Towards interoperable ticketing in railway

Einar Bjørkevoll, Leading Information Architect

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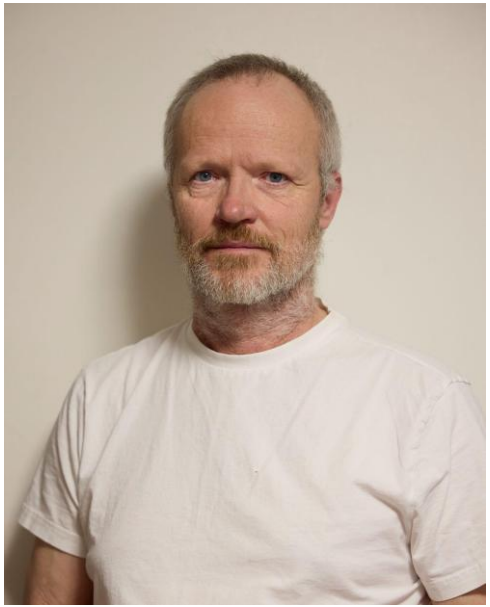
Einar Bjørkevoll



Leading Information Architect

Working with standardization within CEN. Previous working with ticketing in public transport

Oslo, Norway

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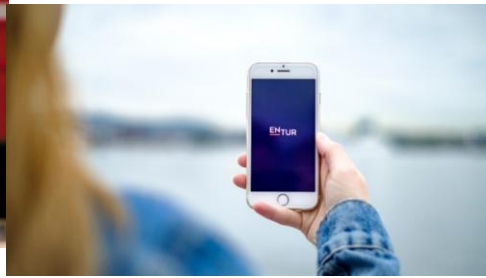
- ❑ Facilitation Company established in **2016**
- ❑ Owned by the Norwegian Ministry of Transport
- ❑ Is responsible for
  - ✓ Collection of all public transport data (NAP)
  - ✓ National services for journey planning (OpenTripPlanner)
  - ✓ National services for ticketing (mandatory for rail, optional for the rest)
  - ✓ Public transport data insights and analytics



PTA & PTO

Entur ensures that everyone who manages public transportation in Norway may provide their customers with effective trip planning and ticket sales.

Train Operators

Entur manages the railway ticketing systems for all train operators in Norway, as well as the service operations at the stations and the railway's customer service center.

Public Transport Users

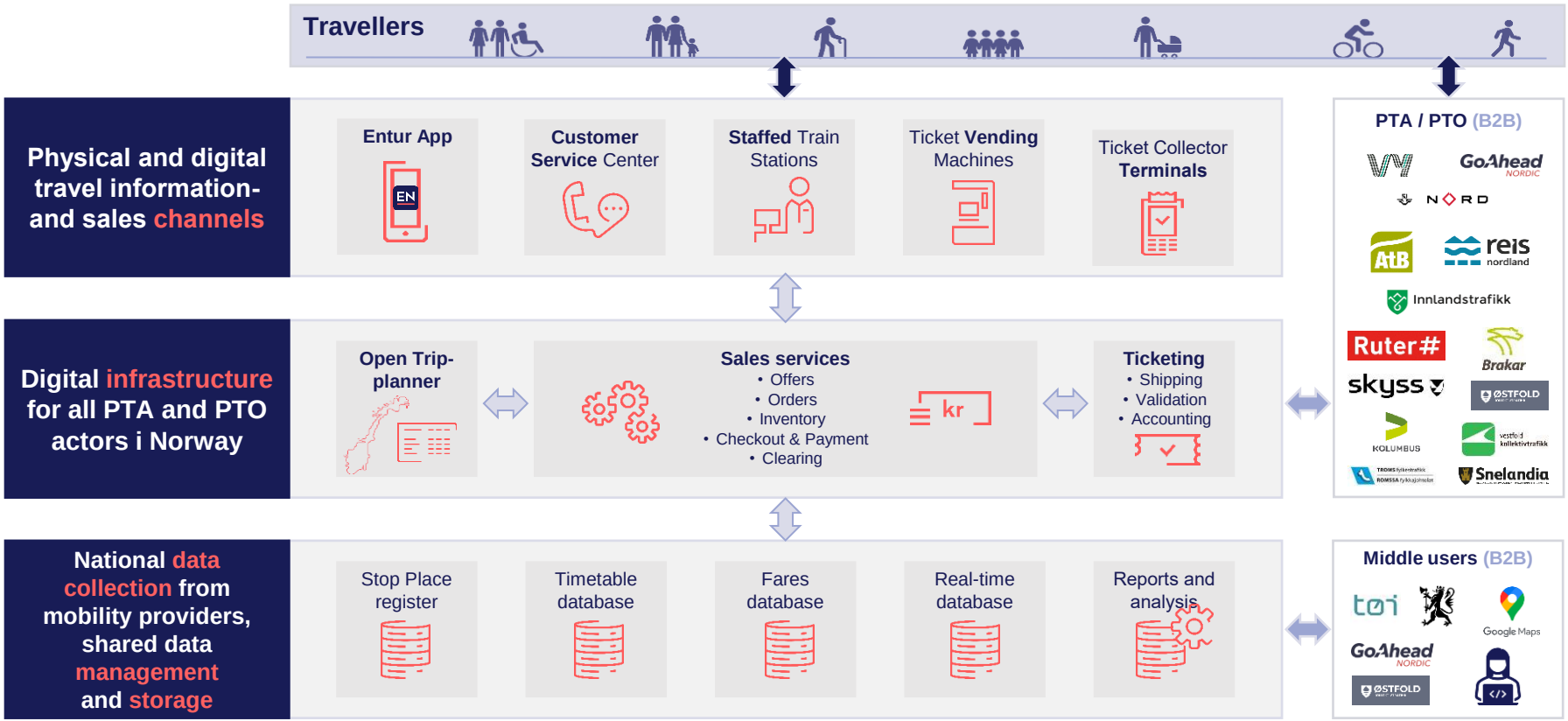
Travelers may locate all public transportation itineraries in one location with the Entur App, and they can buy all train tickets, tickets from many county municipalities, and get assistance from our station sales and customer service.

Service Providers

Anyone who chooses to can obtain public transportation data from Entur via open APIs and utilize it in their services.

Target Audiences for Our Services

Entur Value Chain and Services



Data-Driven Multimodal, Multi-Operator Ticketing Platform as a Service

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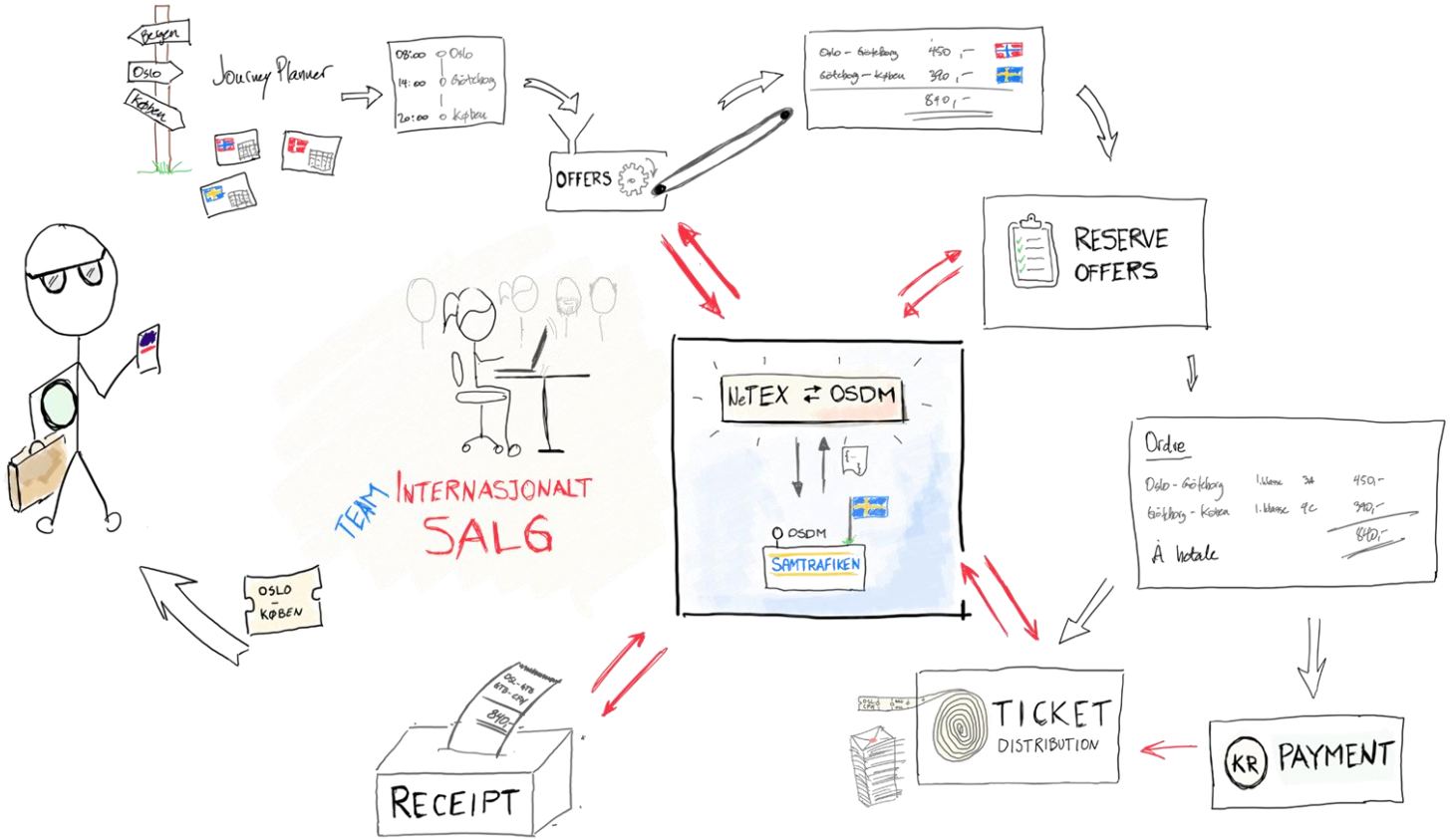
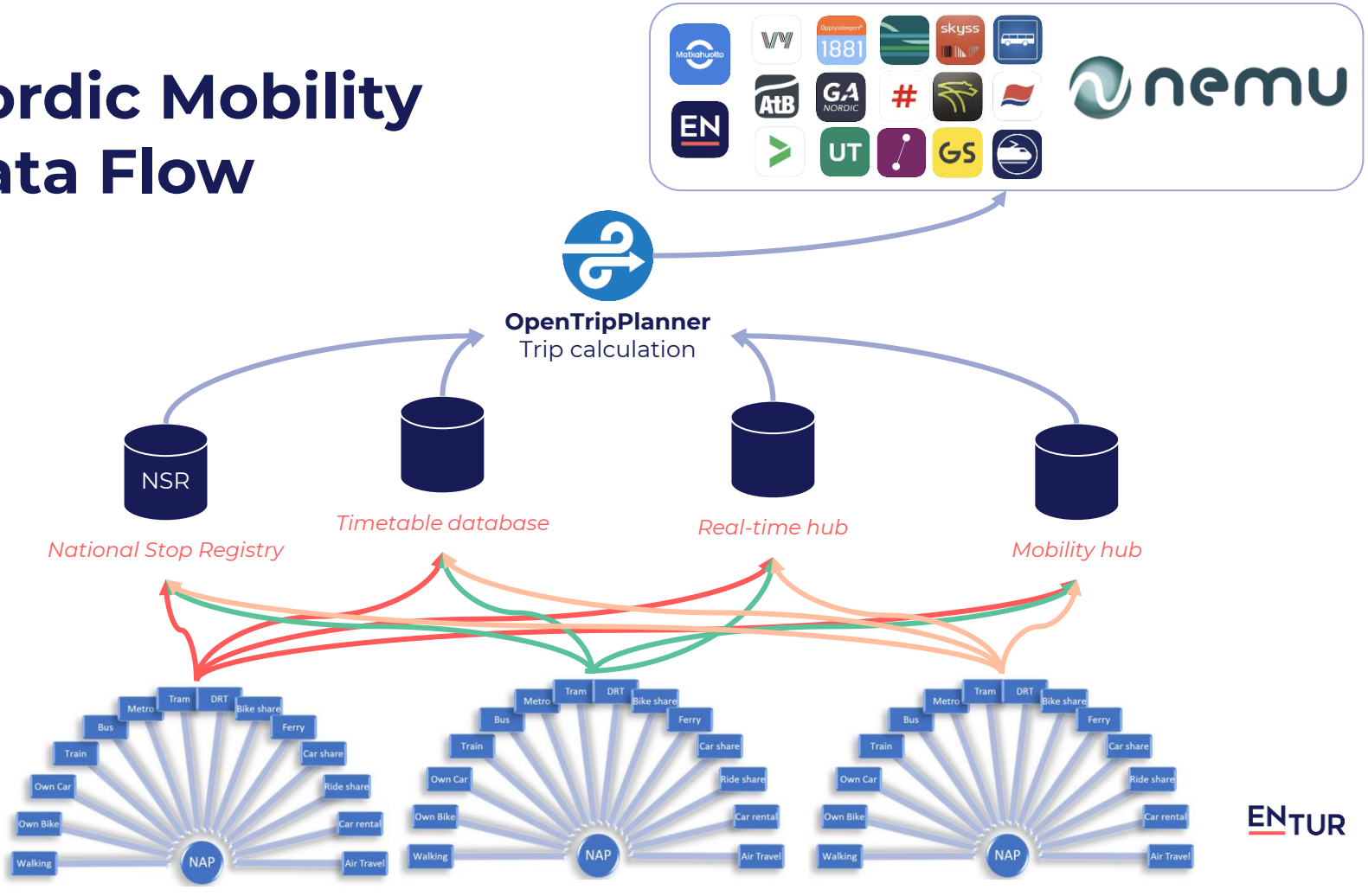
International Ticket Sale

Customer Journey find, book, pay and travel



Nordic Mobility Data Flow



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Import of Timetable data from Sweden

AS IS

NAP
Sweden

Data
correction

Entur TripPlanner services

OpenTripPlanner
Trip calculation

Customer

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Import of Timetable data from Sweden

As it should have been

NAP
Sweden

Data
correction

OpenTripPlanner
Trip calculation

Customer

Entur TripPlanner services

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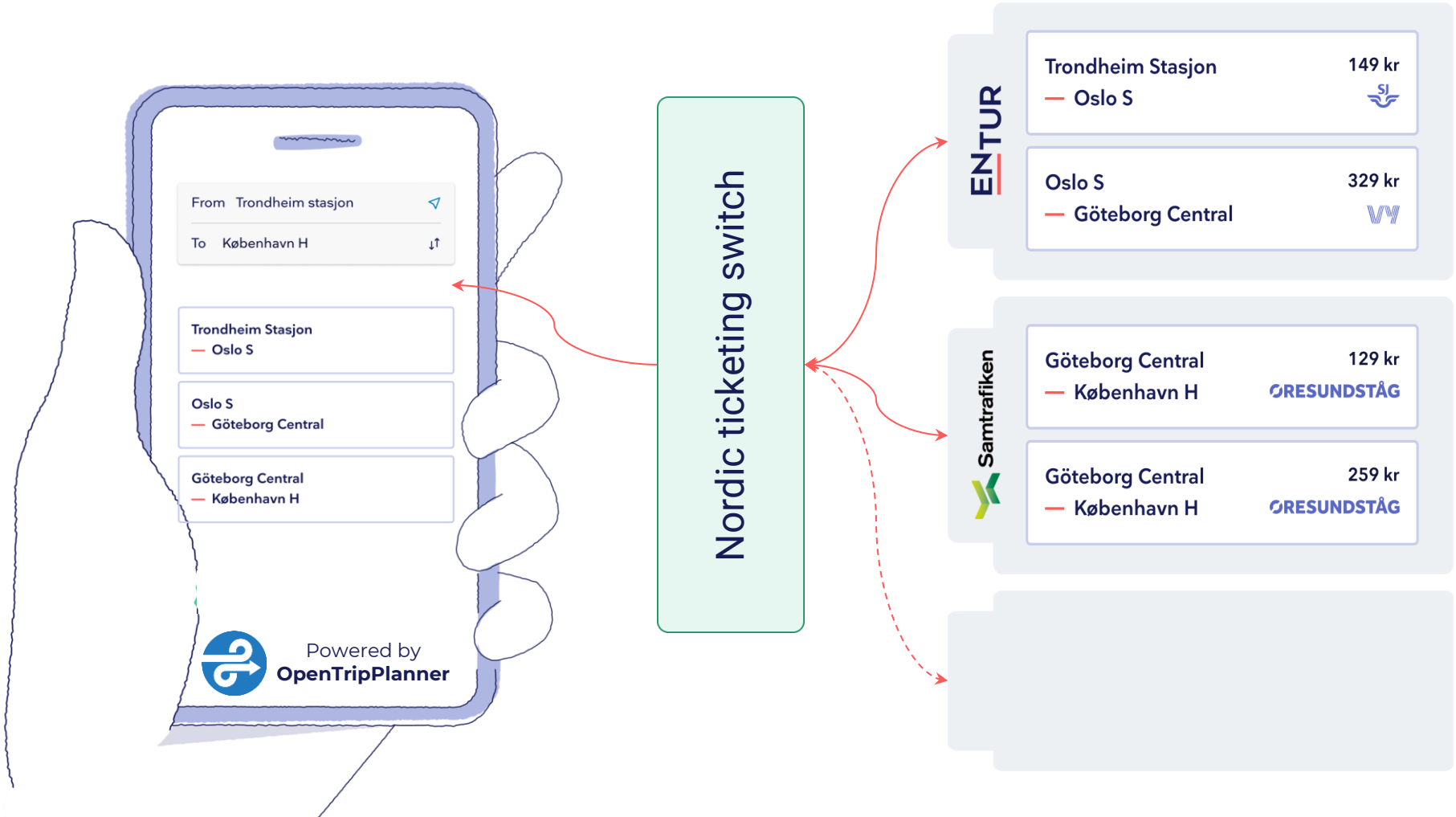
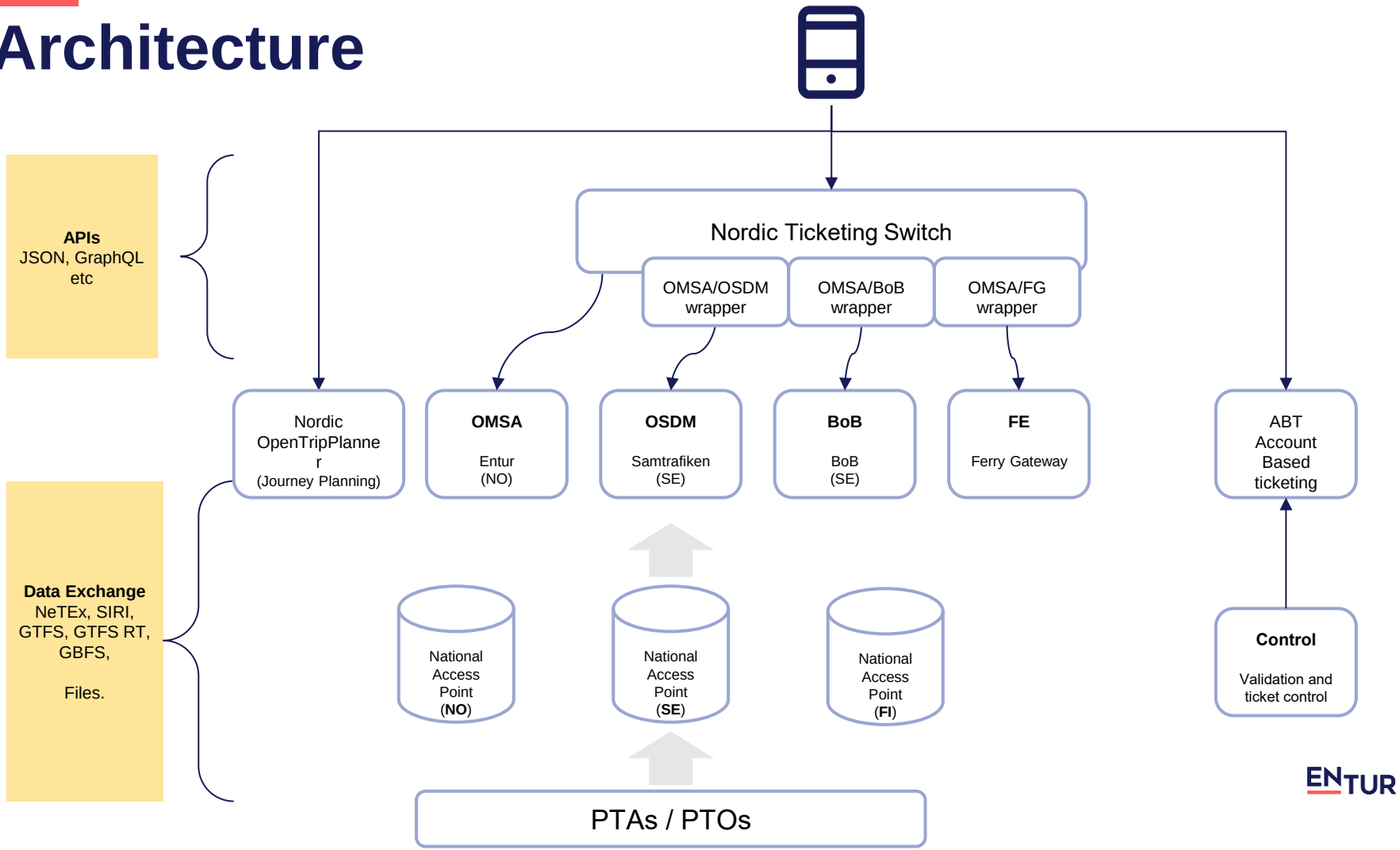
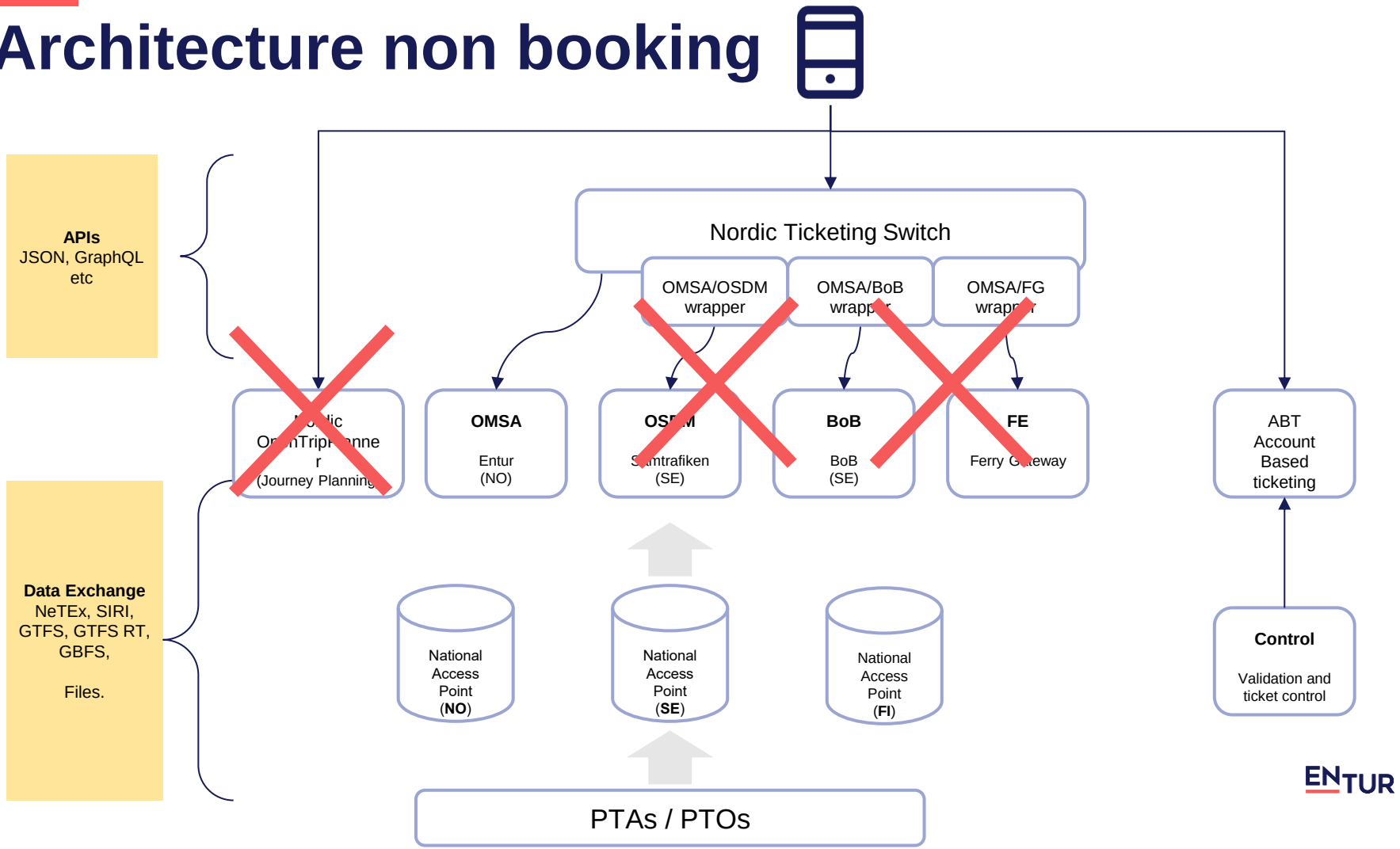

From Trondheim stasjon
To København H
Trondheim Stasjon
— Oslo S
Oslo S
— Göteborg Central
Göteborg Central
— København H
Powered by
OpenTripPlanner
Nordic ticketing switch
ENTUR
Trondheim Stasjon
— Oslo S
149 kr
Oslo S
— Göteborg Central
329 kr
Samtrafiken
Göteborg Central
— København H
129 kr
ÖRESUNDSTÅG
Göteborg Central
— København H
259 kr
ÖRESUNDSTÅG

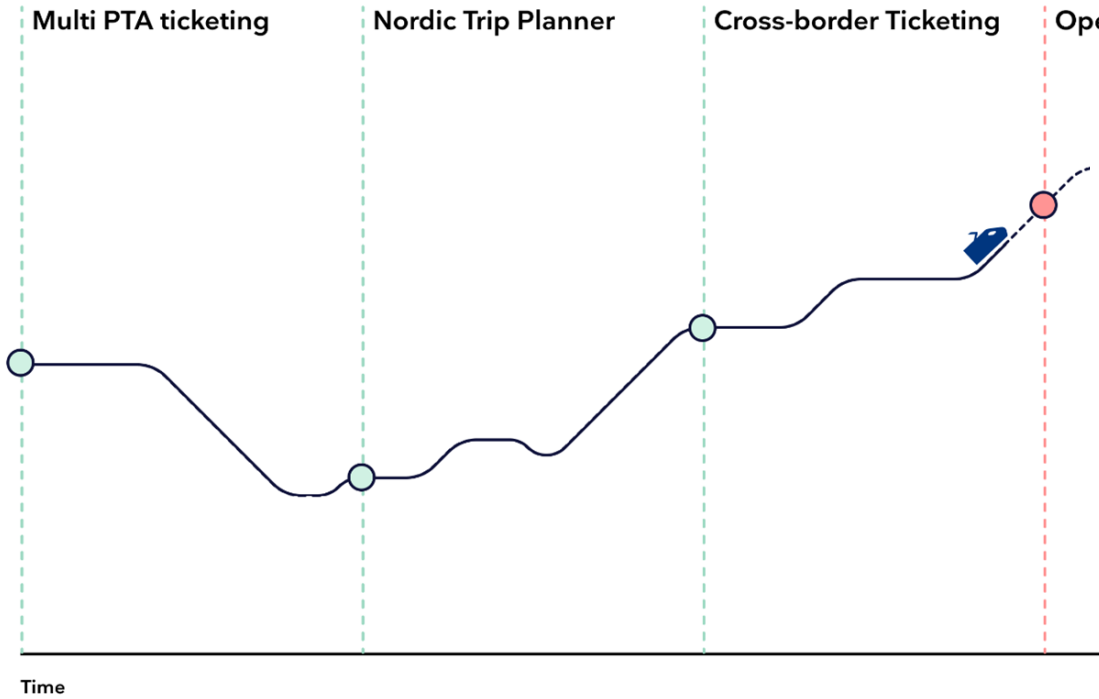
Architecture



Architecture non booking



The tracks towards Nordic ticketing



Obstacles to use NeTEx in Europe

- Different profiles
- Lack of harmonising of content – duplicates
- Shortcuts taken establishing NAPs

What we need?

- Open collaboration in NAPCORE X
- One unified profile, used by all
- Reference validation tool
- Reference implementation

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Key element to success

Challenges

The data is not harmonized between systems and IDs is changed

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Solution

Common data model and standards

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We Follow These Data Management Principles

- **Always use standards end-to-end**
  Conversion of data is never lossless, degradation in quality is inevitable.
- **Avoid “black box” patterns**
  Be open and transparent about solutions, make data and services available to everyone with an interest or need for it.
- **Prefer self-service and automation**
  Provide feedback loops (validation, notifications) and never force manual steps on data managers if not needed.
- **Do not compensate for poor data quality**
  Focus on functionality that helps data managers to produce high quality data.

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Why use Open Standards?

- How do you describe a **bus stop**?
- How do you describe a **rail service**?
- How do you **update** a specific journey with **real time forecast**?
- How do you describe **seating arrangements**?
- How do you describe **access rights** and **conditions**?
- How do you describe **static** and **dynamic pricing** rules?

Because open standards

- ✅ Establishes common **terminologies** and concepts
  → **All speak the same "language"**
- ✅ Allows exchange their data at predictable ability & cost
  → **All use a common exchange format**
- ✅ Prevents national, sector or provider-specific format lock-in
  → **Increases interoperability and markets opportunities**

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Why?

Public Transport is exchanging large datasets between multiple actors

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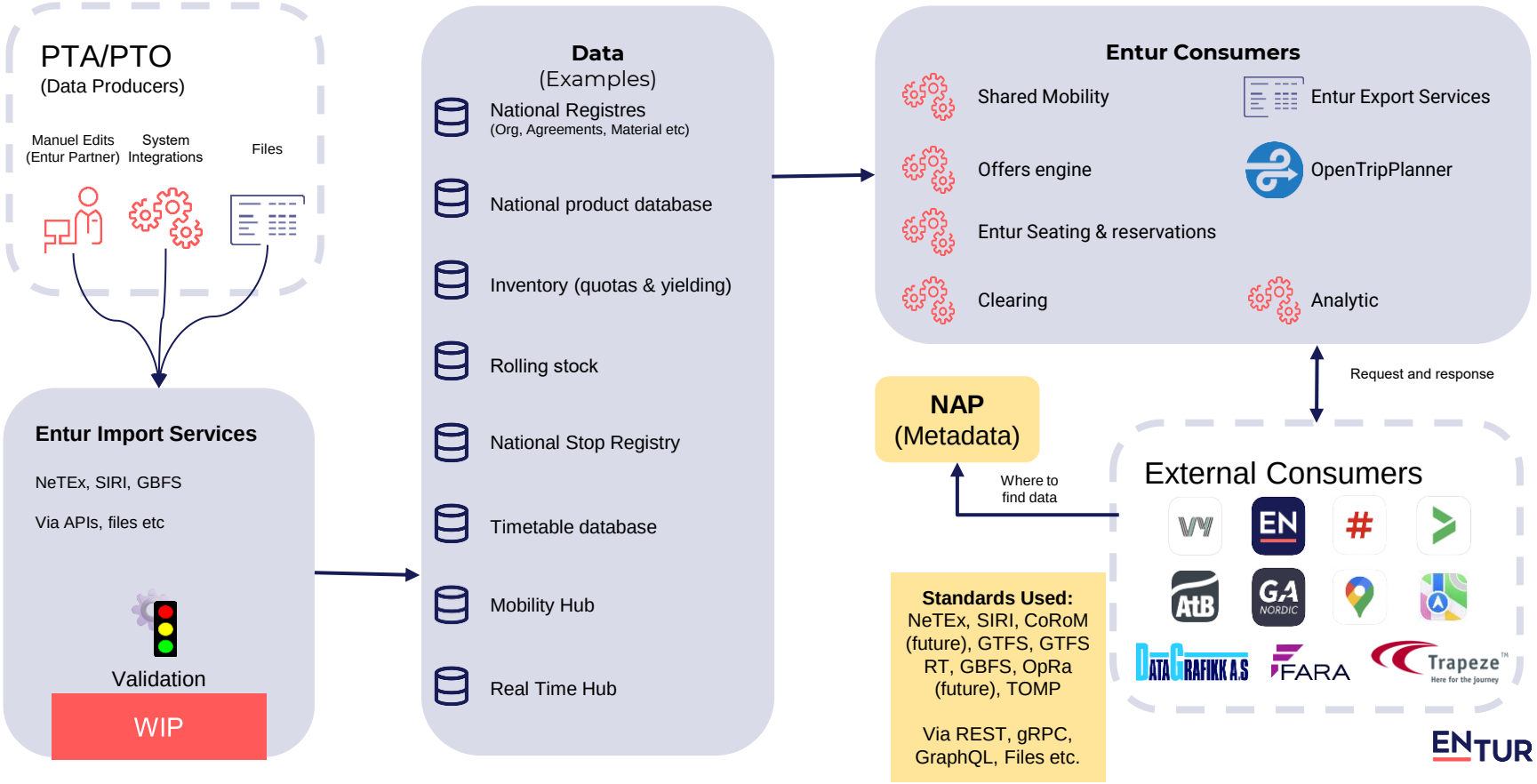
Dataflow Entur

Entur is the central hub for public transport data in Norway



Therefore we need to speak the same language and have a common data model

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Common data model for exchanging data is the most important factor for success!

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Layers of standards

Public Transport have many stakeholders who need to share complex data.
Need a stable and comprehensive fundament.

Easy to use API

Multimodal fundament

Easier to change

Harder to change

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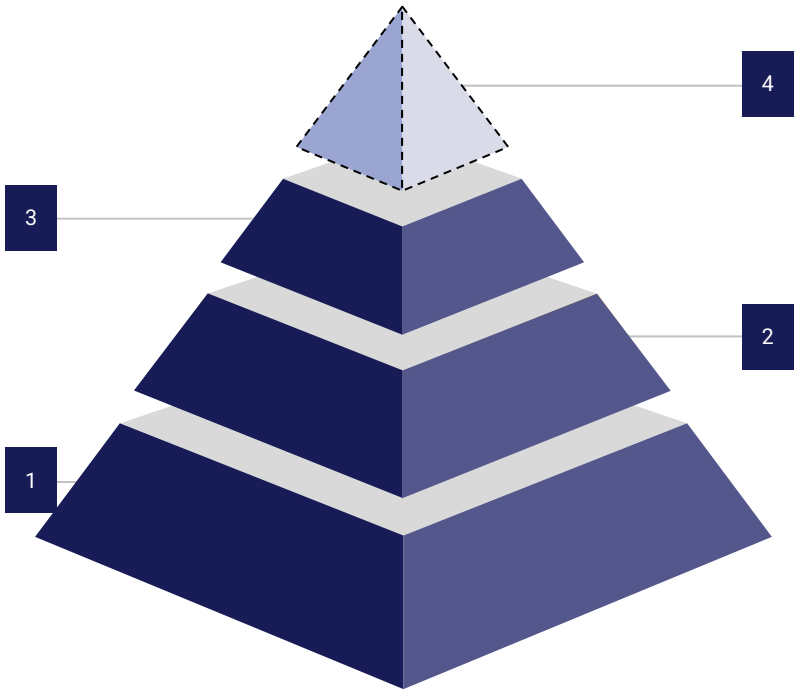
Layers of standards



Transmodel based APIs

Is missing in Transmodel, Entur has a set of APIs that prove it will work,but it's not a standard

CoRoM project work on Booking API standards, Enturs GraphQL OpenTripPlanner api is another

Profile(s)

Specifications to secure interoperable data

Read: Implementation guide

NeTEx, SIRI etc.

Standards for exchange of data for information, product, prices, booking, clearing etc.

Need a profile on how to use the standard

Transmodel

Conceptual data model
Terms and their connections

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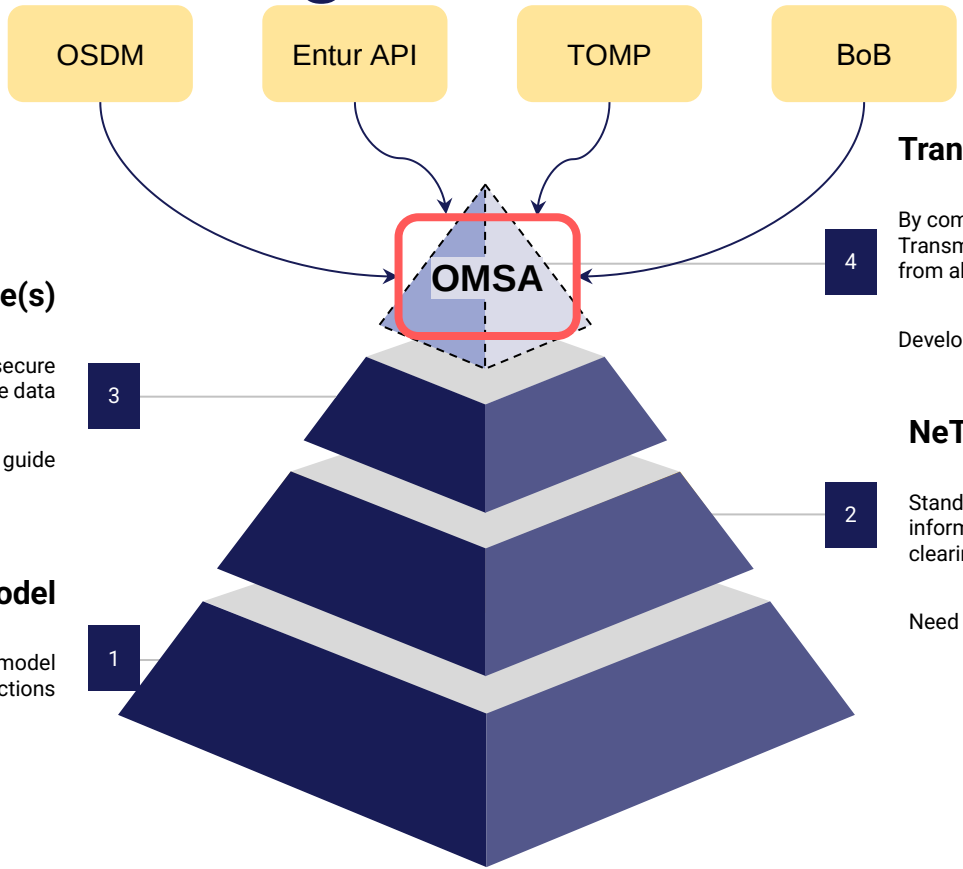
Future of booking API



Transmodel based sales APIs

By combining the best from OSDM, Enturs Transmodel based API and TOMP, we get the best from all

Developed through the CoRoM project

Profile(s)

Specifications to secure interoperable data

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Transmodel

Conceptual data model
Terms and connections

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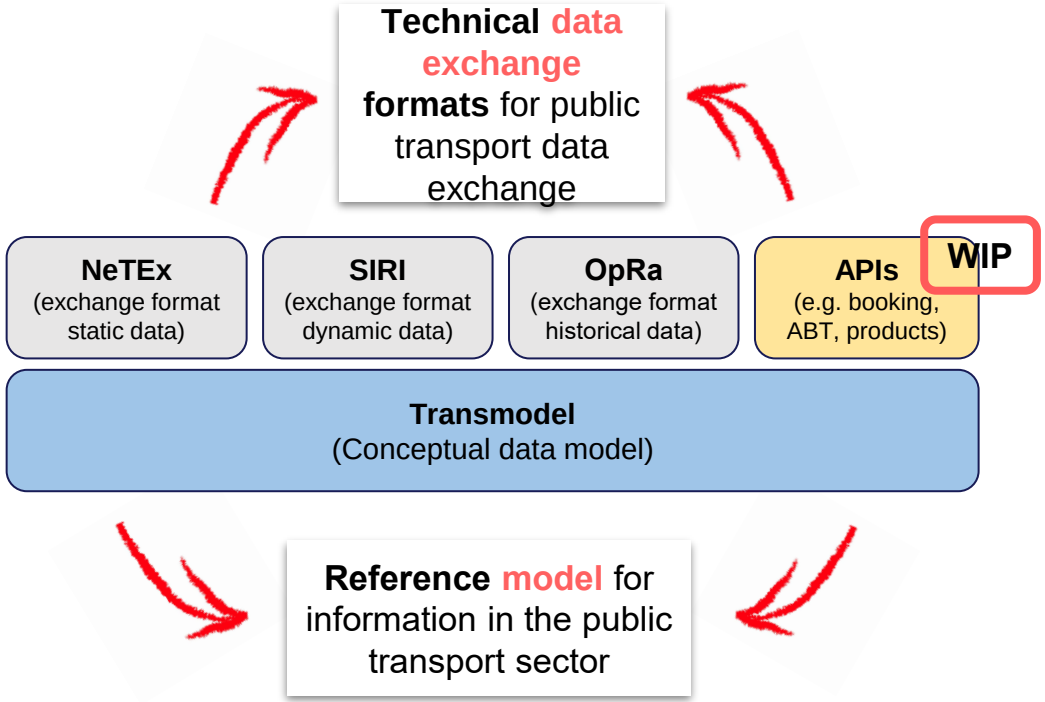
Conceptual Model vs Standards



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Key takeaways

- ❏ Open data **standards** levels the playing field
- ❏ A **data driven** approach **simplifies** onboarding and interoperability
- ❏ **Combining modalities** in one single ticketing platform **is feasible**
- ❏ Operators have **greater freedom** to experiment and innovate
- ❏ **Data quality is essential** for everything above
- ❏ **Collaboration** on standardisation, development and business cases

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