Agenda.

1. Data Sources for Infrastructure and Timetable
2. Automatic Creation of Itineraries Based on Track Information from Timetable
3. Requirements for OpenTrack Topology
SBB Use Several Tools and Methods for Timetable Analysis.

1. **REAL-TIME DATA**
   - **OTT**
   - **RESULTS OF SIMULATIONS**

2. **ARTIFICIAL PRODUCTION**
   - **OPEN-TRACK**

3. **PUNCTUALITY CALCULATION**
   - **OnTime Timetable Evaluation**

4. **PRODUCTION**
   - **NETS**

5. **TIMETABLE**
   - **Use Several Tools and Methods for Timetable Analysis.**
Data Sources for OpenTrack Simulations

Infrastructure
- PFS
  - Speeds
  - Signals
  - Gradients
- DfA
  - Digital maps
- Plans
  - Design of Station
- Regulations
  - For Each Station

Which Train Runs Where?

OpenTrack

Timetable
- NeTS/Viriato
  - Train Numbers
  - Train Kinds
  - Stops
  - Times
    - Arrivals
    - Departures
    - Min Dwell Times
  - Name of Composition
  - Track Numbers
Simplified Process for Creating a New Simulation Project

Viriato → NeTS → RailML → OpenTrack → OpenTrackHub (OTHub) → OpenTrack

Selection of Trains and their Versions

Selection of Simulation Time Slot during Import

Matching of Timetable Infrastructure (Codepoints and StationTracks) to OpenTrack Infrastructure (Itineraries)

„Ready for Simulation“
The Filtration of Trains Takes Place during the RailML-Export from the Timetable Tool

<table>
<thead>
<tr>
<th>Viriato</th>
<th>NeTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Train Groups and Scenarios</td>
<td>Separate Trains</td>
</tr>
</tbody>
</table>

- **Filter by Passed Stations**
- **Filter by Train Number**
- **Filter by Active/Inactive**
- **Filter by Train Type**
- **Filter by Date**
- **Filter by Passed Stations**

Choice of Trains in Collaboration with Timetable Planner
The Time Slot for Imported Trains is Defined by OpenTrack

• Next Step: Matching Timetable Infrastructure to OpenTrack Infrastructure

• Timetable is re-exported to OpenTrackHub
NeTS Delivers all the Necessary Information to Create the Correct Itinerary.

Viriato’s infrastructure model would also be sufficient enough to create the itinerary in this case.
Matching Process Takes Place in OpenTrackHub

Input needed for this process (RailML files)
- OpenTrack Infrastructure
- Timetable

1. StationTrack in Timetable identical to StationTrack in OpenTrack (1) -> «Full Match»
2. No StationTrack defined in Timetable, but defined in OpenTrack (W101)
3. TrackID between JE and FISH identical in Timetable and OpenTrack (835) -> «Full Match»
4. TrackIDs NH2 and NH72 non-existent in OpenTrack, but not necessary for correct Match
Timetable Tools deliver different Infrastructure Models

**Same Train in different Infrastructure Models**

<table>
<thead>
<tr>
<th>Viriato</th>
<th>NeTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Viriato Table" /></td>
<td><img src="image2.png" alt="NeTS Table" /></td>
</tr>
</tbody>
</table>

1. Viriato uses 4-digit country codes (0085), NeTS uses 2-digit country codes (85, only visible in RailML-Export)
3. Viriato gives no information about which tracks are used inside the station.
4. Station tracks are not necessarily identical and are not always shown in Viriato (but always exported)
OpenTrack Topology has to be Adjusted to NeTS and Viriatio Infrastructure

- StationVertices use Track Numbers as Vertex Name

- «CodePoints» (CP) are created between Stations to map TrackIDs

- If the Infrastructure between NeTS and Viriatio is different, multiple CodePoints have to be created.

- No Paths and no Itineraries have to be manually created in OpenTrack!
Matching of Compositions and SpeedTypes by Simple Matching List

→ „Translation“ of NeTS/Viriato Composition Name to OpenTrack Name

<table>
<thead>
<tr>
<th>Name in NeTS</th>
<th>Name in OT</th>
</tr>
</thead>
<tbody>
<tr>
<td>01Bt^</td>
<td>01AB^</td>
</tr>
<tr>
<td>01ETR470</td>
<td>A-ETR 470</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

→ Allocation of…
  - Train SpeedType
  - Performance (on Time / delayed)

…according to Break Type of Train
Last Step: Re-Import into OpenTrack
Ready for Simulation

- Re-Import into OpenTrack of:
  - New Itineraries (and Paths)
  - Courses – for Allocation of Itineraries and Train Compositions etc.
Conclusion and Outlook

→ This process of automated handling of timetable and itinerary information has brought significant time savings for our projects.

→ Process is compatible with two timetable sources.

→ Next step: automated import of infrastructure from SBB infrastructure database („UNO“)
Thank You.
Questions and Discussion