ENIRISST: the first data infrastructure for shipping and transport in Greece

Christos Tryfonopoulos[a] and Amalia Polydoropoulou[b]

[a] Software and Database Systems Lab, Department of Informatics & Telecommunications,
University of the Peloponnese, Tripolis, Greece

[b] Department of Shipping, Trade and Transport,
University of the Aegean, Chios island, Greece

Within the past years, the transportation sector has been affected by the several advancements occurring in the era of big data. This has increasingly attracted the attention of both scientists and practitioners in the private and public sector, and several studies and applications have been developed in this field. Despite these advances, several challenges are still left to be addressed to harness the full potential of big data technologies.

This abstract presents the Intelligent Research Infrastructure for Shipping, Supply chain, Transport and Logistics (ENIRISST), which is a unique, novel and fully extendable Research Infrastructure established in 2019 in Greece. ENIRISST focuses on providing a virtual infrastructure that is realized in a fully extendable way to accommodate current and future extensions. Its goal is to become a widely acceptable, multi-purpose data analytics platform that will unify a wide variety of open data sources and enhance collaborations among different disciplines in the transportation sector. The infrastructure relies on the NIST Big Data Reference Architecture supporting data cataloging, virtualization, analytics and visualization through the use of open source tools and is designed to become a unified data lake that satisfies several important yet conflicting principles including usability, efficiency, security, expandability, reliability, and maintainability.

The ENIRISST platform involves both traditional and state-of-the-art solutions that include relational databases, noSQL solutions for big data analysis, machine learning suites, data lake engines for live interactive queries and analytics, and popular visualization components. The overall architecture is flexible, allowing the integration of new sub-systems in terms of software or a process. The data platform does not intend to be a replica of existing sources, but rather provide a data lake approach that is able to combine, correlate, analyze and leverage the collected data to useful insights. The data lake functionality may be abstracted to three main tasks: (a) real-time/on-premises movement of data, (b) analysis of data, and (c) visualization of data/results. This data lake approach is necessary to accommodate not only the various types of stored data (both historical and 'live' data from different and disparate information sources), but also the various types of services from a wide variety of fields including maritime, land and freight travel, environment, energy, tourism, and finance.

As the project reaches its final year, new services are constantly integrated into the deployed platform; these services (indicatively) include: national transport model simulations, pollution monitoring e-infrastructures, traffic safety training facility and data repository, maritime activity recording and marine/cruise tourism logging, crowdsourced infrastructure registers, multimodal travel advisors, decision support tools for shipping, electronic logistics observatories for freight, logistics and supply chain industries, and intermodal transport operation monitoring tools. By incorporating a large amount of novel services in a national and international level and adopting a flexible data infrastructure, ENIRISST has created a de facto center of excellence and the first intelligent research infrastructure in the fields of shipping and transport in Greece.

Acknowledgments