Moving around Europe seamlessly

Shift2Rail

WEBINARS

WELCOME!

COHESIVE

CONNECTIVE

MaaSive

My-TRAC

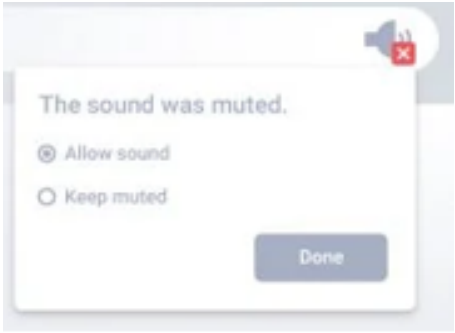
ShiftMaaS

sprint

Check your audio

If you can’t see or hear anything please:

- Reload the page
- Check if the tab is muted and if a pop-up window appears make sure to click ‘allow’ (as per images below)



- If the audio is not working smoothly, close unnecessary programmes and browsers.

Please listen only first (and talk later)

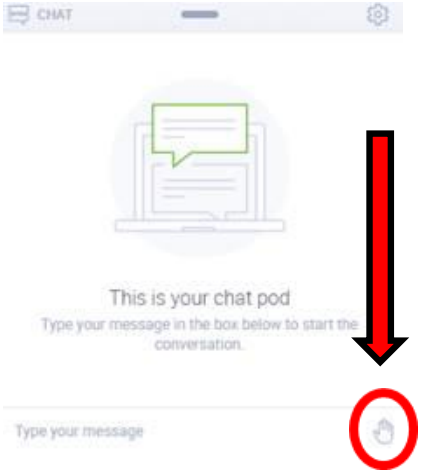
- While the moderator and speakers are presenting, it will not be possible for attendees to speak (to avoid technical interference).

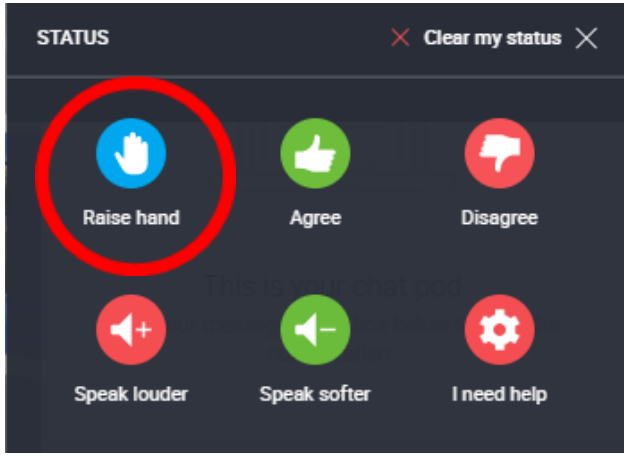
- You can however write any comments or questions in the chat box during this ‘listen only’ time.

Ask a question

When the moderator goes to a Q&A session you can ask a question by:

- Raising your hand by clicking on the hand icon on the right hand bottom corner of the chat box, and then on the blue hand icon (see images below)



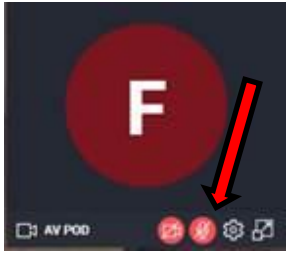


- The moderator will then select an attendee with their hand raised and allow them to speak

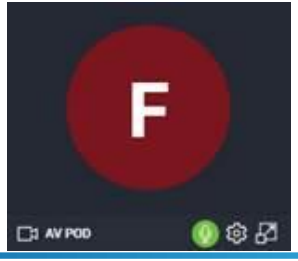
Ask a question

If you are granted permission to speak:

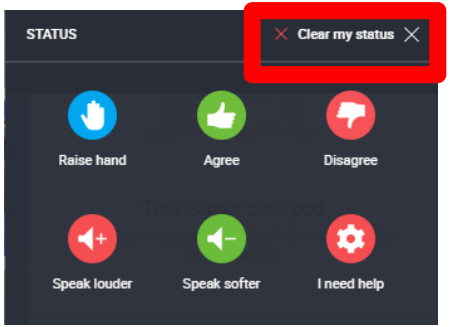
- Click **ALLOW** if a pop up message appears asking for permission
- Click the red microphone icon (see image below)



- When the microphone icon turns green, you are ready to talk (see image below)



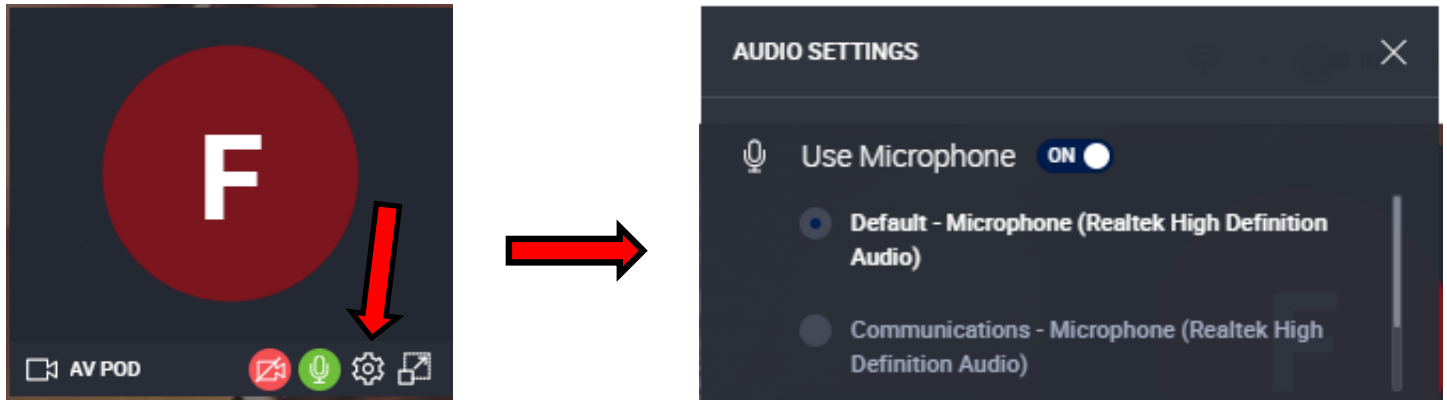
- If your question has been answered, click on the hand on the right hand bottom corner of the chat box again, and select 'clear my status' (see image below)



- If you prefer not to speak, you can alternatively write your question in the chat box.

Microphone

If the microphone is still not working, try to click on the **gear icon** which will give you access to Audio Settings, and chose another microphone source from the list



Shift2Rail innovations from a transport service providers' perspective

Joint dissemination action

14th May – Webinar

Agenda

Agenda

Shift2Rail Innovation Programme 4	Juan Castro, Indra
Shift2Rail Innovation Programme 4: Technical architecture and functionalities	Marco Ferreira, Thales
Q&A session	
Scenario 13: A new TSP registers in IP4 ecosystem	Alessio Carenini, Cefriel
Scenario 14: Converter publication and access	Alessio Carenini, Cefriel
Scenario 15: Dataset publication and access	Alessio Carenini, Cefriel
Scenario 4: Creation of Tarrifs and Mobility Package	Juan Castro, Indra
Scenario 5: Show Business Analytics results	Juan Castro, Indra
Q&A session	

Introduction

Shift2Rail – Innovation Programme 4

Juan Castro – Indra

Shift2Rail initiative

Shift2Rail is the first European rail initiative to seek focused research and innovation (R&I) and market-driven solutions by accelerating the integration of new and advanced technologies into **innovative rail product solutions**.

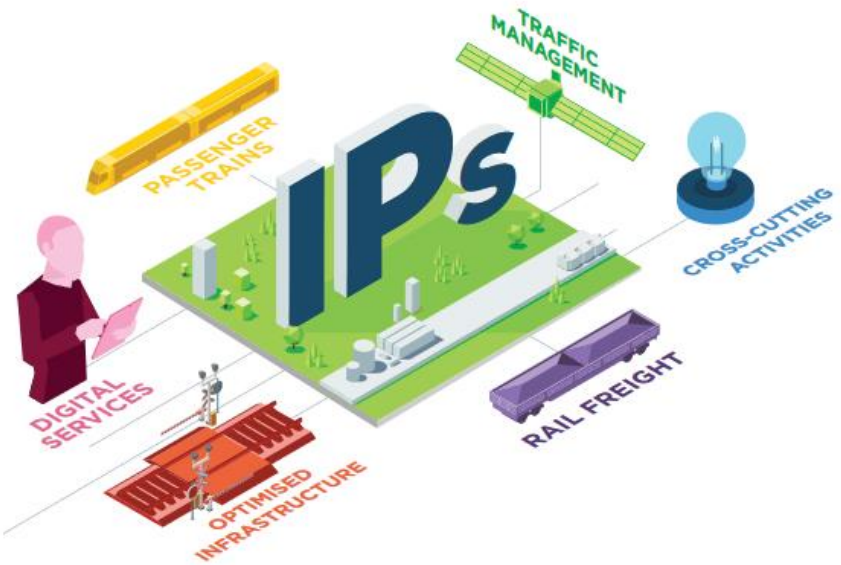
S2R OBJECTIVES

- +50% **INCREASE** RELIABILITY & PUNCTUALITY **BY 50%**
- x2 **DOUBLE** RAILWAY CAPACITY
- **HALVE LIFE-CYCLE COSTS** OF RAILWAY TRANSPORTS
- CONTRIBUTE TO **REDUCTION OF NEGATIVE EXTERNALITIES**, SUCH AS NOISE, VIBRATIONS, EMISSIONS & OTHER ENVIRONMENTAL IMPACTS
- CONTRIBUTE TO THE **ACHIEVEMENT OF THE SINGLE EUROPEAN RAILWAY AREA (SERA)**

UNIQUE PARTNERSHIP

- **28** MEMBERS
- **412** PARTICIPANTS
- **29** COUNTRIES
- **109** SMEs
- **113** RESEARCH CENTRES AND UNIVERSITIES

Shift2Rail Innovation Programmes



IP1 **Passenger trains**
Cost-efficient and reliable trains, including high-capacity trains and high-speed trains

IP2 **Traffic management**
Advanced Traffic Management and Control Systems' Solutions

IP3 **Optimised Infrastructure**
Intelligent Asset Management and High Capacity Infrastructure

IP4 **Digital services**
Towards "mobility as a service" engineered by railway

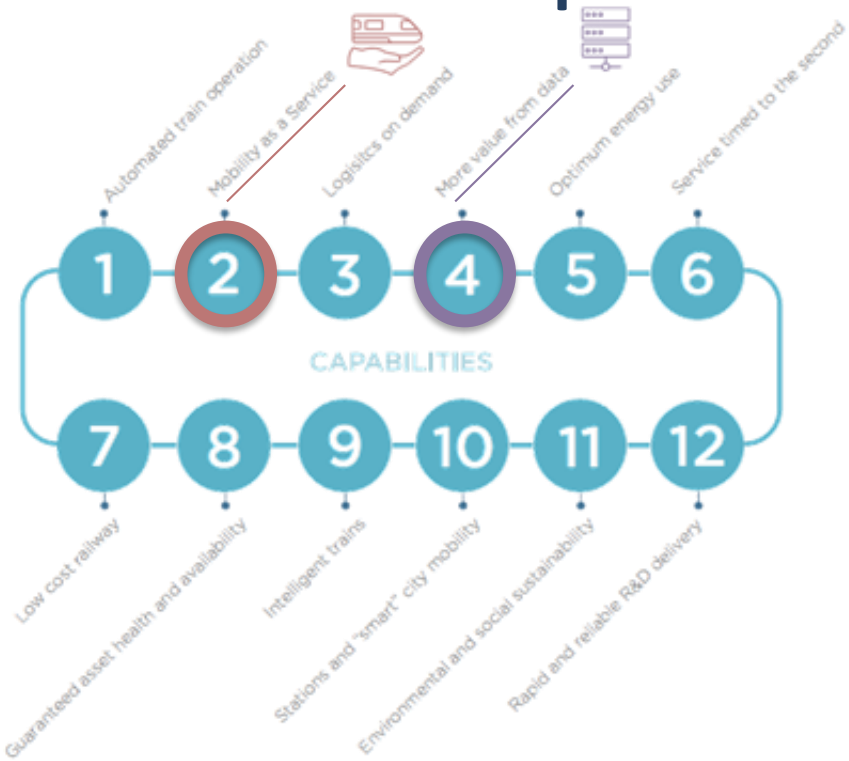
IP5 **European Railway Freight**
Technologies for sustainable and attractive European Rail Freight

CCA **Horizontal Innovative Solutions for Railway**
Cross-cutting activities

IP4 Overview and Objectives

- Put the traveller back at the centre, ease access to rail, increasing its attractiveness
- Complete multimodal travel offer connecting the first and last mile to long distance journeys
- Give access to all multimodal travel services (shopping, ticketing, and tracking) through its travel-companion
- Build an open framework providing full interoperability whilst limiting impacts on existing systems

S2R Innovation Capabilities



Shift2Rail Innovation Capabilities

IP4 Catalogue

Multimodal eco-system

- Seamless Multimodal Travel (IP4 Orchestrators)
- Interoperability Framework (IF)

Travel experience

- Travel Companion-Personal Application (TC IP4)

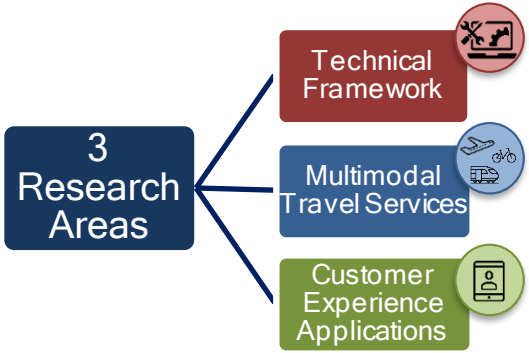
Travel provider tools

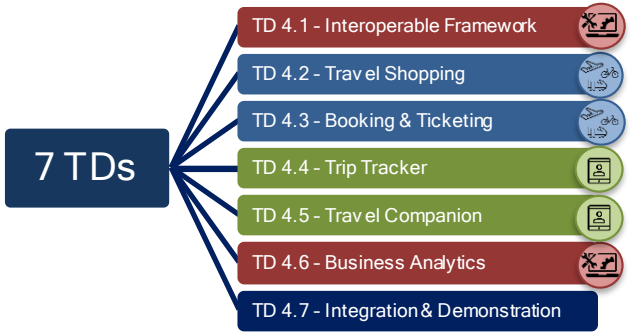
- Operator Portal
  - Contractual Management Market Place (CMMP)
  - Business Analytics for Transportation (BA)
  - Asset Manager (AM)

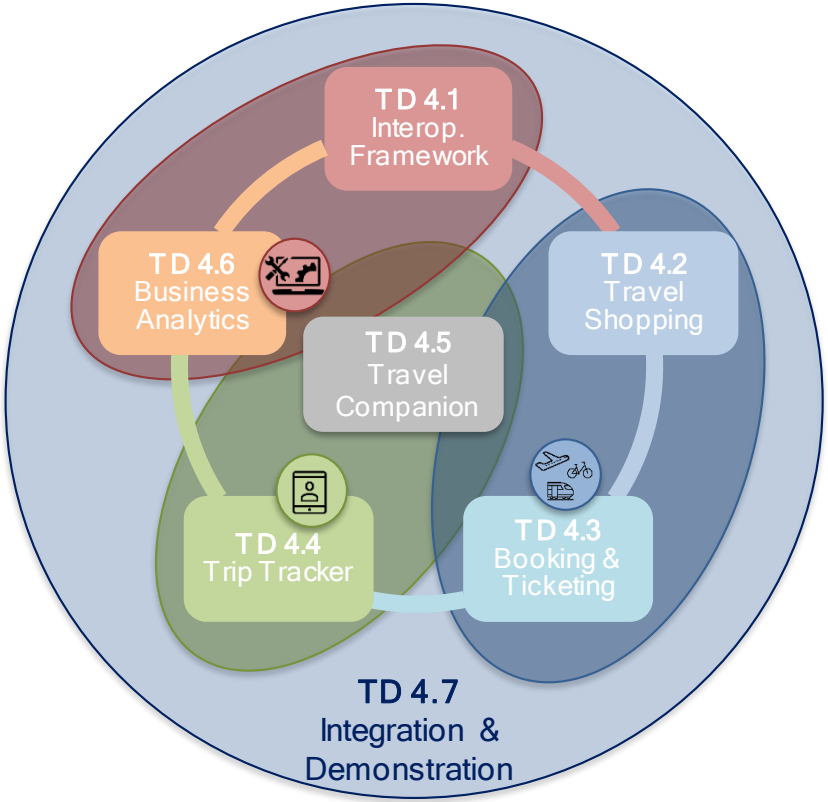
S2R-IP4 – Expected Key Results

Challenges:

- European Level
- To transform travel interactions into a fully integrated and customised experience, across all transport modes, local and long-distance.
- To support modal shift and make rail more attractive, offering a personalised experience in every step of the travel
- One-Stop-Shop to access multimodal services
- Ease integration of the TSPs in the Platform
- Advance beyond the state of the art: location Based Experience, Contract Management, Business Analytics, MaaS

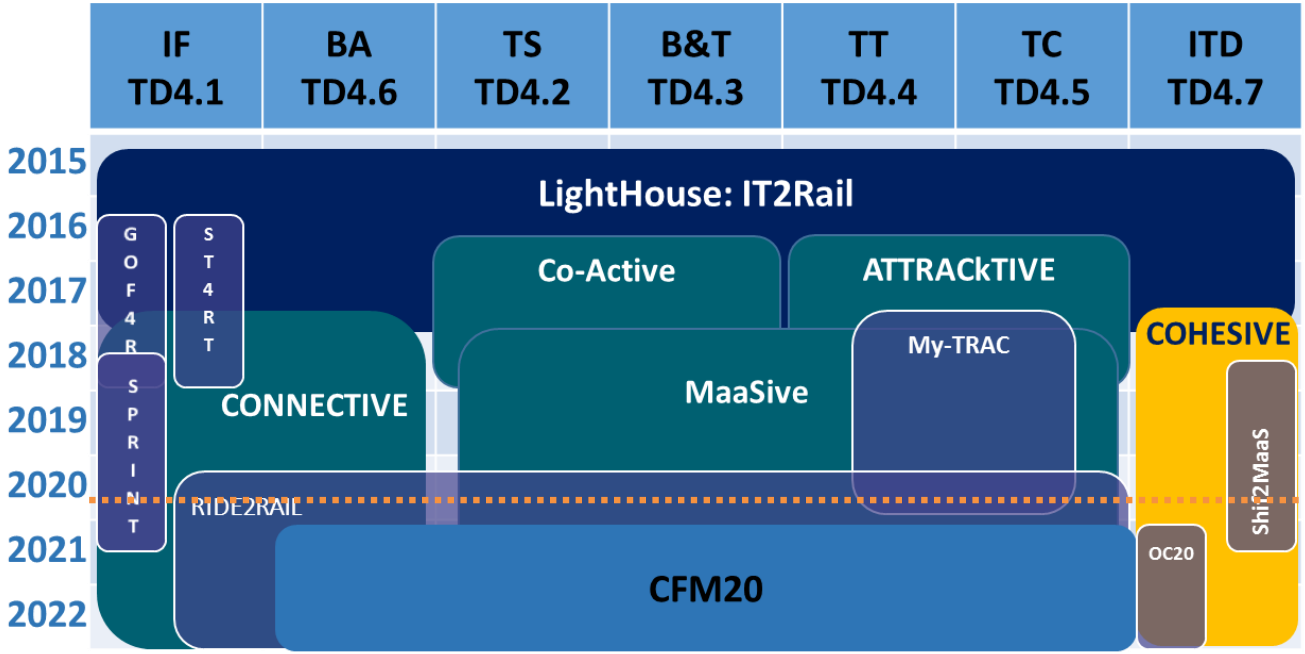

3 Research Areas
Technical Framework
Multimodal Travel Services
Customer Experience Applications


7 TDs
TD 4.1 - Interoperable Framework
TD 4.2 - Travel Shopping
TD 4.3 - Booking & Ticketing
TD 4.4 - Trip Tracker
TD 4.5 - Travel Companion
TD 4.6 - Business Analytics
TD 4.7 - Integration & Demonstration


TD 4.1 Interop. Framework
TD 4.6 Business Analytics
TD 4.2 Travel Shopping
TD 4.5 Travel Companion
TD 4.4 Trip Tracker
TD 4.3 Booking & Ticketing
TD 4.7 Integration & Demonstration

S2R-IP4 - Projects Roadmap

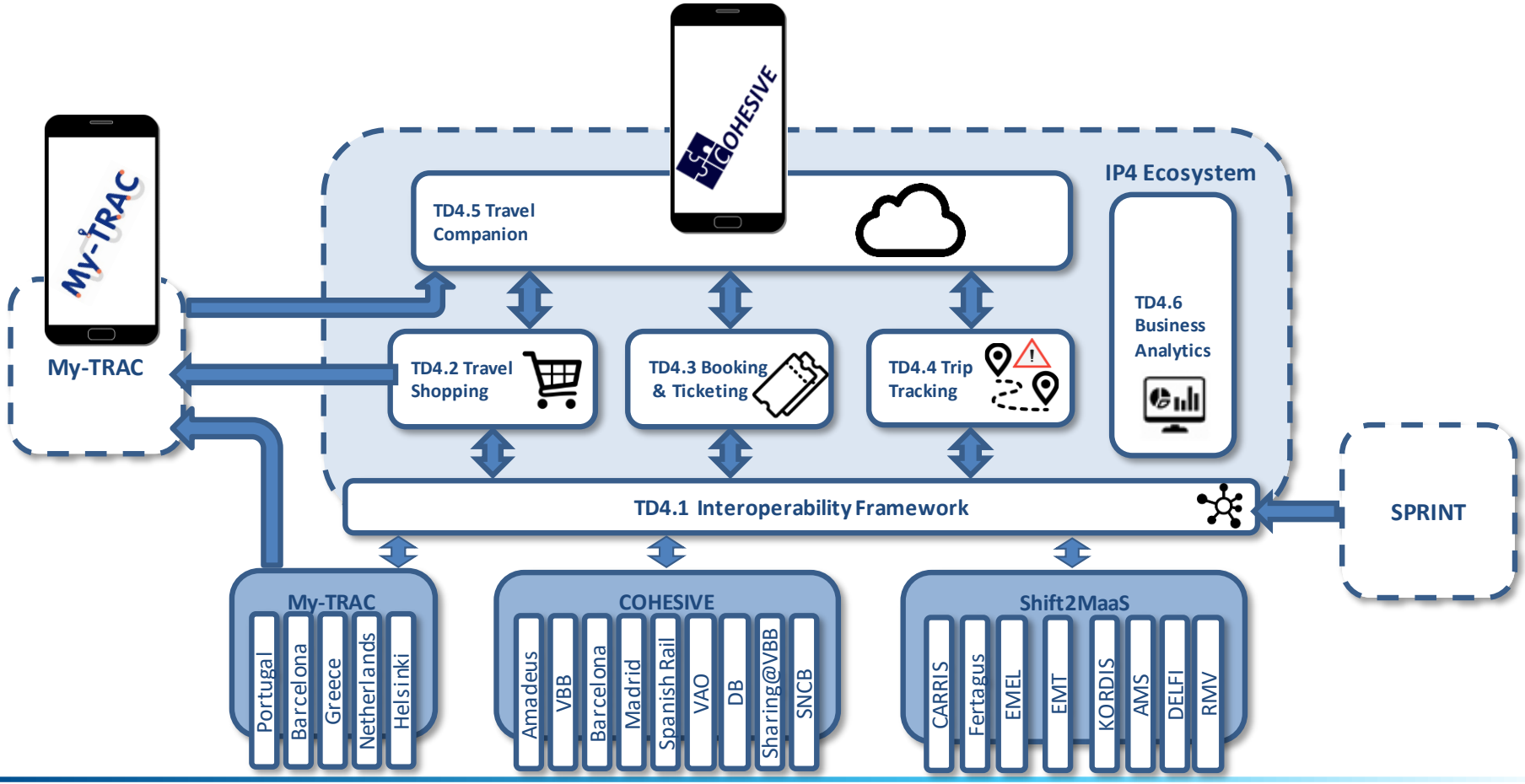
Lighthouse Project:	IT2Rail	**OC15/16:**	GoF4R and ST4RT
CFM15/16:	Co-Active and ATTRACkTIVE	**OC17:**	My-TRAC
CFM17:	CONNECTIVE and COHESIVE	**OC18:**	Shift2MaaS and SPRINT
CFM18:	MaaSIVE	**OC19:**	Ride2Rail
CFM20:	TD4.1-4.5	**OC20:**	iTD7



S2R-IP4 – Technical Architecture and Functionalities

Marco Ferreira – Thales

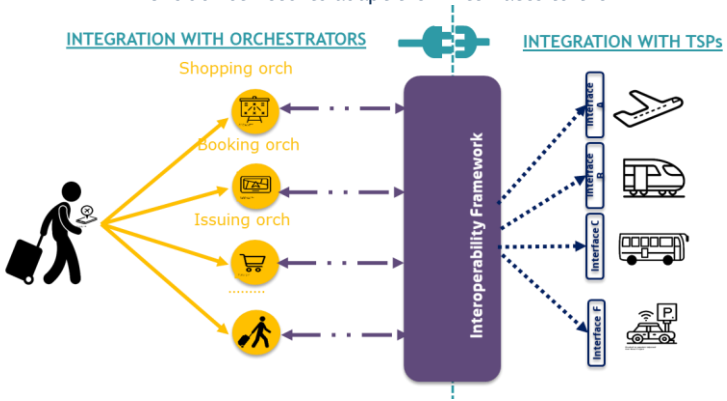
Technical Architecture



TD4.1 **Interoperability Framework** functionalities

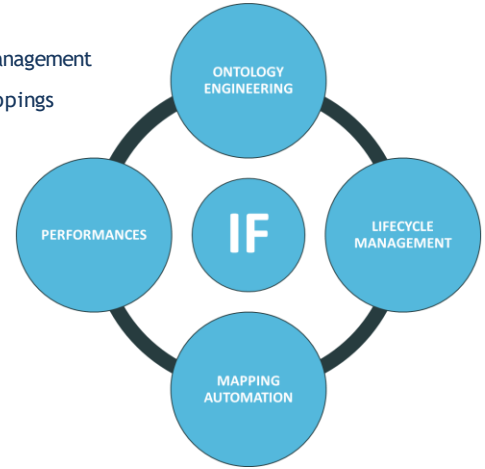
CONNECTIVE

- Development of Interoperability Framework, the component that allows interoperability in the ecosystem:
  - Allows exchanges among heterogeneous systems using different interfaces that guarantees the interoperability;
  - Access point for the services of the TSPs that are available to the ecosystem
  - Provide components that simplify the connection among the different actors, applications and TSPs
  - TSPs do not need to adapt their interfaces to the IF



sprint

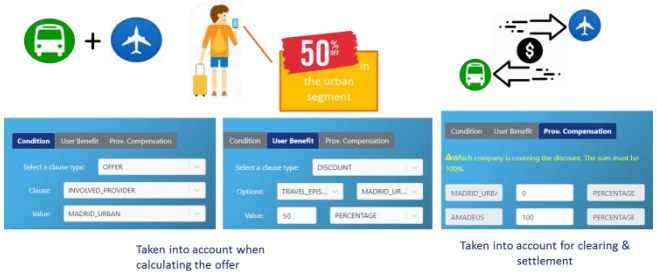
- Provides a tool to manage publication of assets in the IF ecosystem
  - Lifecycle management to support Governance
  - Integration with CI / CD to automate low level tasks
  - Provides a framework to speed up the integration of new TSP services
- Provide tools improving the performances of the IF
  - Ontology creation
  - Collaborative Ontology management
  - Simplified creation of Mappings



TD4.2 **Travel Shopping** functionalities

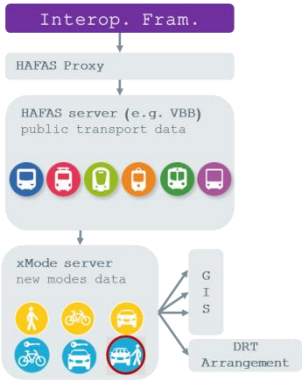
Co-Active

- Journey Planning / Offer Building
  - Modes: Urban PT, Rail, Private Car, Park, Car-Sharing, Bike-Sharing
- Meta-Network
  - Pan-European routing management
- Contractual Management Market Place (CMMP)
- Provision of Ancillary Services



MaaSive

- Journey Planning / Offer Building
  - New Modes: DRT service
  - Multi-User travel management
- Contractual Management Market Place (CMMP)
  - Mobility Packages



My-TRAC

- Social Market
  - Web based and mobile interface
  - Get offers and discounts from 3rd parties (e.g. cafes near the station, museum) with points gained by using the app
  - Transactions based on blockchain
  - Generation of a QR code
  - Two types of Users, providers and travellers

Coupon manager

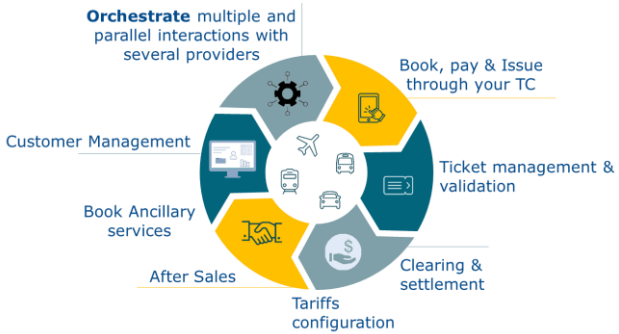
Coupon's information and QR coder

Transaction in the blockchain explorer

TD4.3 **Booking & Ticketing** functionalities

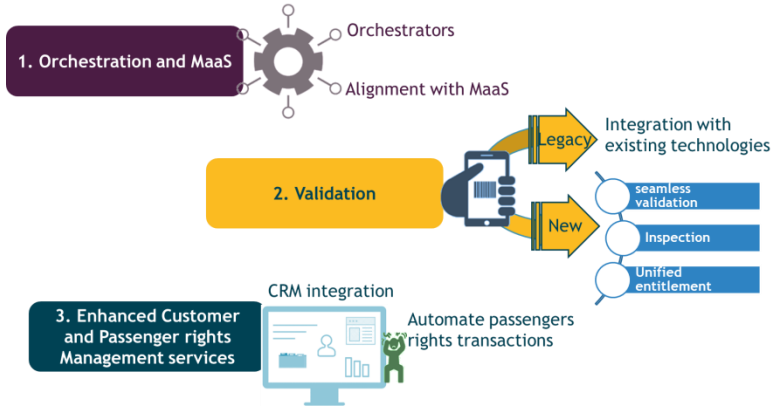
Co-Active

- Booking
- Issuing (Entitlement/Token/Embodiment)
- Payment
- Buy Ancillary services
- Clearing & Settlement
- After-Sales (Cancelation and Refund)



MaaSive

- Improve Co-Active developments
- Validation and Inspection
- Mobility Packages Issuing and usage
- Best-Price calculation
- Customer Relation Management
- Passenger rights and claims management



TD4.4 **Trip Tracking** functionalities

ATTRACkTIVE

- Trip Tracking
  - Tracking Orchestration, partial Trip Tracker and Event Sources
- Re-accommodation
- Standard pTT (GTFS/RT, SiRI-SX, VDV)
- Mobile pTT (Movement analysis and reports)
- Prognosis pTT

MaaSive

- Trip Tracking
  - Interoperability Framework integration (pTTs and data sources)
  - Group travelling management
  - Trip Tracking rules configuration
- Traveller behaviour analysis

My-TRAC

- Location API google (GPS, wi-fi, network) during traveling
- Verify selection of route with route matching algorithm (post-analysis)

TD4.5 **Travel Companion** functionalities

ATTRACkTIVE

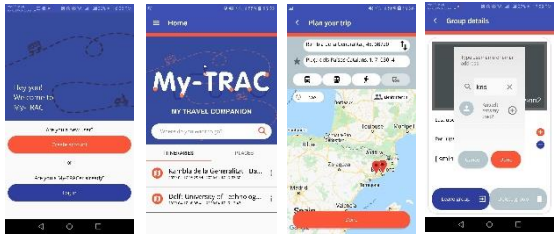
- Personal Application
  - Integrated mobility services interface with the traveller
  - Tickets handling, Alert management, Traveller feedback, Navigation (Smart Watch), Location Based experiences
- Cloud Wallet
  - Manage traveller profiles, preferences and digital tickets
- Location Based Experiences Editor
  - LBE editor for the creation, design, and publication of location based experiences by stakeholders.

MaaSive

- Personal Application
  - New web-based interface
  - Group travelling interface management
  - Share travel status for both travellers and stakeholders
  - Location based experiences supporting new devices (Watches/Glasses)
- Cloud Wallet
  - Manage electronic payment (entitlements and tokens) for validation and inspection
  - Manage account and preferences through the web browser
- Location Based Experiences Editor
  - LBE Composer for the creation and publication of location based experiences on glasses.

My-TRAC

- Personal Application
  - Mobile interface
  - Models deployed and integrated, running in the backend (mode, time of departure, route, activity and recommendation choice models)
  - Personalized UI/UX low vision and high contrast skins for people with visual disabilities
- User profile
  - Demographics details, travel behavioral analytics, social networks animation
  - Group information

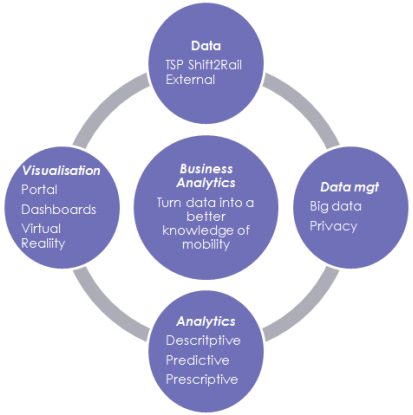


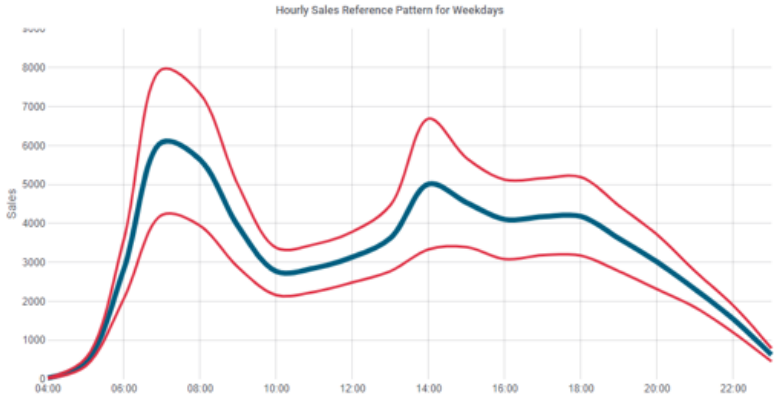
TD4.6 **Business Analytics** functionalities

Shift2Rail

CONNECTIVE

- Provide implementation of architectures for Business Analytics in IP4
- Explore analytics that could be provided: Descriptive, Predictive, Prescriptive Analytics
  - Development of KPIs, prediction algorithms and decision support algorithms
  - Current data provided by operators. Other sources could be considered, such as data obtained from IP4 ecosystem
- Data Visualization
  - Dashboards, Visualization Portal, Virtual Reality
- Privacy algorithms
  - Data anonymization algorithms





S2R-IP4 Functionalities

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iTD4.7 Integration and demonstration

COHESIVE

- Coordinate the interfaces amongst IP4 projects, promoting convergence
- Integration and testing of the different TDs, creating demonstration releases
- Dissemination of result and concepts developed in IP4

Integrated modes

- Amadeus > pan-European
- SNCB, VAO
- DB, Spanish Rail*
- VBB, MAD, BCN, CXX*
- Park, Toll (@MAD, @BCN)
- Sharing (@VBB)

*simulated data

Shift2MaaS

- Design the demonstrations for S2R IP4 deployment
- Deliver necessary support to the COHESIVE project to implement successful demonstrations in 3 European sites
- Guarantee a technical coordination interface with the S2R IP4 projects (in particular COHESIVE, CONNECTIVE and MaaSive)
- Assess the impact of S2R IP4 ecosystem on the selected demo sites

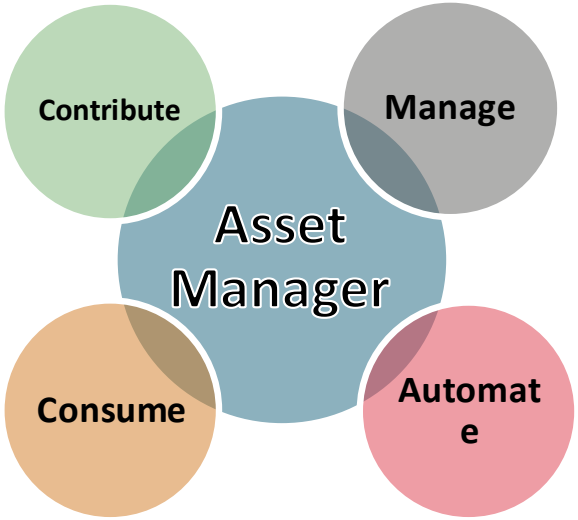
Questions ?

TSP Registration Scenario

Alessio Carenini – CEFRIEL

Travel Service Provider registration in the IP4 ecosystem

- Data used: GTFS feed
- Persona: EMT Malaga representative
- Scenario
  - EMT Malaga joins the IP4 ecosystem and submit their data
  - IP4 technical management board reviews the submission and approves it
  - Consumers can see EMT contributions



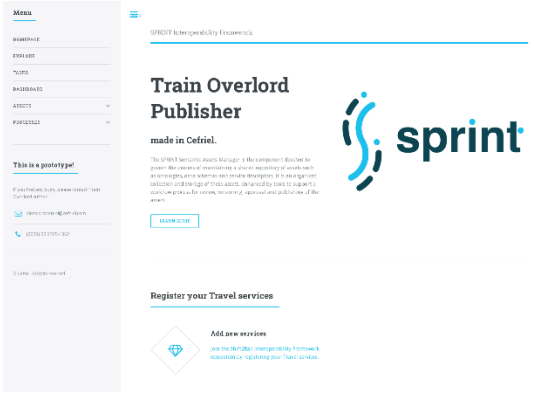
TSP Registration Scenario:

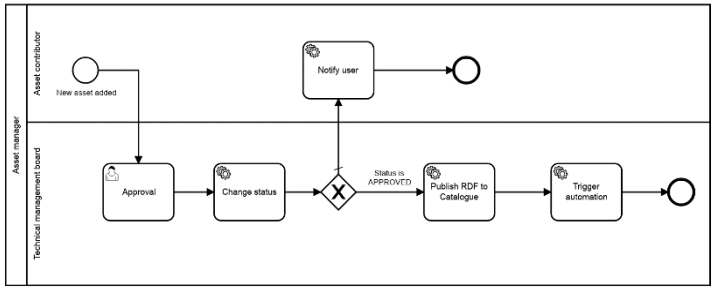
The User adds his services in the Catalogue

Main functionalities used on the scenario

Regulated sovereignty environment

1. Define roles
2. Define responsibilities
3. Draw the lifecycle management process
4. Enforce the process through the Asset manager
   - User tasks
   - Notifications
   - Triggering of continuous delivery



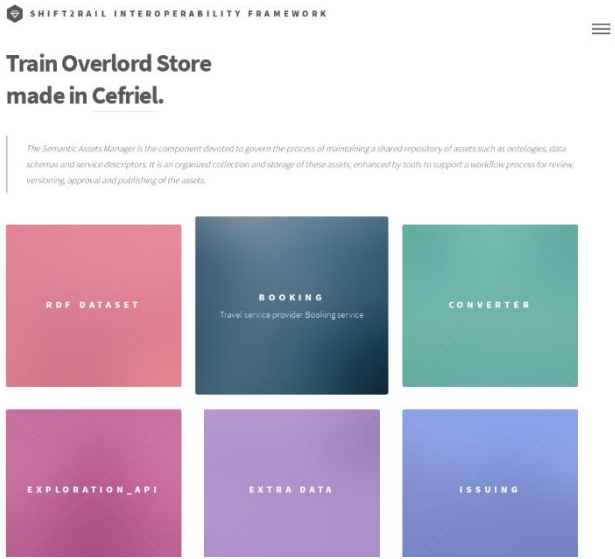


Dataset Publication Scenario

Alessio Carenini – CEFRIEL

Dataset publication and consumer access

- Data used
  - Journey planning information provided by EMT Malaga (GTFS feed)
- Persona
  - MaaS operator
- Scenario
  - EMT Malaga has published assets describing their services
  - A MaaS operator wants to obtain EMT Malaga GTFS feed



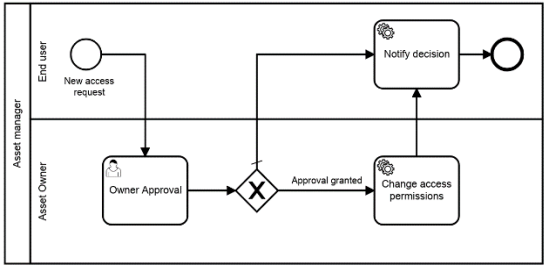
Dataset publication and user access scenario:

The Consumer user browses the Catalogue and asks for the permission to access the EMT Malaga GTFS feed

Main functionalities used on the scenario

- **Asset consumer**
  - Finds an asset
  - Reads basic information
  - Asks for the permission to access it

- **Asset owner decides who has access to it**
  - Receive notifications for access requests
  - Allow consumer access
  - Revoke access

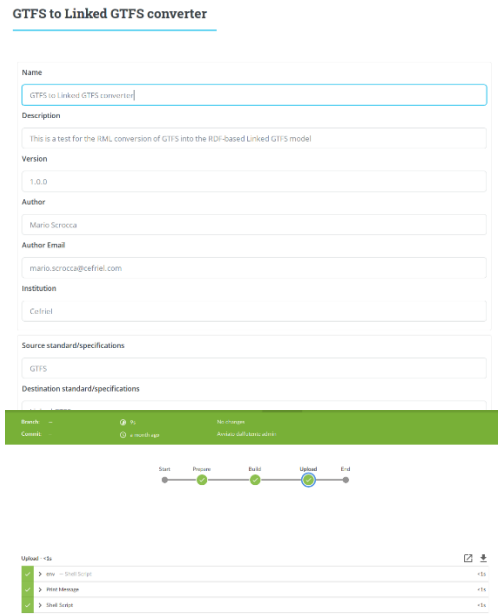


Automatic Converter Creation Scenario

Alessio Carenini – CEFRIEL

Converter publication and access

- Data used
  - GTFS to Linked GTFS RML mappings
  - Linked GTFS ontology
- Persona
  - Developer
- Scenario
  - The IP4 developer want to integrate the TSP services inside the ecosystem, reusing transformation rules already published
  - The Asset Manager creates the microservice to ease the integration of the TSP in the IP4 ecosystem



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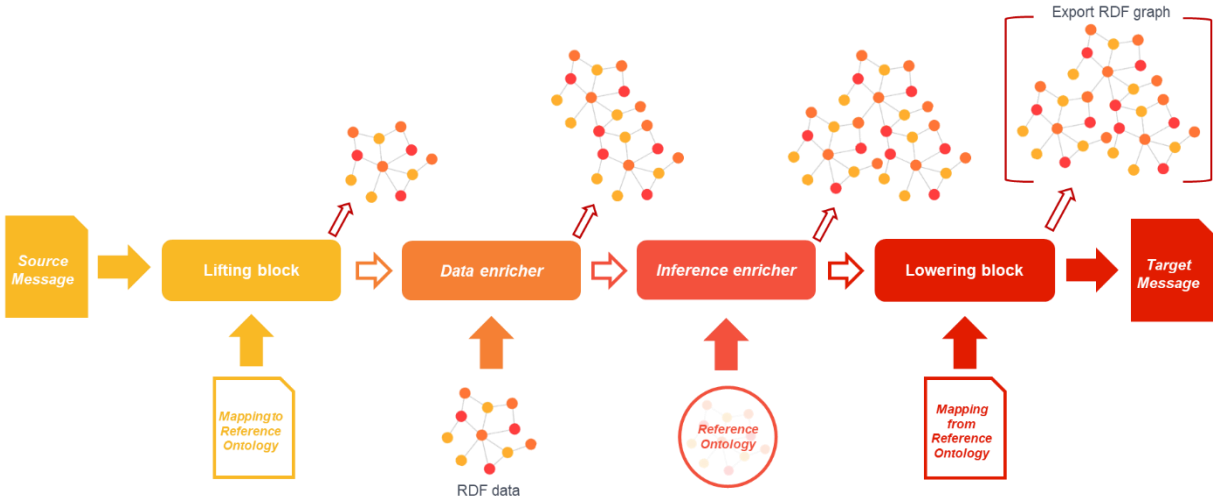
Automatic Converter creation scenario:

The Developer browses through the available mappings

Main functionalities used on the scenario

- **Asset automation**
  - Asset reuse
  - Creation of deployable artifacts
  - Continuous deployment
- **Converter**
  - Message-to-message conversion
  - Low-code framework
  - Allows integration in real environments



Mobility Package Creation Scenario

Juan Castro – Indra

Creation of Mobility Packages in CMMP

- **Operators**
  - MaaS Madrid* is a MaaS operator
  - Bus Madrid* is a Bus Operator
  - Metro Madrid* is a Metro Operator
- **Scenario**
  - MaaS Madrid wants to create a Mobility Package in Madrid
  - The Mobility Package will include Bus and Metro Tickets
  - CMMP creates a valid contract among the involved operators
  - The Mobility Package is available in the IP4 Travel Companion

Contractual Management Market Place

**The operators used in this scenario do not represent real operators*

Mobility Package Creation Scenario

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None of the Operators that appear in the video represent any real operators

Main functionalities used on the scenario

- **Operator Portal**
  - Access Point for IP4 Operator Tools
- **Contractual Management Market Place**
  - Uploading NETEX Products and Tariffs
  - Creation of Mobility Packages
    - Using Operator Tariffs
    - Compensation for Operators
    - Signature functionality
- **IP4 Travel Companion**
  - Buying Mobility Packages

Business Analytics Scenario

Juan Castro – Indra

Business Analytics Goals

Take advantage of the data existing/generated in the ecosystem and provide useful information for travellers and TSP.

- Punctuality
- Service Quality
- Most Used Modes

- Crowed Stations
- Favorite Destinations
- Revenues per mode

- Incidents in the line

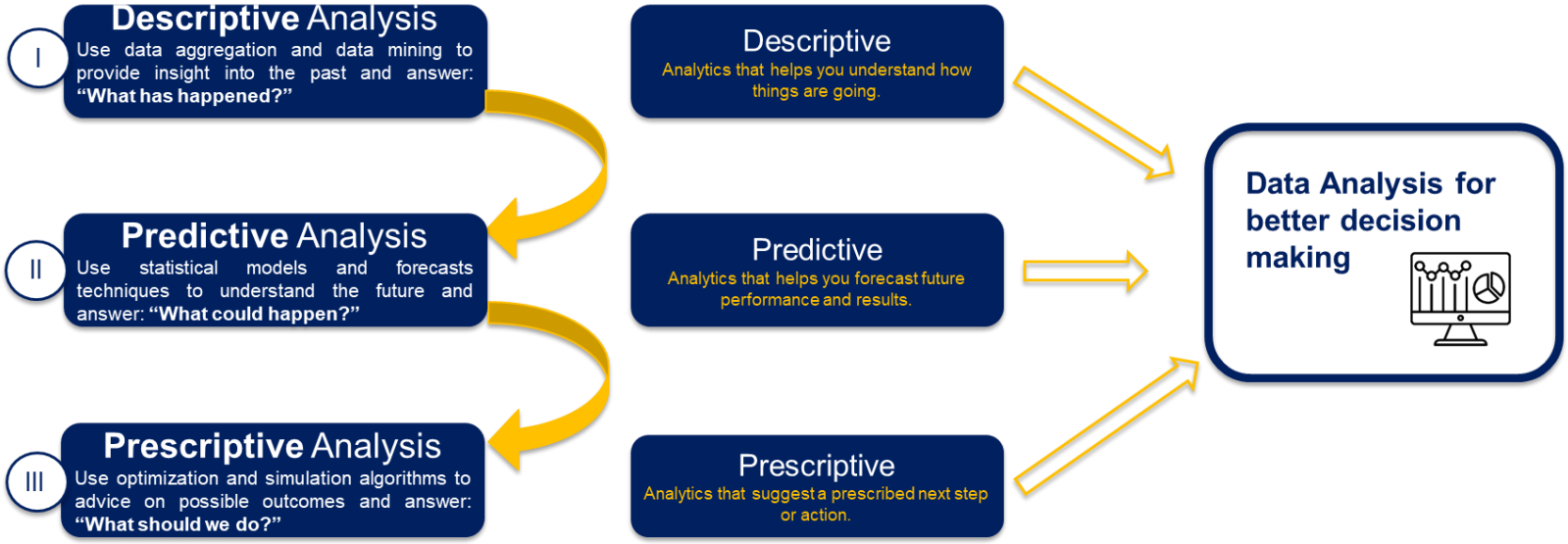
DATA
- Operational data coming from TSP's systems
- S2R applications data
- Data coming from travelers
- Other external data: open data, social network data

MANAGEMENT
- Anonymization techniques to guarantee privacy and confidentiality
- Consideration of GDPR

ANALYTICS
- Descriptive
- Predictive
- Prescriptive

VISUALIZATION
- Interactive and dynamic visualization capabilities

Types of Analysis

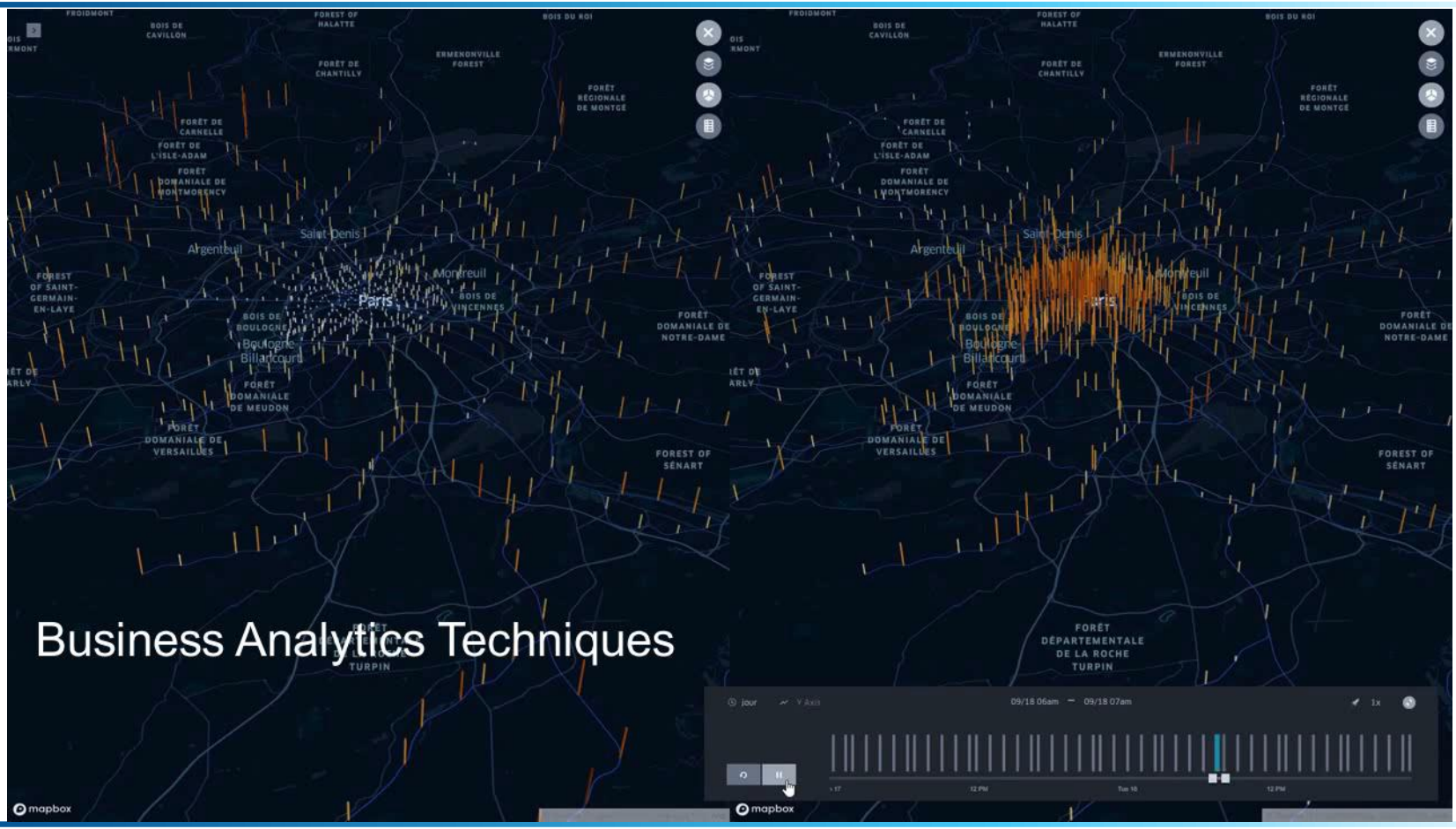


Business Analytics Techniques

- **Datasets**
  - Validations data
  - Weather data
  - Maintenance data
- **Scenario**
  - Descriptive Analysis
    - Visualization Techniques (3D Mapping)
    - Correlation of different sources

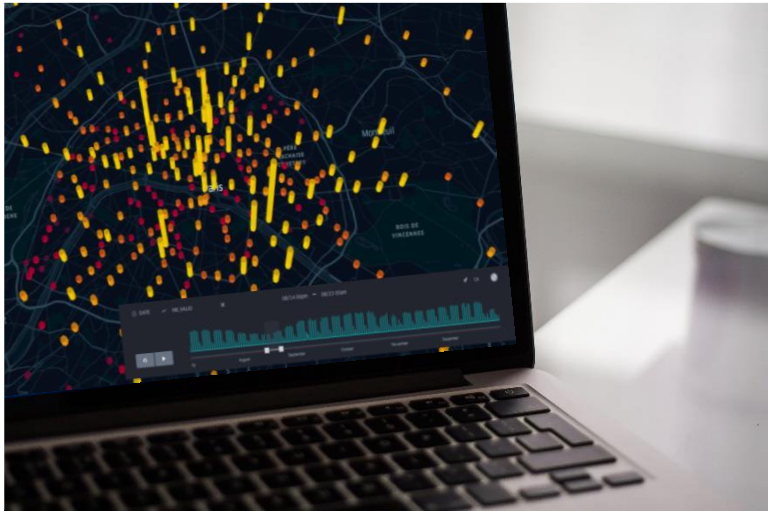
**The operators used in this scenario do not represent real operators*

Business Analytics Scenario



Main functionalities used on the scenario

- **Visualization Techniques (3D Map)**
  - Validations per station
  - Entries and exits in a line
  - Expected station exits per origin
- **Correlation different data sources**
  - Maintenance Weather
  - Weather
  - Traffic
  - Validations



Questions ?

Conclusion

Thank you for your attention

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