

Federated States of Data

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Congestion, especially on roads, is one of the biggest transport challenges. It costs Europe about 1% of its GDP every year and is the cause of significant carbon emissions. Logistics actors are implementing environmentally concerned collaborative strategies addressing supply chain integration, multimodal transportation, consolidation of deliveries, and reverse logistics to reduce their footprint. With the European Green Deal (EDG), the European Commission focuses on shifting 70% of road freight to rail and other more sustainable modes. ERTICO wants to contribute to making all transport means as efficient as possible, minimising their environmental impact.

There are no reasons why the transport & logistics sector shouldn't benefit from an interconnected world. Drawing from innovations from other industries, ERTICO is creating synergies between technological trends – such as Artificial Intelligence, big data, the Internet of Things, and automation – and smart solutions for transport & logistics. Given the organisation's expertise, we provide inputs to the European Technology Platform ALICE, specifically within the Information Systems in Logistics working group.

By combining our team's expertise and experience in transport, logistics, and digitalisation, ERTICO is leading several European flagship projects. In particular, we are working across three specific areas: freight market needs and trends, freight digitalisation, and freight transport automation.

The oil of our times

Achieving key EU priorities (EDG, a more robust economy that works for people, digitalisation in Europe) will require much effort, not least creating an integrated and harmonised transport

network. Transport is the essential link between different value chain processes, from outsourcing raw materials, to choosing the production site and carrying the end product to the client's doorstep (hopefully, retrieving it for circular re-use, too).

This process may sound uncomplicated, but in reality, it involves hundreds, if not thousands of different stakeholders, both operating hard assets (like vehicle fleets) and people managing the digital backbone. To face these challenges, the new European project **BOOSTLOG** is looking at maximising the efficiency and effectiveness of the freight transport system to progress towards a transport system that is low-carbon, low-energy, congestion-free, growth-supporting, all modes-inclusive, and user-centric.

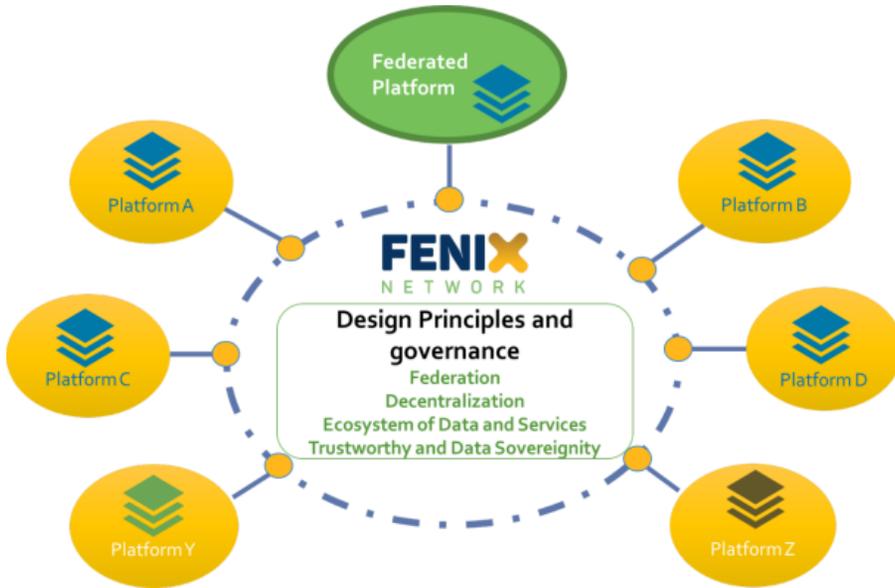
Boosting the impact of freight transport & logistics will require the oil of our times: data. The overarching aim of the **FENIX** project is to develop the first European federated architecture for data sharing. It will serve the logistics community (shippers, logistics service and mobility infrastructure providers, cities and authorities) by developing and implementing digital corridor information systems

(a multimodal federation of IT platforms). FENIX will establish a federated network of transport & logistics actors across Europe and beyond, enabling information and service sharing needed to optimise the Trans-European Transport Network Core Corridors, including the Motorways of the Sea Programme, from multiple angles: economic, environmental and societal. One use-case concerns connecting port operations between the Italian La Spezia and the Moroccan Casablanca, making the entire transport process more efficient.

Based on these principles, the design of the FENIX Network architecture focuses on the provision of a specification of a connector, following reference architecture data sharing concepts that respect decentralisation of the ecosystems of platforms. It will describe the technical roles and specifications of a few functionalities needed to be federated and adhered to the design principles.

Firstly, Identity Management. This part is required to authenticate the identities of the federation participants to allow the exchange of identities between the platform nodes. It will guarantee access to the proper

Fig. 1. Architecture components of and design principle relations within the Fenix Network



The figure visualises the FENIX Federation network of platforms. It depicts the main design principles (the middle of the picture) and the different platforms (different circles) that exchange data following the principles. Each of these platforms has its datasets or services (i.e., estimated time of arrival, planning, CO₂ footprint, IT). The small circles linked to each Federation platform represent the federated services specified in FENIX (Identity Management, Broker, Data Exchange).

service or data asset. Secondly, there's the Broker function, a search & discovery service of a distributed catalogue of services and data available in each of the federated platforms in the network. This functionality should allow federated entities to discover logistics services or data offered by each platform and provider based on a harmonised data and service description metadata model. Thirdly, Data Exchange. As the degree of global collaboration grows, and given the multi-tiered nature of modern logistics networks, the complexity of supply chains will also increase. Swift, reliable, and secure data sharing between different logistics data platforms will become even more critical to the involved stakeholders.

Going beyond prototype demonstrations

With three-quarters of goods exported or imported to the EU via its seaports, the port industry is vital to the European economy. At the same time, ports face their specific challenges: cargo volumes are rising – with an expected 57% increase by 2030 – and so are the vessels. How to handle these shipments efficiently, from berth to the gate, is a task that requires fitting together many moving puzzles – and in an environment that changes, too. Technological developments, such as Industry 4.0, are opening new vistas for growth. Meanwhile, social pressure demands from the port

and shipping industries to partake in the green transition.

The **5G-LOGINNOV** project, started in late 2020, is focusing on seven 5G thematic areas. By supporting public-private partnerships across 11 use-case clusters, it strives to help build a European offer for new 5G core technologies. The initiative's main aim is to design an innovative framework addressing integration and validation of Computer-Aided Design & Computer-Aided Manufacturing (CAD/CAM) technologies related to Industry 4.0 in general and ports in particular. As such, it intends to create new opportunities for innovation in the logistics value chain. Several 5G technological blocks support the project. These include a new generation of 5G terminals, notably for future connected and automated mobility, new Internet of Things 5G devices, data analytics, next-generation traffic management, and emerging 5G networks. The intention is to help port cities to address present and future capacity, traffic, efficiency, and environmental challenges.

The 5G-LOGINNOV project will deploy technologies beyond Technology Readiness Level 7 (system prototype demonstration in operational environment), e.g., the **Green Truck Initiative** will use CAD/CAM & automatic truck platooning based on 5G technological blocks. Thanks to the new advanced capabilities of 5G relating to wireless connectivity and core network agility, 5G-LOGINNOV ports will significantly optimise their operations whilst minimising their environmental footprint and negative impact on cities and the local community. At the same time, 5G-LOGINNOV will be a catalyst for market opportunities, particularly for hi-tech small- and medium enterprises, including start- and scale-ups, willing to share their solutions with the port market. To that end, 5G-LOGINNOV will make it easier to access these new possibilities by using its three Living Labs as facilitators and ambassadors for innovation. Regardless of their size and budgets, all ports are more than welcome to explore and find new solutions that best fit their needs.

A historical moment

ERTICO's work and activities in the transport & logistics field focus on increasing interoperability, connectivity for cargo-flows optimisation, and facilitating supply chain management. By 2030, the organisation intends to achieve seamless logistics and freight transport. Closer to 2025, its goal is to achieve complete digitalisation and automation of freight and logistics operations.

We are in a historical moment when we, as a society, are overcoming the pandemic. That said, COVID will have an enduring impact on many areas of our daily life, including changing how shared mobility works. At the same time, activities and projects within ERTICO are reaching key milestones. We work towards defining new pan-European initiatives on urban freight, multimodal cargo traffic, and overall decarbonisation of the transportation sector. Working together is key in moving forward. That is why ERTICO and its Partners are open to broadening the cooperation and onboarding new leaders from across the transport & logistics domain.



ERTICO – ITS Europe is a public-private partnership of 120 companies and organisations representing service providers, suppliers, traffic and transport industry, research, public authorities, user organisations, mobile network operators, and vehicle manufacturers. Together with our partners, we develop, promote, and deploy Intelligent Transport Systems and Services (ITS) through a variety of activities, including European co-funded projects, innovation platforms, international cooperation, advocacy, and events. Our work focuses on connected & automated driving, urban mobility, clean mobility, and transport & logistics. Please visit www.ertico.com for more details.