

Presentation of Shift2Rail innovations: Mobility as a Service (MaaS); Autonomous train operations; Logistics as a service

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S2R Joint Undertaking



USER FIRST



AN OPEN and ACTIVE ORGANISATION



28
MEMBERS



375
PARTICIPANTS INVOLVED
FROM **28** COUNTRIES



101
SMEs



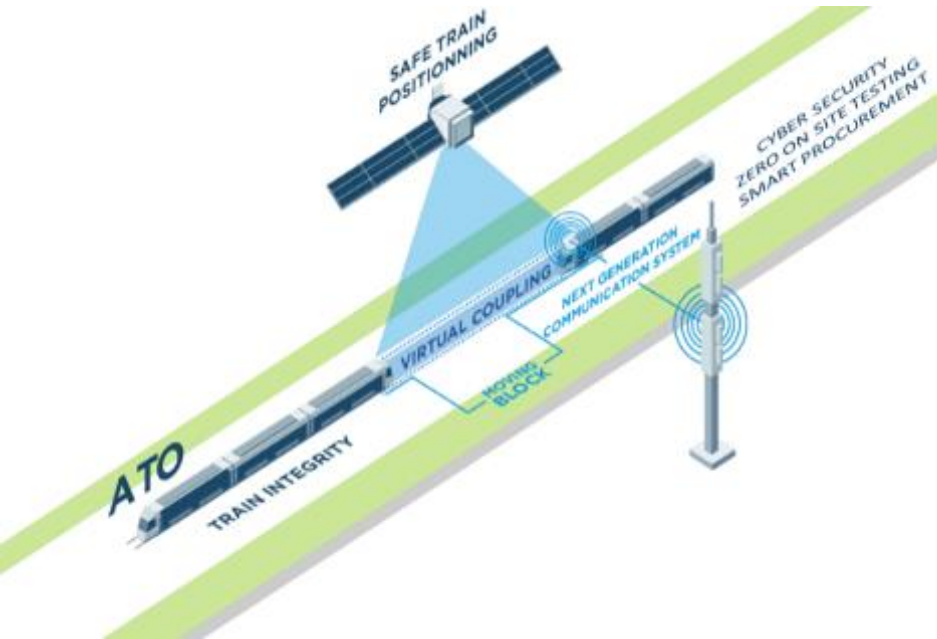
103
RESEARCH CENTRES
AND UNIVERSITIES

¹Data extracted from CORDA database in February, 2019



...opening up new Capabilities coming from emerging technologies or concepts!

Towards autonomous train operations



	Grade of automation	Train operation	Setting the train in motion	Driving and stopping the train	Opening and closing the doors	Operation in the event of disruptions
The work of Shift2Rail from 2016-2019	1	ATP with a driver	Driver	Driver	Driver	Driver
	2	ATP and ATO with a driver	Driver / Automatic	Automatic	Driver	Driver
The work of Shift2Rail from 2019-2022	3	Driverless	Automatic	Automatic	Automatic / Attendant	Attendant
	4	Unattended	Automatic	Automatic	Automatic	Automatic

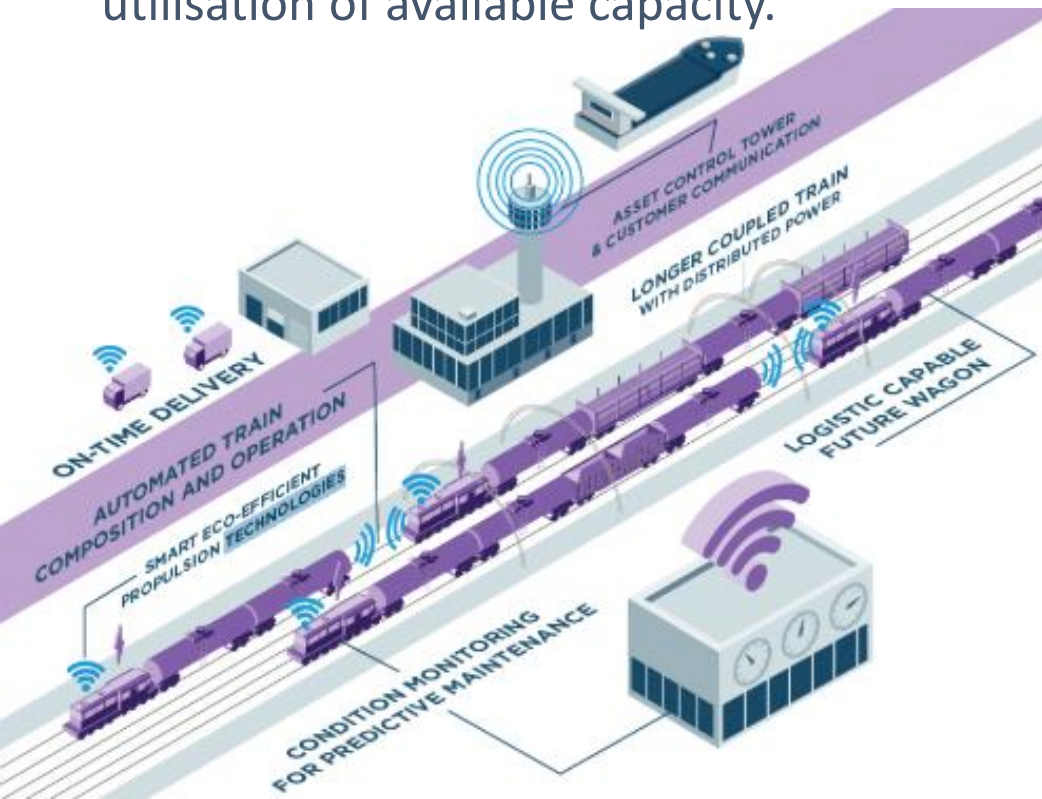
ATP - Automatic Train Protection
ATO - Automatic Train Operation




First step: two trams virtually coupled
A world-premiere proof of concept (InnoTrans 2018)

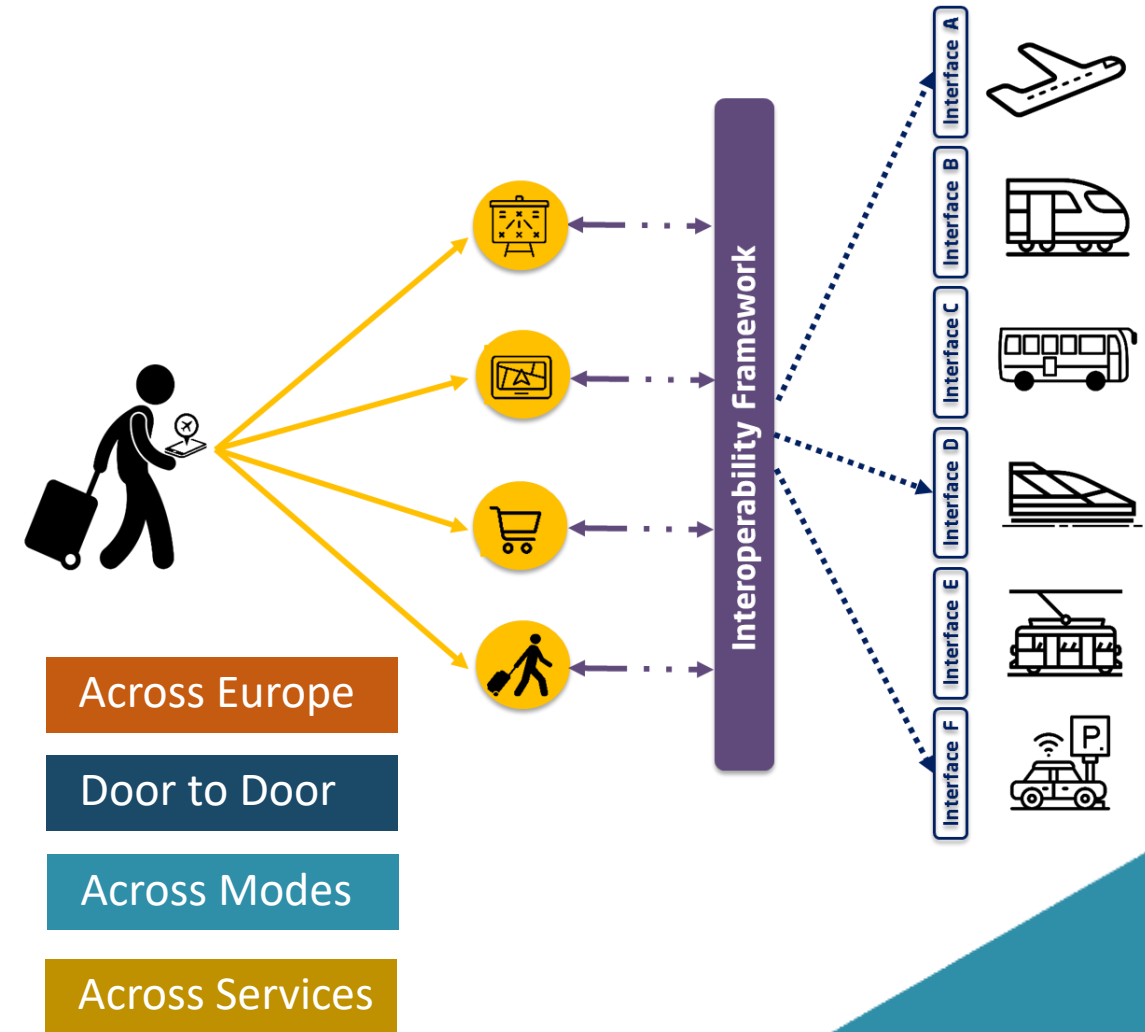
Technologies for Sustainable & Attractive European Rail Freight

- ✓ Fleet Digitalisation and Automation : Digitisation of Rolling Stock leads to smart, connected assets that offer the necessary information for **improved services** and also is a pre-condition for efficient and reliable **automated freight trains**.
- ✓ Digital Transport Management :Optimise **service planning and operation** and support better utilisation of available capacity.



Towards logistics as a service

Integrating mobility as a service in a wider ecosystem



IPx: looking beyond S2R currently planned technology applications and integrating them with disruptive innovations

Activities just started or to be started

1. Concepts for the autonomous railway vehicles “train-centric”
2. Disruptive technologies impacting automation systems and maintenance
3. Full system and life-cycle analysis on mobility as a service (MaaS), industry 4.0 (automated industry and industry as a service), railway clouds and decentralised ownership
4. A.I. for railways Digital solutions (breaking language barriers)

✓ S2R System Architecture and Conceptual Data Model :

1. aligning all ongoing modelling initiatives in terms of modelling principles and digital data exchange format
2. comprehensive model/architecture, technologies and strategy for implementation of a new encompassing railway system approach

NEXT STEP?

maybe overall mobility on demand ? Not only allocation of resources within given services but moving more with less (allocation within given spaces)

... to be continued



Results achieved so far in the Shift2Rail R&I programme MaaS – Mobility as a Service

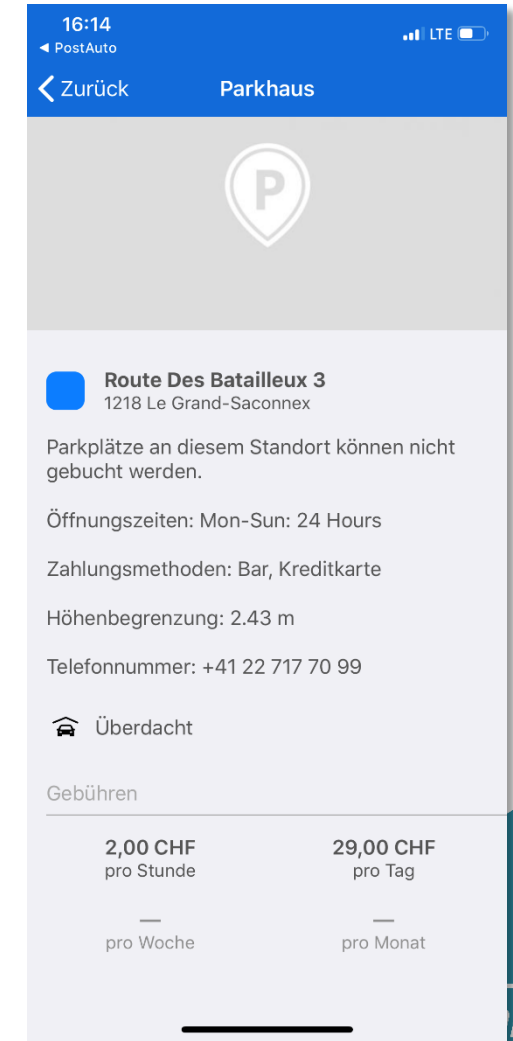
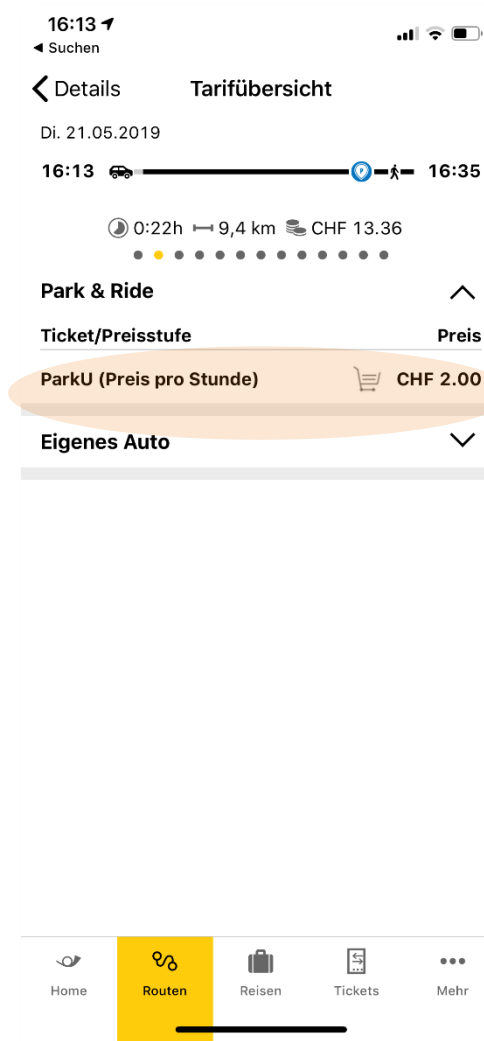
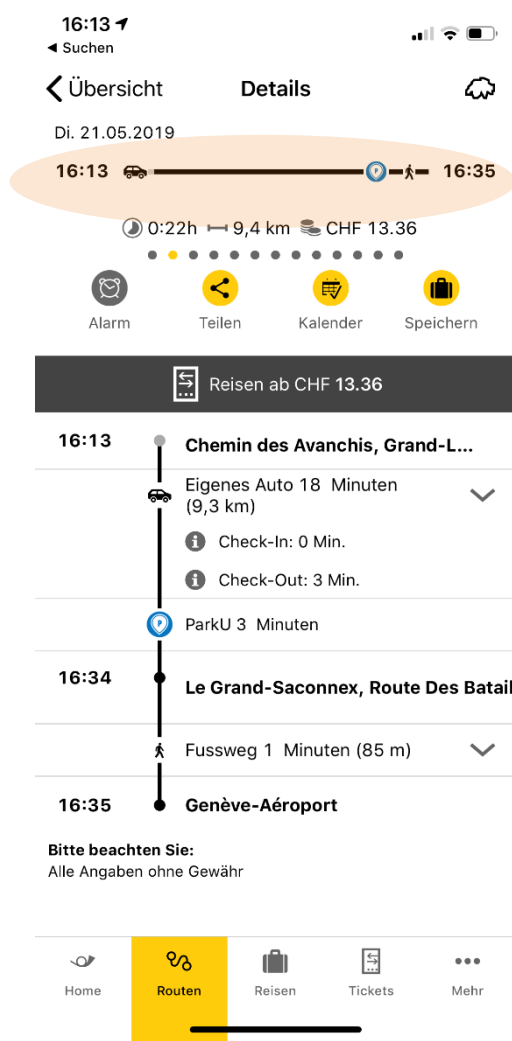
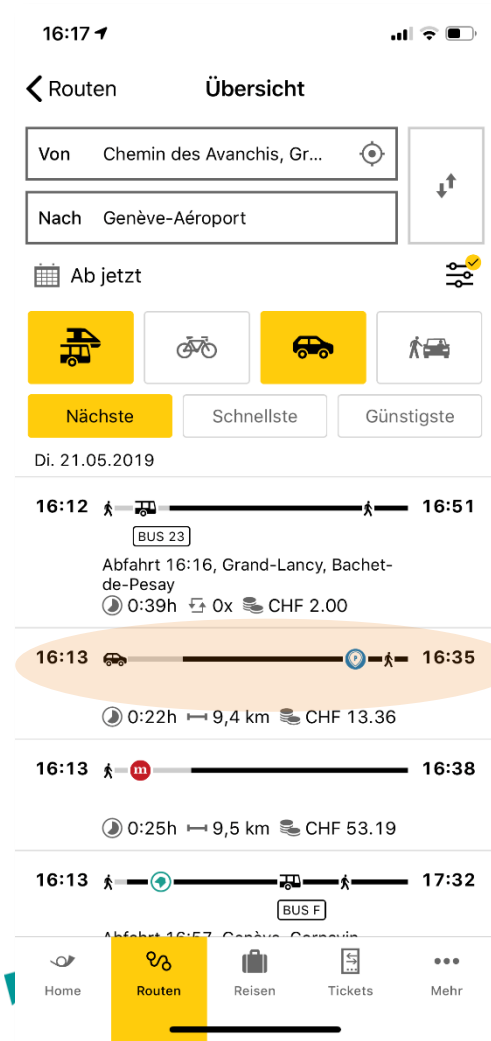
Dirk Esters

Head of HAFAS research and development and COO of HAFAS

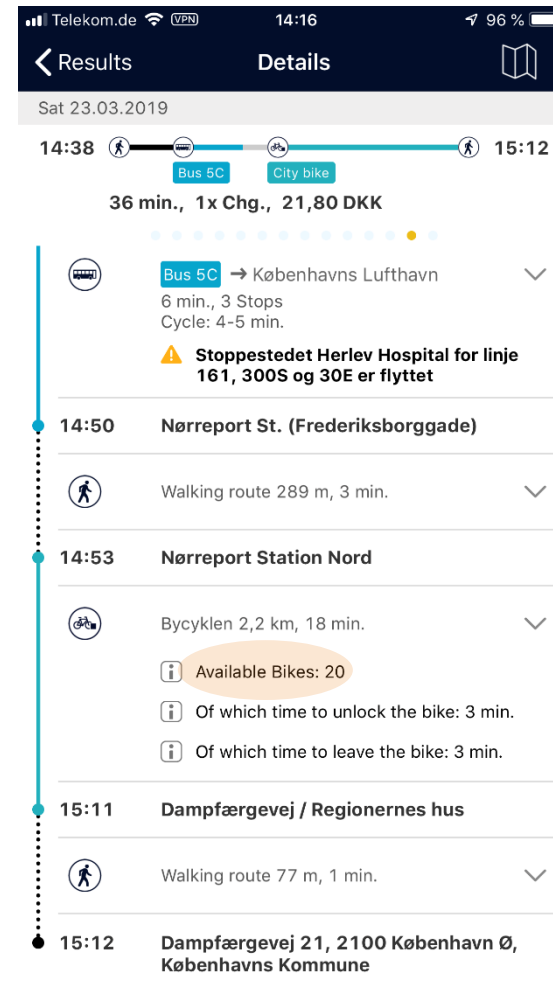
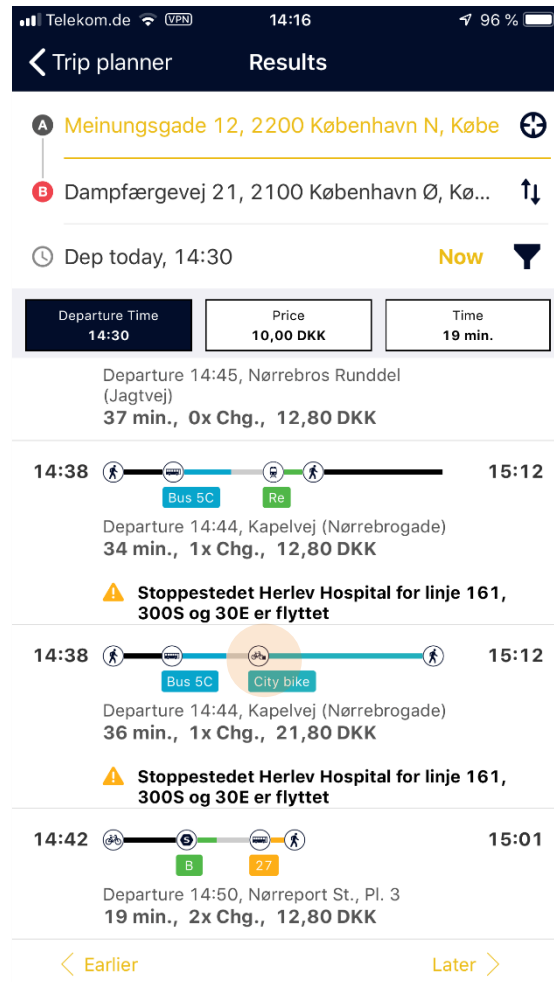
HaCon



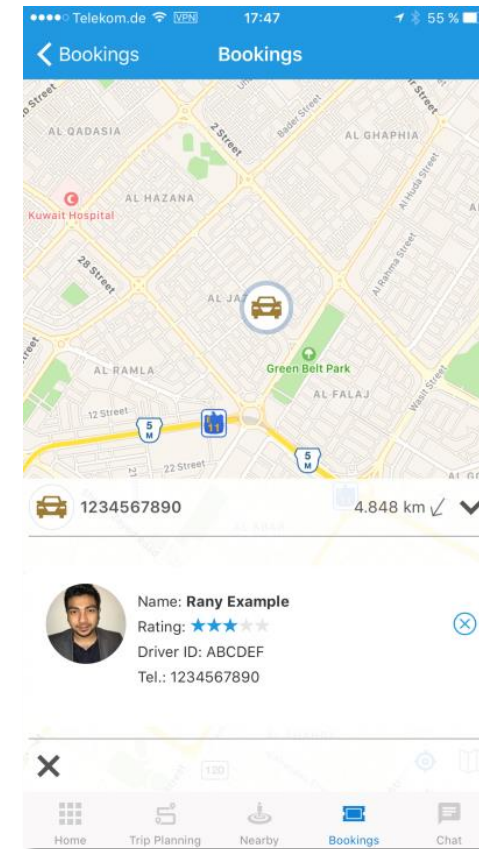
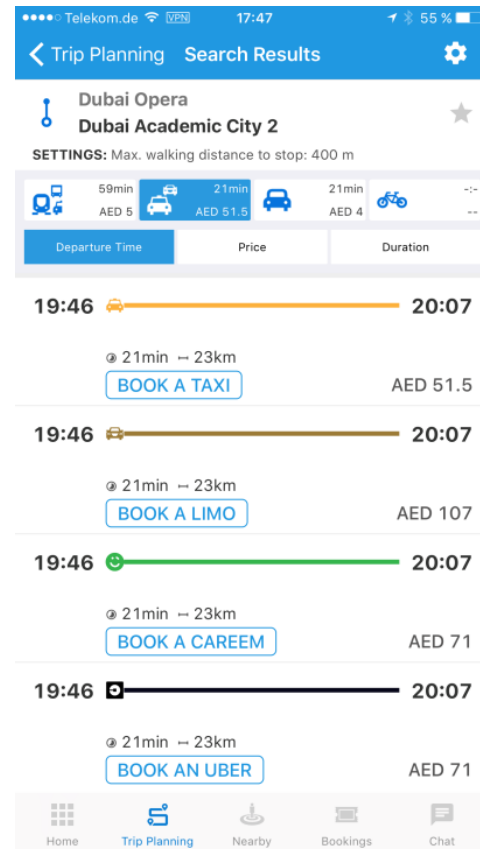
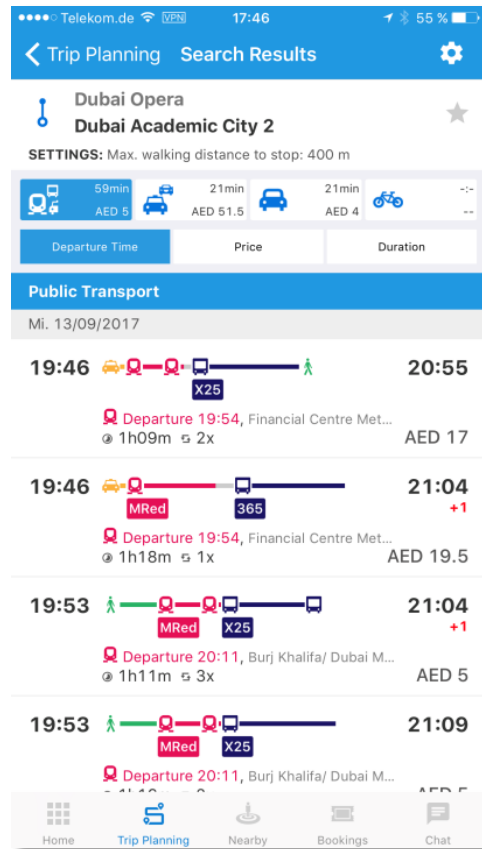
MaaS Projects – Postauto Switzerland



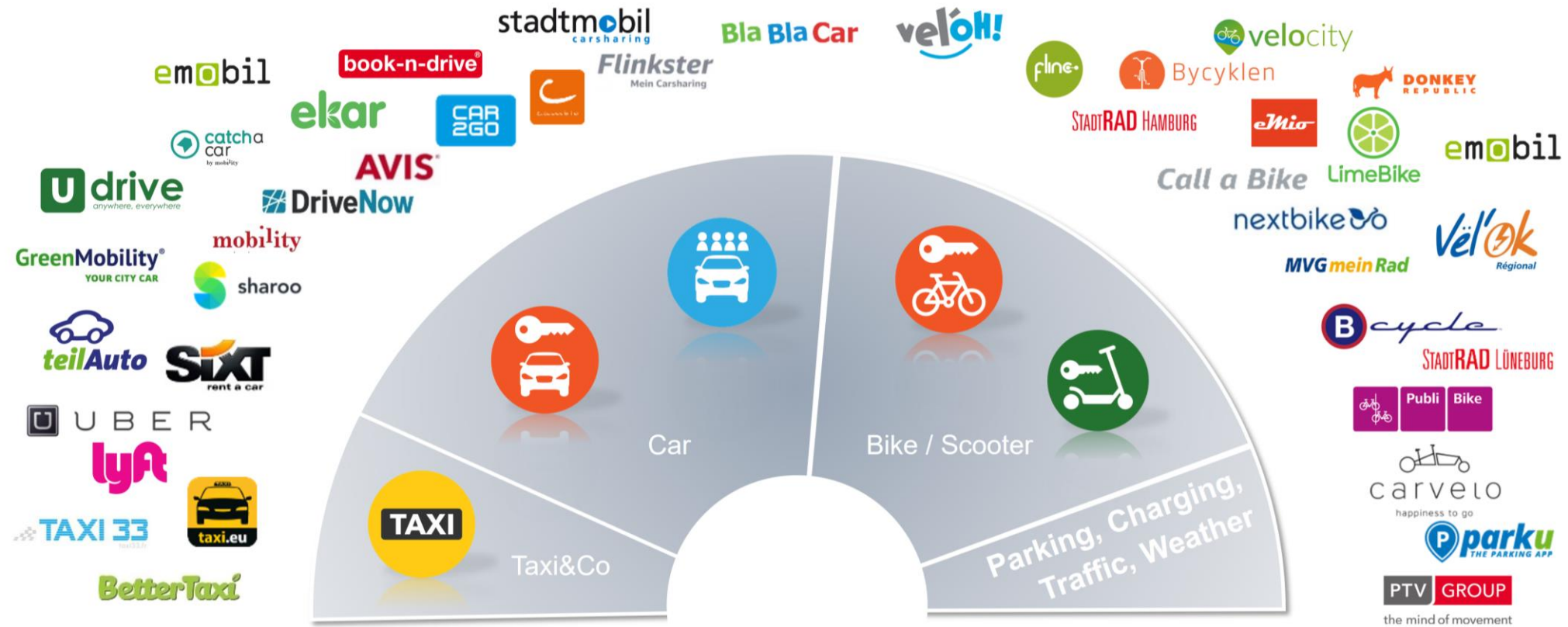
MaaS Projects - Rejseplanen



MaaS Projects – Dubai S'Hail



Integrated Mobility Provider



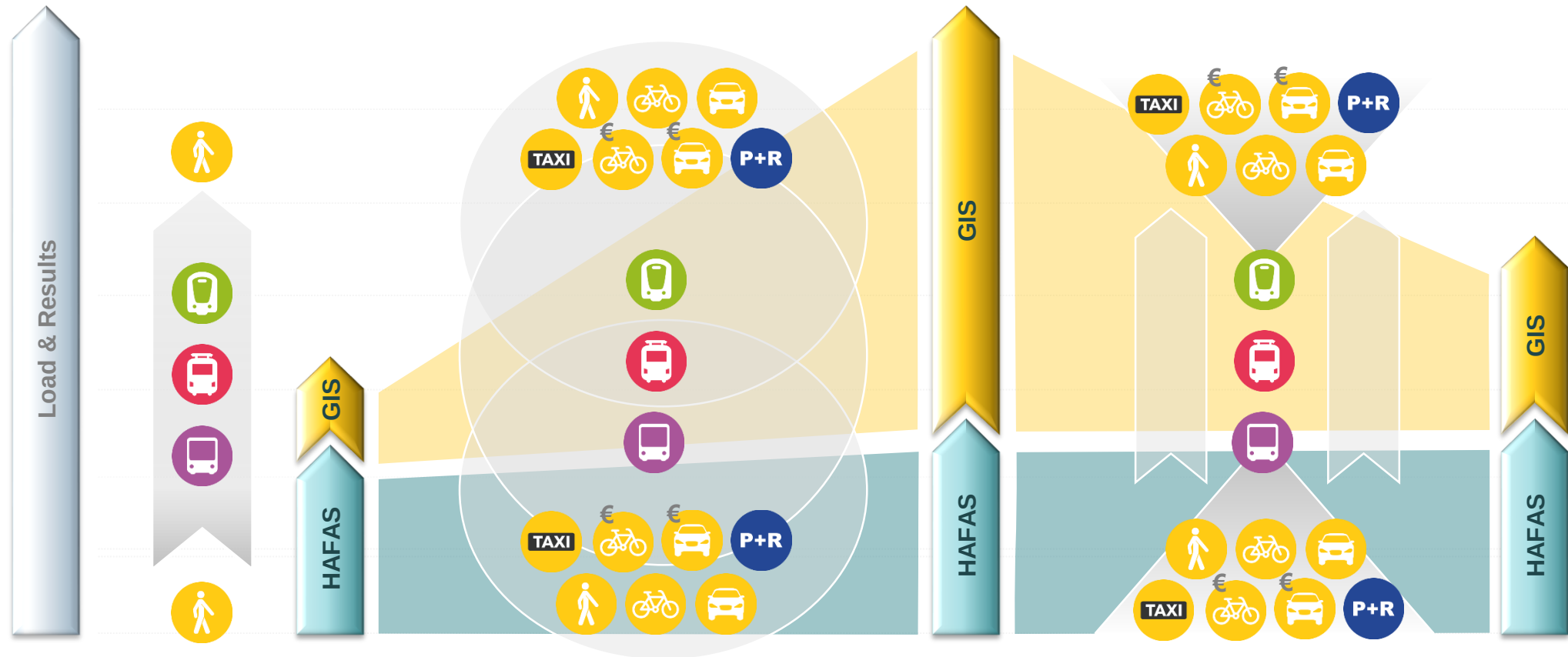
MaaS in Rural Areas



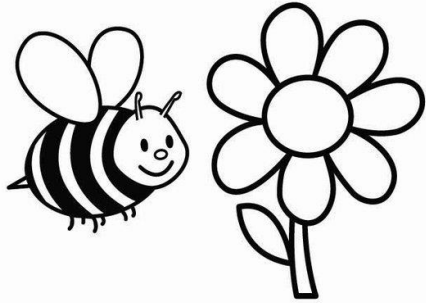
Urban mobility



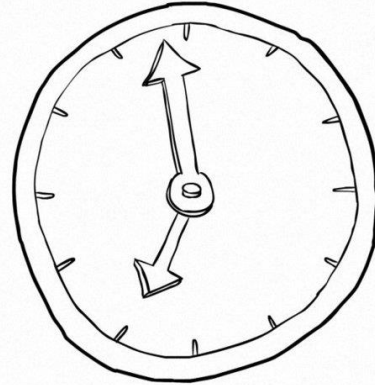
Computing Load of MaaS-Platforms



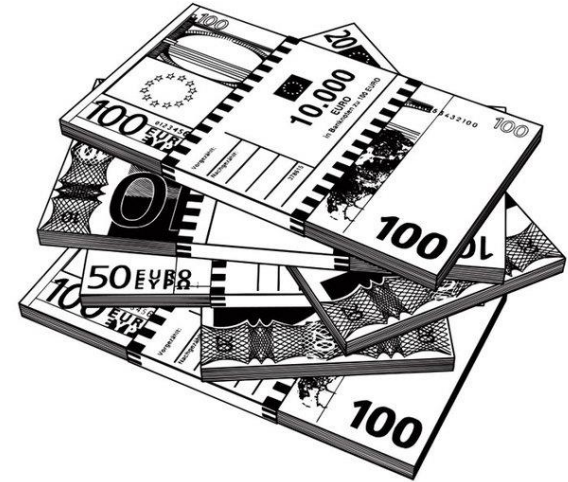
One challenge of MaaS: meet the criterias



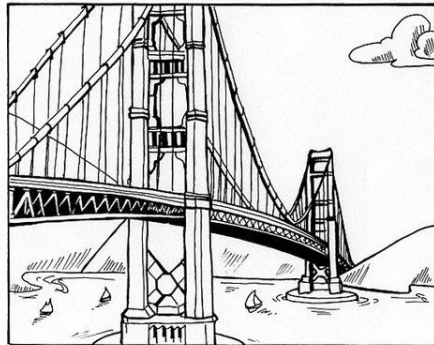
Environment



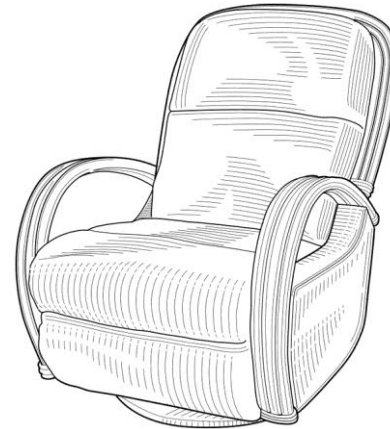
Travel Time



Price



Stability



Comfort

But.....

- This happens in the „HaCon“ world
- In most cases regional/national coverage
- We are on the level of information, in most cases only booking/payment for public transport
- Partly missing real time information from third parties

S2R IP4 goals = foster MaaS

- Provide **pan-European** door-to-door journeys (One-stop-shop)
- Multimodal journeys (Rail, Urban, Coach, Air, Shared- and Private modes, Toll, Parking, etc.)
- Provide a **multimodal framework** that enable the deployment of a MaaS environment
- **Facilitate the inclusion of transport service providers in the ecosystem**
- Promote IP4 technical demonstrators through a set of pilots
- **Allow third-parties to use the framework**, to provide enhanced services
- Foster rail as the backbone for mobility in Europe

IP4 Overview

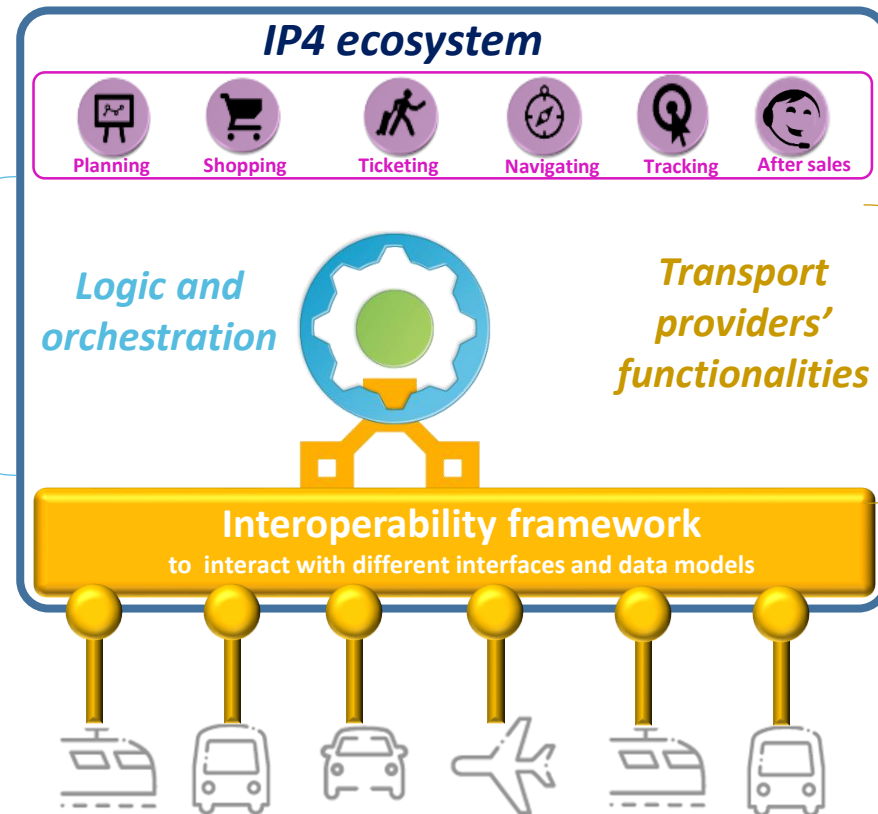


Travel Companion

- Unique ID
- Tickets stored in Virtual Wallet
- Services tailored to preferences
- Real time notifications
- Location Based Experiences

Traveller services

- Dialogues with each provider
- Integration of data
- Logic for added value services



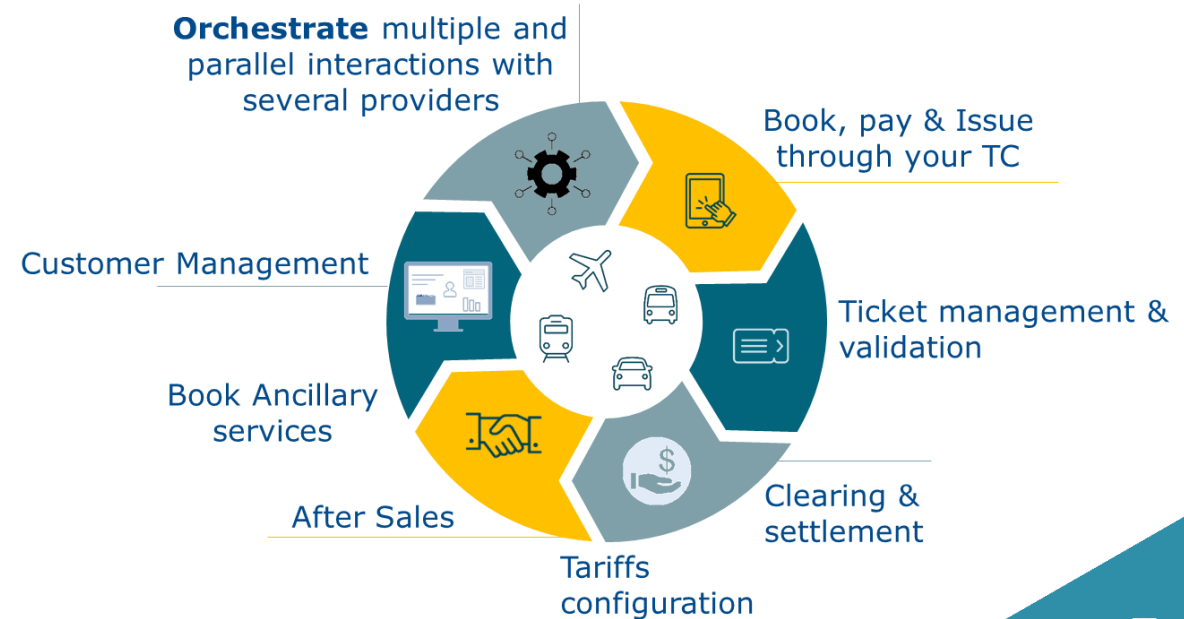
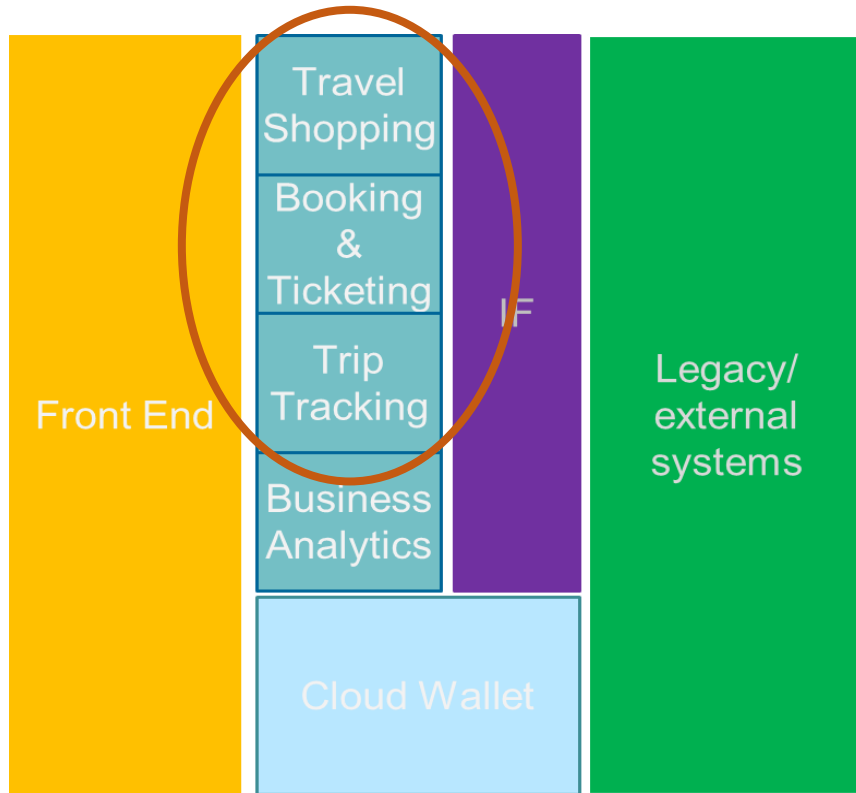
- Clearing & Settlement
- Configuration of multimodal agreements
- Business Analytics

IP4 Solutions so far:

- Seamless Multimodal Travel: Pan-European Door-to-Door Functionalities for
 - Planning
 - Booking
 - Trip tracking
- Travel Companion-Personal Application
 - Access to all Services
 - One-Stop-Shop = One face to the customer
 - Hide the complexity
- Interoperability Framework
 - Allow easy integration of the TSP capabilities

Seamless Multimodal Travel

The seamless multimodal travel experience solution provides an eco-system which allows one-stop-shops for pan-European door-to-door itineraries including multimodal travel planning, booking, ticketing and payment, trip tracking and additional services.



Travel Companion

The travel companion-personal application provides access to European door-to-door multimodal transport services through a unique user interface. It will enable the user to access information related to travel services and real time information.



Create moments beyond new forms of Location-Based Experiences aiming to make travels more engaging and attractive for the passengers.

Provide Navigation assistance at interchanges for indoor and outdoor locations.

Allow user to share information by enriching the travel companion user interface with new functions such as social interactions.

Real time & feedback

Give travellers real-time and accurate information and provide support in case of disruption. Continuous support to passengers during the trip by managing travel disruptions and offer one-click options for rebooking. Value traveller feedback.

Location Based Experiences

The travel companion

Preferences

Manage and remember traveller preferences. Fine-tune messaging and offers according to the travellers needs.

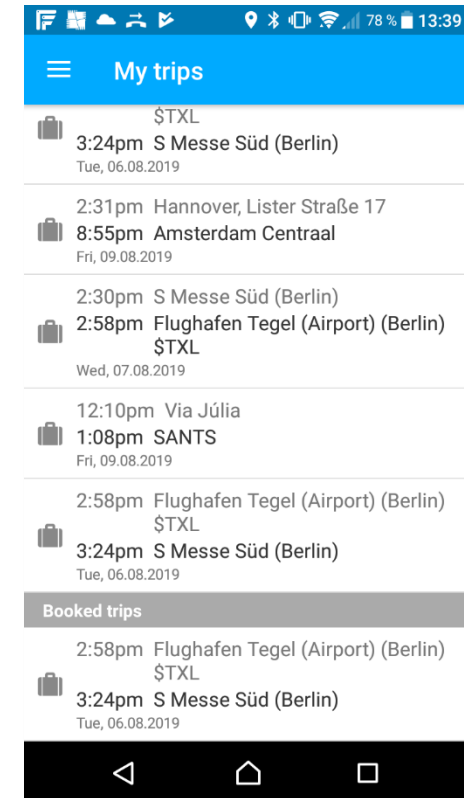
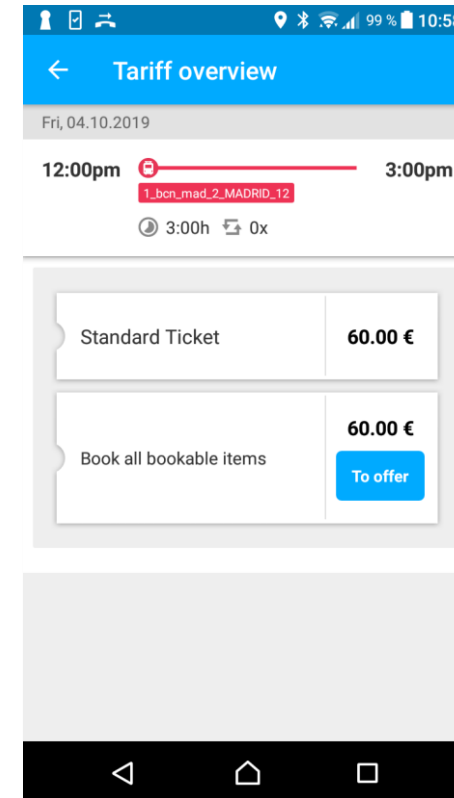
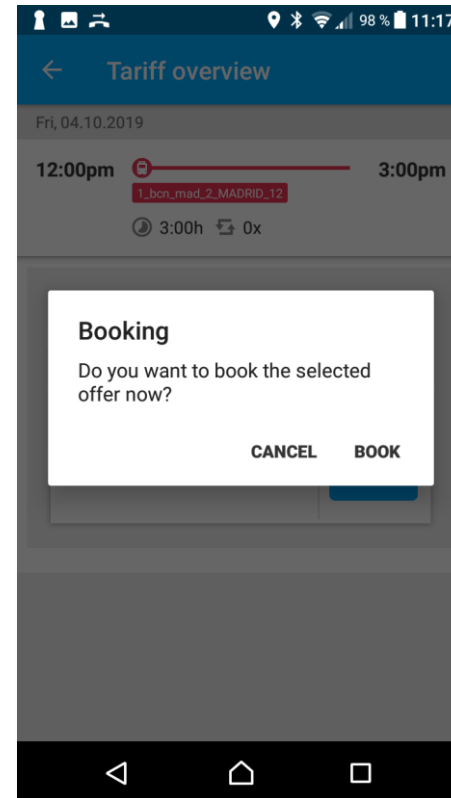
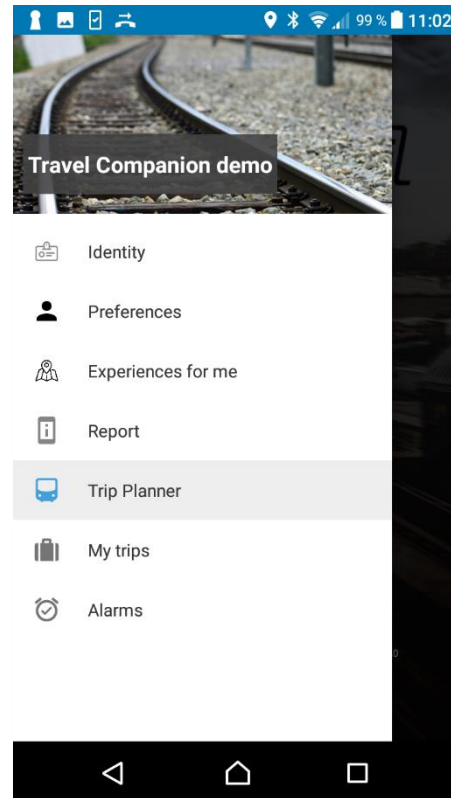
Navigation

Multi-user

Shared information

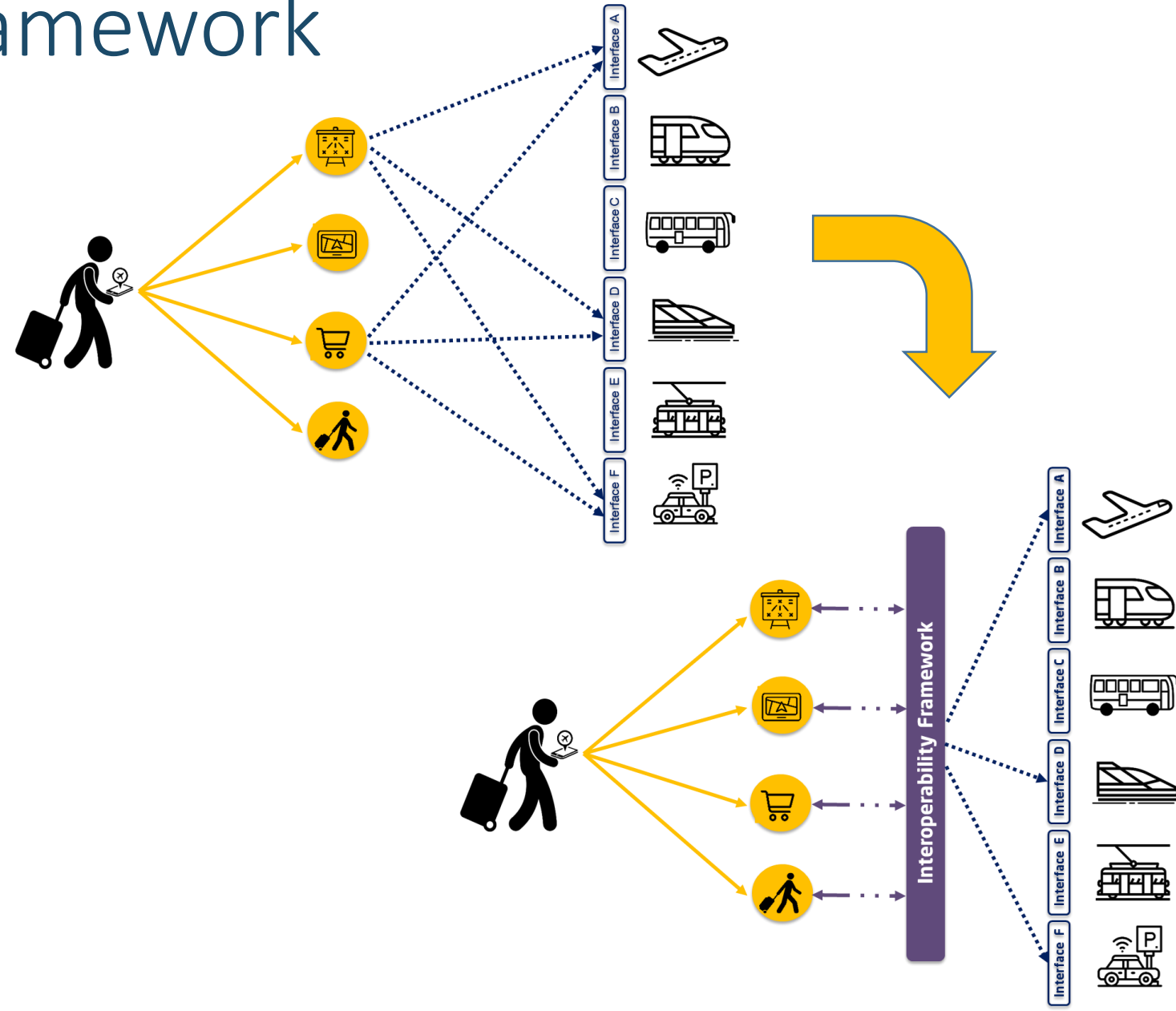
Interact with travellers and take into account new services such as multi-User and group.

Travel Companion



Interoperability Framework

The Interoperability Framework (IF) solutions will foster the digital transformation of the transport ecosystem and facilitate interoperability among heterogeneous system to make possible the provision of multimodal services that combine information/services from different TSPs.



Next in „MaaSive“

- Integration of additional modes, like DRT
- handling of MaaS-Tariffs, incl.
 - configuration
 - calculation and clearing schemas
 - Easy inspections and validation
 - Introduction of Best Price Guaranties
- Allow claiming of Passenger Rights
- Allowing MUC (MultiUserCapabilities)

Save the date

- ATTRACKTIVE +CoActive Final Event:
 - 5th November in Brussels
- TRA2020 (April 2020 in Helsinki)
 - 2nd joint Demonstration of IP4 results
- InnoTrans (September 2020 in Berlin)
 - 3rd joint Demonstration of IP4 results