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OPTIMUM Project

Multi-source Big Data Fusion Driven Proactivity for Intelligent Mobility

Name **Organisation**

event location date

Overview

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The OPTIMUM Project

… in a nutshell

OPTIMUM is working to unveil IT solutions, beyond the state-of-the-art, to improve transportation, transit, freight and traffic connectivity throughout Europe.

OPTIMUM aims to bring proactive and problem-free mobility to modern transport systems by introducing and promoting interoperability, adaptability and dynamicity through its tailor-made applications.

Project placement
Enabling Technologies

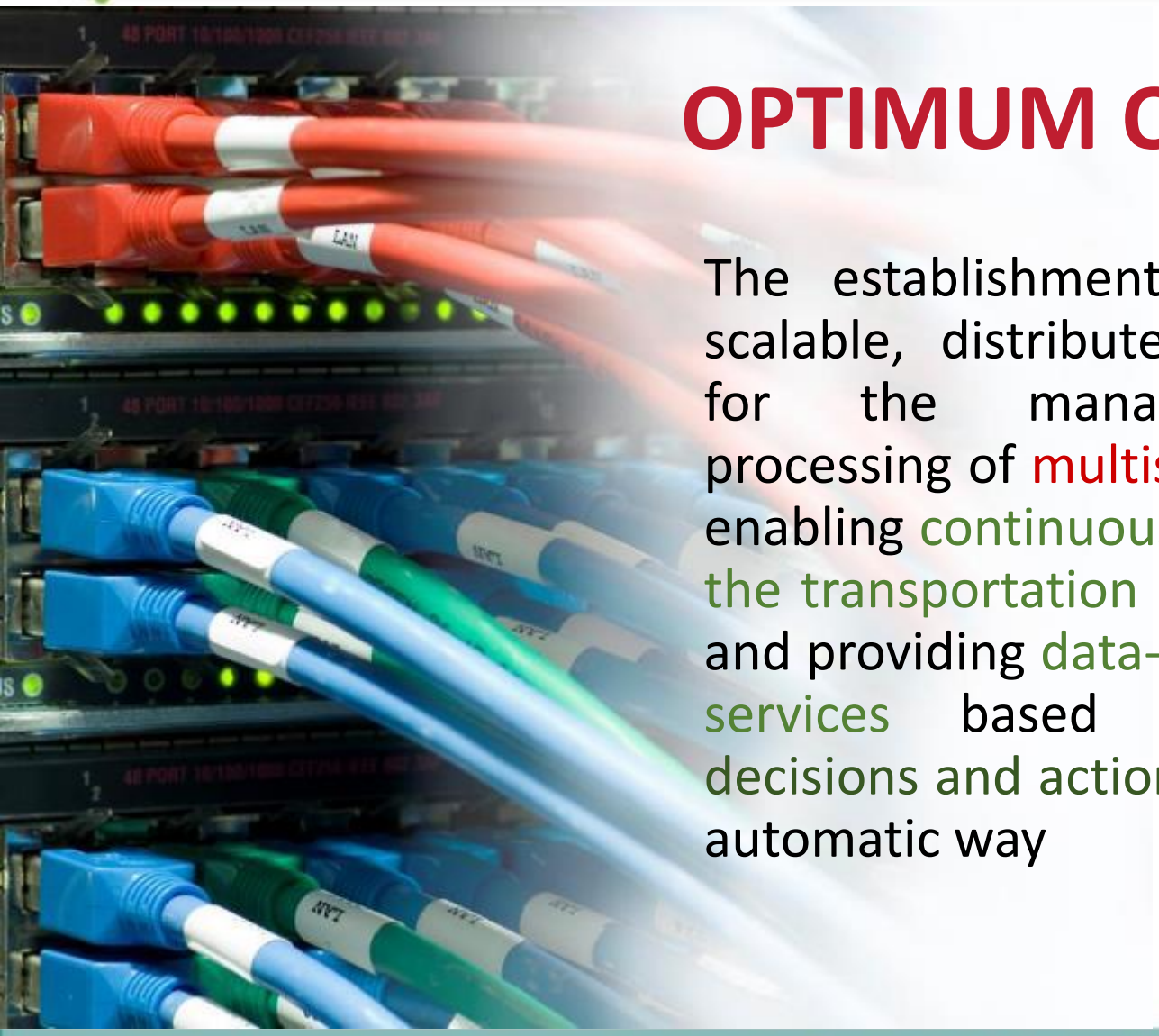
- Transport and traffic **modelling and forecasting**
- Travel **behaviour** analysis
- Personalized traveller information for **multi-modal mobility**
- System-aware **optimization**
- **Real-time big data** processing, data management and fusion
- **Predictive** analysis, **adaptive** charging and **incentive** schemes, **persuasive** technologies

OPTIMUM Objectives

Deploy proposed solutions in real-life pilots of how to improve transport system quality and efficiency – such as Dynamic Toll Charging, Proactive Multi-Modality in complex urban transportation networks and Cross-border travels with smart Motor Homes; and.

OPTIMUM Objectives

Generate business models to commercialise results beyond selected end-user pilots, thus ensuring long-term project impact.

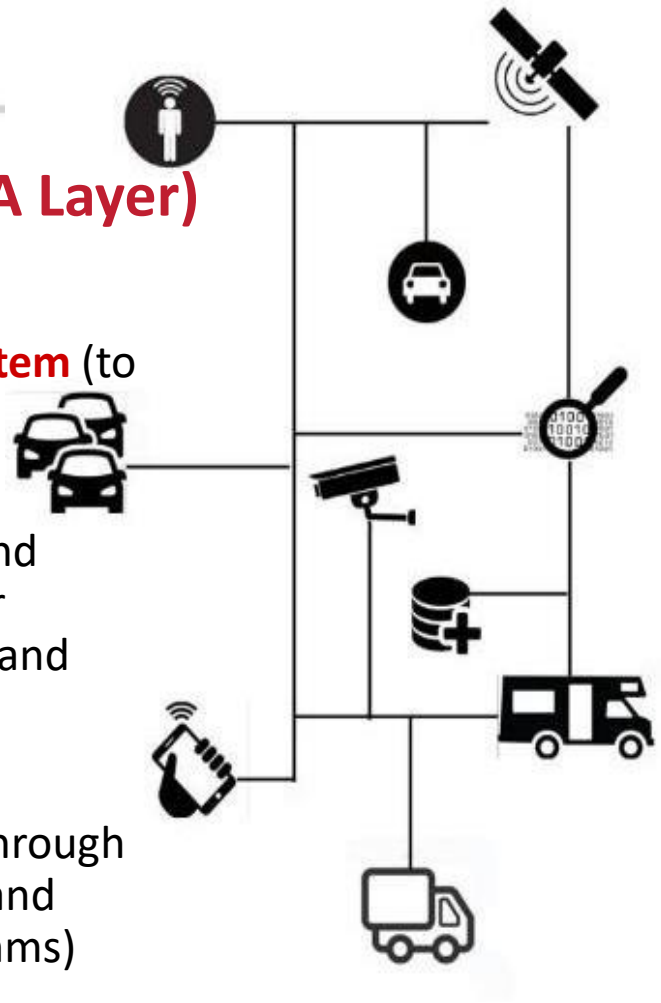


OPTIMUM Objectives

The establishment of a largely scalable, distributed architecture for the management and processing of multisource big-data enabling continuous monitoring of the transportation systems' needs and providing data-driven mobility services based on proactive decisions and actions in an (semi-) automatic way

OPTIMUM Approach: OODA

OPTIMUM Objectives (per OODA Layer)



- **(Observe):** Comprehensive **observations** of the transport ecosystem, by designing and developing a **smart sensing system** (to manage huge amounts of heterogeneous data in real-time)

- **(Orient):** **Enable semantic understanding** of acquired data and **predict** the status of transport networks (via a framework for dynamic, context-aware forecasting and detection (complex and predictive data analysis algorithms and event-detection)

- **(Decide):** To realize **sustainable transportation behaviours** through system-aware optimisation mechanisms (adaptive charging and crediting models, multimodal routing and navigation algorithms)

- **(Act):** Support **proactive decisions and sustainable transportation behaviours** (proactive information provisioning, personalization, persuasive mechanisms)

Project Consortium

Project Consortium

Dynamic Charging Services

Portugal

Pilot 1 – Proactive Charging Schemes for freight transport

- **Aim:** OPTIMUM will develop dynamic charging models for road use by **freight vehicles** based on real-time conditions of the transport network and test the solution on a fleet of **10 Luís Simões freight trucks** in **Portugal**.
- **Rationale:** OPTIMUM's **dynamic charging model** will combine **historical** and **real-time data** collected and produce a model that will incorporate a multitude of variables.
- The model will be integrated in the OPTIMUM platform and provide, in due time, actionable information to the end user (highway authority and logistics operator) in order to enable a **suitable operational planning**.

Pilot 2 – Proactive improvement of transport systems quality and efficiency





- **Aim:** OPTIMUM will implement a smart multi-modal transit concept, involving up to 500 users in the greater regions of **Vienna (AUT), Birmingham (UK) and Ljubljana (SI).**
- **Rationale:** The integration of various real-time traffic data sources will provide the required information to realize traffic-state aware routing and guiding the travelers towards their destination.
- Members of the traffic receive proactive recommendations for personalized trip and re-routing based on their personal plans, traffic information and historical data, while city authorities will be able to dynamically plan and response to the predicted traffic.

Long distance and cross border trips assistant

Slovenia

Pilot 3 – Integrated Car2X communication platform

- **Aim:** OPTIMUM will develop and test intelligent assistance for dealing with complexities of multi-sensor environments and CAR2X communication for long distance trips on a fleet of at least 18 motorhomes with full sensor setups.
- **Rationale:** Users of cognitive campers will be offered personalized services affecting their travel, gather data about traffic which allows deep analytics that will enable the operator to develop new strategies and incentive models.
- Smart Motorhomes can autonomously react to problems, adapt to the users' preferences and provide resource efficiency, safety, comfort and navigation to innovate the concept of travelling with freedom and satisfaction.




Impact

- Improvement of the travel efficiency for public transport (e.g. reduction of waiting times, avoidance of congested areas, etc.)
- Increase of economic benefits for travellers when they offer information that can be utilised by other service providers through the platform
- Shift from urban/national roads to highways
- Improvement in the efficiency of operations (travel time, capacity utilisation, etc.)
- Cross-border trips to be performed with minimum delays
- Reduction of disruptions on traffic due to vehicle breakdowns
- Increase in effectiveness and safely of tourist travelling affecting more pleasant travelling, secure and safety
- Reduction of the time to market for the new strategies that will result from the operation of the OPTIMUM platform
- Increase in testing new traffic strategies based on the information and models that will be developed using deep analytics.
- Better utilisation of public transport services by the use of persuasive strategies that will favour collective modes of transport

Impact on sustainability

- OPTIMUM promotes shift towards sustainable modes of transport, walking, cycling, rideshare, public transit and telework
- OPTIMUM promotes improvement of the well-being of travellers with high environmental awareness
- OPTIMUM will tackle the unsustainability of the current transportation system by the introduction of adaptive charging schemes and multi-modal routing algorithms that favour sustainable transport and collective mobility.
- OPTIMUM will develop novel applications that will support both dynamic charging and crediting of individuals using and freight vehicles having as a goal to promote the use of public transport modes and the sustainability of the overall transportation system
- Follow the CIVITAS Initiative developments that helps cities to achieve a more sustainable, clean and energy efficient urban transport system by implementing and evaluating an ambitious, integrated set of technology and policy based measures.

Addressing Political Requests

General Facts about Mobility	What OPTIMUM offers
1. The existing transport system is not sustainable.	1. Promotion of sustainable and collective mobility.
2. New transport patterns must emerge.	2. Capitalise on the intelligence that can be derived from the abundance of transport and social media data.
3. Better modal choices will result from greater integration of the modal networks	3. Proactive decision support for optimisation of urban transport.
4. There is a need to move towards full application of 'user pays' and 'polluter pays' principles.	4. Minimise the imbalance in the existing cost vs. use paradigm.
5. Urban transport is responsible for about a quarter of CO2 emissions from transport, and 69% of road accidents occur in cities.	5. Quantification of the benefits of the developed platform.
6. Freight shipments over short and medium distances (below some 300 km) will to a considerable extent remain on trucks.	6. Ensure the adoption of the proposed platform.

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Contribution to Standards

- OPTIMUM foresees to observe **CEN/TC 278** developments and collaborate with its Working Groups (WGs) as follows:
  - Dynamic charging for freight transport and dynamic charging and crediting for commuters will contribute to CEN/TC 278 "**WG 1** Electronic Fee Collection, **WG 2** Freight and Fleet Management Systems"
  - Traveller behaviour prediction, Multi-modal trip planning, Personalised travel advisor will contribute to "**WG 3** Public Transport";
  - Traffic forecasting, Multimodal routing and navigation will contribute to "**WG 8** Road Traffic Data";
  - Proactive context aware recommendations, Persuasive strategies will contribute to **WG 10** Human-Machine Interfacing.

- Further contribution to standardization efforts in the ITS area include:
  - The **GML Schema** (http://www.opengeospatial.org/standards/gml)
  - the **DATEX-II** (http://www.datex2.eu/) for real-time traffic information
  - Standards related to **public transport information systems** (Transmodel, NaPTAN, NPTDR, Google Transit Feed Specification)
  - Standards related to **Multi-Modal Journey Planners** (JourneyWeb, http://www.dft.gov.uk/journeyweb/)
  - **Multimodal framework architectures** for the transport sector (http://www.arktrans.no/)

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