OpenTripPlanner in Norway

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EnTur

- Established in October 2016
- Established to support the Norwegian railway reform
- Owned by the Norwegian Department of Transportation
- ~200 employees (~80 consultants)

National Journey Planner Project

NRI
Norsk Reisinformasjon AS

NSB
Collect all PT-data for the whole of Norway

- ~30 major sources of Timetable data
- ~25 sources of Real-Time data
- maintain a National Stops register

Fully open Journey Planning API

A National Journey Planner

National Hub for Open Data
• Used OpenTripPlanner for almost 4 years
  • Production for ~2 years

• Served more than 120 million requests in march 2019
  • ~44 million was journey calculations

• Serves a wide range of clients…

~22 %  ~52 %  ~11 %  ~15 %
"GTFS world"    "Transmodel world"

Exchange format – Static data

GTFS  GTFS-RT

GTFS - model

Exchange format – Real-time data

NeTEx   SIRI

Transmodel

Data model

IFOPT
Transmodel compliant OTP

Timetable & Stops Data:
- GTFS
- NeTEx

Real-time Data:
- GTFS-RT
- SIRI

API:
- GTFS based Rest API
- GTFS based GraphQL API
- Transmodel based GraphQL API

More generic internal model
Functionality

- Multimodal routing
  - National neutral journeyplanning
  - Whitelisting/banning of Authorites/Lines/VehicleJourney
- Real-time transit updates
  - Prognoses and textual messages
- Street routing (foot, bike, car)
  - Height data import with walk/bike speed adjustment
- Transfere/Interchange
  - Guaranteed, stay-seated
- Park & Ride, Kiss & Ride, Ride & kiss
- Citybike integration
- Flexible transport (not in production)
IDE for testing Journey planning API

https://api.entur.org/doc/shamash-journeyplanner/
Open Street map

- Source for street network relevant for walk/bike/car routing
- Stops needs to be connected to street network to be accessible
- Essential part of building routing-graph in OTP

+ One of the strengths of OTP
- Missing map coverage hurts your searches
Graph build process

http://otpdebug.entur.org/
• Split requests to several requests (walk, bike, car, transit)
• Split request for long & short journeys
• Filter obviously “bad” journeys
• Combine/remove walk/bike-legs
Ops

• Flexible deployment of OTP
  • Rolling update
    - Code changes
    - Graph changes

• Automatic Scaling

• “Self-healing”

• Metrics
Metrics
Current Challenges

• ~3 GB Graph-size gives poor performance, especially on longer searches
  • OTP 1 relies on single thread performance
  • GCP does not focus on single thread performance (AWS and Azure seems to provide ~25% better performance)

• OTP 1 – Cost function
  + works well for a broad perspective on journey options
  - Provides difficulties when presenting a “Timetable view”
  - May in some cases drop relevant journeys

• Lack of multi-criteria searches
  • Price as search criteria
Open Source

• “All” code/components Entur works on (within public transport information) is open source

• This excludes the Entur Journey Planner web/APP

• An Software Developer Kit (SDK) is made open source

• Other OTP-powered Journey planner clients are open source

https://github.com/entur

https://github.com/entur/sdk
OpenTripPlanner & EU-regulations
EU-Regulation -
Regulation 2017/1926

- All EU countries must establish a National Access point (NAP) for all national Public Transport data
- Purpose to ensure that EU-wide multimodal travel information services across borders
- Applies to both public and private actors
- Should be applied to all modes of transport
- NeTEx **must** be used for static PT data
- SIRI **should** be used for real-time data
- Open Journey Planner (OJP) **should** be interface for connecting Journey planners
<table>
<thead>
<tr>
<th>Timeframe – EU regulation</th>
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<tbody>
<tr>
<td><strong>December 1th 2019</strong></td>
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<tr>
<td>• Trip plans scheduled services (NeTEx)</td>
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<tr>
<td>• Real-time information (SIRI)</td>
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<tr>
<td>• Trip plan computation</td>
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<td><strong>December 1th 2020</strong></td>
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<tr>
<td>• Trip plans - demand responsive (NeTEx)</td>
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<td>• Fares (NeTEx)</td>
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<td><strong>December 1th 2021</strong></td>
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<td>• Support for Open Journey planner (OJP)</td>
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OJP – Open Journey Planner

- Standardized interface for distributed Journey planning
- The goal is to enable distributed journey planning for long-distance journey planning across Europe
Long term goal of OpenTripPlanner

Timetable & stops data:
- GTFS
- NeTEx

Real-time data:
- GTFS-RT
- SIRI

API
- GTFS - GraphQL API
- Transmodel - GraphQL API
- OJP API

Generic internal model