BALKAN FORUM
THESSALONIKI
05 October 2022

"Digital transformation, networking, collaborations and convergences in the Balkans"
5 Octoberber 2022,
Thessaloniki, Greece

CiViTAS
Cleaner and better transport in cities

2020 CiViTAS PORTIS

Decision Support System for Sustainable Mobility in Urban Agglomerations

Prof. Eden MAMUT

"Ovidius" University of Constanta

THE CIVITAS INITIATIVE
IS CO-FINANCED BY THE
EUROPEAN UNION

Specific Objectives

- **Improving the governance by enhanced cooperation between the Municipality and the Port administration in order to plan and implement innovative mobility solutions and of integrated structures of spatial planning**

- **Creating a more sustainable and healthier city-port environment**

- **Development of a transport infrastructure and of an integrated mobility system to attract residents and to support the diversification of the local economy**

- **Improving the efficiency of the urban freight transport in the cities in relation with the port**

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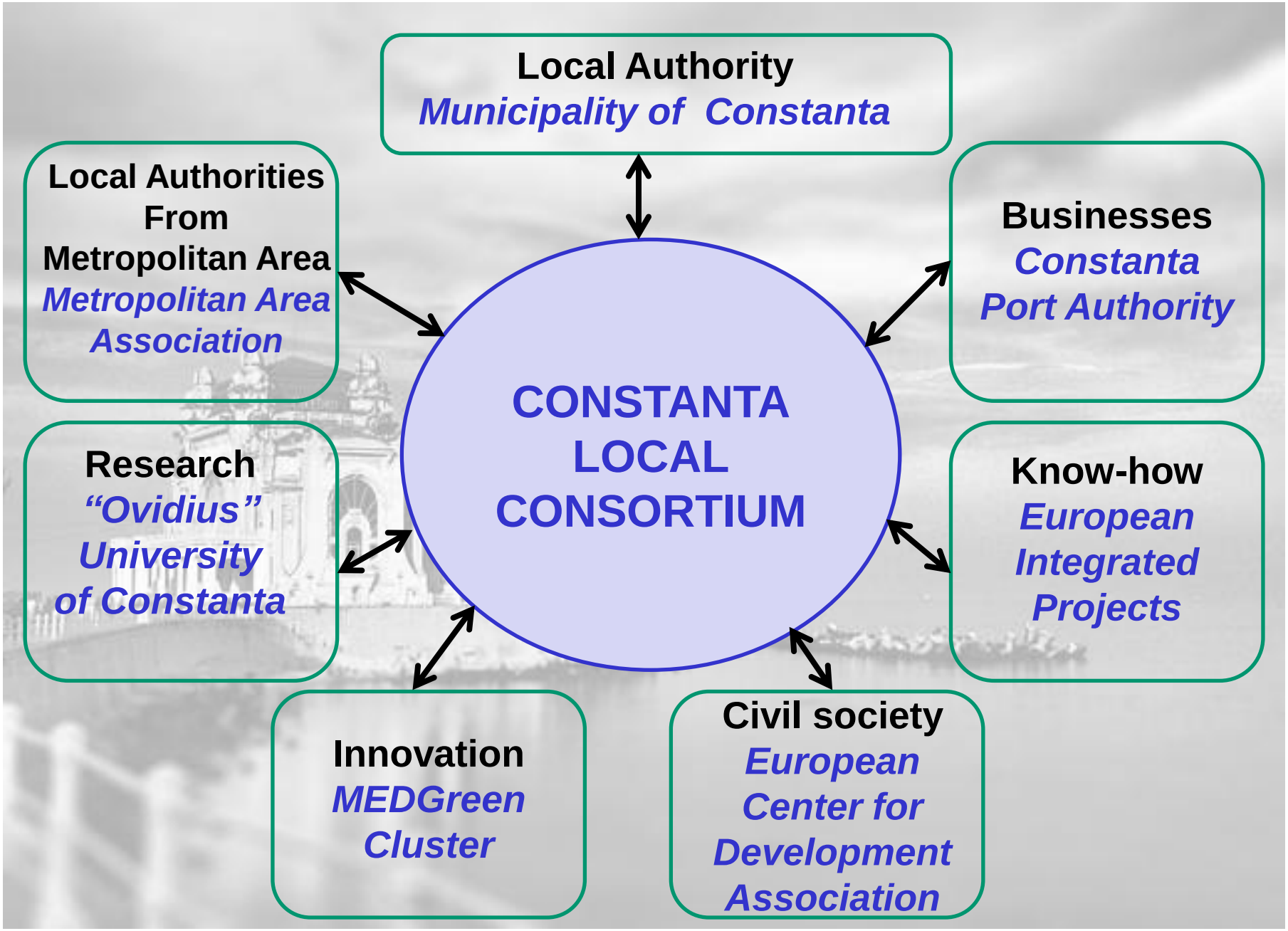
Local Authority
Municipality of Constanta
Local Authorities From Metropolitan Area
Metropolitan Area Association
Businesses
Constanta Port Authority
CONSTANTA LOCAL CONSORTIUM
Research
"Ovidius" University of Constanta
Know-how
European Integrated Projects
Innovation
MEDGreen Cluster
Civil society
European Center for Development Association

Specific measures for Constanta

- **New models of mobility governance for port cities:**
  - 1CTA1 – Demonstration of SUMP strategies to strengthen the core to growth pole accessibility for economic and social cohesion
  - 1CTA2 – Establishing decision-support forum
- **Life styles based on new types of mobility to port cities:**
  - 2CTA1 – Allocating road space for walking and cycling
  - 2CTA2 – Reducing car dependency for port workers
  - 2CTA3 – Raising awareness
  - 2CTA4 – Implementing virtual e-mobility

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Specific measures for Constanta

- **Efficient and sustainable mobility for port cities:**
  - 3CTA1 – Transferring real-time information
  - 3CTA2 – Improving seamless mobility through TEN network nodes
  - 3CTA3 – Charging e-busses with alternative energy
  - 3CTA4 – Enforcing parking strategy
- **insuring a harmonized and effective model for goods transport:**
  - 4CTA1 – Mapping freight traffic flows and designing a distribution plan

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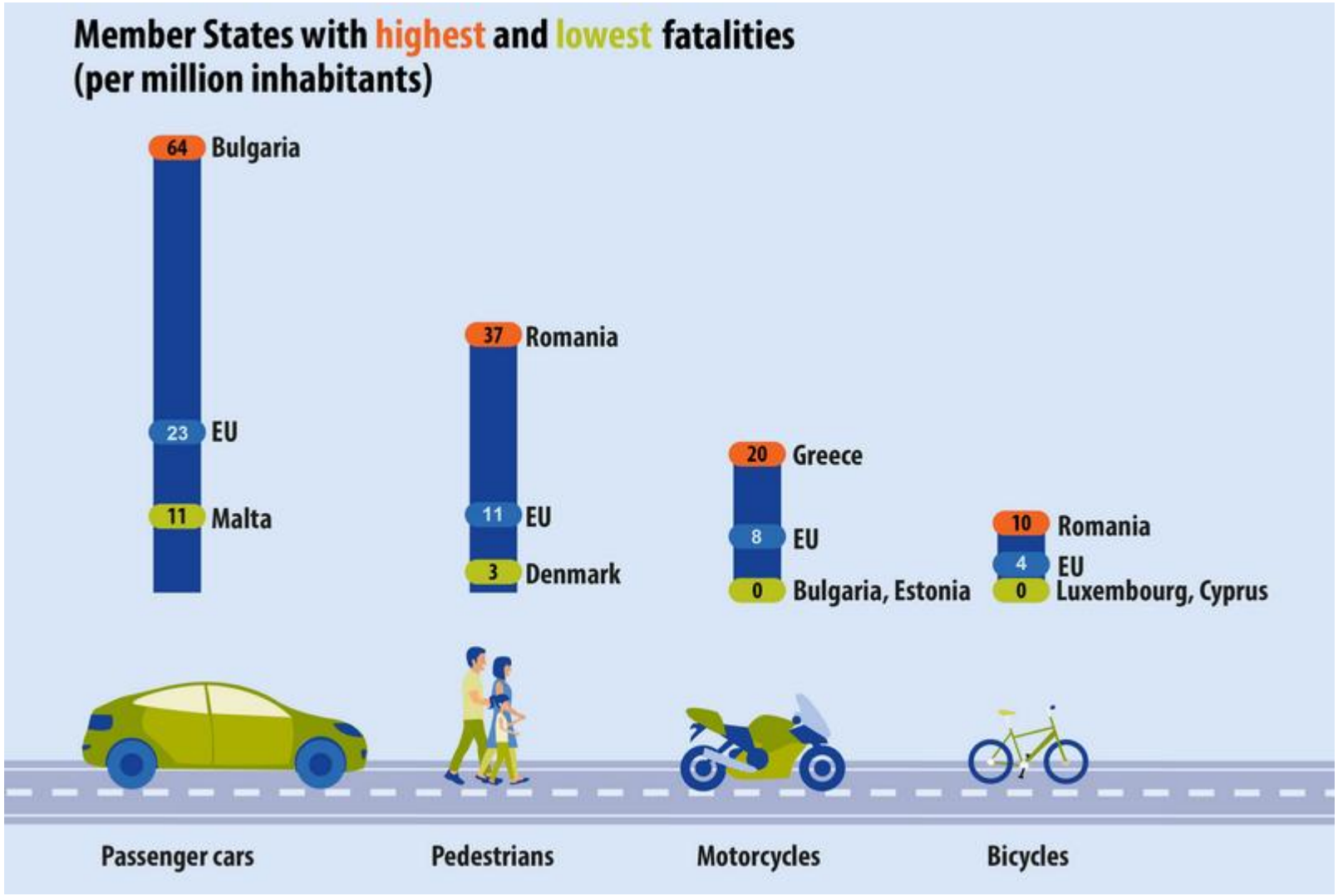
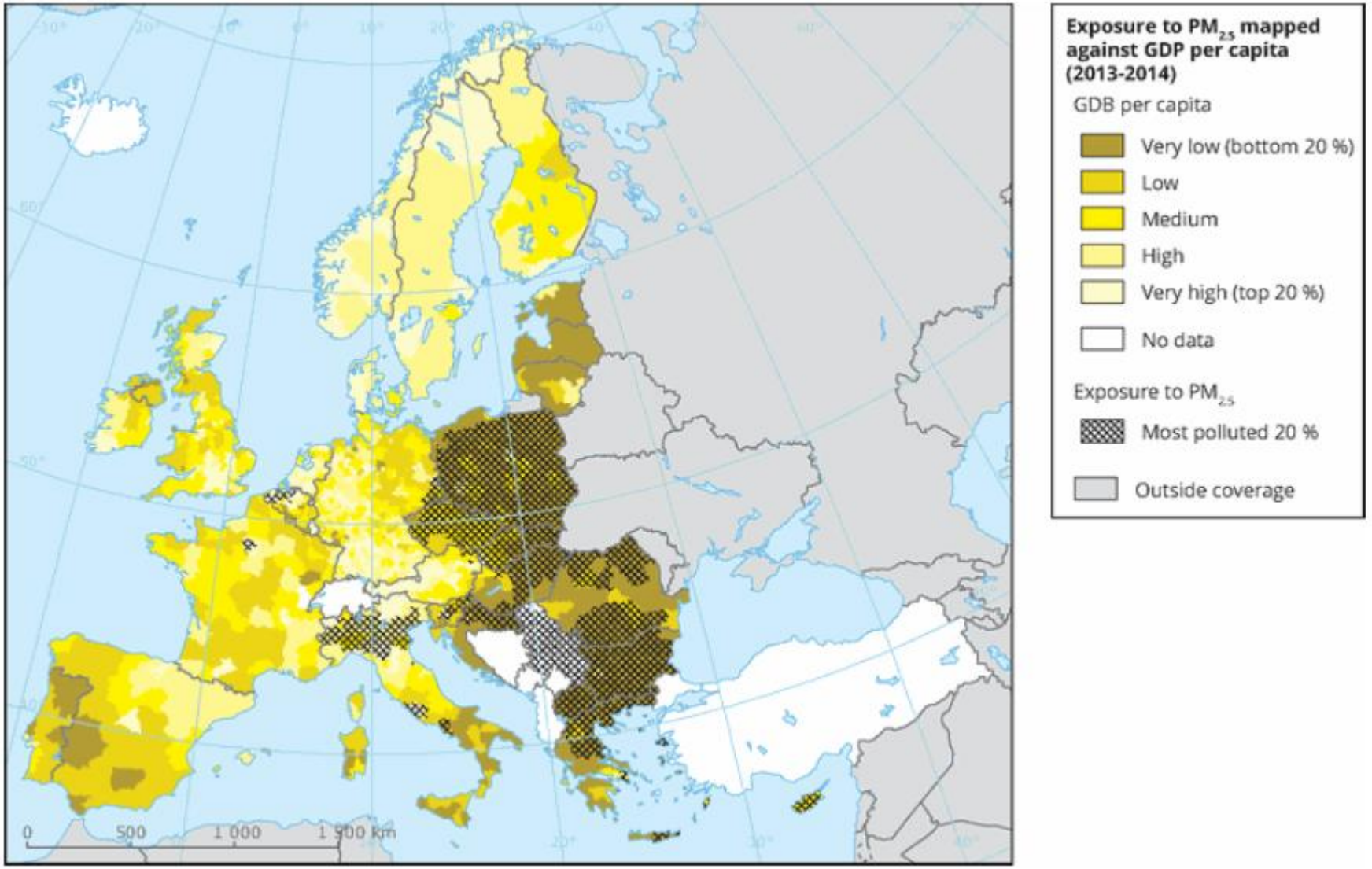
THE CONTEXT


Member States with highest and lowest fatalities
(per million inhabitants)
64 Bulgaria
23 EU
11 Malta
37 Romania
11 EU
3 Denmark
20 Greece
8 EU
0 Bulgaria, Estonia
10 Romania
4 EU
0 Luxembourg, Cyprus
Passenger cars
Pedestrians
Motorcycles
Bicycles

THE CONTEXT


Exposure to $PM_{2.5}$ mapped against GDP per capita (2013-2014)
GDB per capita
Very low (bottom 20 %)
Low
Medium
High
Very high (top 20 %)
No data
Exposure to $PM_{2.5}$
Most polluted 20 %
Outside coverage
0
500
1 000
1 500 km

THE CONTEXT

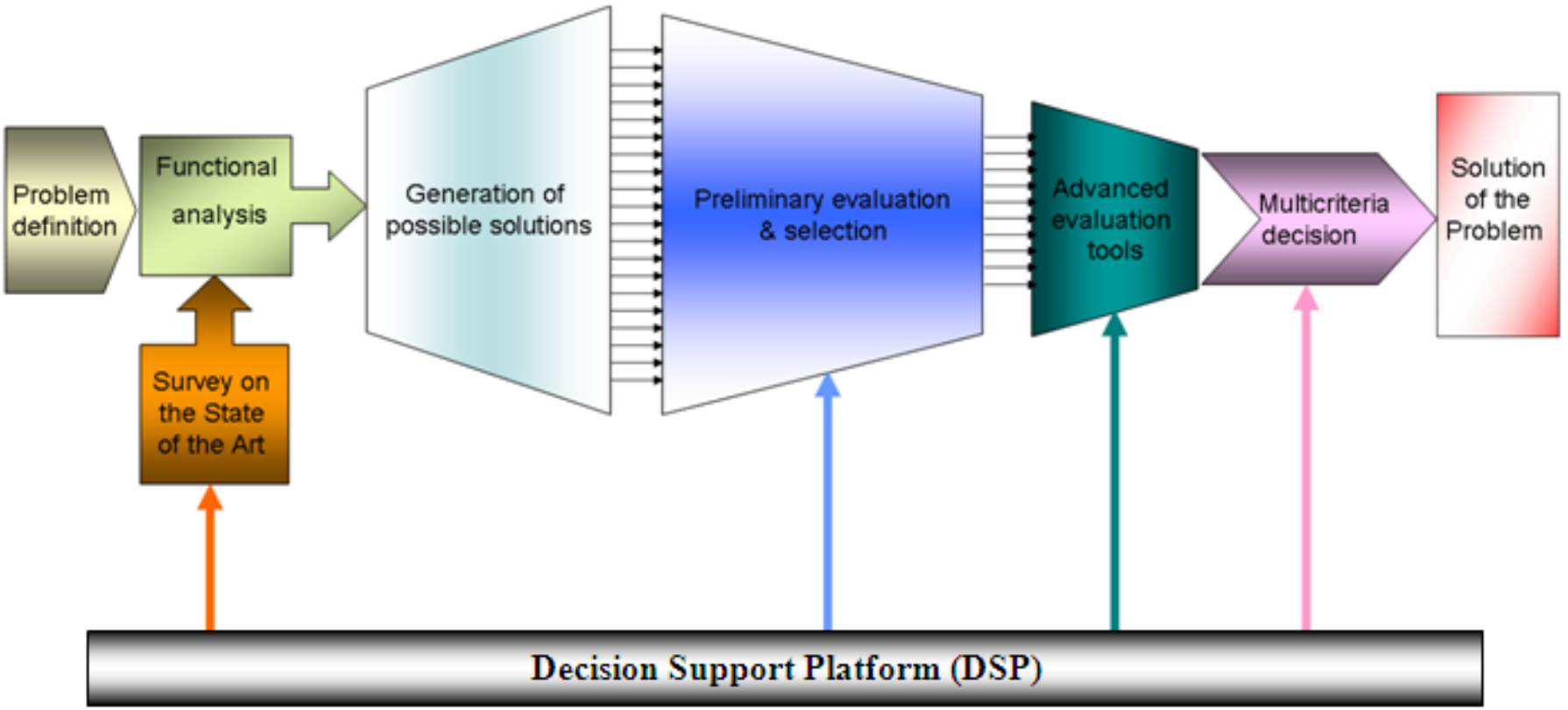
Rezidenţii şi afaceriştii din zona peninsulară au dezbătut problemele ce vor face obiectul unei petiţii pe care o vor înainta spre rezolvare autorităţilor locale

04 Sep, 2019 00:00 Lavinia SICLITARU 463 Mărire text

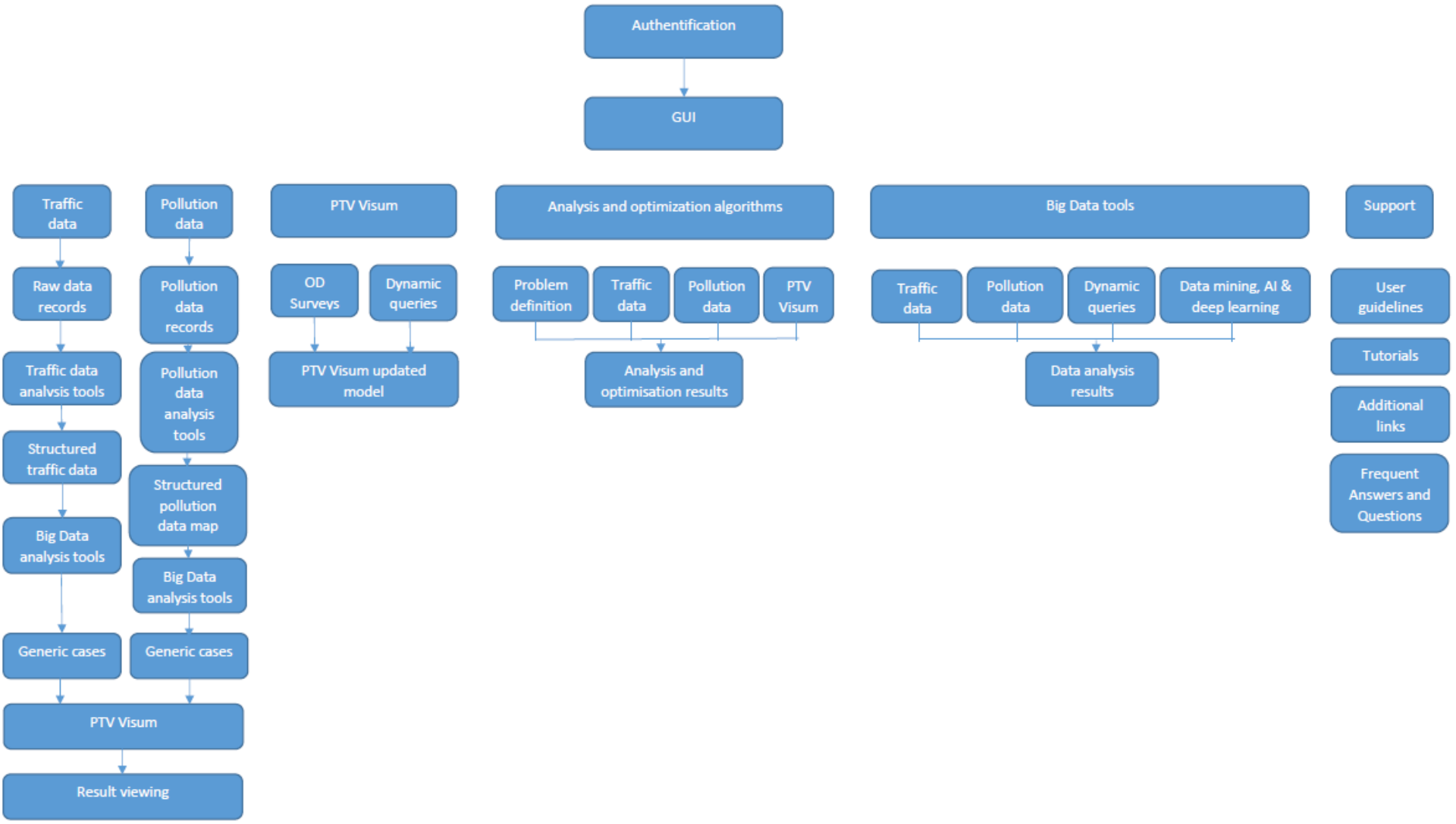
ARTICOL COMPLET GALERIE FOTO (1) VERSIUNE PRINTABILA

Peste 30 de persoane, rezidenţi în zona peninsulară a municipiului Constanţa, şi-au dat întâlnire luna trecută. La discuţii fusese invitat să participe şi arhitectul-şef al Constanţei, Radu Vânturache, dar acesta nu a mai ajuns.

DECISION SUPPORT SYSTEMS FOR INNOVATION



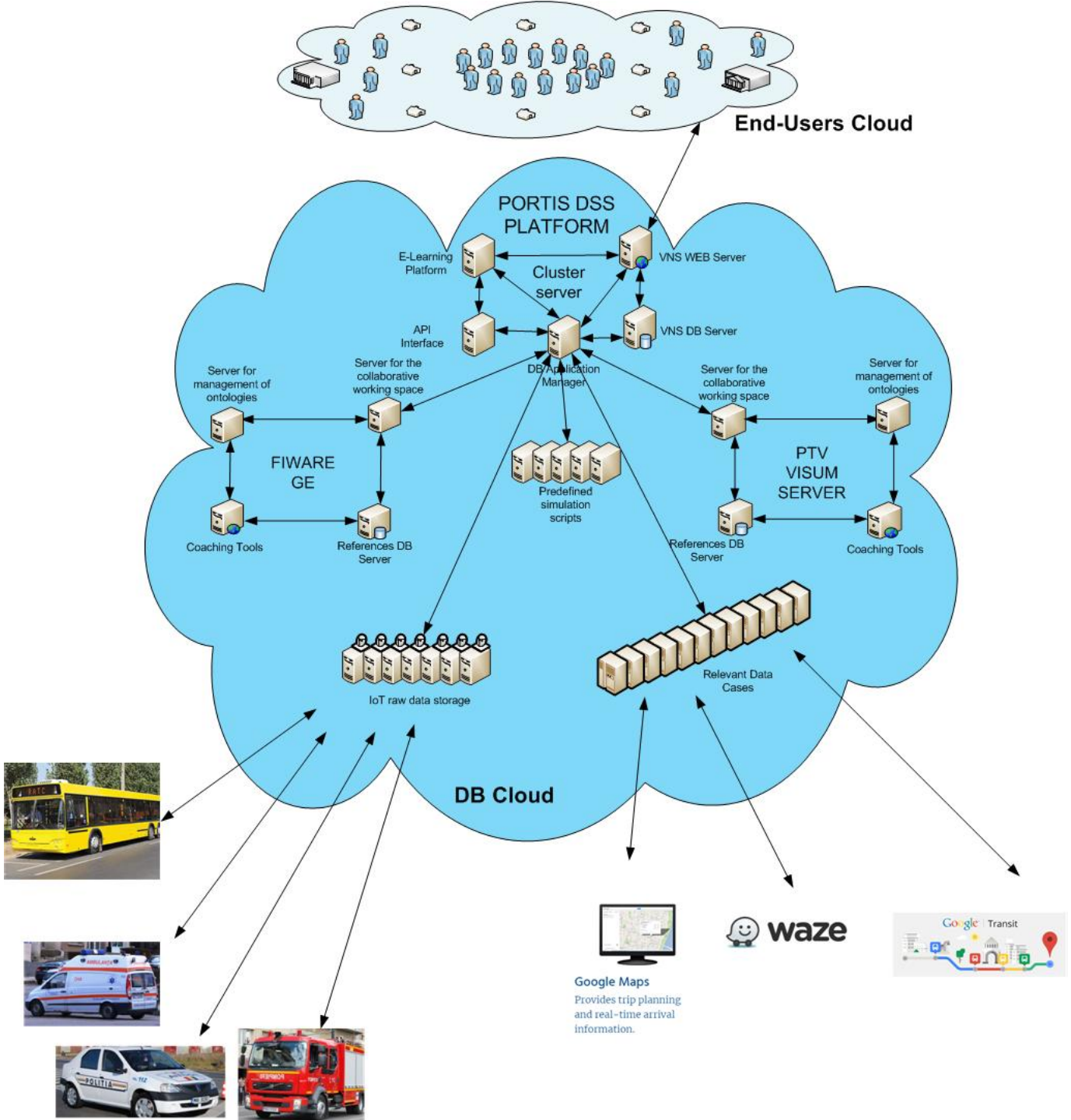
Architecture of the Decision Support System



PLATFORM FUNCTIONALITY

- Traffic Data Analyses
- Pollution Data Analyses
- Modeling, Simulation & Optimization
- Decision support
- Scenario building
- Simulation of alternative cases
- Sensitivity analysis
- Trip planning, step-by-step directions and schedules
- Bus estimated time of arrival to bus stops, estimated time of arrival to destination, live bus locations and stops
- Complete bus line information
- Points of interest, display Points of Interest that can be visited with the public transport in a given time
- Feedback inputs
- EVALUATION !!!!

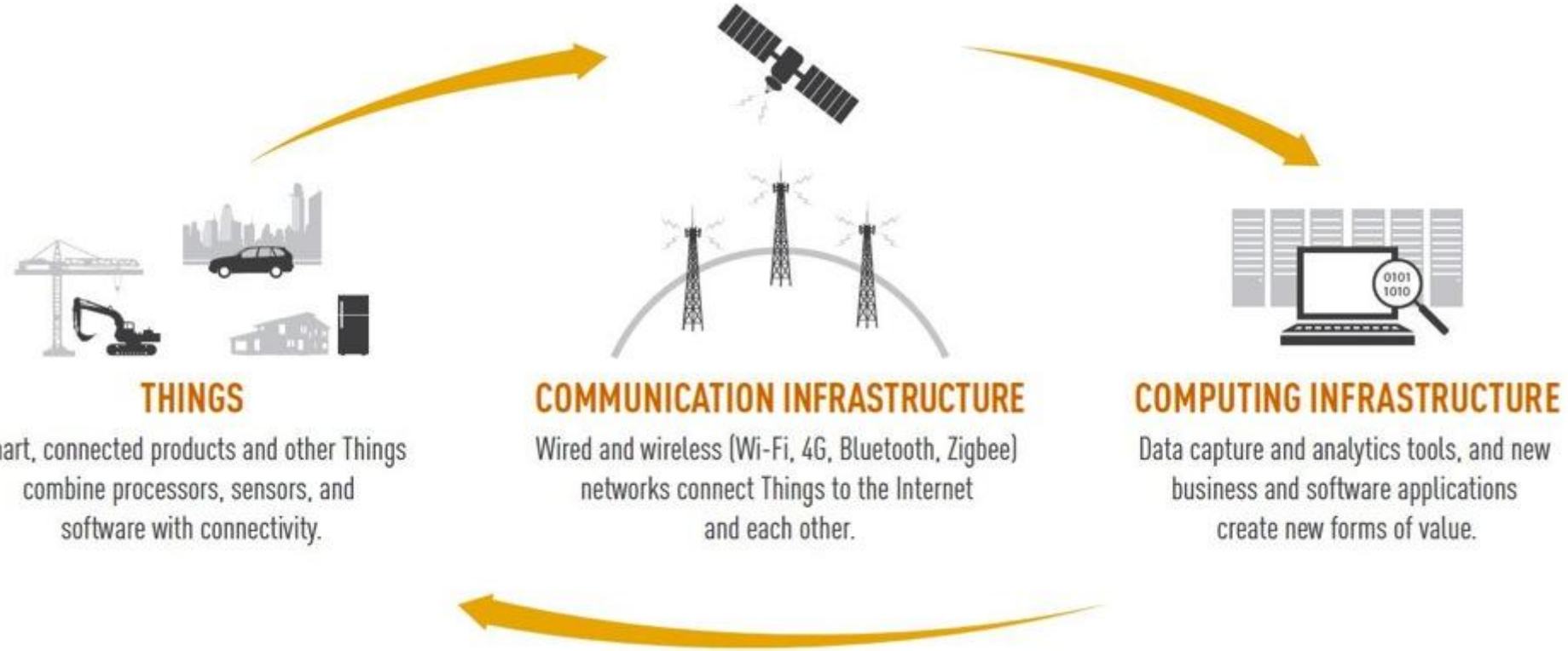
CONCEPT


End-Users Cloud
PORTIS DSS PLATFORM
E-Learning Platform
VNS WEB Server
Cluster server
API Interface
VNS DB Server
DB Application Manager
Server for management of ontologies
Server for the collaborative working space
Server for the collaborative working space
Server for management of ontologies
FIWARE GE
PTV VISUM SERVER
Predefined simulation scripts
Coaching Tools
References DB Server
References DB Server
Coaching Tools
IoT raw data storage
Relevant Data Cases
DB Cloud
Google Maps
Provides trip planning and real-time arrival information.
waze
Google Transit

INTEGRATING PLATFORMS

Internet of Things - IoT

Smart, connected objects, products, systems and other Things connected through Internet-like communication infrastructure to a computing infrastructure that are changing the world.



Internet of Things - IoT

Dynamic Applications

Rapid Application Dev. Platform

MASHUP BUILDER | SQUEAL | 3RD PARTY TOOLS

REST APIs

SYSTEM SERVICE INTEGRATION

BUSINESS LOGIC
Properties/Services/Events

3D STORAGE ENGINE

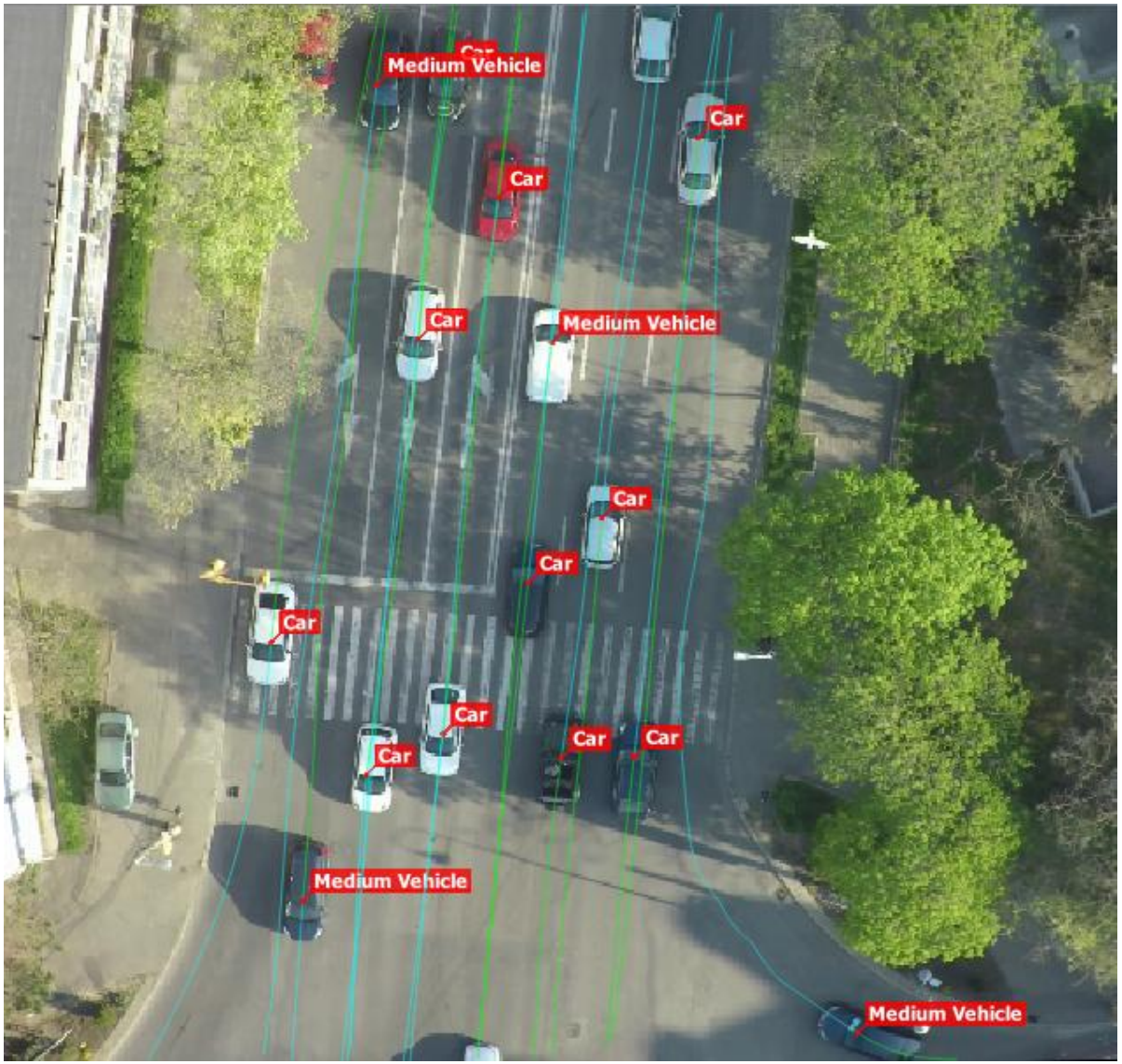
COMMUNICATIONS AlwaysOn™, REST, API, MQTT, Sockets, etc.

The Network

Sensors, Devices & Equip.

DIGITAL ROBOTS

TRAFFIC DATA CAPTURING



POLLUTION DATA CAPTURING

TOMYbot

TOMYbot – robot digital pentru asistență, evaluare și suport de decizie pentru implementarea măsurilor de mobilitate durabilă în orașe porturi

TOMYbot

MENIU
SISTEM SUPORT DE DECIZIE PENTRU SOLUTII DE MOBILITATE DURABILA
Bună, Eu sunt Tomy!
Asistentul tău de mobilitate în municipiul Constanța.
AFLATI MAI MULTE

TOMYbot

PORT-CITIES: INTEGRATING SUSTAINABILITY-PORTIS

Proiectul CIVITAS PORTIS are ca principal scop proiectarea, demonstrarea si evaluarea unor seturi de masuri integrate pentru mobilitate inovativa si sustenabila care adreseaza problemele oraselor port din Europa. Aceste solutii sunt demonstrate in 5 orase port din Europa localizate la Marea Nordului (Aberdeen si Antwerp), Marea Mediterana (Trieste), Marea Neagra (Constanta) si Marea Baltica (Klapeida). Toate aceste porturi sunt implicate direct sau indirect in ESPO, un suporter oficial al CIVITAS PORTIS. In proiect este implicat si un oras port din Marea Chinei de Est (Ningbo).

TOMYbot

Tomybot *site in constructie*

Home | Links | Despre | Chestionare | SSD | Contact | Suport

Sugestii de mobilitate în Constanța

Punct de plecare

Destinatie

Dă-mi indicații

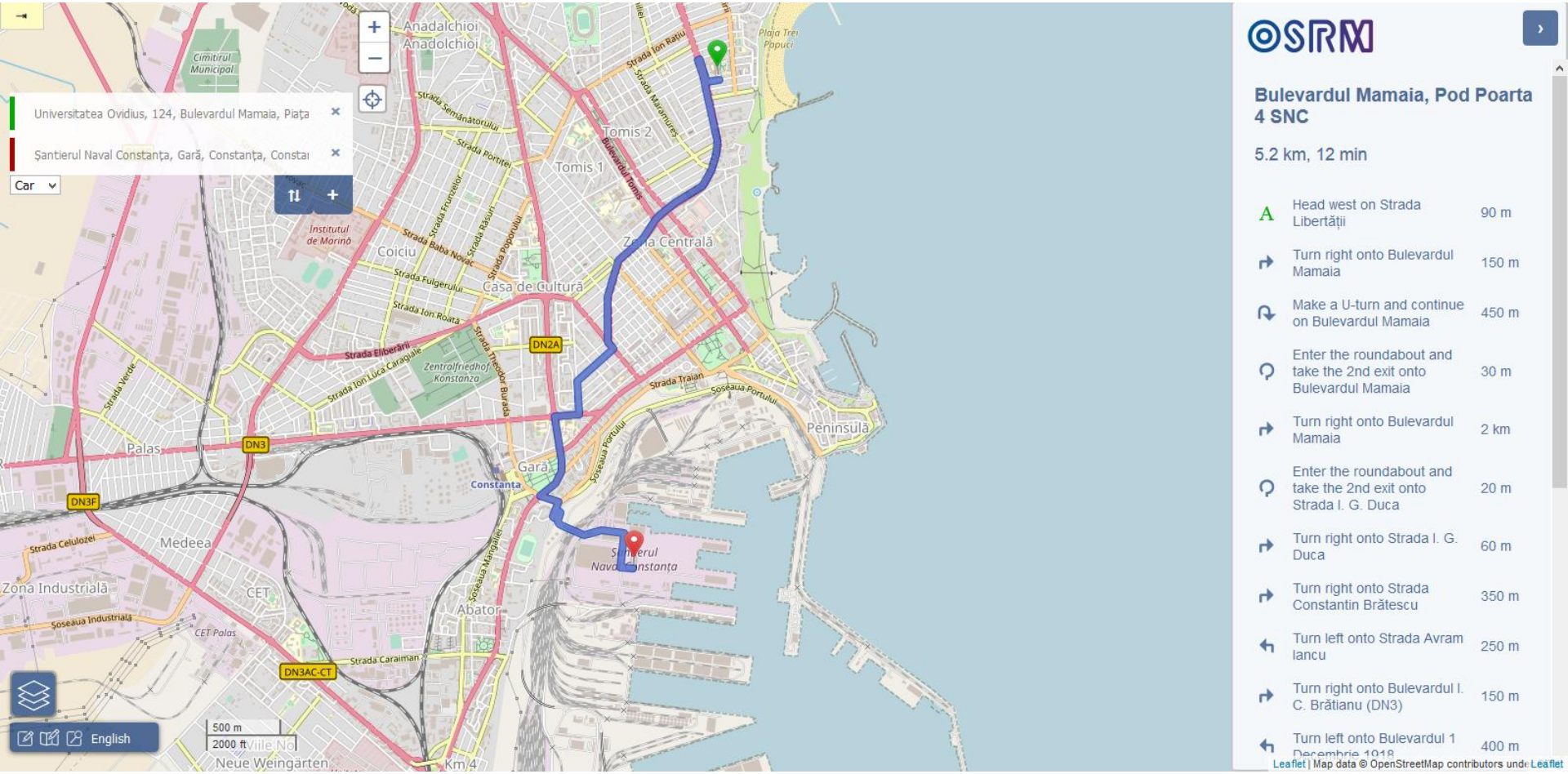
Platforme de mobilitate durabilă

Acces la biciclete în Constanța

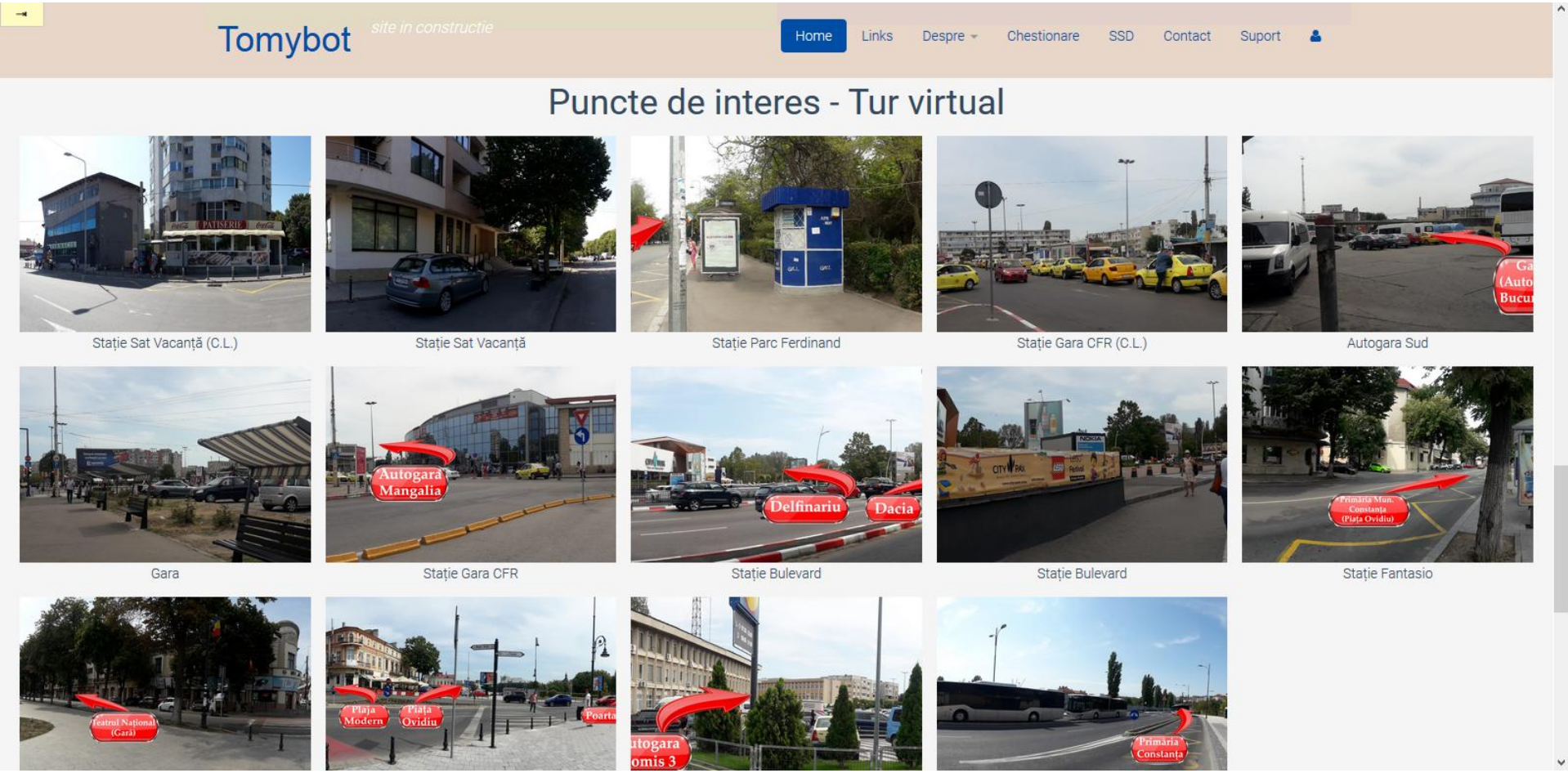
Acces la transportul public

Planificare rute CTBUS

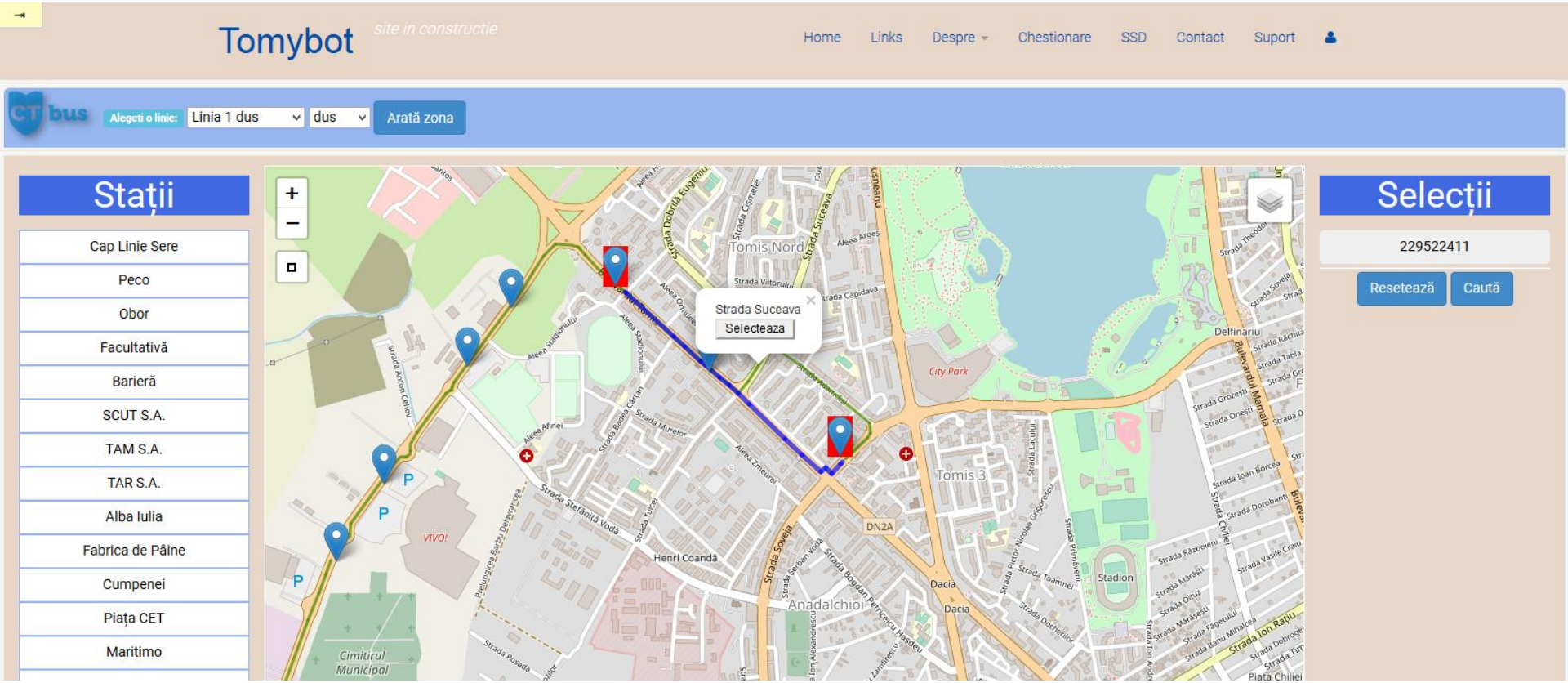
TOMYbot


Universitatea Ovidius, 124, Bulevardul Mamaia, Piața
Șantierul Naval Constanța, Gară, Constanța, Constar
Car
Bulevardul Mamaia, Pod Poarta 4 SNC
5.2 km, 12 min
A Head west on Strada Libertății 90 m
Turn right onto Bulevardul Mamaia 150 m
Make a U-turn and continue on Bulevardul Mamaia 450 m
Enter the roundabout and take the 2nd exit onto Bulevardul Mamaia 30 m
Turn right onto Bulevardul Mamaia 2 km
Enter the roundabout and take the 2nd exit onto Strada I. G. Duca 20 m
Turn right onto Strada I. G. Duca 60 m
Turn right onto Strada Constantin Brătescu 350 m
Turn left onto Strada Avram Iancu 250 m
Turn right onto Bulevardul I. C. Brătianu (DN3) 150 m
Turn left onto Bulevardul 1 Decembrie 1918 400 m
Anadalchioi
Tomis 2
Tomis 1
Zona Centrală
Coiciu
Casa de Cultură
Peninsulă
Gară
Constanța
Palas
Medeea
Zona Industrială
CET
Abator
DN2A
DN3
DN3F
DN3AC-CT
English
500 m
2000 ft
Leaflet | Map data © OpenStreetMap contributors

TOMYbot


Tomybot
site in constructie
Home
Links
Despre
Chestionare
SSD
Contact
Suport
Puncte de interes - Tur virtual
Stație Sat Vacanță (C.L.)
Stație Sat Vacanță
Stație Parc Ferdinand
Stație Gara CFR (C.L.)
Autogara Sud
Gara
Autogara Mangalia
Stație Gara CFR
Delfinariu
Dacia
Stație Bulevard
Stație Bulevard
Primăria Mun. Constanța (Piața Ovidiu)
Stație Fantasio
Teatrul Național (Gară)
Plaja Modern
Piața Ovidiu
Primăria Constanța

TOMYbot



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site in constructie
Home
Links
Despre
Chestionare
SSD
Contact
Suport
Alegeti o linie:
Linia 1 dus
dus
Arată zona
Stații
Cap Linie Sere
Peco
Obor
Facultativă
Barieră
SCUT S.A.
TAM S.A.
TAR S.A.
Alba Iulia
Fabrica de Pâine
Cumpenei
Piața CET
Maritimo
Strada Suceava
Selecteaza
Tomis Nord
City Park
Tomis 3
Stadion
Anadalchioi
Henri Coandă
Cimitirul Municipal
Selecții
229522411
Resetează
Caută

TOMYbot

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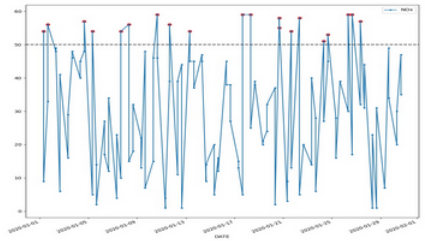
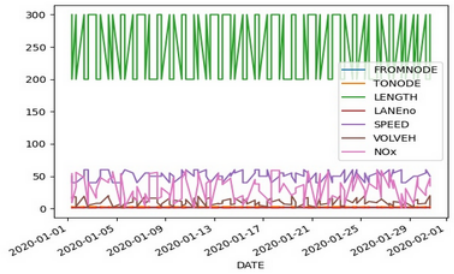
Home Links Despre Chestionare SSD Contact Suport

Raw data | PTV Visum | Analysis and optimization algorithms | Big Data tools | Generic cases | Result viewing

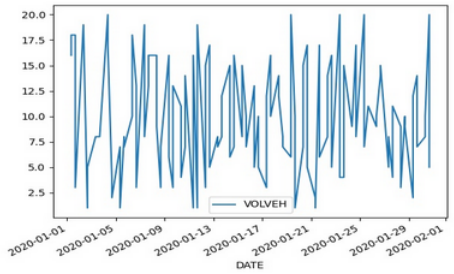
- Fiware Knowage
- Jupyter
- LCA Tool



Grafic NOx



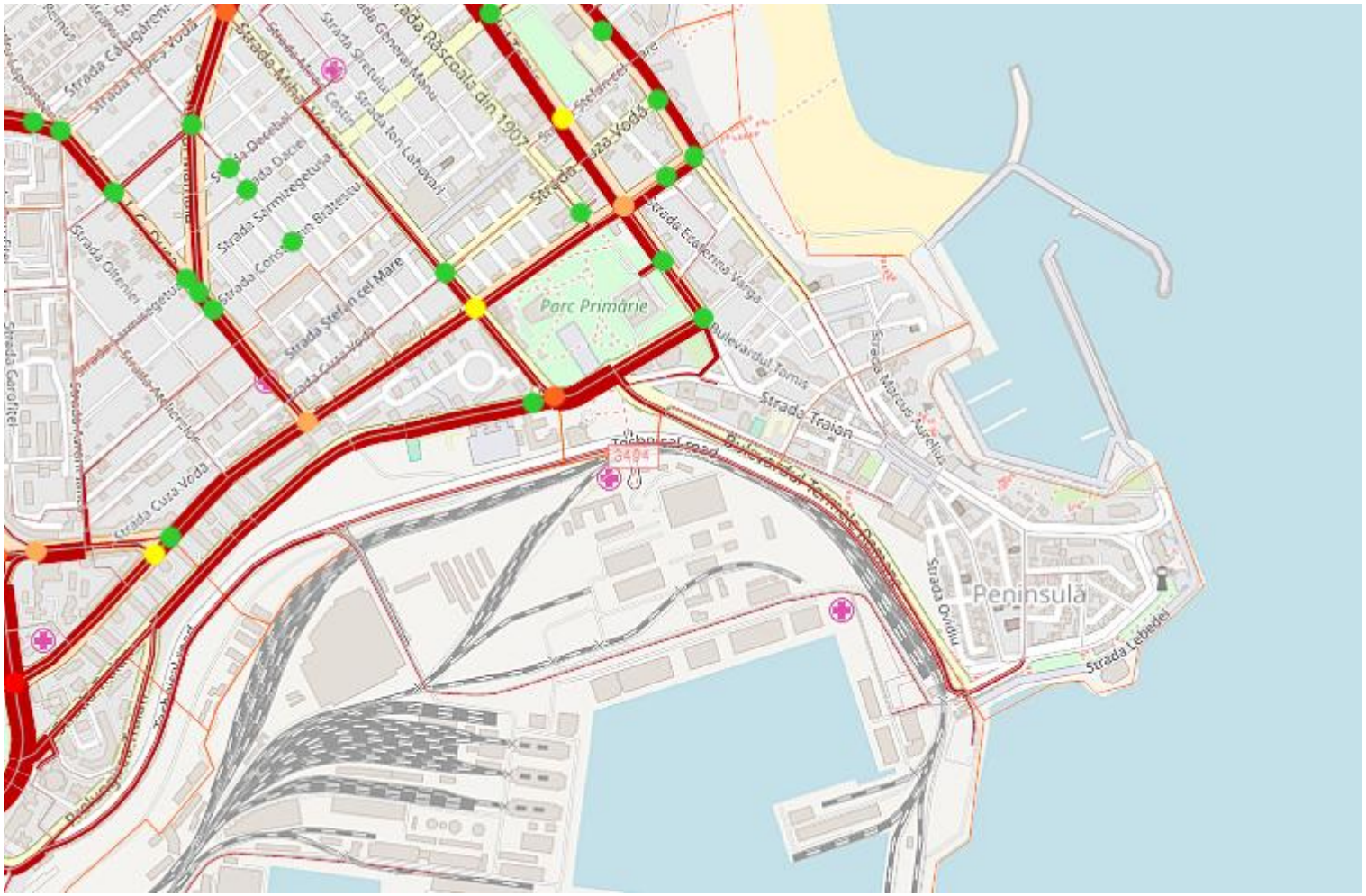
TSA



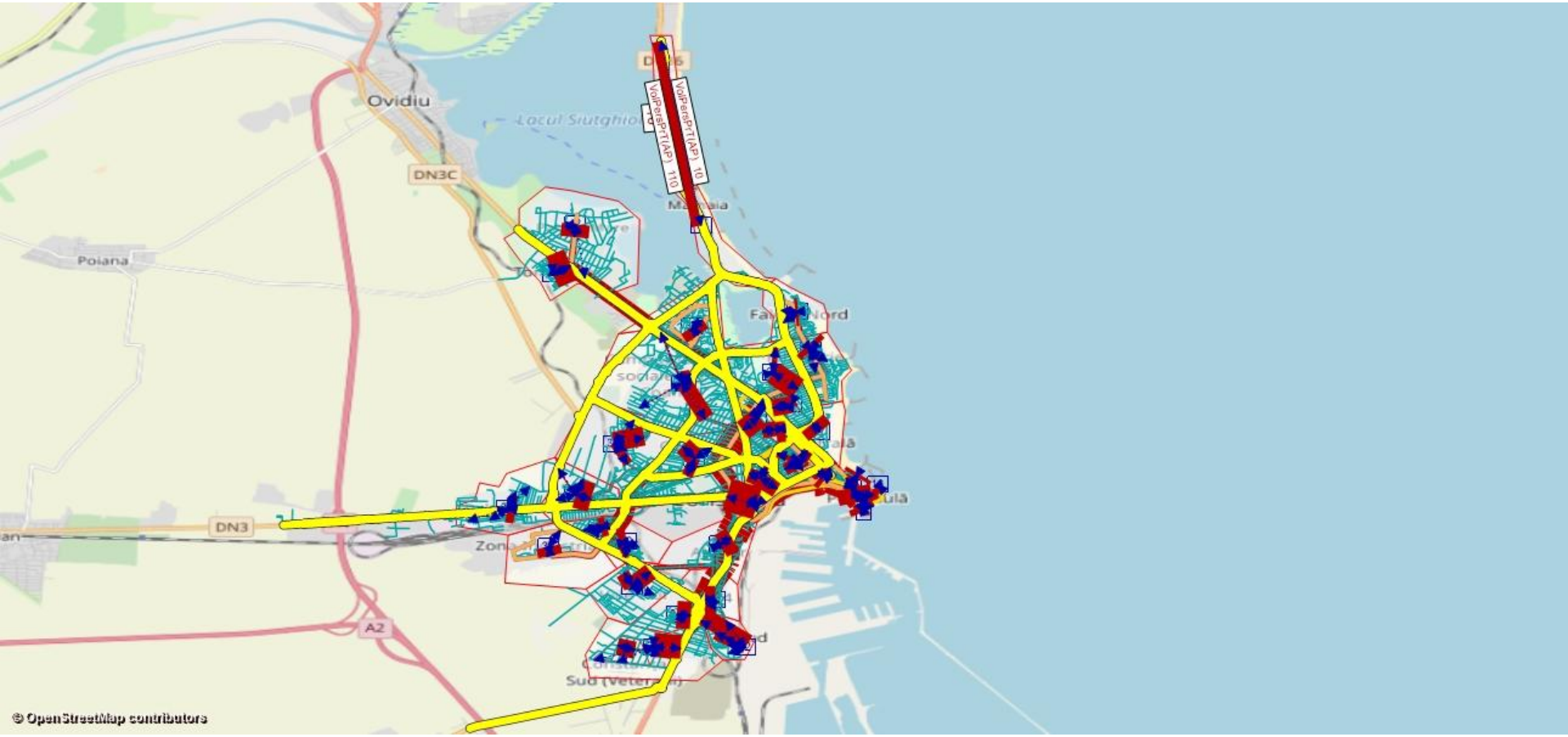
Predictie nr. vehicule

VISUM MODELING

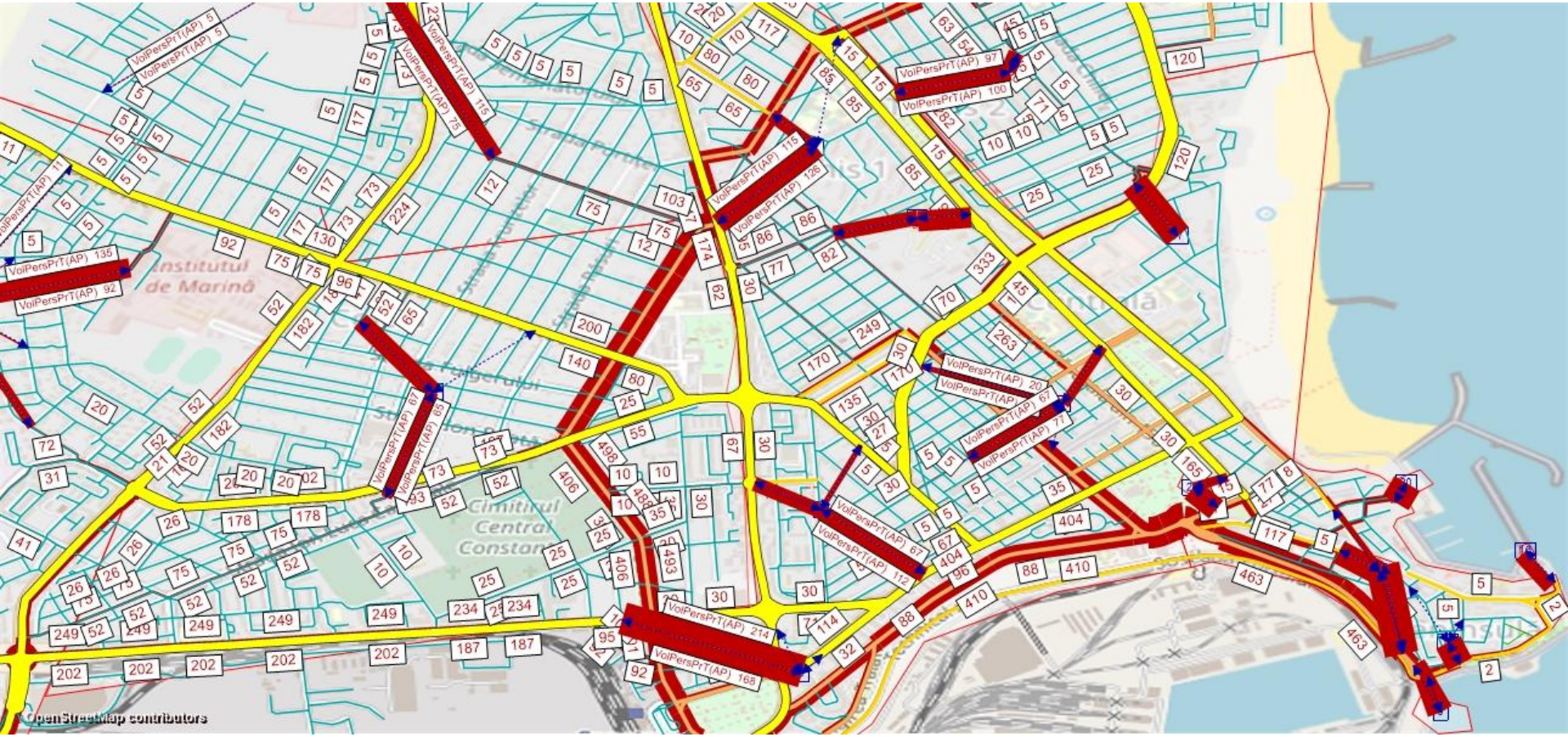
VISUM MODELING



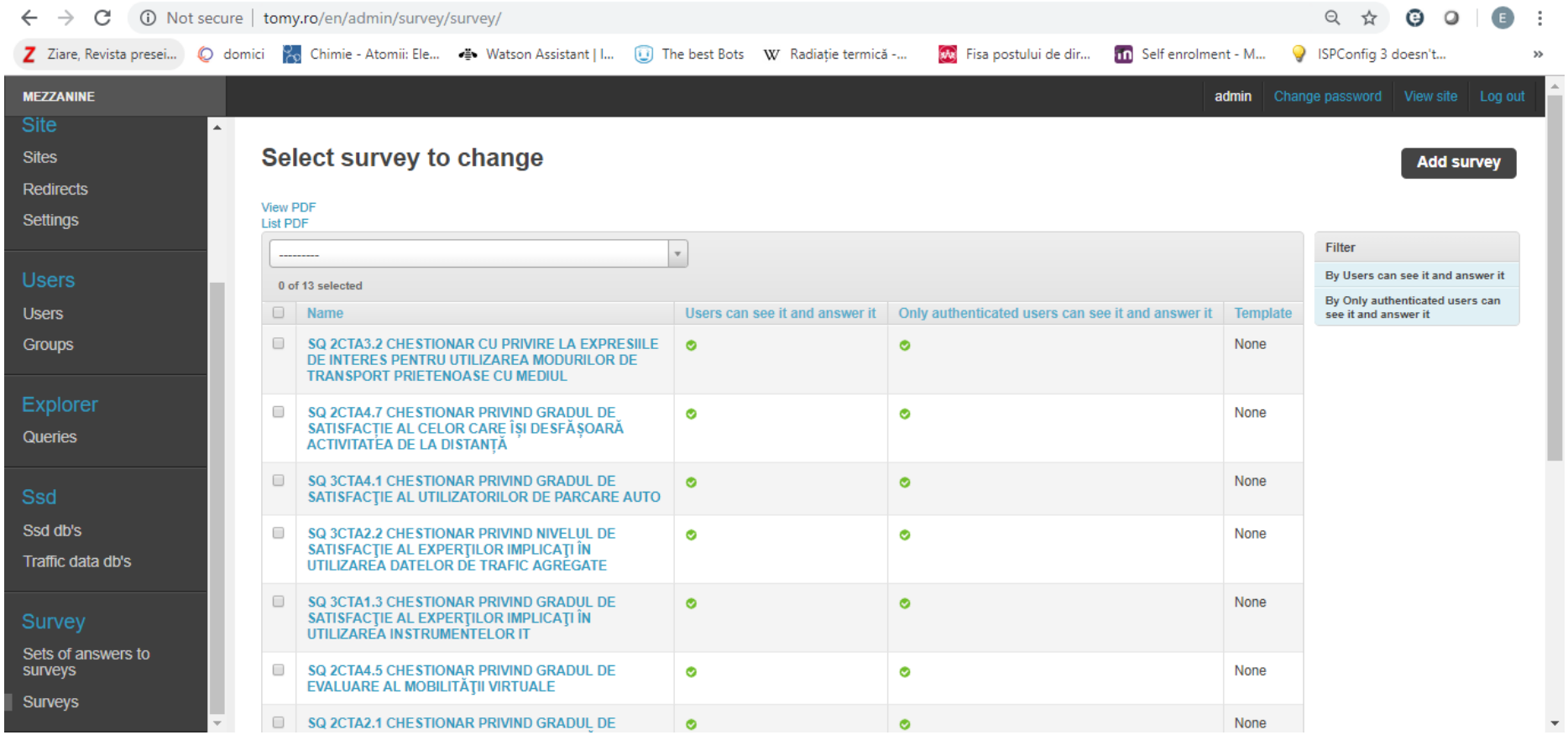
VISUM MODELING



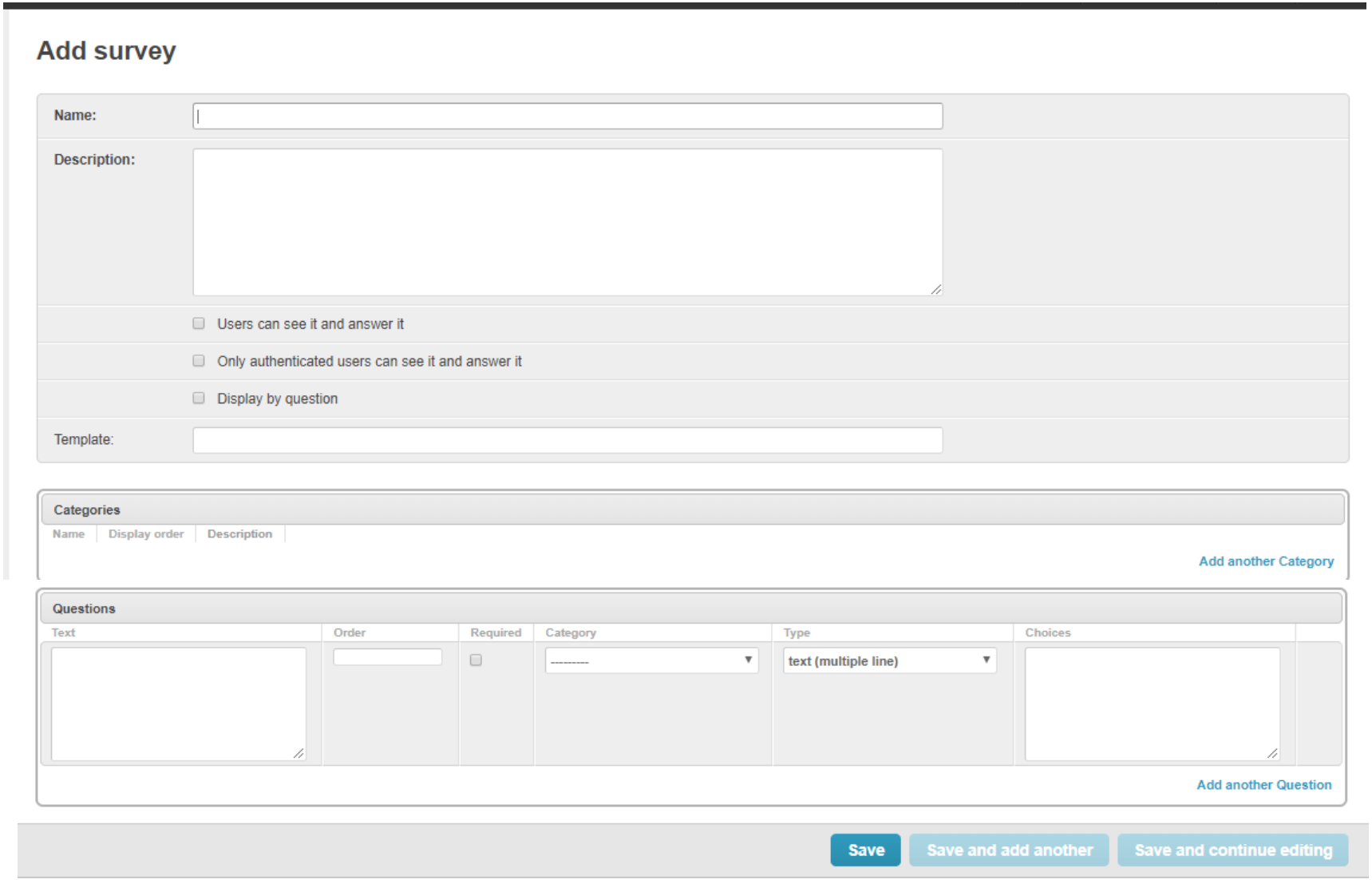
VISUM MODELING



Evaluation toolbox

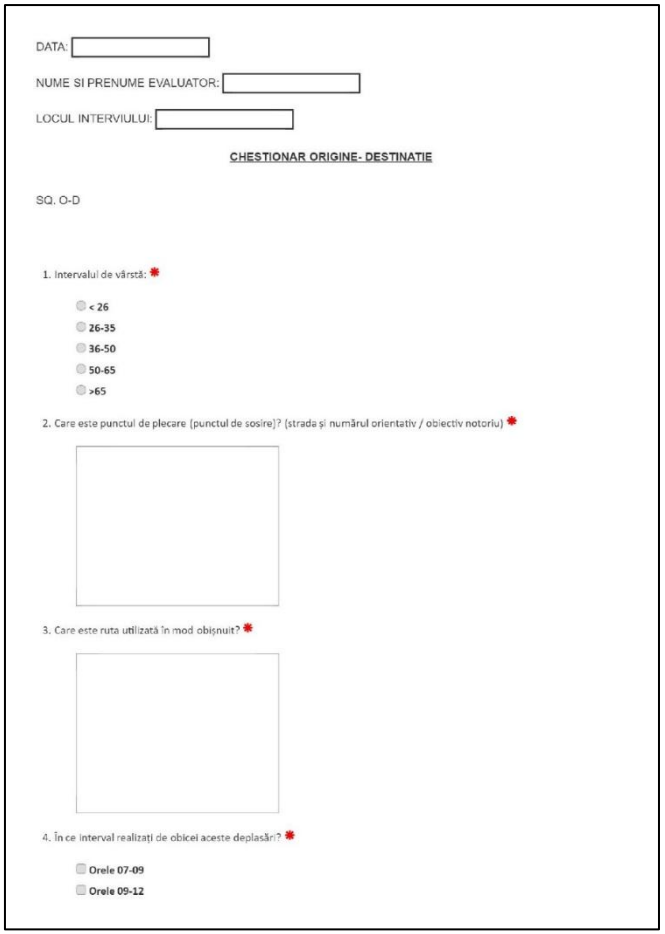


Evaluation toolbox



Evaluation toolbox

CODE DOC.	RELEASED	AUTHOR	DATE	AUTHORIZED	DATE
SQ. O-D	2019	RAMONA FLORENTINA ȘOVĂILĂ	16.05.2019	EDEN MAMUT	17.05.2019



DATA:

NUME SI PRENUME EVALUATOR:

LOCUL INTERVIULUI:

CHESTIONAR ORIGINE- DESTINATIE

SQ. O-D

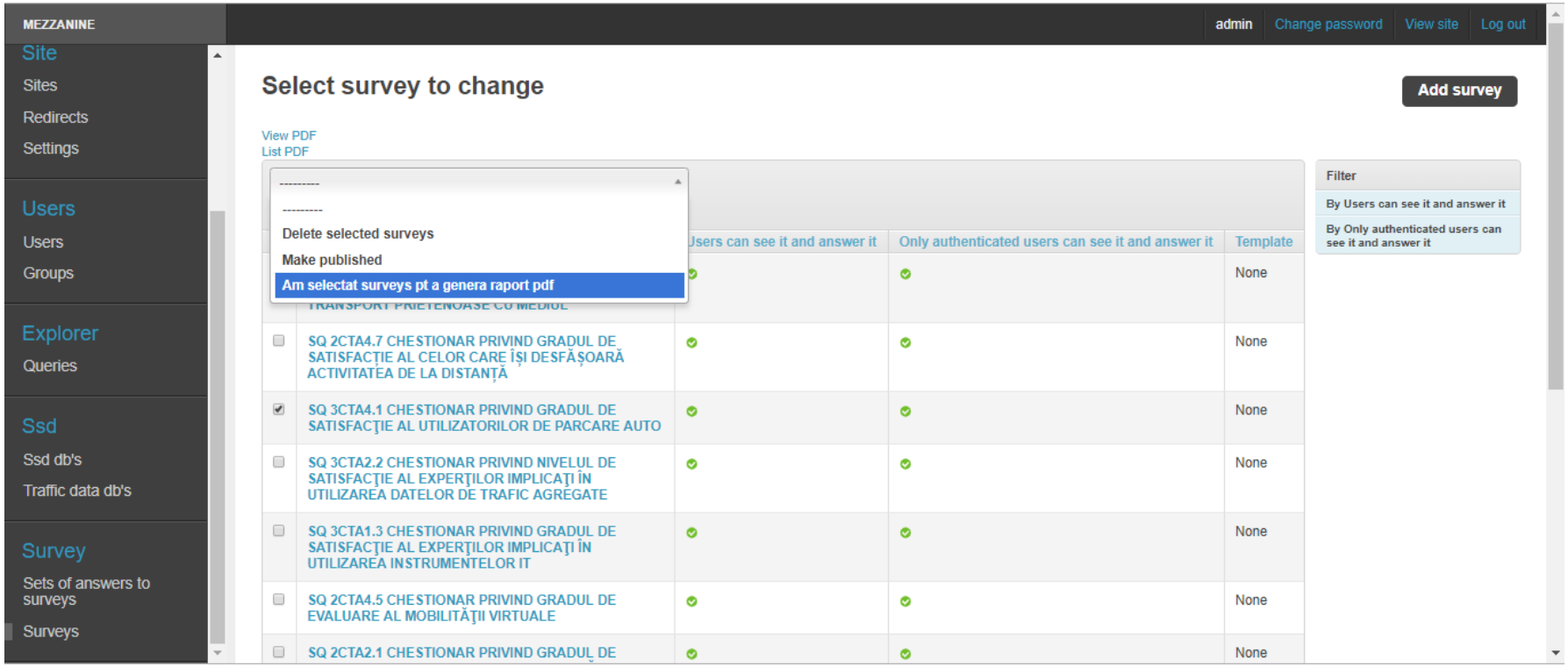
1. Intervalul de vârstă: *
   - < 26
   - 26-35
   - 36-50
   - 50-65
   - >65
2. Care este punctul de plecare (punctul de sosire)? (strada și numărul orientativ / obiectiv notoriu) *
3. Care este ruta utilizată în mod obișnuit? *
4. În ce interval realizați de obicei aceste deplasări? *
   - Orele 07-09
   - Orele 09-12

- Orele 12-16
- Orele 16-19
- Orele 19-22

5. Care este motivul deplasării? *
   - Serviciu / școală (zilnic)
   - Deplasări / vizite periodice (săptămânal)
   - Probleme casnice (lunar sau trimestrial)
   - Ocazionale
   - Altele

OK | Print to PDF

Evaluation toolbox



Evaluation toolbox

5 DATE DESPRE PERSOANA INTERVIEVATĂ - SEX:

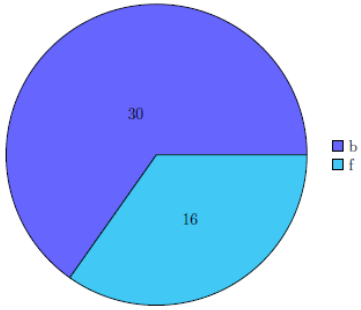


Figure 5: Repartition of answers for the question 'DATE DESPRE PERSOANA INTERVIEVATĂ - SEX:'.

6 DATE DESPRE PERSOANA INTERVIEVATĂ - GRUPA DE VARSTĂ:

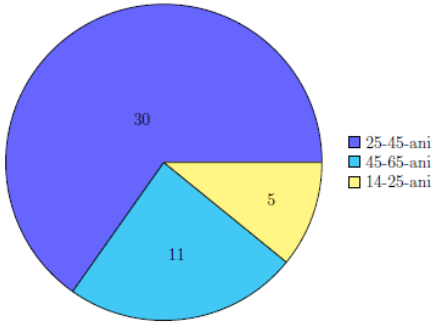


Figure 6: Repartition of answers for the question 'DATE DESPRE PERSOANA INTERVIEVATĂ - GRUPA DE VARSTĂ:'.

12 CUM AȚI NOTA DE LA 1 LA 5 DISPONIBILITATEA SPAȚIILOR DE PARCARE ÎN VECINĂTATEA ZONEI DE MUNCĂ?

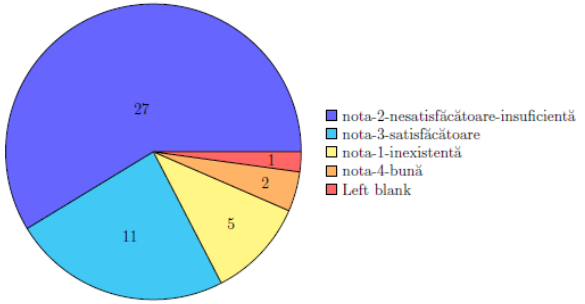


Figure 12: Repartition of answers for the question 'CUM AȚI NOTA DE LA 1 LA 5 DISPONIBILITATEA SPAȚIILOR DE PARCARE ÎN VECINĂTATEA ZONEI DE MUNCĂ?'.

9 ÎN CE SCOP FOLOSIŢI AUTOTURISMUL?

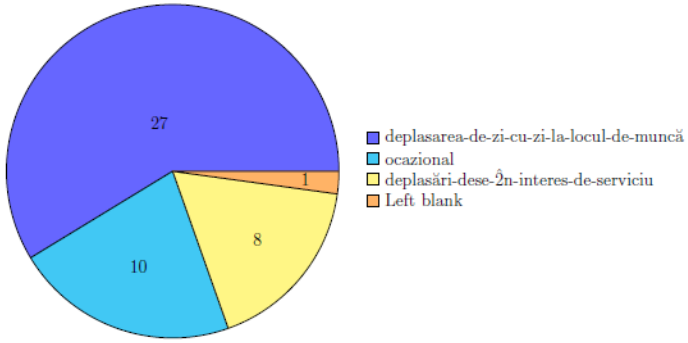


Figure 9: Repartition of answers for the question 'ÎN CE SCOP FOLOSIŢI AUTOTURISMUL?'.

8 CÂŢI KILOMETRI PARCURGETI PE SĂPTĂMÂNĂ CU AUTOTURISMUL?

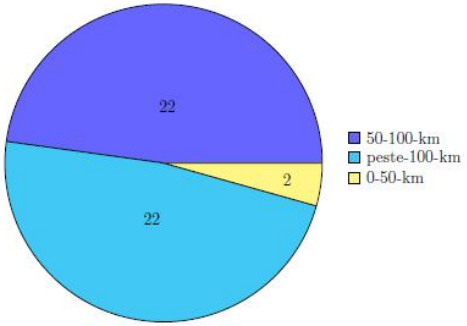


Figure 8: Repartition of answers for the question 'CÂȚI KILOMETRI PARCURGETI PE SĂPTĂMÂNĂ CU AUTOTURISMUL?'.

Collecting data from the ground

Collecting data from the ground

UNIUNEA EUROPEANĂ

Instrumente Structurale 2014-2020

Next steps: Ovidius Cyber Cloud

Project title: Development of the numerical computation infrastructure of the Ovidius University of Constanta for modeling, simulation and processing of massive data structures by the establishment of a Cloud Computing Data Center. Contract no. 252/29.05.2020, MySMIS code 124984, Operational Program Competitivity, Priority Axis – Scientific Research, Technology Development and Innovation in the support of economic competitivitness and business development, Project type: Cloud Computing and Massive Data Processing Infrastructures.

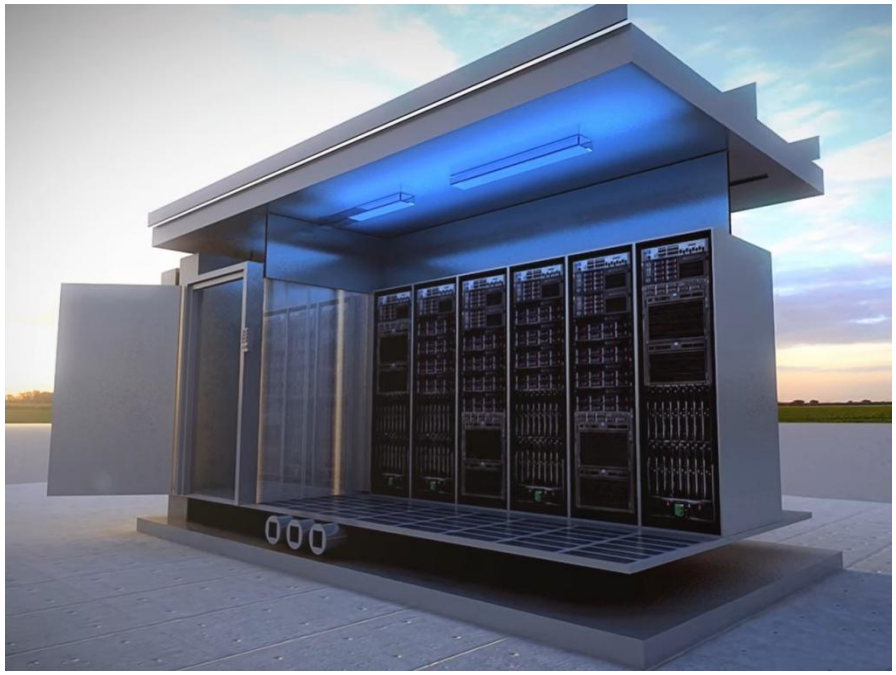
Implementing organization: Institute for Nanotechnologies and Alternative Energy Sources at "Ovidius" University of Constanta.

The aim of the project is the development of a data center for cloud computing consisting on the infrastructure, operation procedures, integration in the national network and in the EOSC.

UNIUNEA EUROPEANĂ

Instrumente Structurale 2014-2020

Next steps: Ovidius Cyber Cloud



Co-financed project by the European Regional Development Fund through the Competitiveness Operational Program

Conclusions

- **The implementation of the sustainable transport measures requires a very professional approach and for this purpose, a Decision Support System might be extremely useful;**

- **The collection and processing of reliable data is the crucial element of the appropriate functioning of such a digital platform;**

- **Building a system for data collection and processing is a very challenging process and it might be considered as a whole project on its own;**

- **It is an iterative process and has a valuable impact also in the implementation of the sustainable transport measures;**