Data Sources for Simulation Projects

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SBB CFF FFS

Agenda.

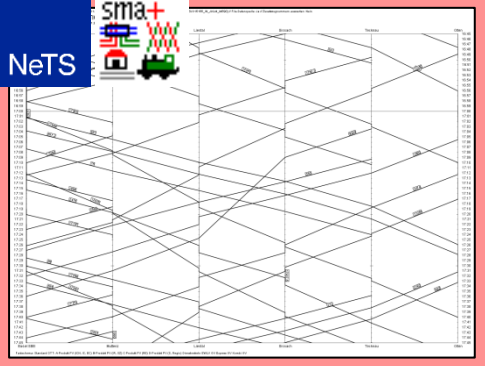
1. Data Sources for Infrastructure and Timetable
2. Automatic Creation of Itineraries Based on Track Information from Timetable
3. Requirements for OpenTrack Topology

SBB Use Several Tools and Methods for Timetable Analysis.

TIMETABLE

NeTS

sma+

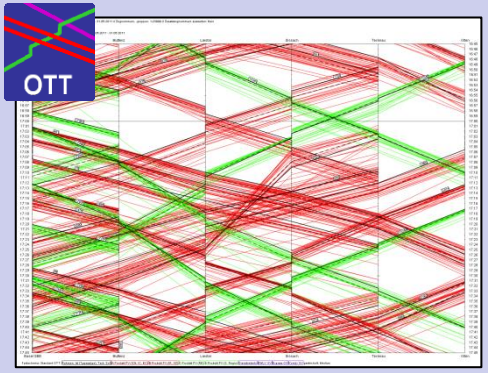


PRODUCTION

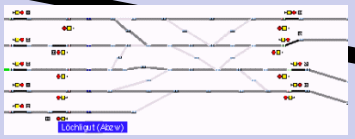
(1)

REAL-TIME DATA

OTT



(2)



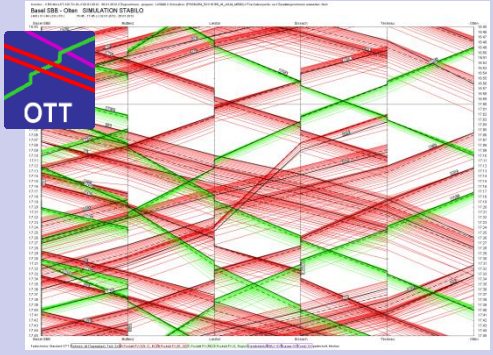
ARTIFICIAL PRODUCTION

OPEN TRACK

(3)

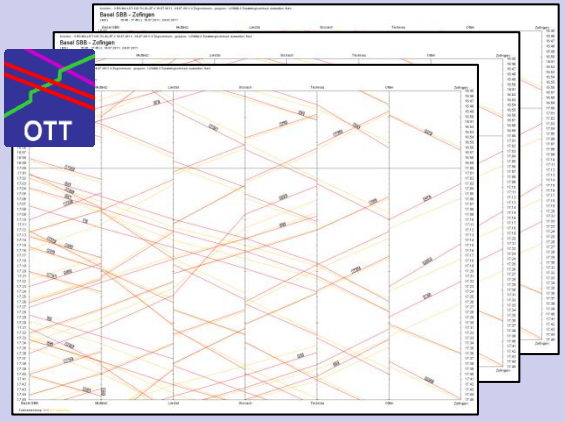
PUNCTUALITY CALCULATION

OTT



RESULTS OF SIMULATIONS

OTT



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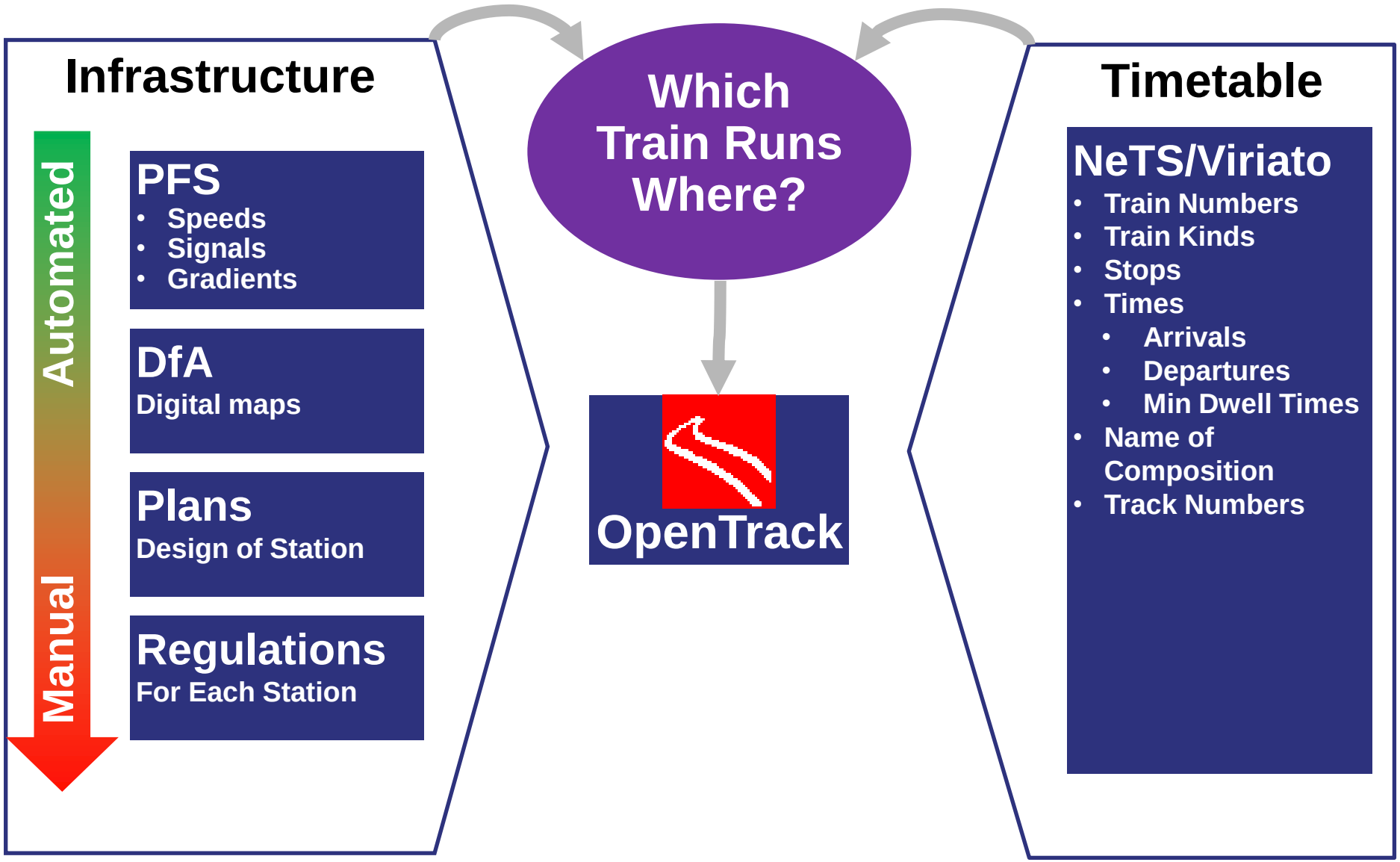
Data Sources for OpenTrack Simulations



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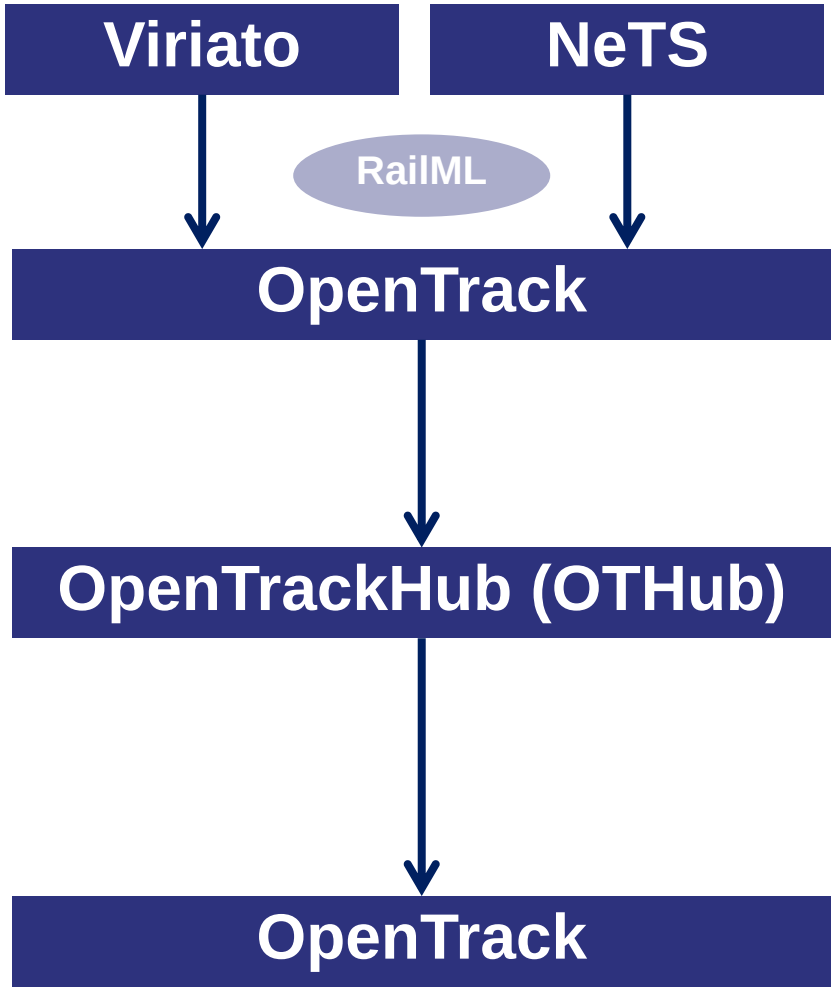
Simplified Process for Creating a New Simulation Project



Selection of Trains
and their Versions

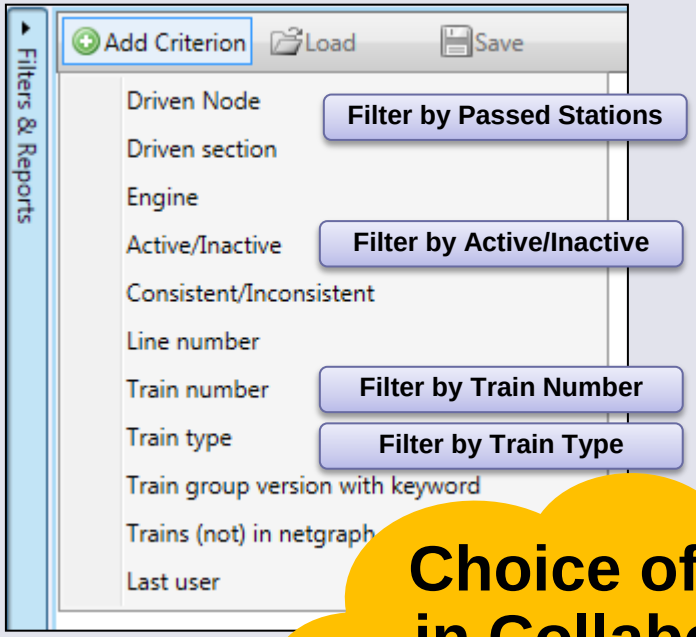
Selection of **Simulation Time Slot**
during Import

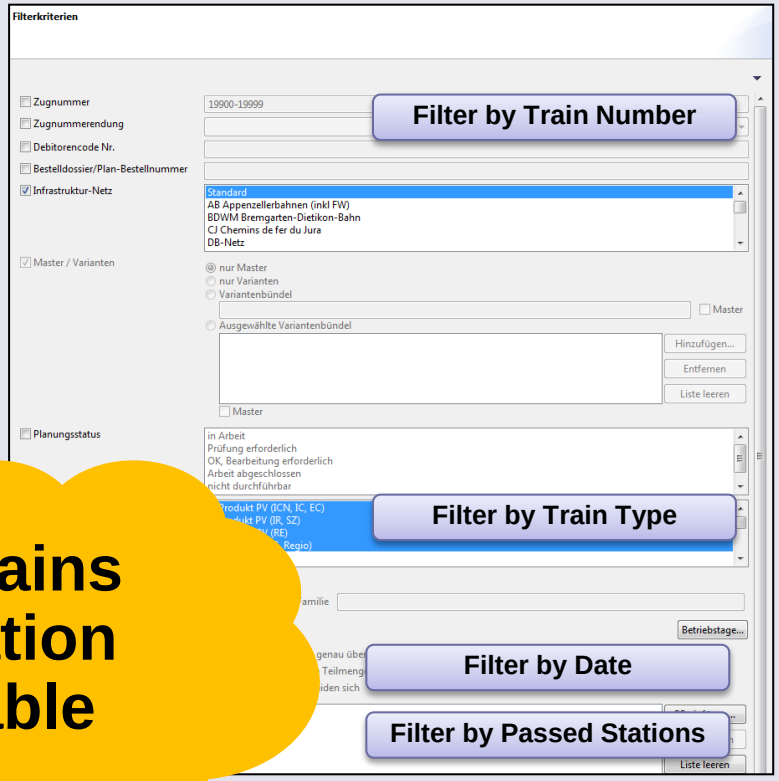
Matching of Timetable Infrastructure
(Codepoints and StationTracks)
to OpenTrack Infrastructure (Itineraries)

„Ready for Simulation“

The Filtration of Trains Takes Place during the RailML-Export from the Timetable Tool

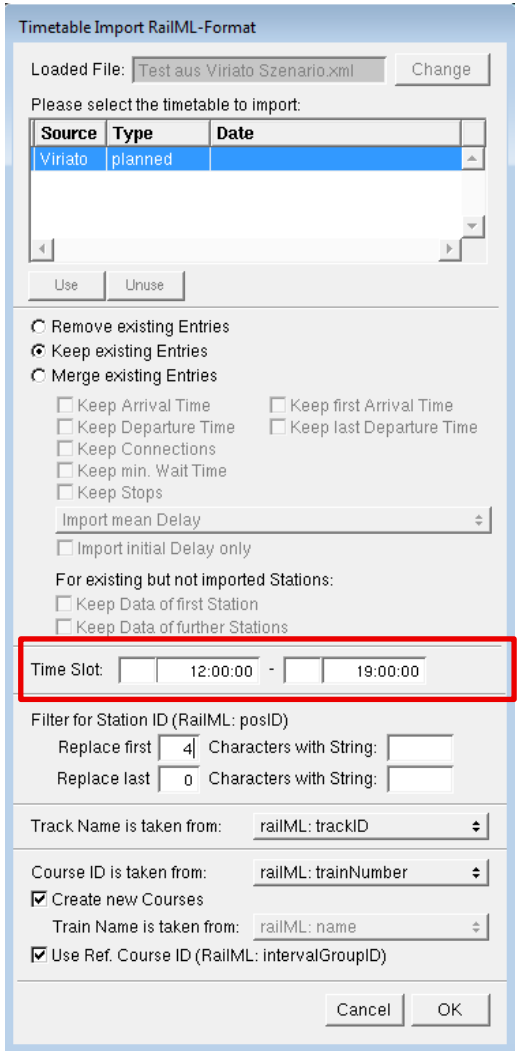
Viriato	NeTS
Train Groups and Scenarios	Separate Trains





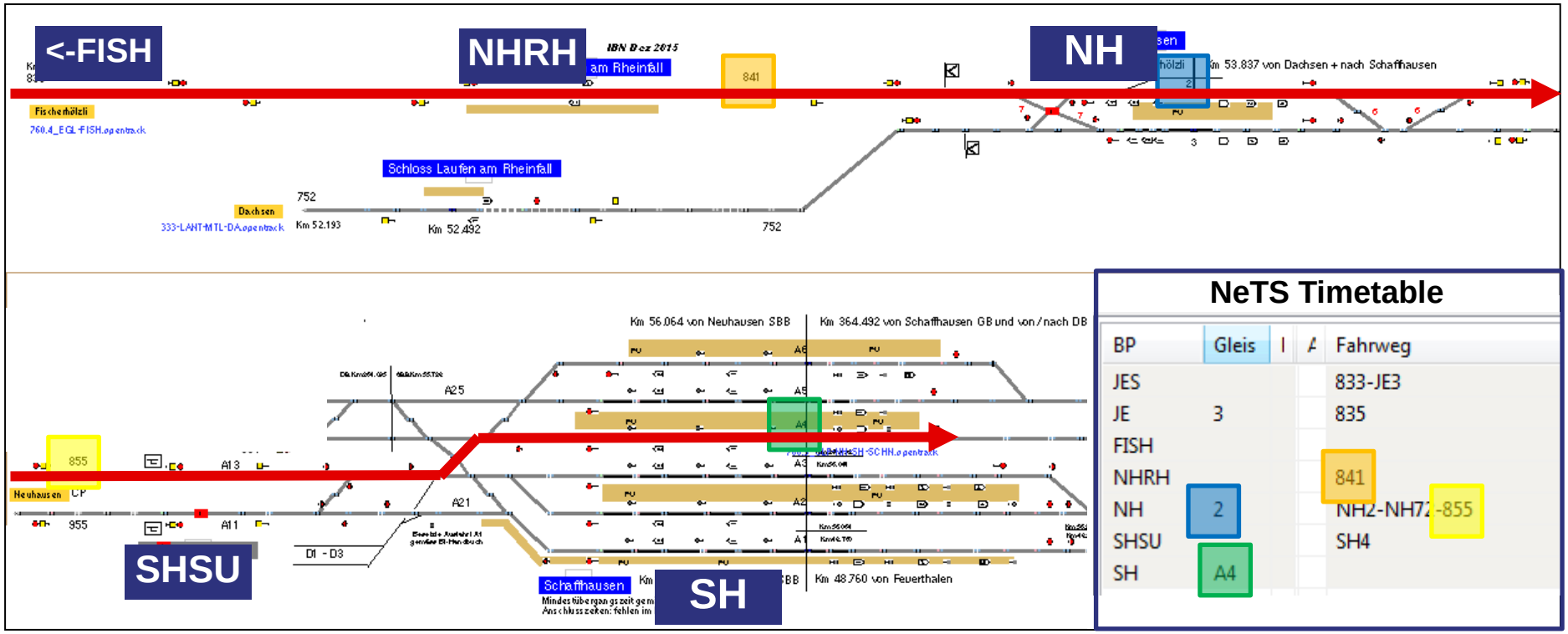
Choice of Trains in Collaboration with Timetable Planner

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.

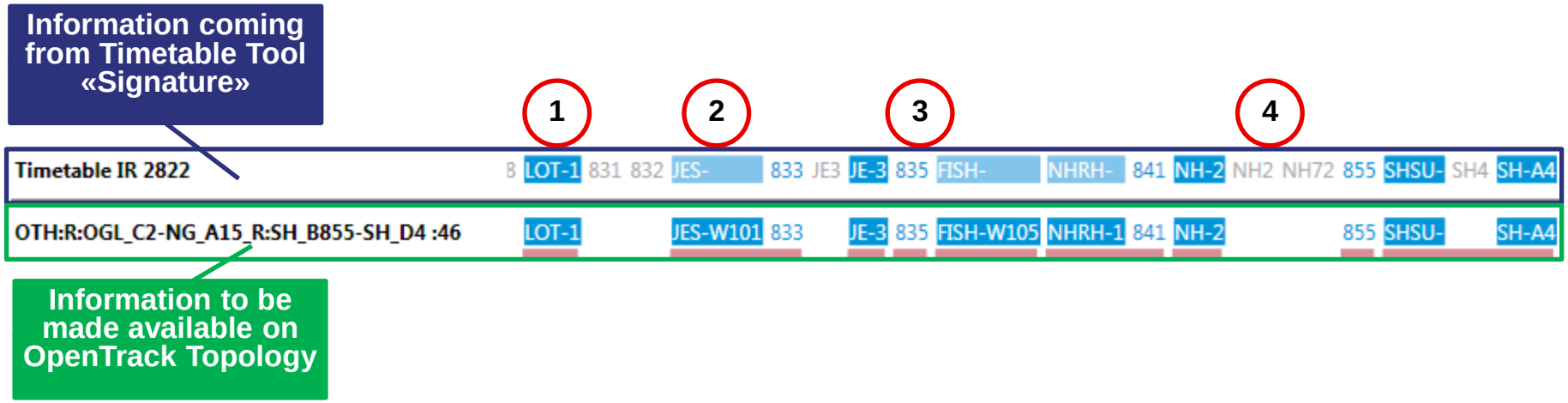


Viriato's infrastructure model would also be sufficient enough to create the itinerary in this case.

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

Viriato

Bst-ID	Str. Gleis	Bhf. Gleis	Gleis-info
0085GUN	420		
0085ESL	422		
0085SIR	416		
0085WIGB	412		
0085WIL	61	1	
0085WILM	31		
0085WILS	208		
0085SCHZ	208		
0085ALG	203		

1 2 3 4

NeTS

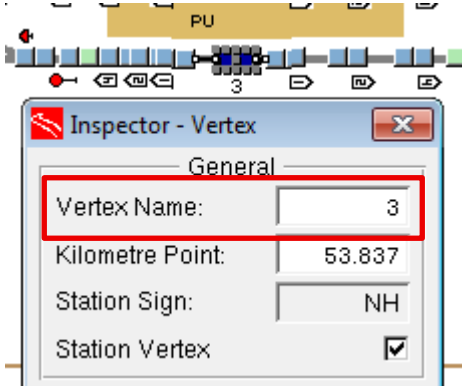
BP	Gleis	I	A	Fahrweg
GUN	422			420
ESL	1			ESL1-416-SIR1
SIR	1			SIR21-412-410
WIWE				WIL81-WIL61
WIGB	61			WIL1
WIL	1			WIL31
WILM				WIL11
WILO				208
SCHZ	4			SCHZ4-205-203
ALG	203			UZW84-UZW4

1 2 3 4

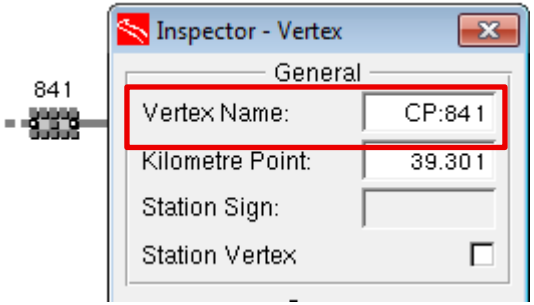
1. Viriato uses 4-digit coutry codes (*0085*), NeTS uses 2-digit country codes (*85*, only visible in RailML-Export)
2. Different stations exist: Viriato: *WIGB-WIL-WILM-WILS*; NeTS: *WIWE-WIGB-WIL-WILM-WILO*
3. Viriato gives no information about which tracks are used inside the station.
4. Station tracks are not necessarily identical and are not always shown in Viriato (but always exported)

OpenTrack Topology has to be Adjusted to NeTS and Viriato 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

Name in NeTS	Name in OT
01Bt^|01AB^|01B^|01Re450	D-1 DPZ
01ETR470	A-ETR 470
…	…

- 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