

# IN2DREAMS

INtelligent solutions 2ward the  
Development of Railway  
Energy and Asset Management  
Systems in Europe.



# INTRODUCTION TO IN2DREAMS

The predicted growth of transport, especially in European railway infrastructures, is expected to introduce a dramatic increase in freight and passenger services by the end of 2050. To support sustainable development of these infrastructures, novel data-driven ICT solutions are required. These will enable monitoring, analysis and exploitation of energy and asset information for the entire railway system including power grid, stations, rolling stock and infrastructure. **IN2DREAMS** (Intelligent solutions 2ward the Development of Railway Energy and Asset Management Systems in Europe) will address these challenges through two distinct work streams: Work Stream 1 (WS1), focusing on the management of energy-related data and Work Stream 2 (WS2), focusing on the management of asset-related data.

**IN2DREAMS** will develop and demonstrate a modular cloud-based open data management platform (ODM) facilitating ubiquitous support of both energy and asset services. WS1 will provide energy metering services through a dynamically reconfigurable platform offering improved reliability, ease of monitoring and on-the-fly optimisation for the entire railway system.

This will include a heterogeneous secure and resilient telecommunication platform comprising both wireless and wireline technologies converging energy and telecom services.

This infrastructure will interconnect a plethora of monitoring devices and end-users to the railway control centre and will include an ODM platform for data collection, aggregation and analysis, able to scale with the railway operators needs. This platform will be non-intrusive exploiting advanced signal processing and intelligent learning algorithms. Within WS2, **IN2DREAMS** will concentrate on defining IT solutions and methodologies for business-secure decision support in the field of data processing and analytics for railway asset management. The general aim is to study and proof the application of smart contracts in the railway ecosystems, by addressing also legal and regulatory implications, and advanced visual and rule-based data analytics, including metrics for performance assessment.



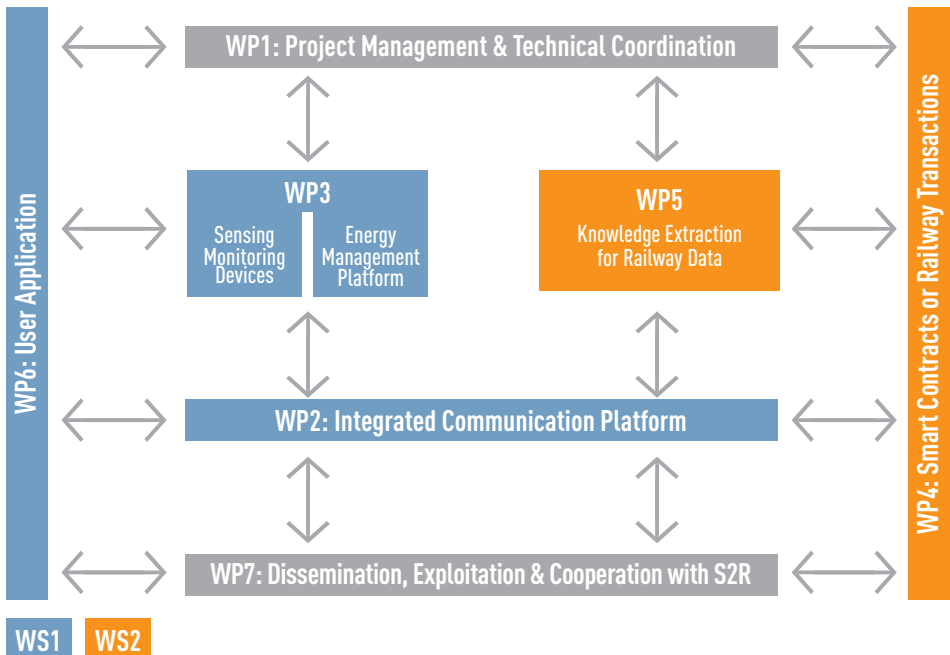
# PROJECT IN A NUTSHELL

## Work Stream 1

- Realization of a non-intrusive Smart Metering sensor networks at Railway System Level
- An open system and interface for data collection, aggregation and analysis in an open source Operational Data Management (ODM) Platform
- A set of User Applications design and specifications. The Applications will exploit the energy analysis process with the aim to enhance the energy decision making and the line operation patterns, as well as other possible improvements such as preventive maintenance

## Work Stream 2

- Support data-driven methodologies applied in real world railway contexts
- Address fundamental topics of data and transactions security, safeguarding data ownership rights, railway specific structural contract mechanisms for information and knowledge exchange
- Extend the work carried out in the framework of the IN2RAIL project by studying, designing and developing data-driven IT tools and methodologies for explicit knowledge extraction, with particular reference to the derivation of data-driven descriptive, diagnostic, and predictive models
- Design and develop visual analytics tools for the interpretation of data and models by human operators and decision makers



# LINKS WITH SHIFT2RAIL

Shift2Rail is a Joint Undertaking (JU) putting together resources from the European Commission (with funds coming from Horizon 2020) and from main railway stakeholders (Founding Members and Associated Members), for a total budget of € 940 million, aimed at steering research activities in the railway sector.

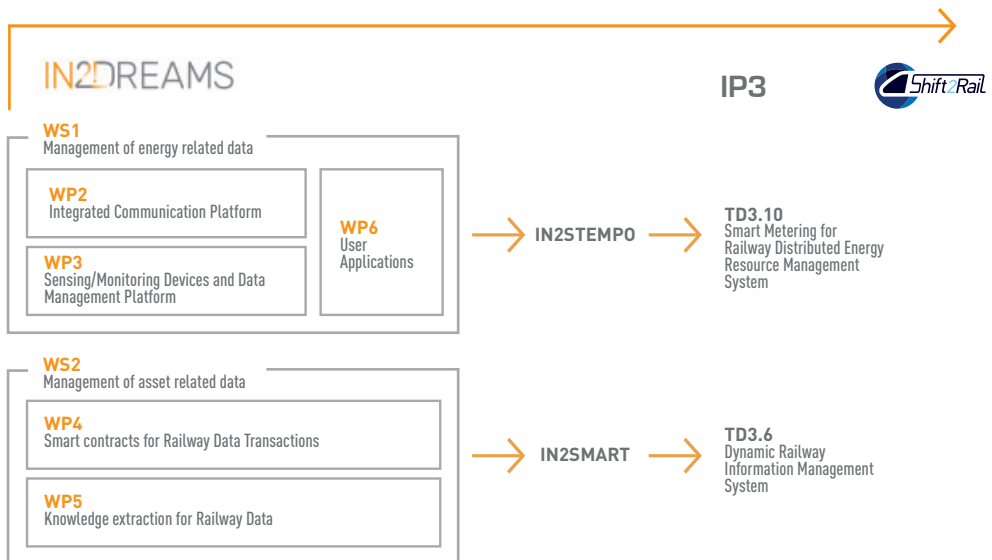
Shift2Rail is organised according to five Innovation Programmes (IP), addressing the main railway challenges in specific areas (Rolling Stock, Control & Command, Infrastructure, IT services and Freight) and five Cross-Cutting activities, addressing topics which have a transversal impact on all areas.

Specifically, IP3 addresses the subject of Cost-Efficient and Reliable High-Capacity Infrastructure, which will enable a resilient, consistent, cost-efficient, high capacity and attractive European network by delivering operation critical research, development, and innovation for rail infrastructure. This will be achieved by the adoption of a whole system approach linking infrastructure and station design with maintenance actions, asset management and energy management.

IP3 tackles all the Shift2Rail objectives, aiming at:

- Enhancing the existing CAPACITY fulfilling user demand of the European rail system;
- Increasing the RELIABILITY delivering better and consistent quality of service of the European rail system;
- Reducing the LIFE CYCLE COST (LCC) increasing competitiveness of the European rail system and European rail supply industry.

IP3 will deliver outcomes which will produce a step change in the way that the European rail network is developed and operated, such that the infrastructure will improve the economic viability and attractiveness of the network. IN2DREAMS will take up some of the key results from past and current EU R&D projects such as In2Rail, IT2Rail, MAXBE, TOUCAN, INITIATE, MERLIN etc. and will contribute, together with the corresponding CFM Projects IN2SMART and IN2STEMPO, to the EU rail infrastructure vision of IP3 in line with the goals set in the 2011 EC Transport White Paper.



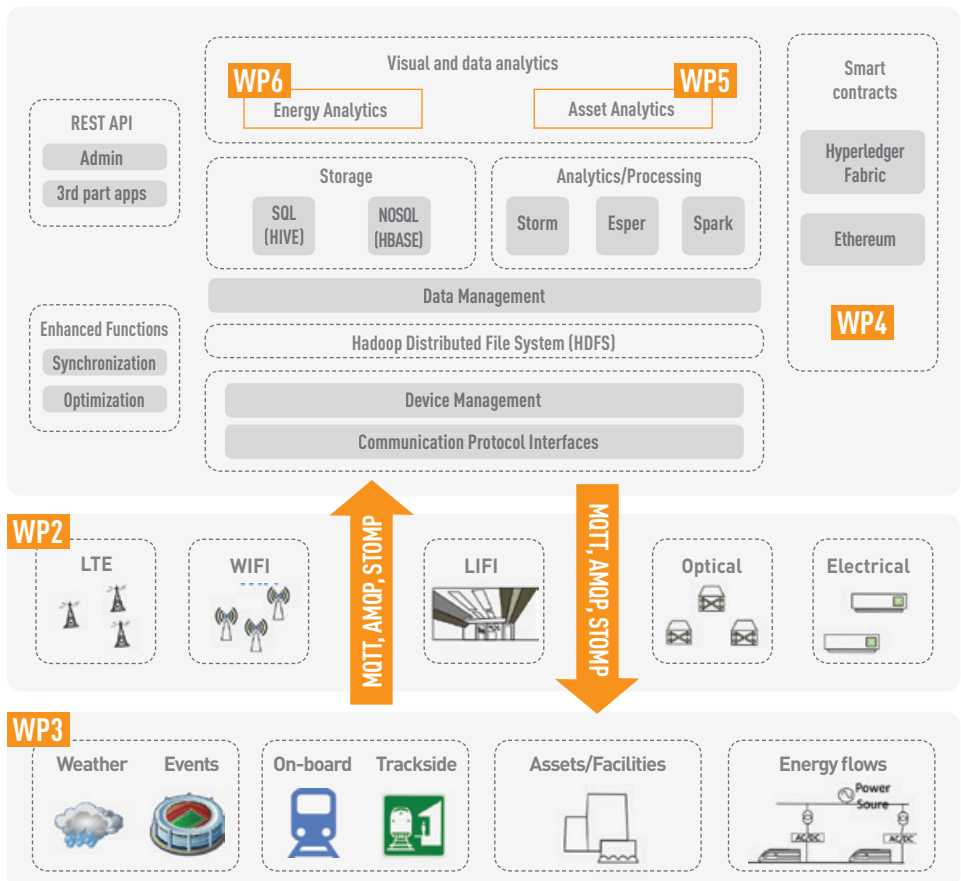
# MAIN OBJECTIVES OF IN2DREAMS

## Work Stream 1 – Management of Energy-related Data

WS1 aims to remove the current and anticipated limitations of REMS, by making these capable of supporting a much wider array of requirements than it is currently the case.

## Work Stream 2 – Management of Asset-related Data

WS2 will address some of the challenges related to a specific Technology Demonstrator (TD3.6) outlined in the Shift2Rail Multi-Annual Action Plan. This TD focuses on interfaces with external systems, maintenance-related data management as well as data mining and data analytics, asset degradation modelling covering both degradation modelling driven by data and domain knowledge and the enhancement of existing models using data/new insights.



# PARTNERS

## PROJECT COORDINATOR



## TECHNICAL LEADERS



## BENEFICIARIES



This project has received funding from the Shift2Rail Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 777596

# FACTS AND FIGURES



Total Project Value  
**2.2M€**



Partners  
**14**



Duration  
**24 Months**



Start date  
**1 09 2017**



## CONTACT US

Stefanos Gogos (UNIFE) Project Coordinator  
[stefanos.gogos@unife.org](mailto:stefanos.gogos@unife.org)

[www.in2dreams.eu](http://www.in2dreams.eu)