Open tools and methodology for the development of a web-based transportation platform

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Introduction

Transportation platform: Supports all activities relating to transport, logistics and the distribution of goods.
Usually transportation platforms offer functionality based on:

- Proprietary GIS systems.
- Proprietary updates on network and data.
- External, proprietary web applications.

Introduction

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Usually transportation platforms offer functionality based on:

- Proprietary GIS systems.
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✓As a result, such platforms heavily depend on their proprietary software.

Open Data and Tools Platform

Alternative Approach

Platform based exclusively on free/open source data and tools.

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- Open Data
- Open source tools for building the platform
- Open Maps

Why a platform based on open tools?

- **Sustainability** of the system.
- **Maintainability** - no dependencies on proprietary tools.
- **Integrity** - Data checked and maintained by the community.

Basic Platform Components

Basic blocks for building a web transportation platform:

1. Maps and geospatial data visualization tools.
2. Data and tools for data selection and process.
3. Set of functionalities offered through a web interface.

Abstract Methodology

For the alternative platform to be developed the following steps applied:

- Maps collected and integrated to the platform.
- Data collected from various sources.
- Data organized and integrated to the platform.
- Data visualizations computed and offered (through charts/pies and maps).
- Extra functionalities developed combining the data collected with geospatial information.

Conceptual Architecture of the Platform

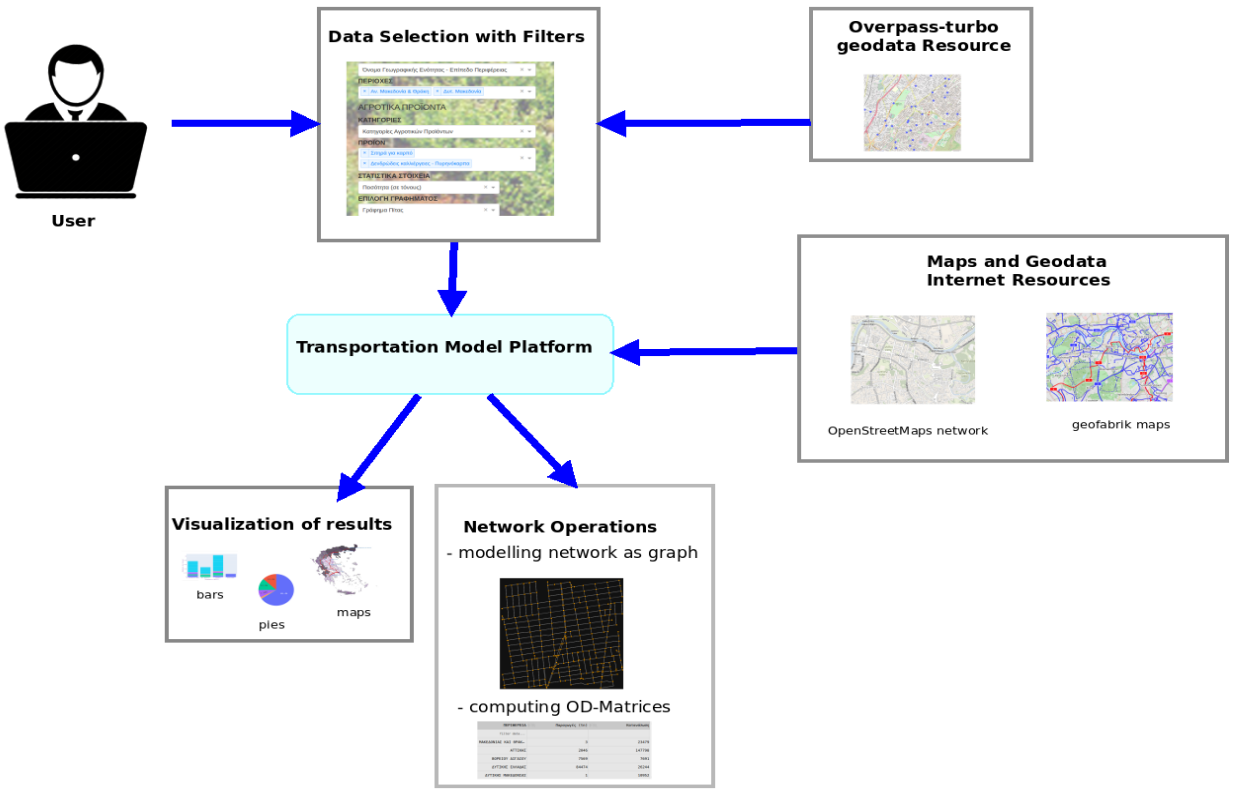


Figure 1: Conceptual Architecture of the Platform.

Maps

The maps selected for the platform are the OpenStreetMaps (OSM). OSM is a collaborative project that creates a free, editable map of the world.

OpenStreetMaps

- It covers the world.
- It is supported by OpenStreetMap Foundation (non-profit organization).
- Open Database License (ODbL)

Platform Data

- Data has been collected from many, different sources (elstat, eurostat, et al)
- Data has been normalized and filters may be applied to create a custom configuration.

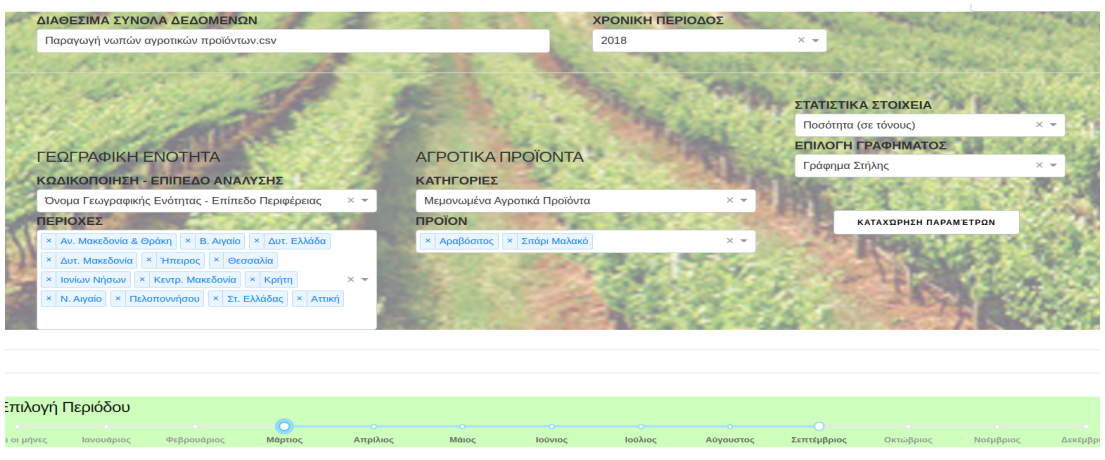
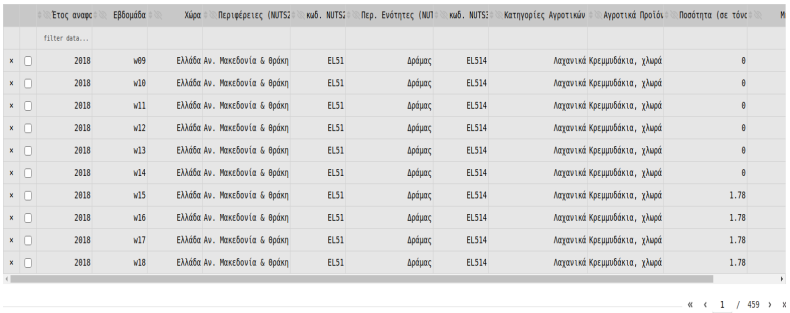


Figure 2: Filters applied to data available.

Data Visualizations

Visualizing data

Data selection is visualized through tables, charts, pies and choropleths.



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2018	w11	Ελλάδα	Αν. Μακεδονία & Θράκη	EL51	Δράμας	EL514	Λαχανικά Κρεμμυδάκια, χλωρά		0
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2018	w13	Ελλάδα	Αν. Μακεδονία & Θράκη	EL51	Δράμας	EL514	Λαχανικά Κρεμμυδάκια, χλωρά		0
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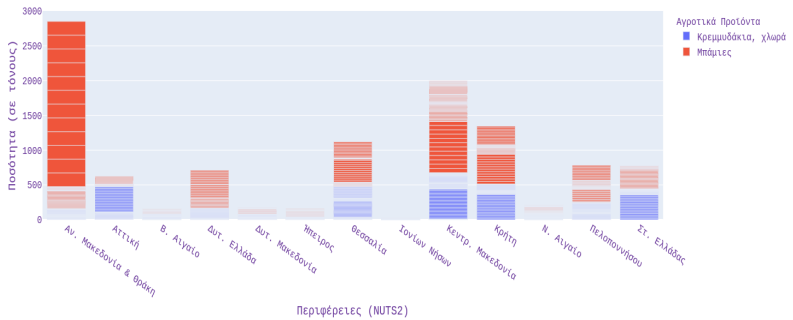

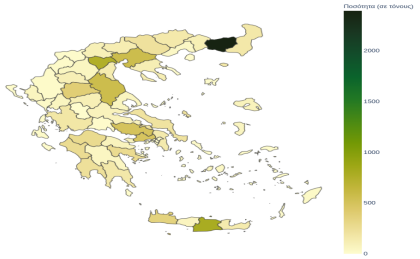

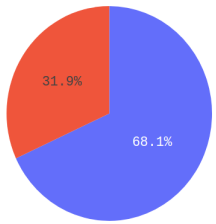

Figure 3: Data visualization.

Overview of platform basics

- ✓A platform for data manipulation.
- ✓Integration of data of interest with geodata.
- ✓Visualization of data to maps.

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Added value?

By selecting a custom data sub-set the user may further take advantage of the platform for valuable insights via a set of web-apps.

Applications on selected data: Four Step Model Example

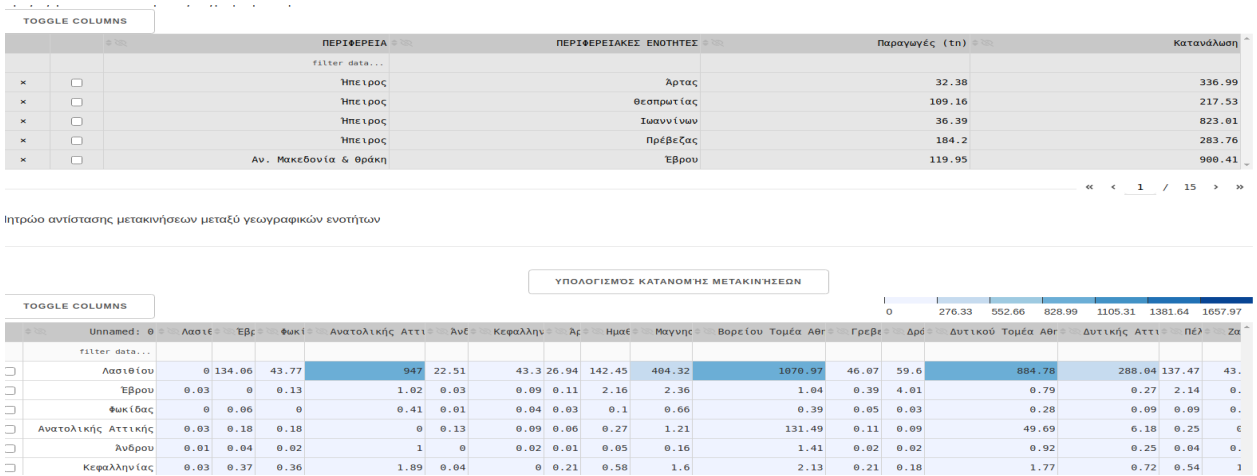
With the selection of the dataset of interest the user may procceed to run a four step model on it.

- The user may select the dataset of her choice for the four step model execution.
- The user may customize the four step model by selecting a friction function.

Figure 4: Selection of custom dataset and friction function for the Four Step Model Execution.

Four Step Model app execution

✓Custom data set that used as input is presented.
✓Origin-Destination Matrix with highlighted values is presented.


TOGGLE COLUMNS

		ΠΕΡΙΦΕΡΕΙΑ	ΠΕΡΙΦΕΡΕΙΑΚΕΣ ΕΝΟΤΗΤΕΣ	Παραγωγές (tn)	Κατανάλωση
		filter data...			
×	☐	Ήπειρος	Άρτας	32.38	336.99
×	☐	Ήπειρος	Θεσπρωτίας	109.16	217.53
×	☐	Ήπειρος	Ιωαννίνων	36.39	823.01
×	☐	Ήπειρος	Πρέβεζας	184.2	283.76
×	☐	Αν. Μακεδονία & Θράκη	Έβρου	119.95	900.41

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Ιητρώο αντίστασης μετακινήσεων μεταξύ γεωγραφικών ενοτήτων

ΥΠΟΛΟΓΙΣΜΟΣ ΚΑΤΑΝΟΜΗΣ ΜΕΤΑΚΙΝΗΣΕΩΝ

TOGGLE COLUMNS

0 276.33 552.66 828.99 1105.31 1381.64 1657.97

	Unnamed: 0	Λασιθ	Έβρ	Φωκί	Ανατολικής Αττι	Άνδ	Κεφαλλην	Άρ	Ημαθ	Μαγνης	Βορείου Τομέα Αθη	Γρεβε	Δρά	Δυτικού Τομέα Αθη	Δυτικής Αττι	Πέλ	Ζα
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☐	Λασιθίου	0	134.06	43.77	947	22.51	43.3	26.94	142.45	404.32	1070.97	46.07	59.6	884.78	288.04	137.47	43.
☐	Έβρου	0.03	0	0.13	1.02	0.03	0.09	0.11	2.16	2.36	1.04	0.39	4.01	0.79	0.27	2.14	0.
☐	Φωκίδας	0	0.06	0	0.41	0.01	0.04	0.03	0.1	0.66	0.39	0.05	0.03	0.28	0.09	0.09	0.
☐	Ανατολικής Αττικής	0.03	0.18	0.18	0	0.13	0.09	0.06	0.27	1.21	131.49	0.11	0.09	49.69	6.18	0.25	0
☐	Άνδρου	0.01	0.04	0.02	1	0	0.02	0.01	0.05	0.16	1.41	0.02	0.02	0.92	0.25	0.04	0.
☐	Κεφαλληνίας	0.03	0.37	0.36	1.89	0.04	0	0.21	0.58	1.6	2.13	0.21	0.18	1.77	0.72	0.54	1

Figure 5: Four Step Model Execution based on user data selection.

Conclusions - Added value

Platform created as Proof of Concept.

- A web-based transportation platform can be built solely on open tools and data.
- Such a platform offers functionality and apps restricted only by its community.
- A platform based on open data and tools is able to offer high-level solutions and customization.
- No proprietary software ensures sustainability of such a project.

Restrictions - Future Work

- Such a platform is heavily-bound to its users and the community.
- It can be developped so much as its users are interested to.
- Challenge: Platform integration to open geodata ecosystem.

Thank you!

Thank you for your attention

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