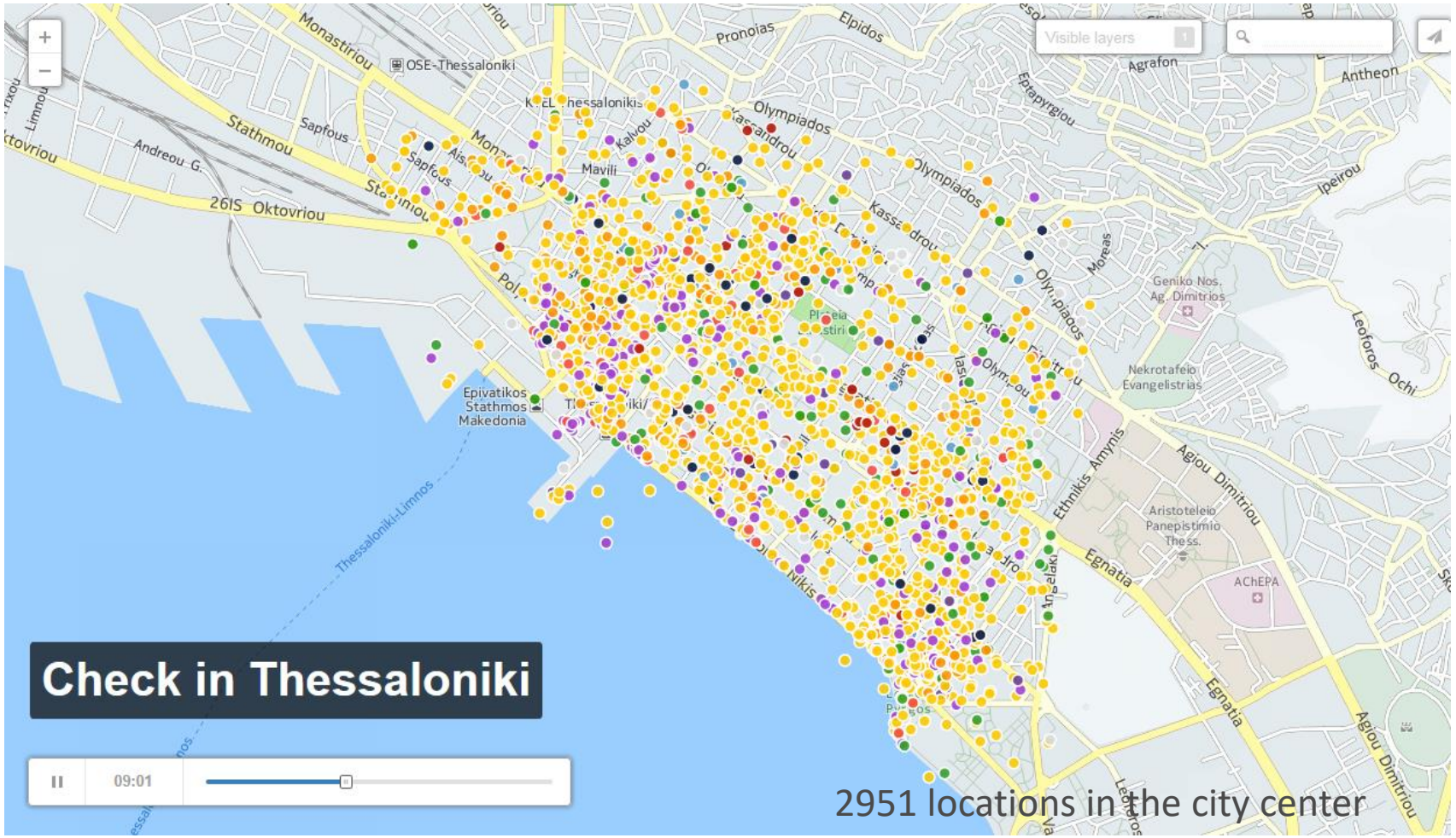


Social media (SM) - Facebook

- Data Collected from Public Graph API
- Spatial Queries using grid centroids
- 20 minutes interval



Social media (SM) - Facebook

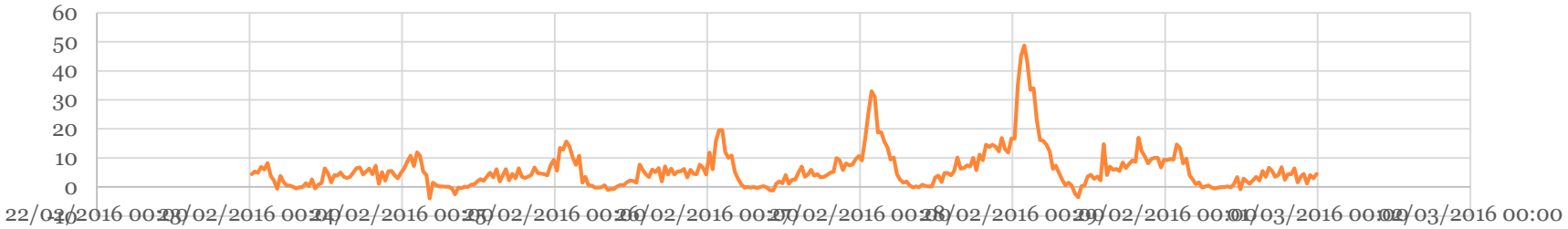


Social media (SM) - Facebook

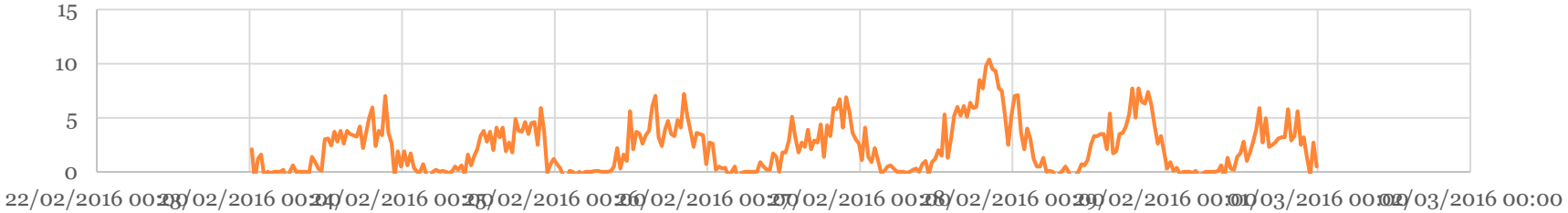
- *44.000 check-in events per week (750 locations)*
- Up to
  - 50 check-in events per minute (in the 136 locations tagged as bar)
  - 17 check-in events per minute (in the 150 locations tagged as restaurant)
  - 12 check-in events per minute (in the 32 locations tagged as outdoor)
  - 10 check-in events per minute (in the 125 locations tagged as cafe)
  - 10 check-in events per minute (in the 55 locations tagged as nightlife)
- Up to
  - 1265 check-in events during the "peak hour"
  - 920 check-in events in bars (Sunday 01.00)
  - 300 check-in events in restaurants (Saturday 22.00)

Social media (SM) - Facebook

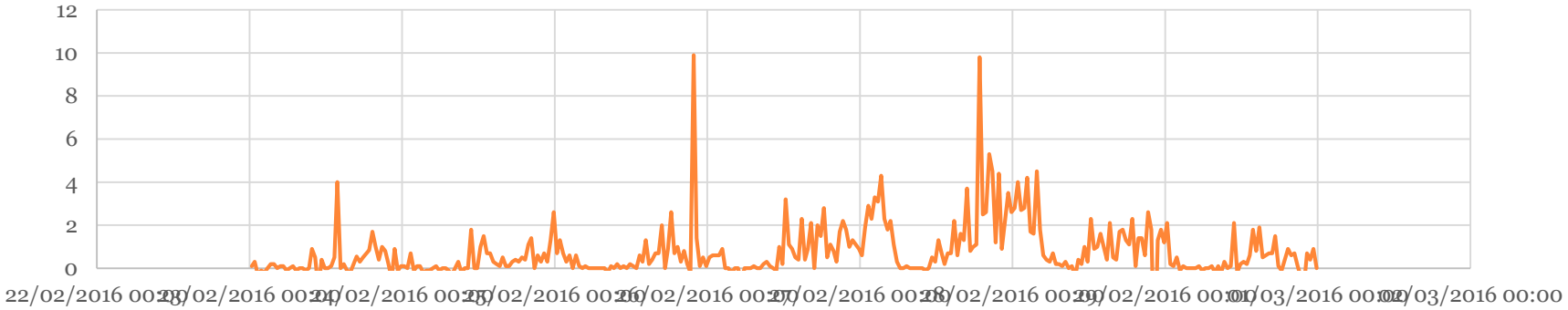
BAR



CAFE

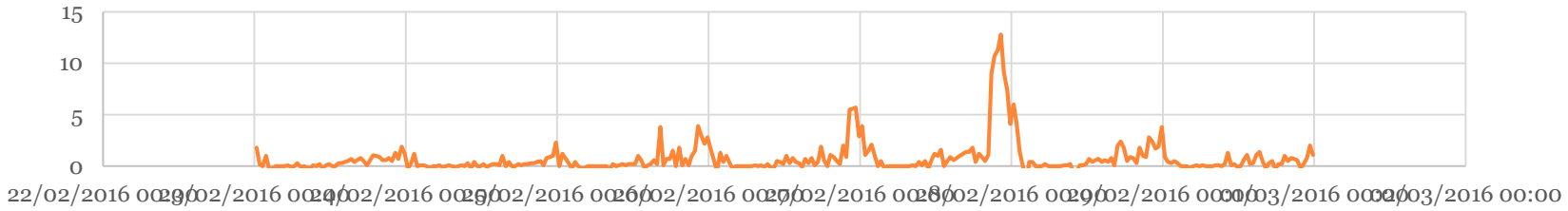


NIGHTLIFE

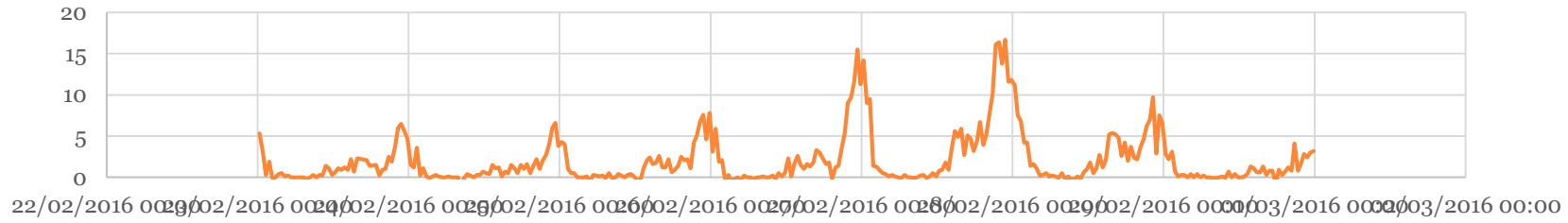


Social media (SM) - Facebook

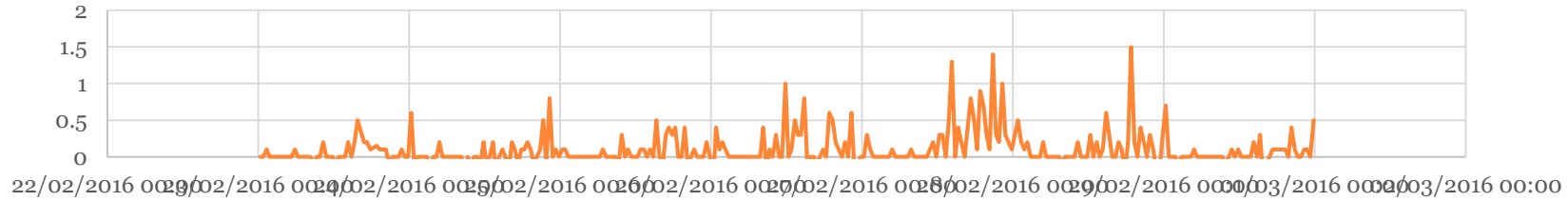
OUTDOORS



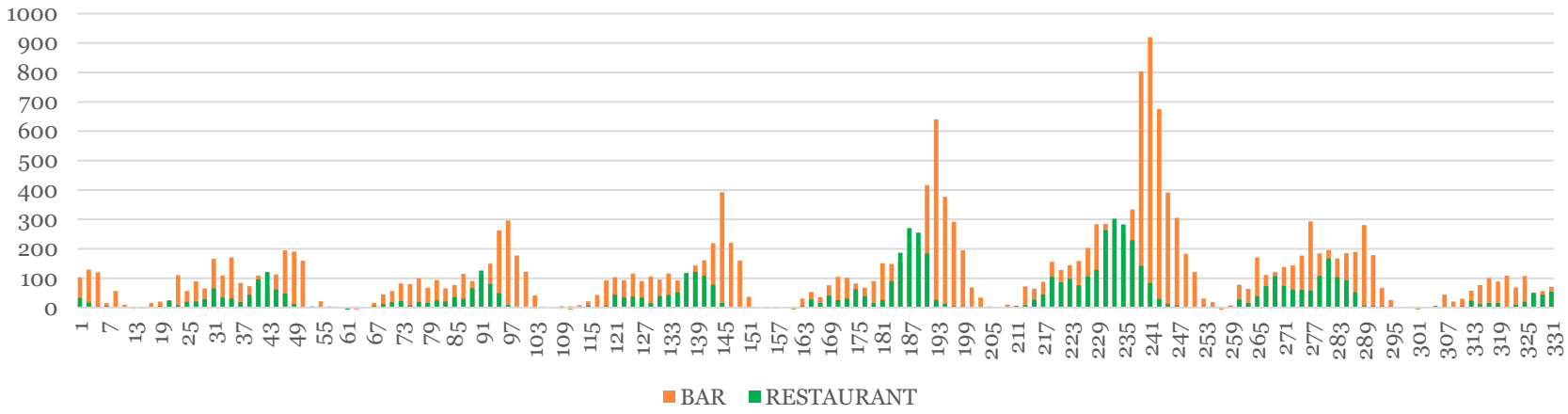
RESTAURANT

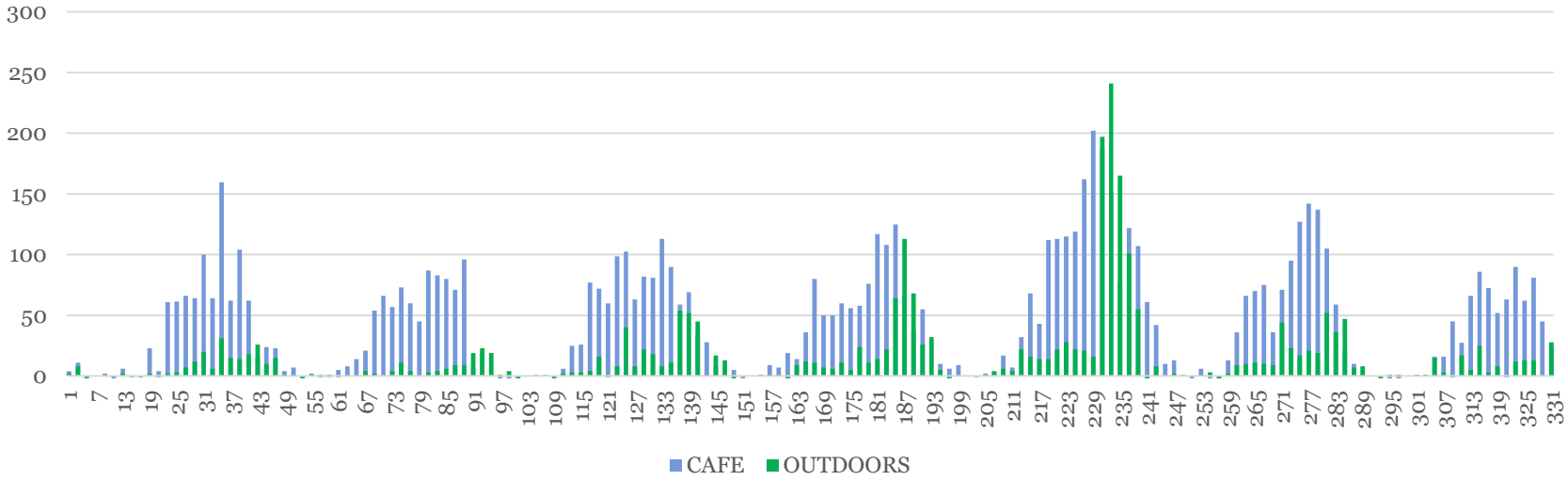


TOURIST ATTRACTION

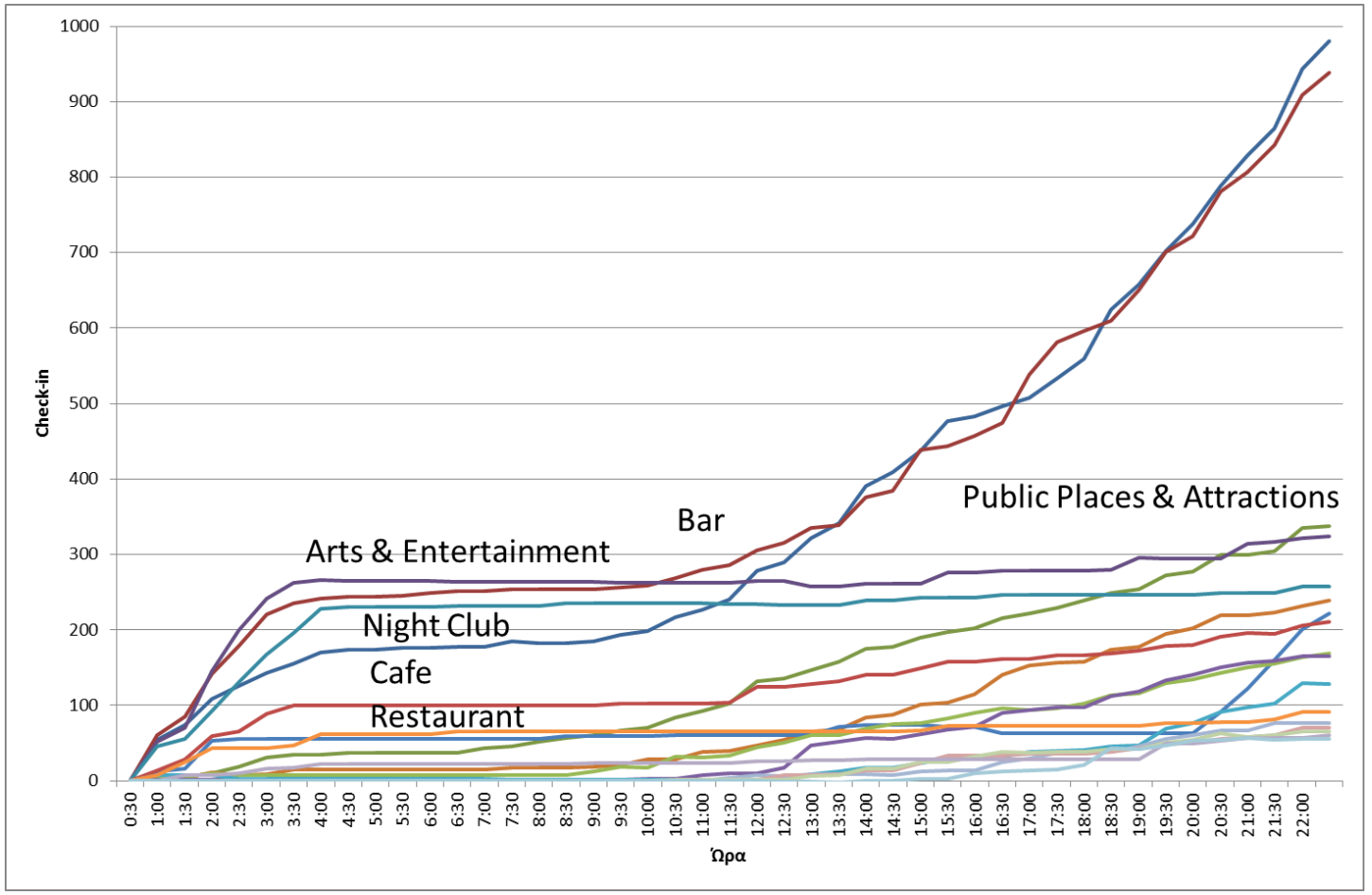


Social media (SM) - Facebook

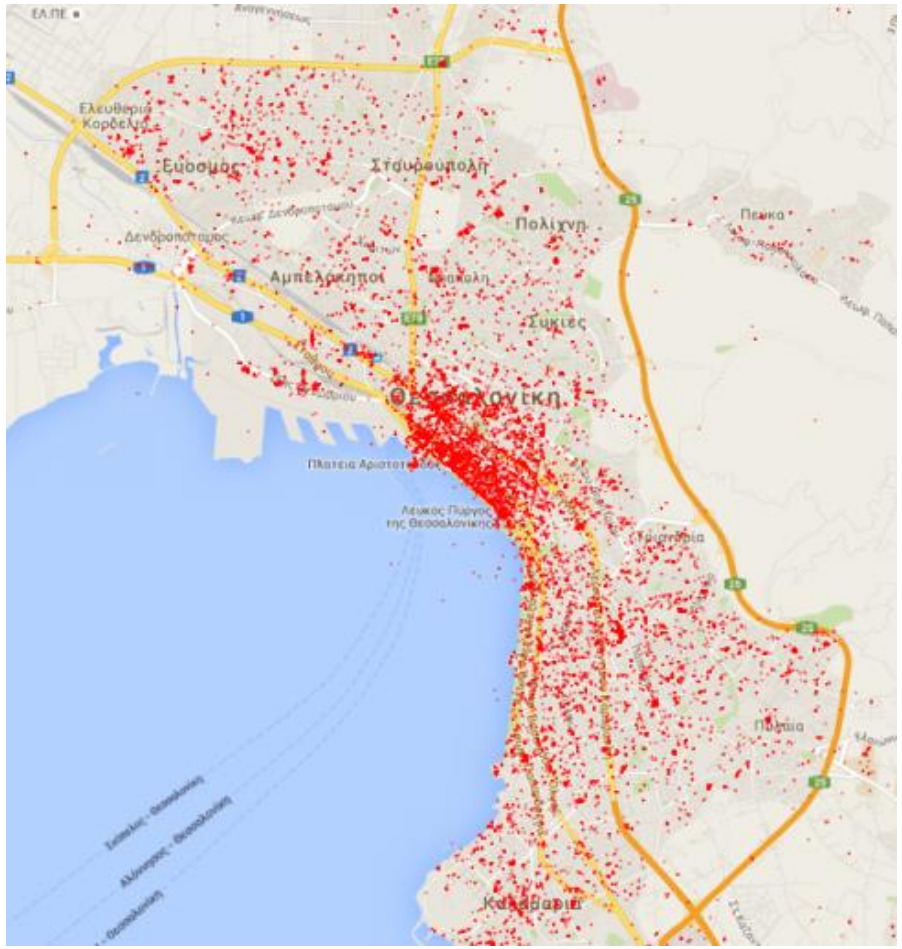


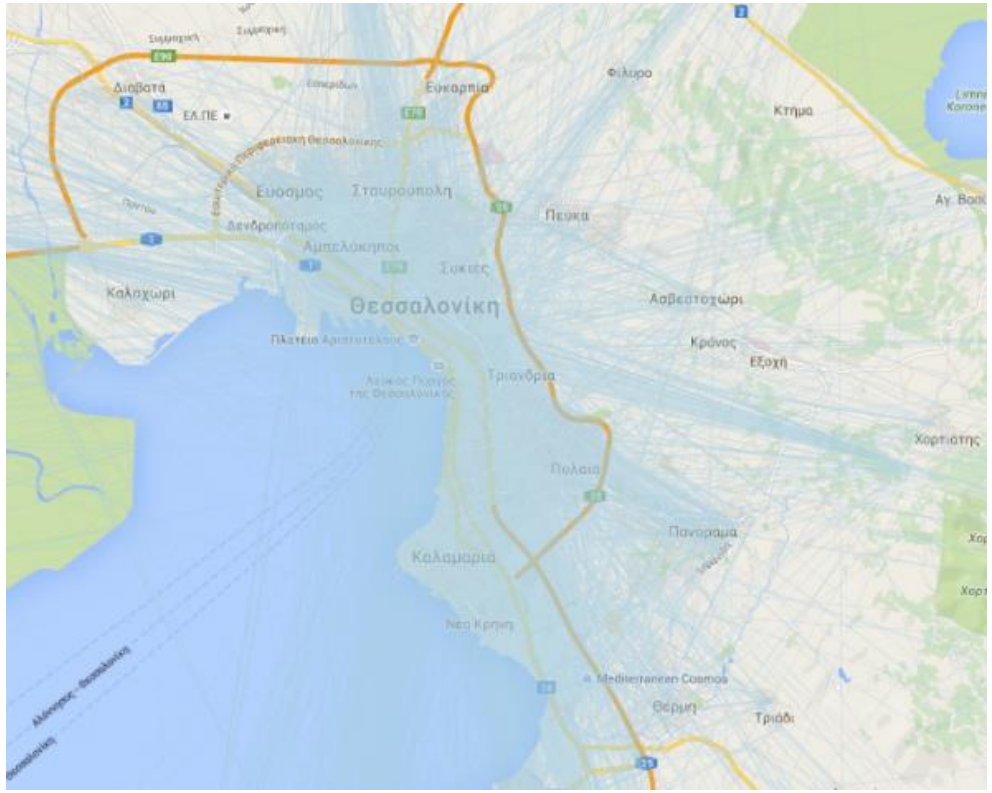


Social media (SM) - Facebook

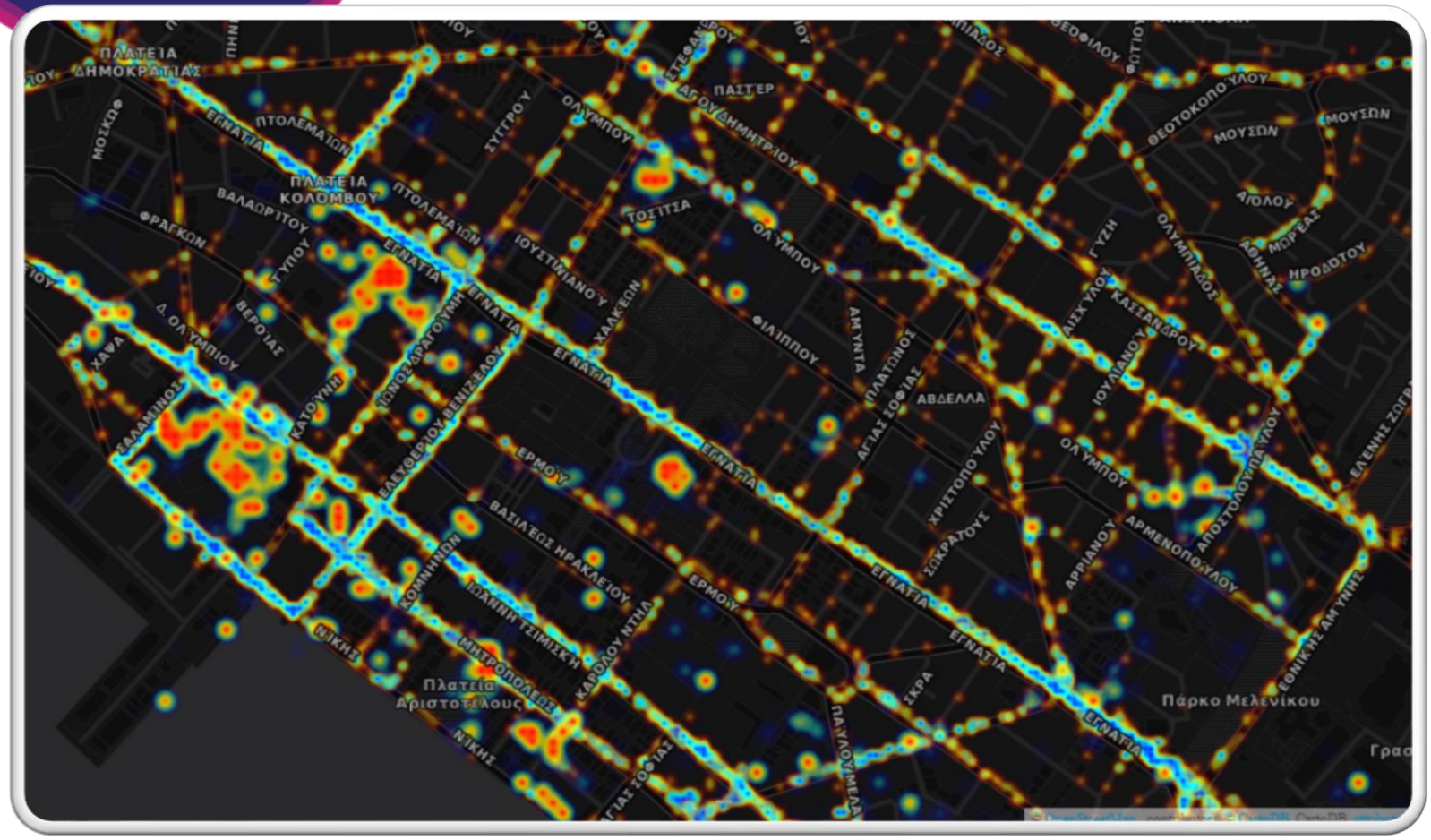


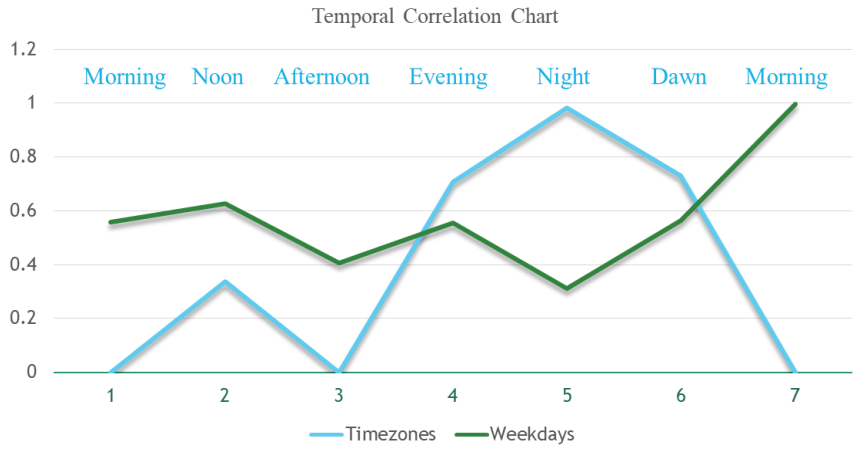
Social media (SM) - Twitter

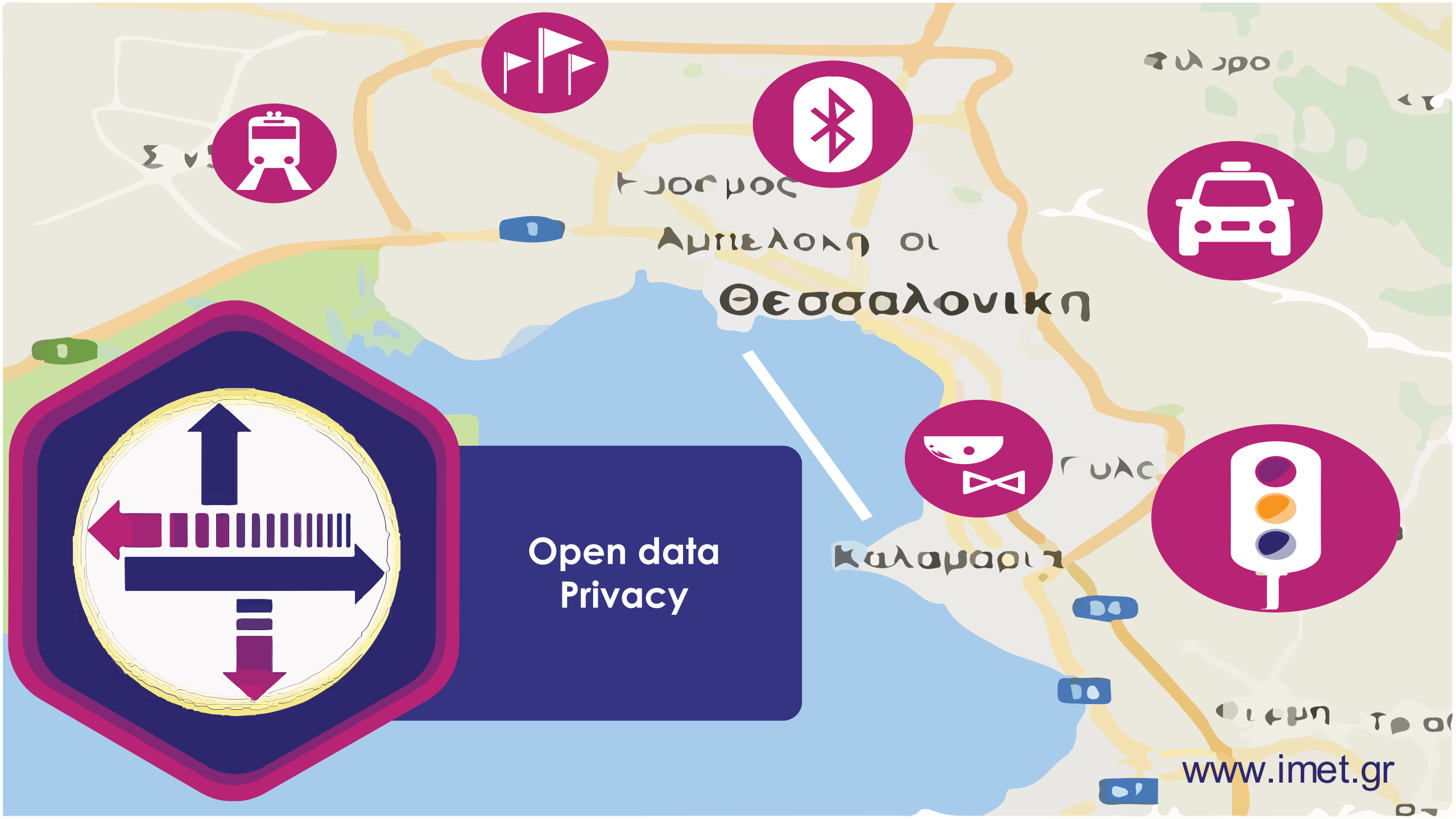




Data Fusion


ΠΛΑΤΕΙΑ ΔΗΜΟΚΡΑΤΙΑΣ
ΠΛΑΤΕΙΑ ΚΟΛΟΜΒΟΥ
ΠΑΣΤΕΡ
ΤΟΣΙΤΣΑ
ΑΒΔΕΛΛΑ
Πλατεία Αριστοτέλους
Πάρκο Μελενίκου

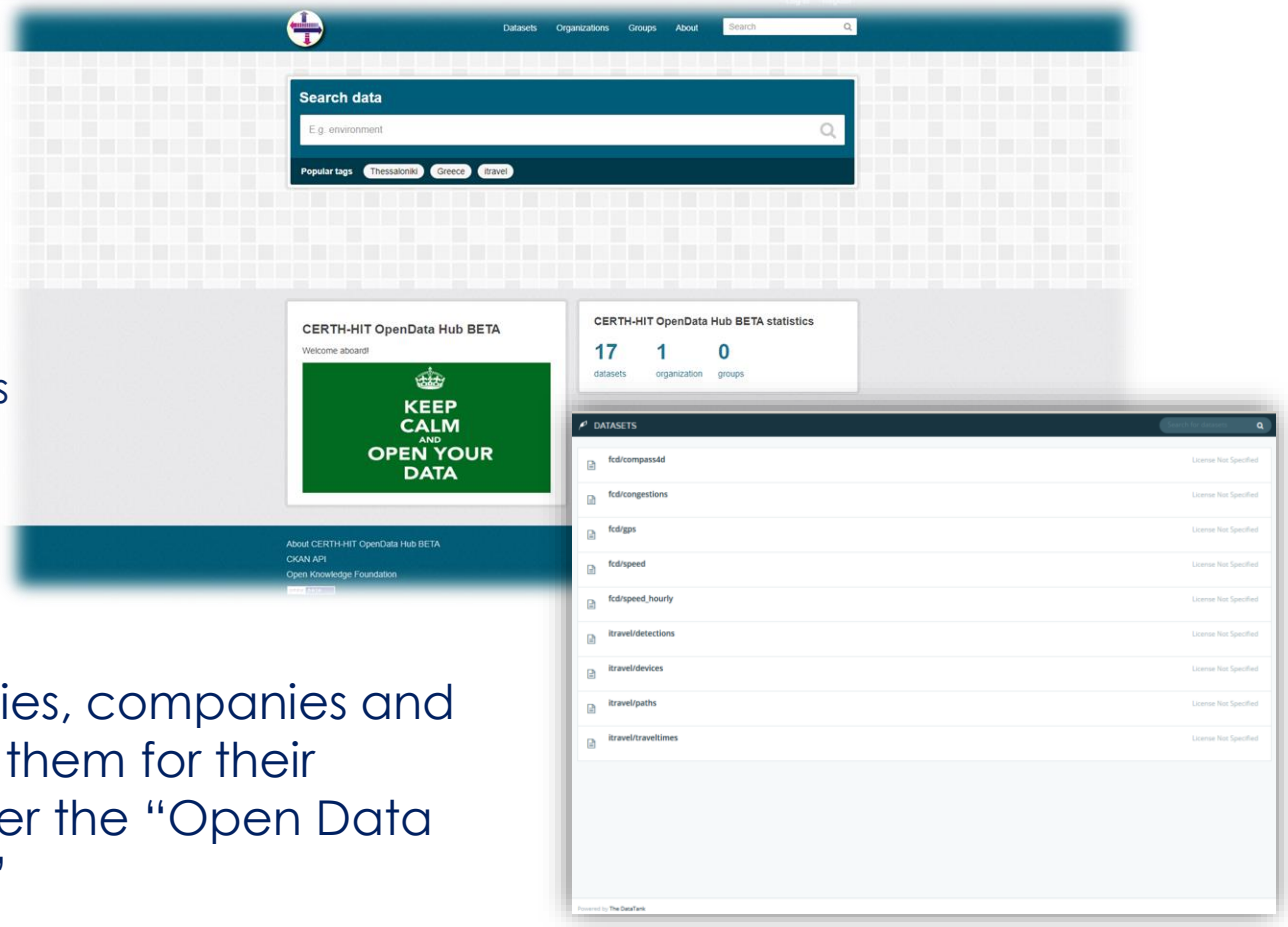

Temporal Correlation Chart
1.2
1
0.8
0.6
0.4
0.2
0
Morning
Noon
Afternoon
Evening
Night
Dawn
Morning
1
2
3
4
5
6
7
Timezones
Weekdays


Θεσσαλονικη
Open data
Privacy
www.imet.gr

Open Data APIs

The H.I.T. Open Data portal is intended to be a unique access point for open data on transport research in Greece.

- ✓ Historical datasets renewed on a monthly basis
- ✓ Powerful restful HTTP API (powered by "The Datatank") which serves real-time datasets in different machine readable formats (JSON, XML, CSV, KML etc.)



The datasets are freely available to universities, companies and individual developers who are willing to use them for their research or to create relevant services, under the "Open Data Commons Open Database License (ODbL)"

GDPR Compliance

Main guidelines

- CERTH-HIT is committed to never use any collected or derived personal information for anything beyond the specific research purposes that are mentioned clearly and to never process any individual's personal information otherwise without the data subject's explicit consent
- All services collect and process only the information needed in order to be functional
- Data subjects can request a copy of their data, correct any data associated with them or request to erase their data completely and permanently from H.I.T. Portal at any time
- CERTH-HIT never shares or sells any personal information

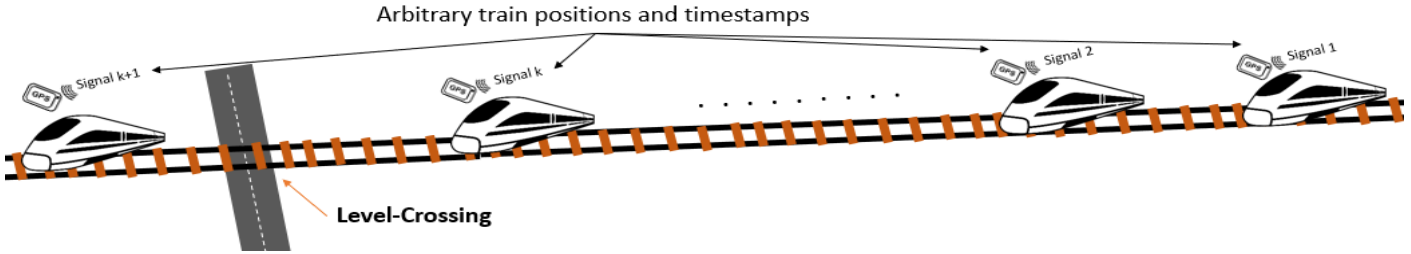
GDPR Compliance

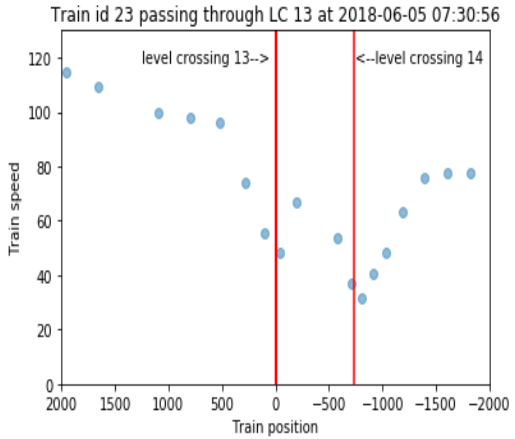
Basic technical measures

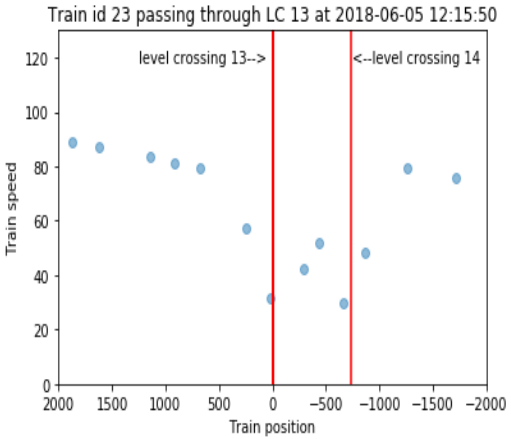
- Distinct credentials for each application and user
- Encrypted credentials on application configuration files
- Optimal security configuration and firewall access
- TLS encryption on websites that handle personal data is enabled
- Encrypted databases (data protection at rest)
- Every access attempt is audited
- Verbose logs of data processing


Θεσσαλονικη
The projects
www.imet.gr

Machine Learning Algorithms







Objective:
Predict the arrival time to the next level crossing

Model Input:
Train GPS signal at arbitrary geolocation in the region of Thessaloniki. (coordinates, trainID, timestamp, speed, line).

Machine learning Algorithms:
Tested numerous models from the most basic ones (decision trees, logistic regression) to SVR, ensemble, boosting methods (random forest, gradient boosting, xgboost) to Artificial Neural Networks.

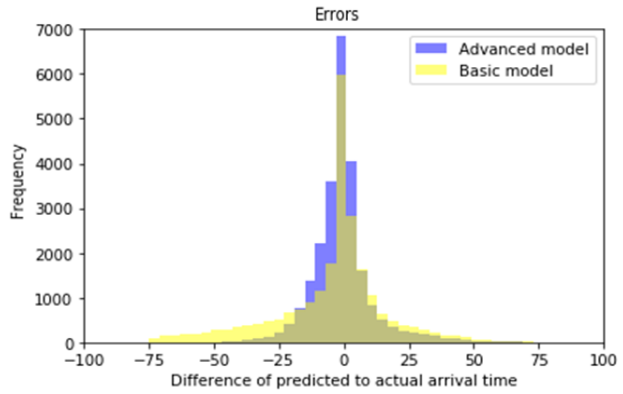
Machine Learning Algorithms

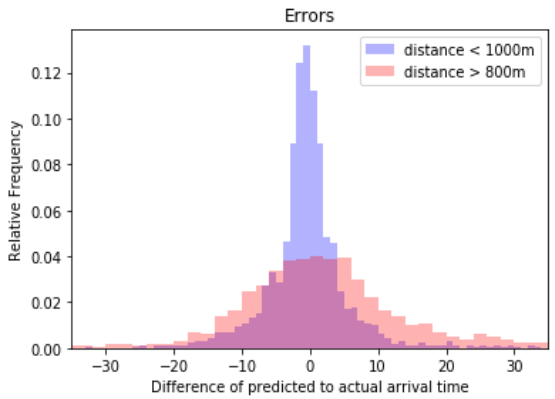
The winner:
Artificial Neural net with 3 dense hidden layers, Leaky Relu activation function and dropout (0.1).

Training:
On historical data of train traversals from level crossings for a period of more than 2 months.

Performance:
When train distance < 1000 m we achieve a MAE of 5 seconds.
When train distance > 800 m we achieve a MAE of 12 seconds.

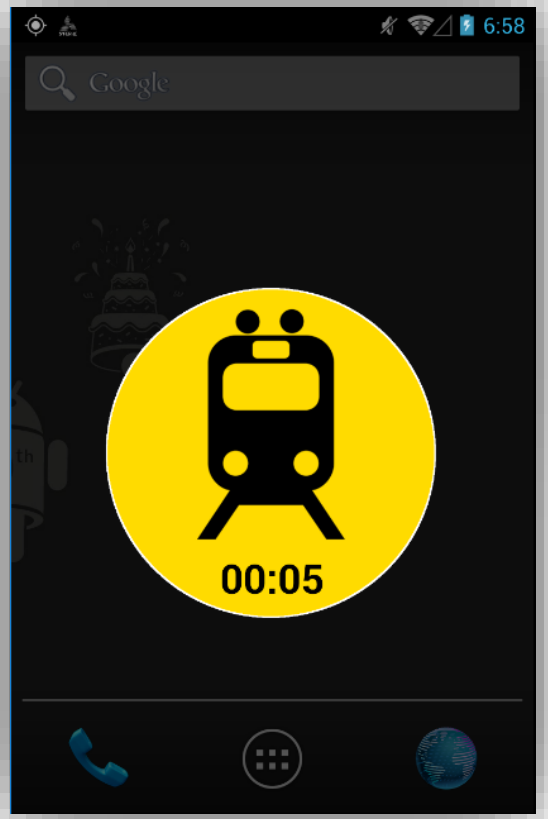
Error plots on unseen data predictions:

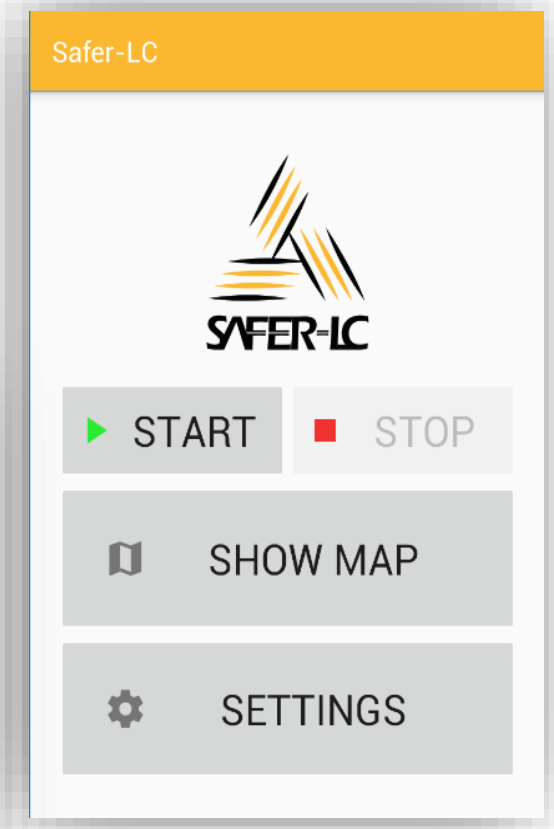




App: Safer-LC

The Safer-LC mobile app is aiming to improve safety and minimize risk at level crossings by warning users of any incoming trains through a notification/alert.





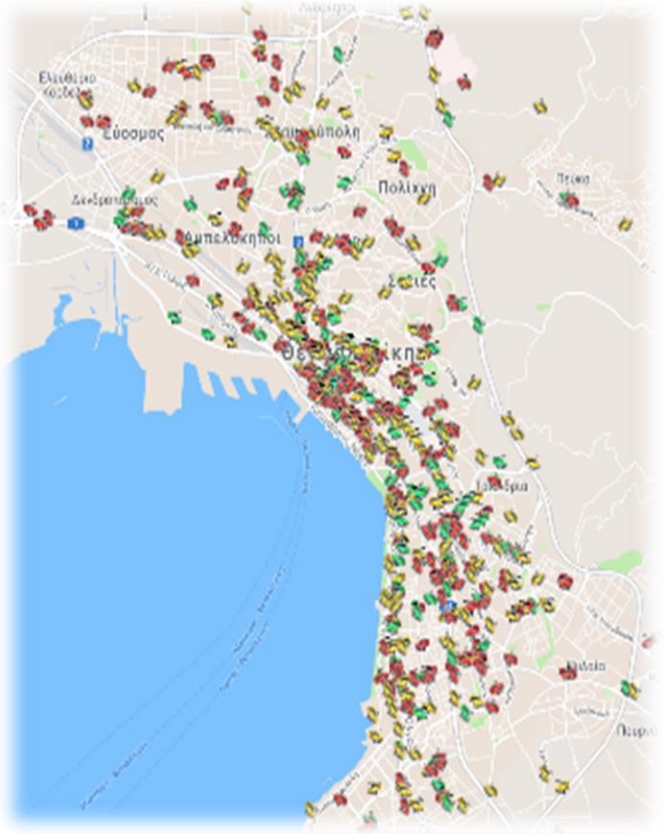
SAFER-LC

Machine Learning Algorithms

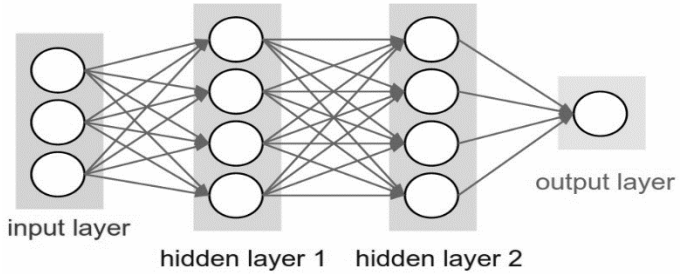
OPEN KNOWLEDGE GREECE

Objective:
Monitor Thessaloniki traffic status and issue short term traffic forecasting.

Model Input:
Floating car data (FCD) from Taxis operating in the region of Thessaloniki. (coordinates, vehicleID, timestamp, speed, passenger).
500 – 2.500 speed measurements per minute.



Machine learning Algorithm:
Artificial Neural Network

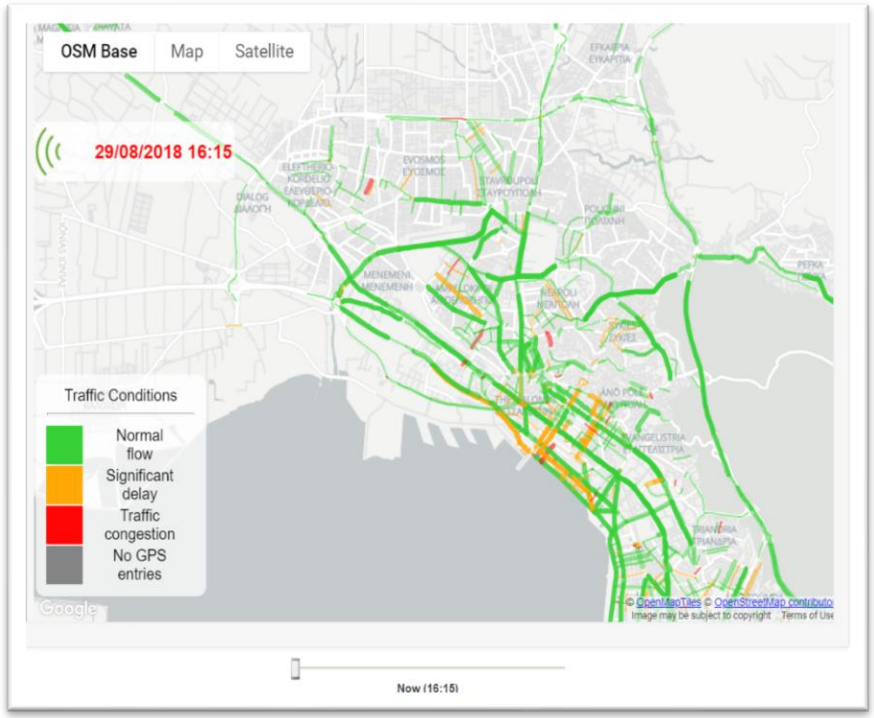


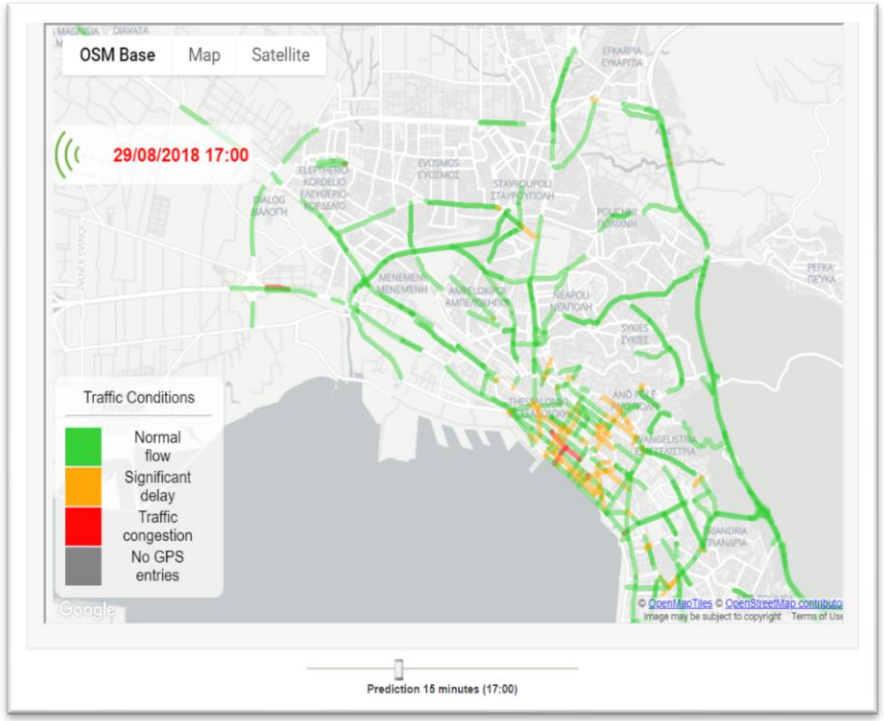
Machine Learning Algorithms

OPEN KNOWLEDGE GREECE

Results:

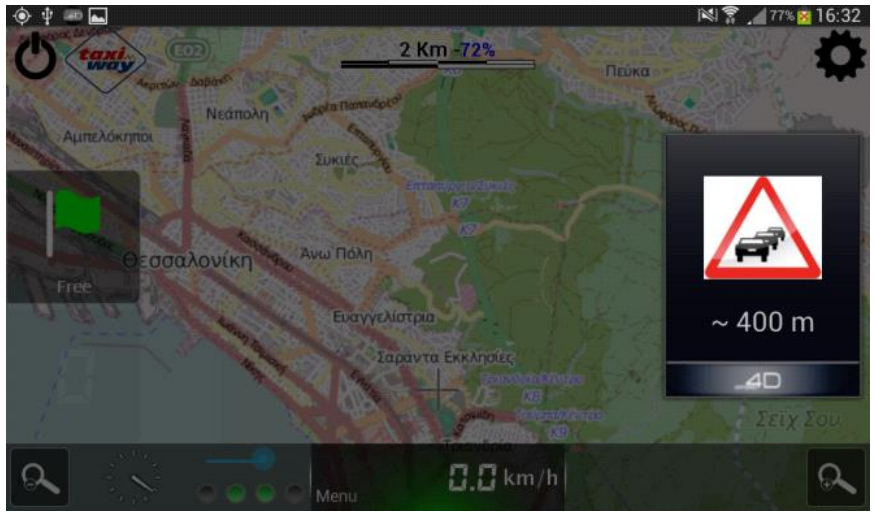
Open, available online: http://trafficstatusprediction.imet.gr

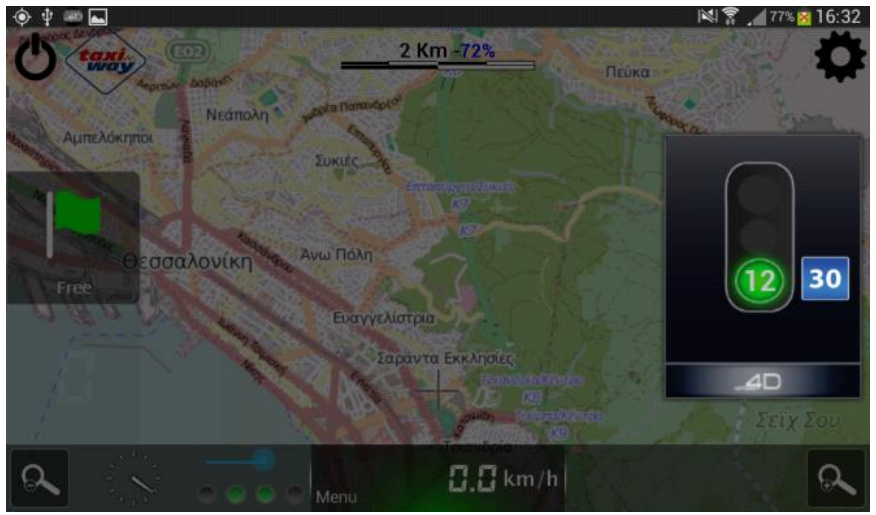




App: C-ITS

Deploying Cooperative Logistics
CO-GISTICS





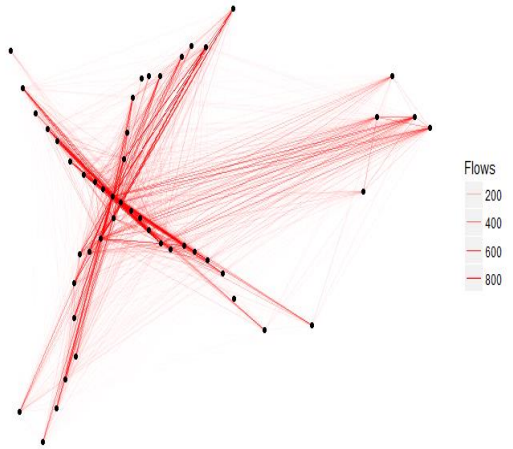
App: C-ITS

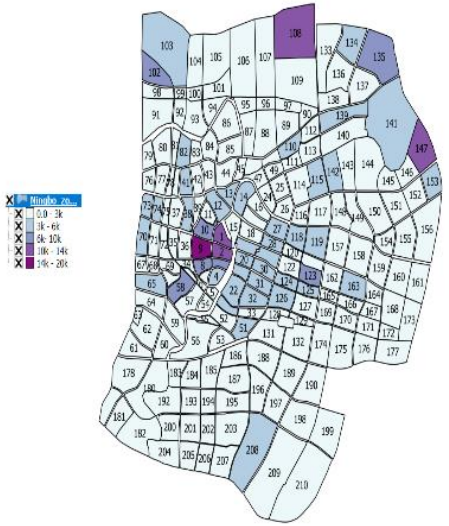
Technology / Innovation Element	Current TRL	Target TRL	Barcelona	Bilbao	Bordeaux	Copenhagen	Newcastle	North Brabant	Thessaloniki	Vigo
Bundle 1: urban efficiency										
a.Rest time management	8-9	9		x	x			x		
b.Motorway parking availability	8-9	9		x	x			x		
c.Urban Parking availability	7	9		x	x					
Bundle 2: infrastructure-to-vehicle safety										
a.Road works warning	8	9	x	x	x	x	x	x	x	x
b.Road hazard warning (incl. traffic jams)	7-8	9	x	x	x	x	x	x	x	x
c.Emergency Vehicle Warning	7-8	8-9	x		x			x	x	x
d.Signal Violation Warning	5	7	x		x			x	x	x
e.Warning system for pedestrian (not limited to crossings)	5	6-7	x		x	x	x	x	x	x
Bundle 3: traffic efficiency										
a.Green priority	7	9	x		x	x	x	x	x	x
b.Green light optimal speed advisory / Dynamic eco-driv	6-7	8-9	x		x	x	x	x	x	x
c.Cooperative traffic light for pedestrian	5	6-7	x		x	x		x	x	
d.Flexible infrastructure (HOV, peak-hour lanes)	5-6	7-8	x		x		x		x	
e.In-vehicle signage (e.g. Dynamic speed limit)	5-6	7-8	x		x		x		x	x
f.Mode & trip time advice (e.g. by incentives)	7	8	x		x				x	
g.Probe Vehicle Data	6	8	x		x		x		x	x
Bundle 4: vehicle-to-vehicle safety										
a.Emergency Brake Light	7-8	8-9			x					x
b. Cooperative (Adaptive) cruise control (Urban ACC)	5-6	7-8			x			x		x
c.Slow or Stationary Vehicle Warning	7-8	8-9			x					x
d.Motorcycle approaching indication (including other VRUs)	6-7	7-9			x			x		x
e.Blind spot detection / warning (VRUs)	5	6-7		x	x		x	x		

Project: Ningbo OD construction

Purpose: Identify Passenger Flows in the City of Ningbo, China
Data: Smart Cards
Limitations: No alighting Station
Our Approach: Design a new algorithm to infer alighting stations based on:

- Importance of the geographical zone
- Importance of the station



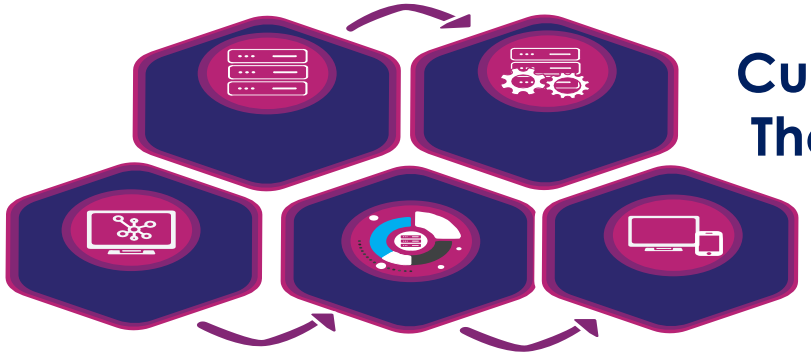


GALILEO FOR MOBILITY

A taxi/ride sharing service in Thessaloniki

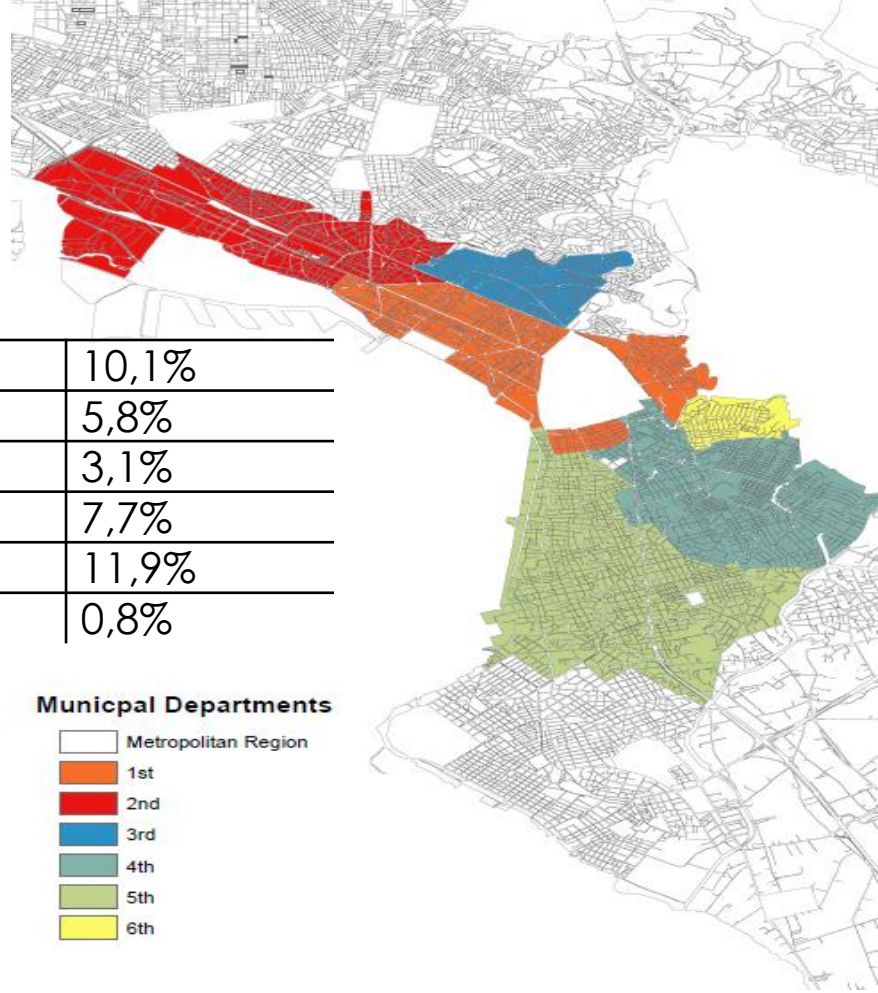
The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776381

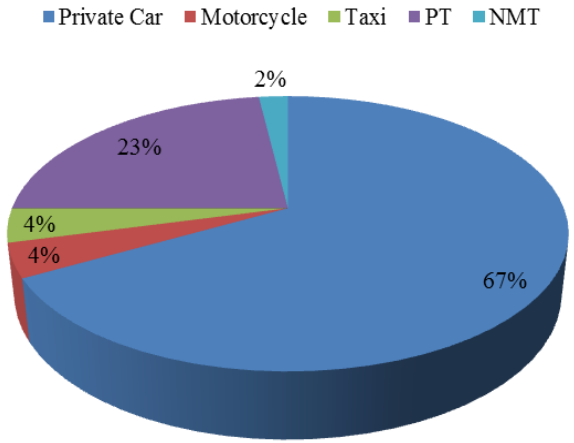
Website : http://www.galileo4mobility.eu/pilot-sites/thessaloniki/



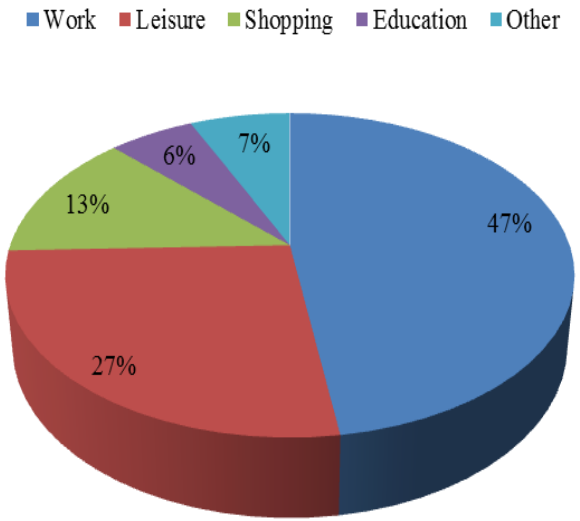
Current situation in Thessaloniki

Typical Weekday Number of Trips	1.306	
MD 1	132	10,1%
MD 2	76.3	5,8%
MD 3	40.8	3,1%
MD 4	100.9	7,7%
MD 5	155.2	11,9%
MD 6	10.8	0,8%





• 67% of trips is conducted with private cars

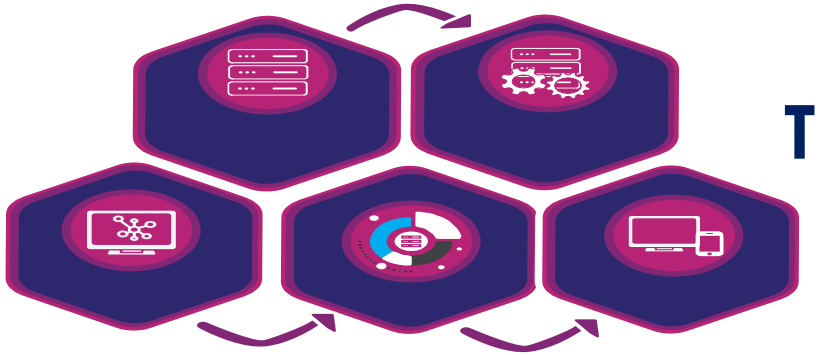


• 47% of the trips are conducted for work

• On a daily average, the city centre attracts a total of 10% of all trips

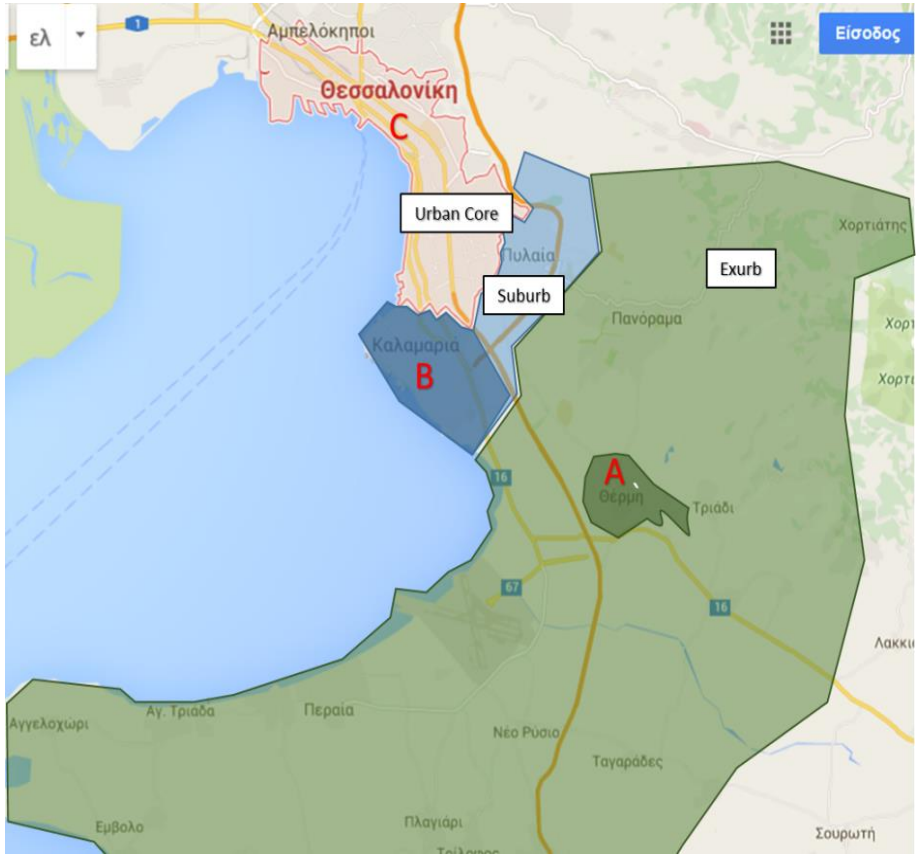
• The percentage of trips originating and ending in the city centre (MD 1) are 4,9% and 8,7% respectively

• Four major axes crossing the city, from which three of them pass through the city centre.



The pilot

A set of 20 taxis of the Taxi Way company will collect residents of Thermi and Kalamaria and transport them to the city centre and back to their home aggregating as much as possible the trip origins and destinations.



- ✓Simplicity
- ✓Friendliness
- ✓Easy to Use
- ✓Responsiveness

ADDED VALUE

✓Through the HIT application the user of the new service provided by "Taxiway" benefits from a taxi use leaving his car and any obligation behind.

✓A comfort and cost-effective "home-work-home" solution to the suburban area's residents

✓A quicker, less stressful, hustle free way to arrive to work opposed to the services currently provided

✓A transportation mode customized to each user

✓Information available in real time

USER ENGAGEMENT STRATEGY

Thessaloniki International Exhibition

Trifold

Future Actions

A Workshop organized by HIT for the stakeholders

Info kiosks in municipalities of Thermi & Kalamaria

Disseminations actions through the Websites of municipalities and Taxiway

Open Day HIT on 11th November

App: Galileo4Mobility

A taxi sharing mobile application aiming to reduce the traffic congestion in the cities.

GALILEO FOR MOBILITY

www.imet.gr

Smart Port Vehicle Management

Website: www.logimatic-project.eu
Twitter: www.twitter.com/Logimatic_EU
LinkedIn: www.linkedin.com/company/logimatic-project

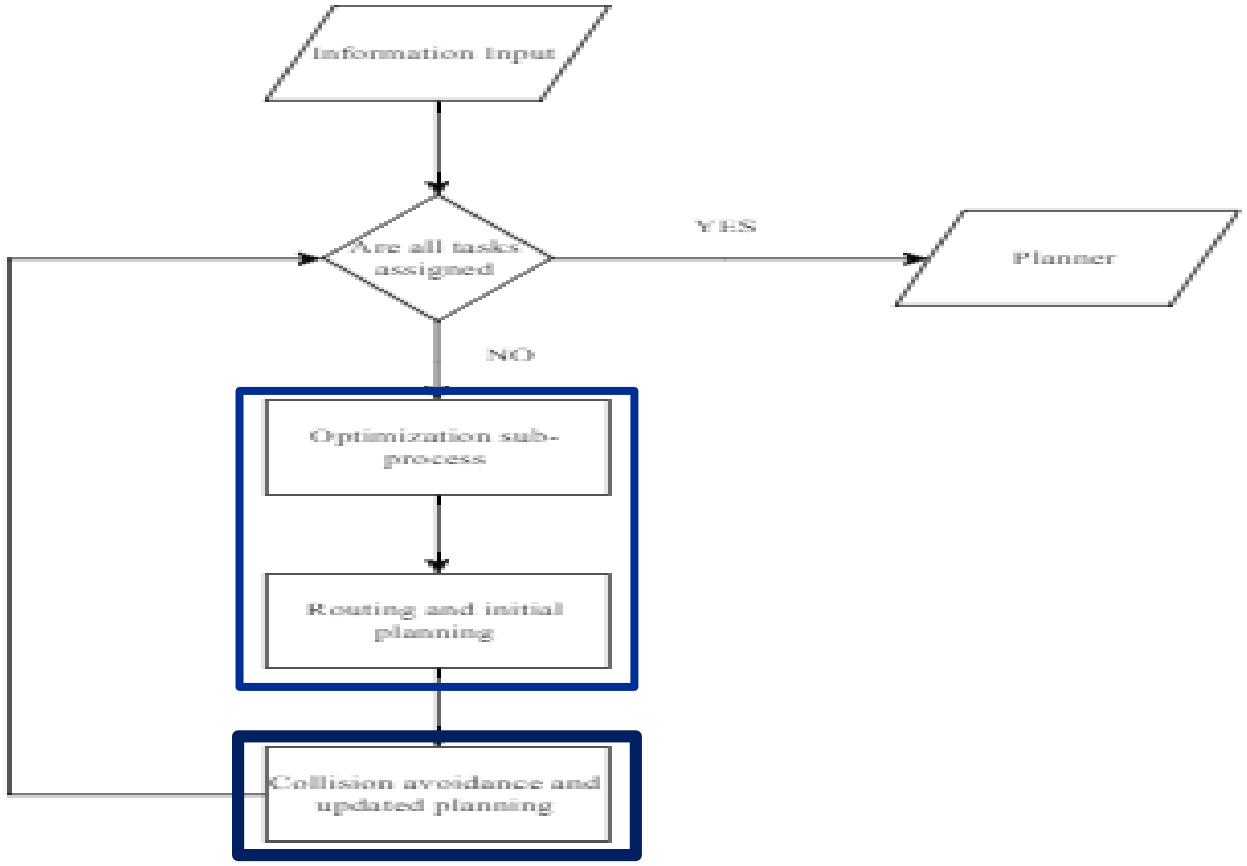
The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 687534.

Project: LOGIMATIC

Objective:

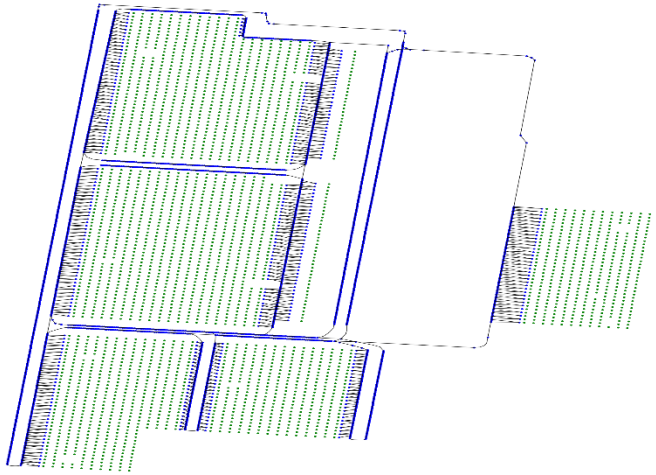
Project: LOGIMATIC

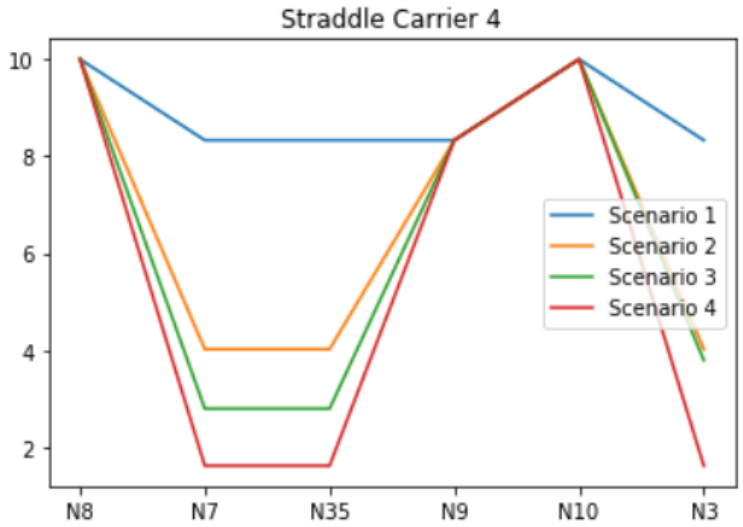
Our Approach:

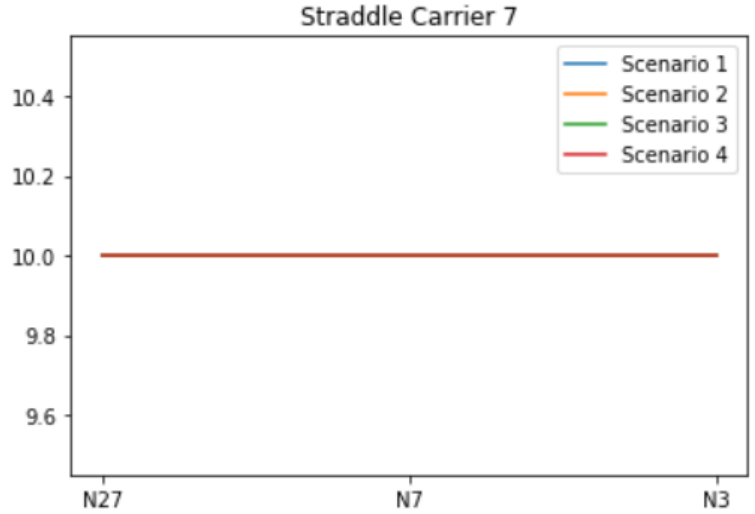


Project: LOGIMATIC

Results:







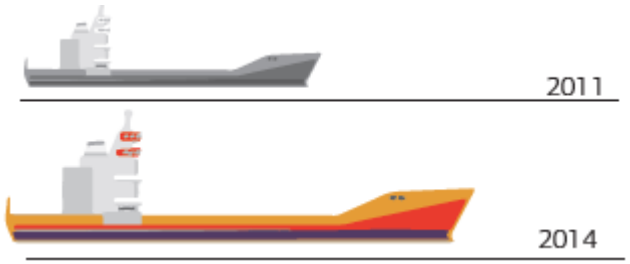
Market at a glance

Market Players

- 700 specialised container terminals worldwide and around 600 multi-purpose and Roll on/Roll-of ship facilities handling containers
- 24 companies considered as global/international terminal operators control 60% of world container handling capacity
- 74% of goods imported and exported and 37% of exchanges within the Union transit through seaports
- Ports enforce the territorial cohesion of the European Union as they operate as links between different modes of transport

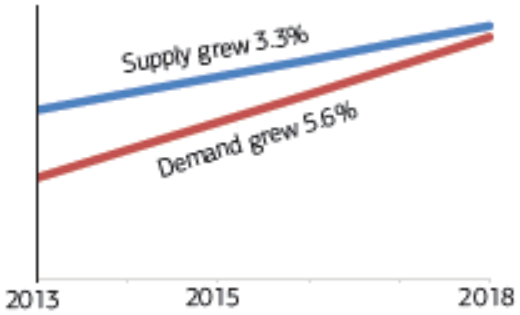
Market Trends

- Increase in average container ship size grew around 40%



- Less than 5% of terminals globally are fully or semi automated, but the proportion is growing.

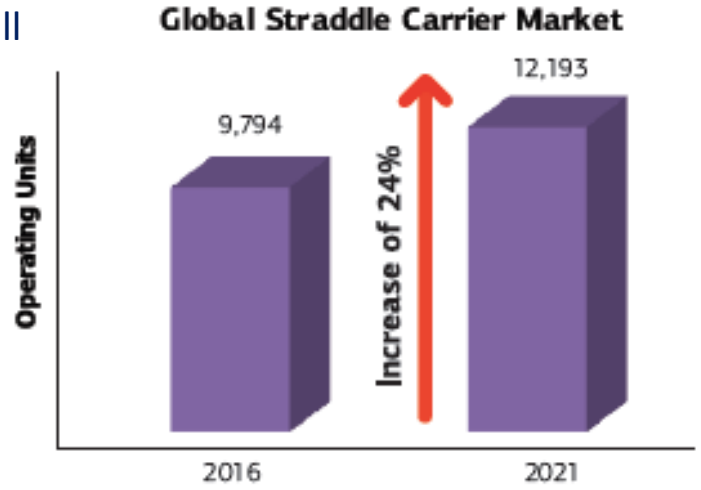
Supply-Demand in port container terminals

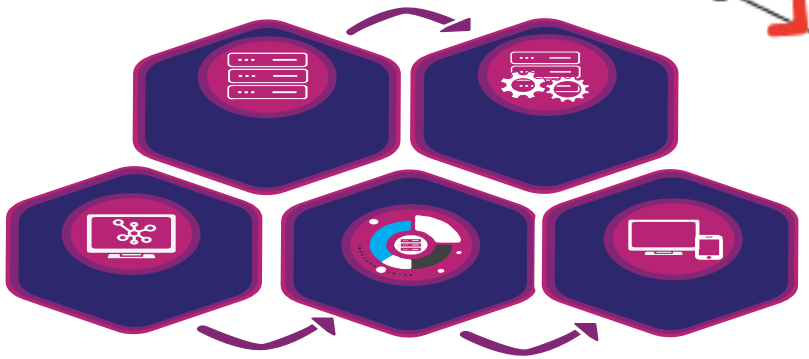


Market Size

- 640 Million TEU
  - Annual growth of worldwide container trade rate at 3.8% .
  - Around 24m TEU of vessels will be in service by 2020.

- Revenue: US$ 48 billion
- EBITDA: US$ 11 billion





The challenge

High social and economic return of resources invested in ports

Increasing utilization rates (from 68% of 2013 to 75% in 2018)

Operating difficulties such as congestion and capacity problems

Reduced productivity of many container terminals

Solutions

Increase of ports' capacity

Obstacle

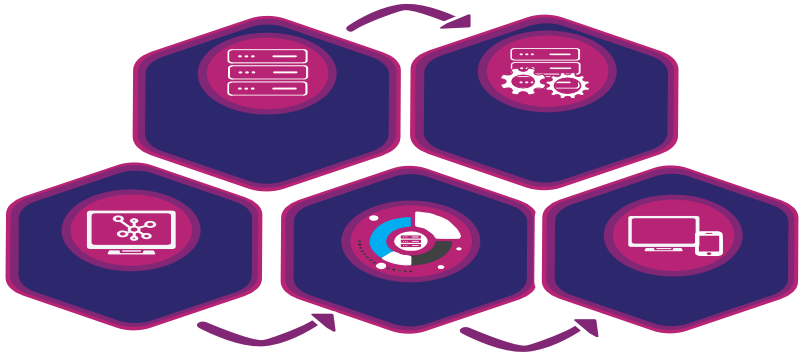
Scarcity of land available for port expansion

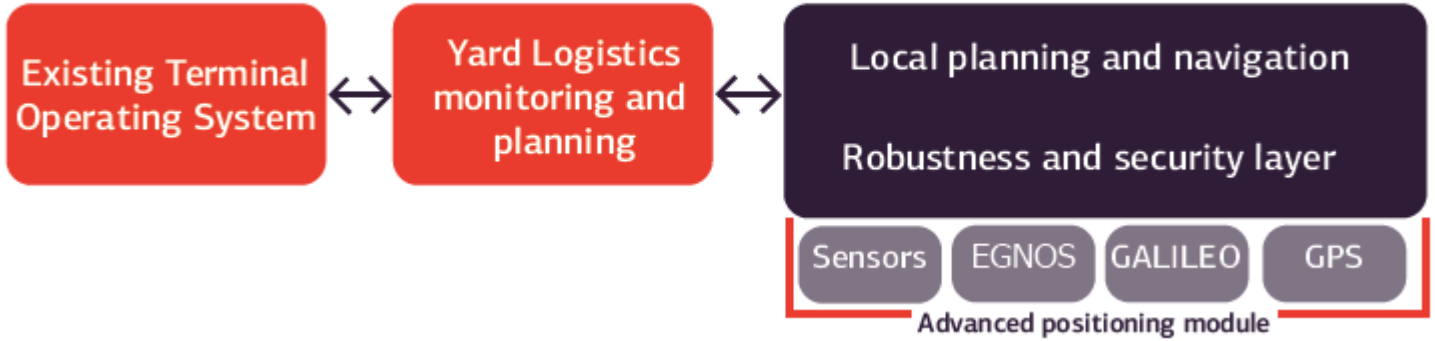
Automated vehicles

Obstacle

Enormous investment for short-medium term period

LOGIMATIC proposes an ad-hoc advanced location and navigation solution applied for the automation of existing port vehicles. Such a solution reduces up to 50% the cost in short-medium term and permits the better planning of long-term investment including the renewal of the whole port fleet with totally autonomous vehicles.

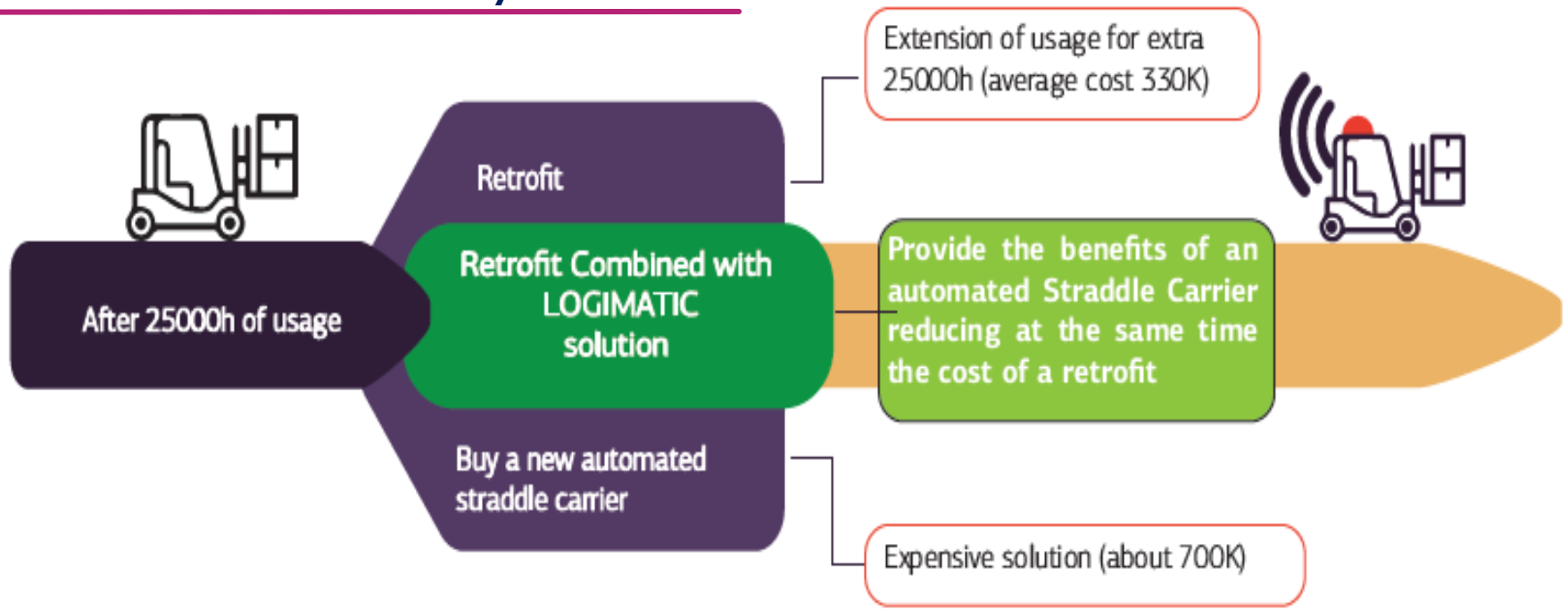




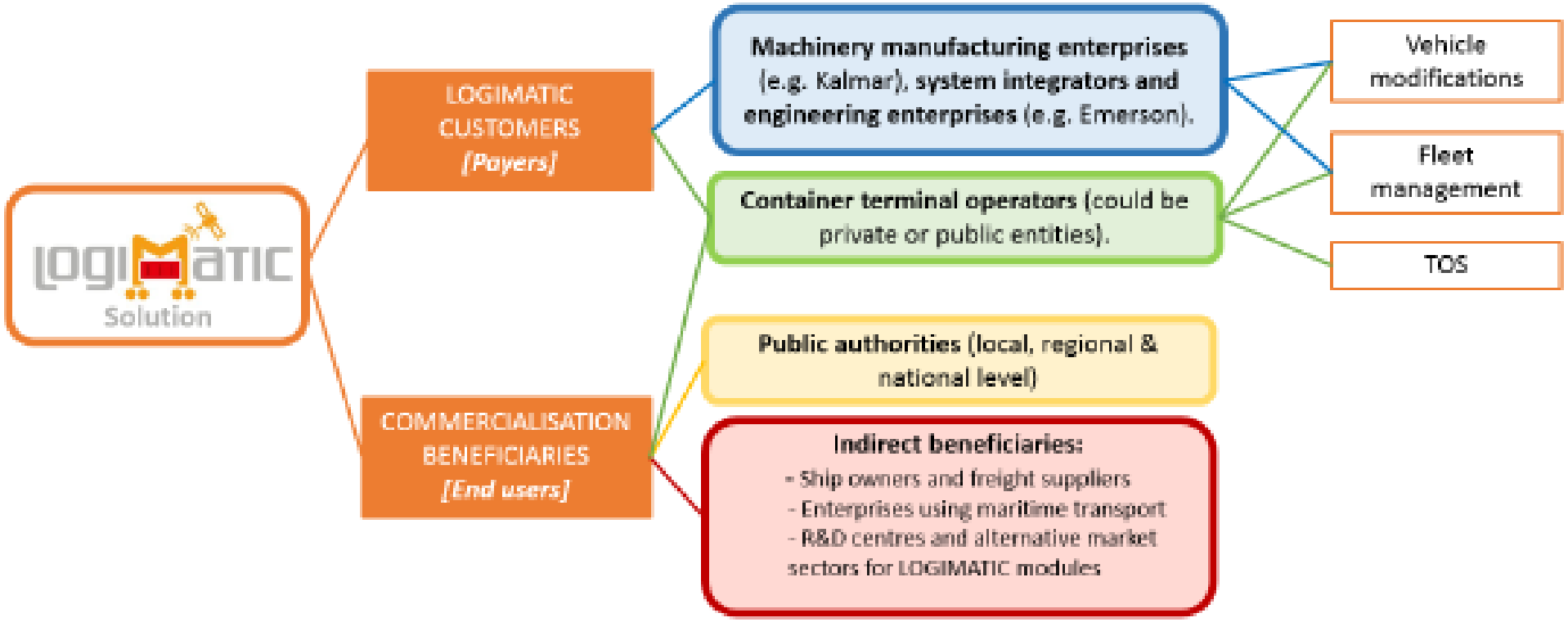
The project

The core of the project is a cost-effective, real-time positioning system that primary relies on a combination of a multi-constellation GNSS receiver augmented by EGNOS and equipped with onboard sensors.

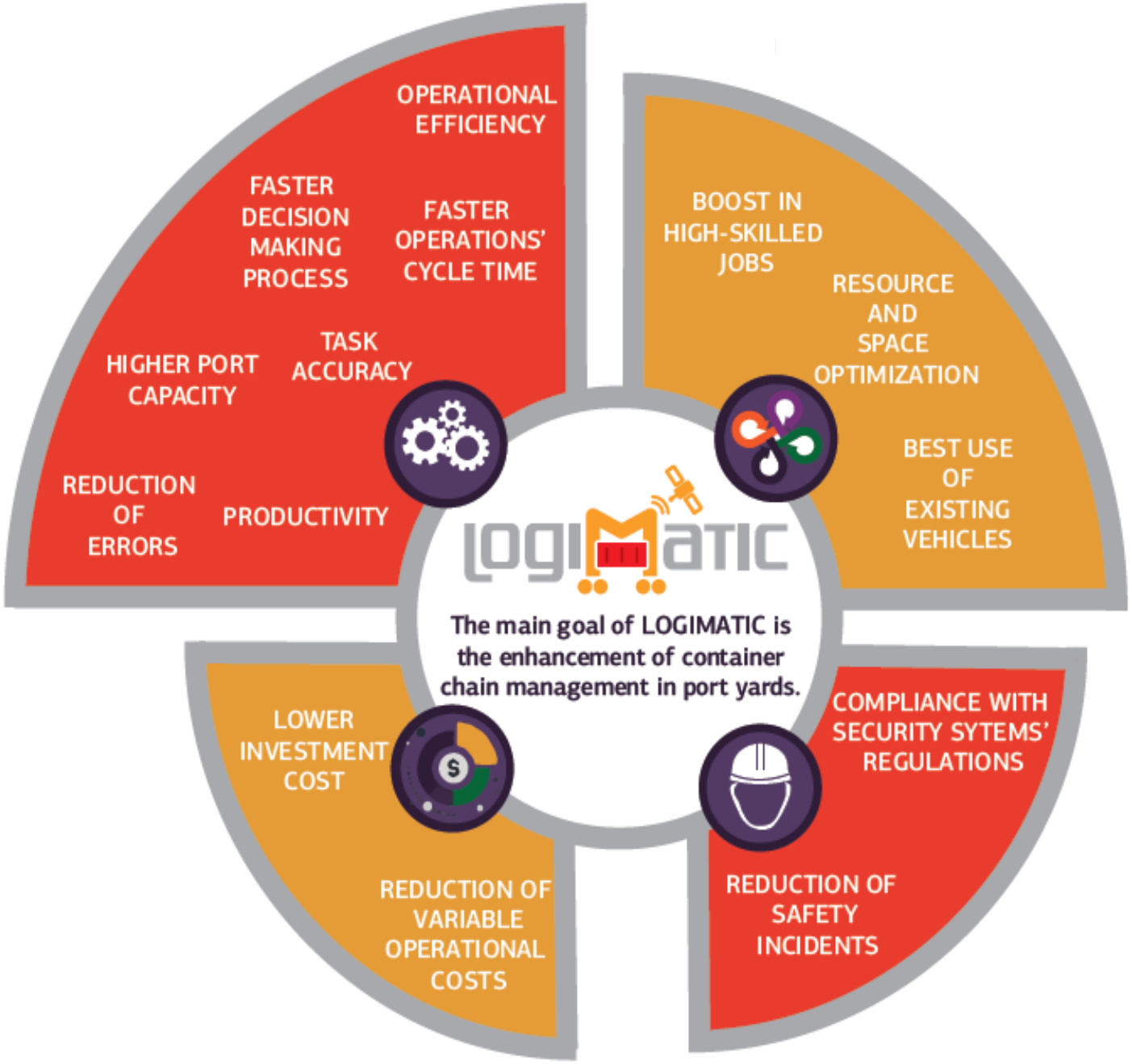
Straddle Carrier's Life Cycle



Targeted Users



Why to choose LOGIMATIC?



Competitive Advantages

- Job Assignment to the most appropriate Straddle Carrier for each job aiming to the minimization of the operational cost
- Selection of the "smartest" route for each job assignment
- Avoidance of possible collisions between the SCs due to the ability of route redesign
- A Terminal Operating System (TOS) customized to each terminal's needs
- Conversion and maintenance of the equipment at lower cost than alternatives
- License provision

The Team

The Team

Georgia Aifadopoulou
HIT's Deputy Director

Civil Engineering. Informatics, Transportation Planning Engineering . PhD in fleet routing and scheduling problems of transport fleets

Evangelos Mitsakis

Dipl. Civil-Transport EngineerPhD in Transport Engineering-

Maria Morfoulaki

Civil-Transport Engineer
PhD in Civil Engineering

Josep Maria Salanova Grau
Engineering-Managment

Civil Engineer
Msc in Transport Engineering
PhD Transportation / Mobility Management
Specialization in Data Science

Panagiotis Tzenos
Computer Science-IT

Computer Programmer
Msc in Communications Systems and Technologies

Michael Vassilantonakis

BEng Control & Computer Systems Engineer
MSc Computer Systems & Networks

HIT’s Director

HIT's Deputy Director

The Team

The Team

Senior Researcher

IT and application development supervisor

Josep Maria Salanova Grau

Civil Engineer, PhD Transportation/Mobility Management, Project management

Panagiotis Tzenos

Computer Programmer, Msc in Communications Systems and Technologies

Georgios Tsaples

Electrical and Computer Engineering, Msc in Engineering and Policy Analysis, Operational Research

Maria Konstantinidou

Urban Planner, Msc in Environmental Planning, MSc Amenagement, Urbanisme et Transports, Master in Business Administration (MBA)

Neofitos Boufidis

Maths, MSc Web Science, MSc Data Science

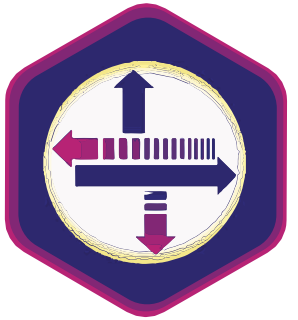
Thanasis Tolikas

Software Developer, MSc in Internet and World Wide Web

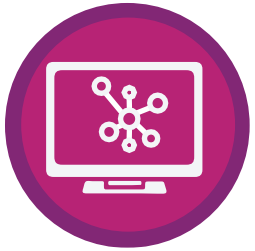
Skills and Expertise

Algorithms development (fleet management, user clustering and vehicle routing)

Mobility modelling and systems simulation



Data analytics and visualization
Business Intelligence
Knowledge extraction



System development, implementation and testing

Impact assessment and qualitative interpretation

Research Interests

- Data-driven analytics and knowledge extraction
- Mobility and activity patterns identification
- System optimization
- Added value services and monetization of data
- Multi source data analytics and visualization
- Mobility modelling and innovative mobility schemes

Thank you for your attention!

www.mobithess.gr/

www.thessmd.imet.gr/

www.trafficthess.imet.gr
www.trafficpaths.imet.gr
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Open Day IMET (11/11/2018)