

Elimination of disadvantageous railway overtaking scenarios utilizing a fuzzy- logic driven performance indicator

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Problems of ensuring sufficient capacity

- Extension of infrastructure, modernisation
- Operational-technical measures (staff)

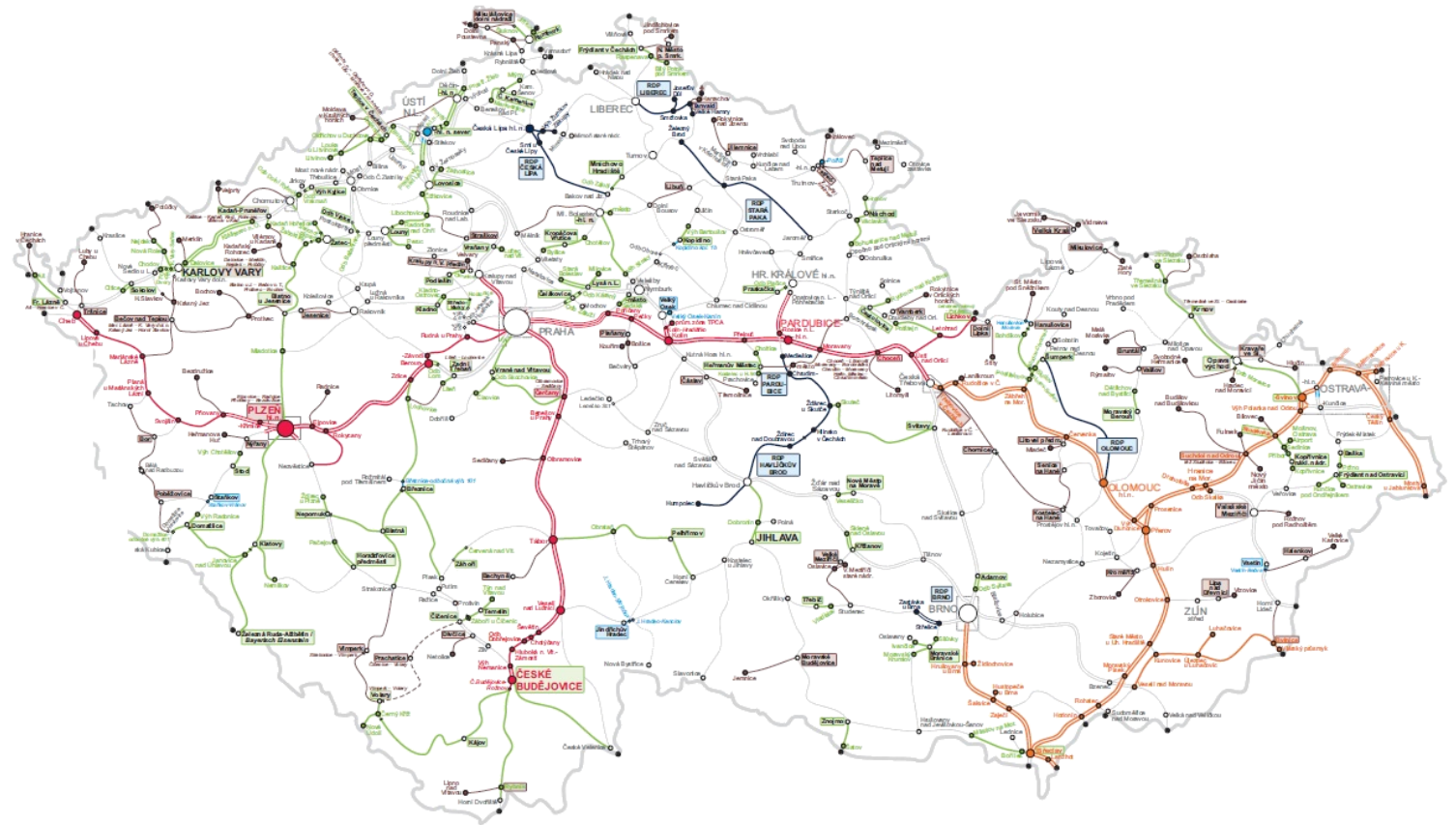
X

- Financial intensity
- Time requirement

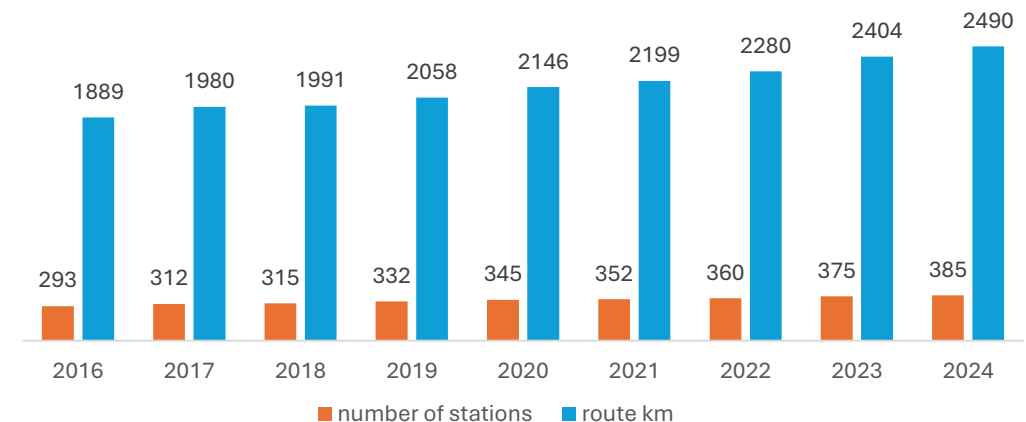
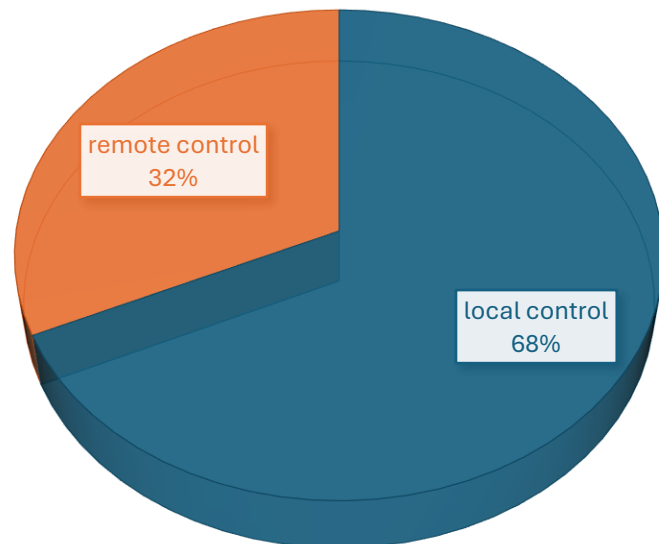


Remote control

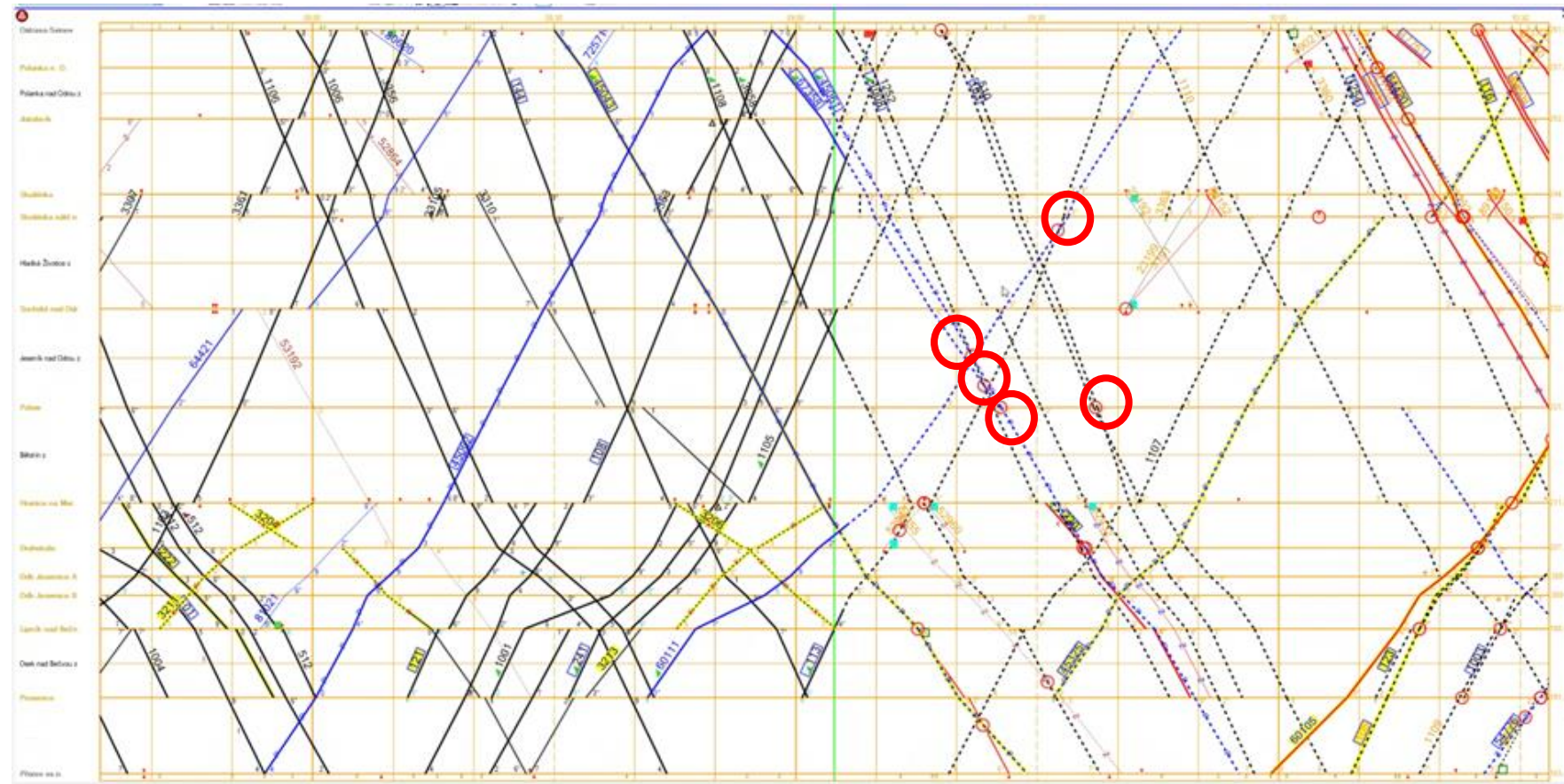
- 2 Central dispatching centres
- Regional dispatcher centres
- Remote control of neighbouring stations



Remote control on Czech railway



Conflicts

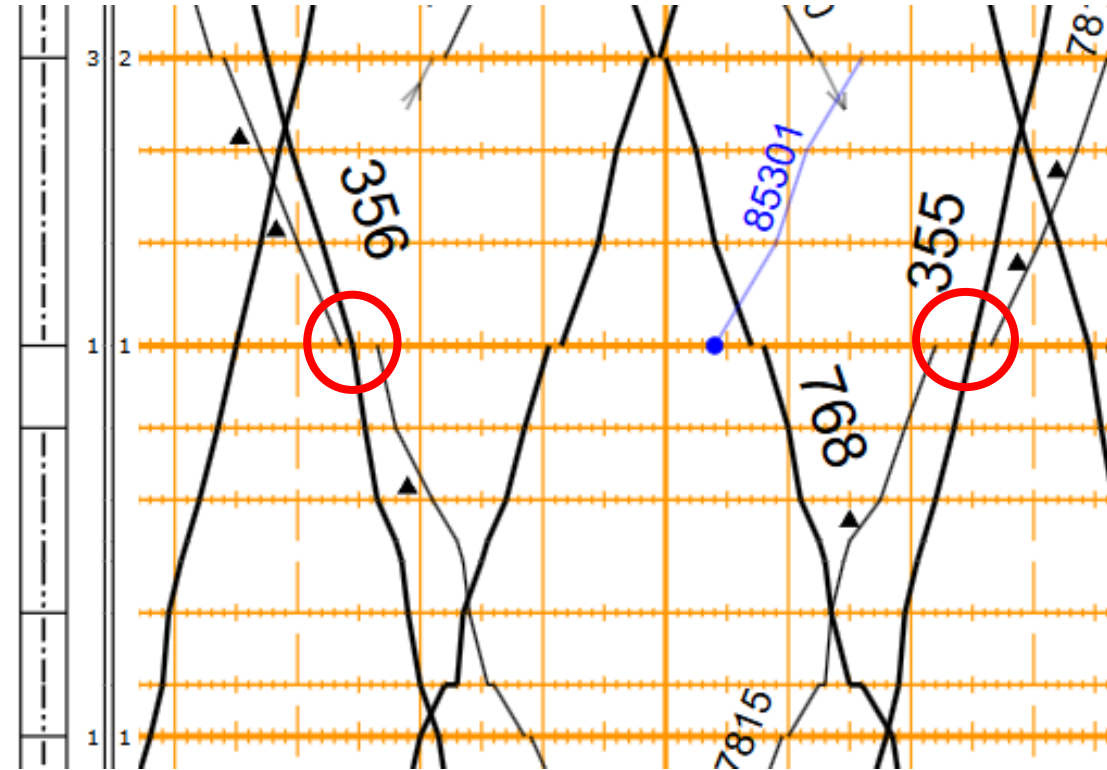


- Operational applications can search
- Resolving is manual
- Metric for evaluating simulation
 - It could be applied in practice

Overtaking maneuvers

- Why, when, how they occur?
- Delays
 - Emergencies
 - Temporary capacity restrictions
 - Connection constraints

Zdice
Stašov z
Praskolesy z
Hořovice
vl. v km 60,423
Cerhovice z
Odb Zbiroh
Kařez z
Kařízek

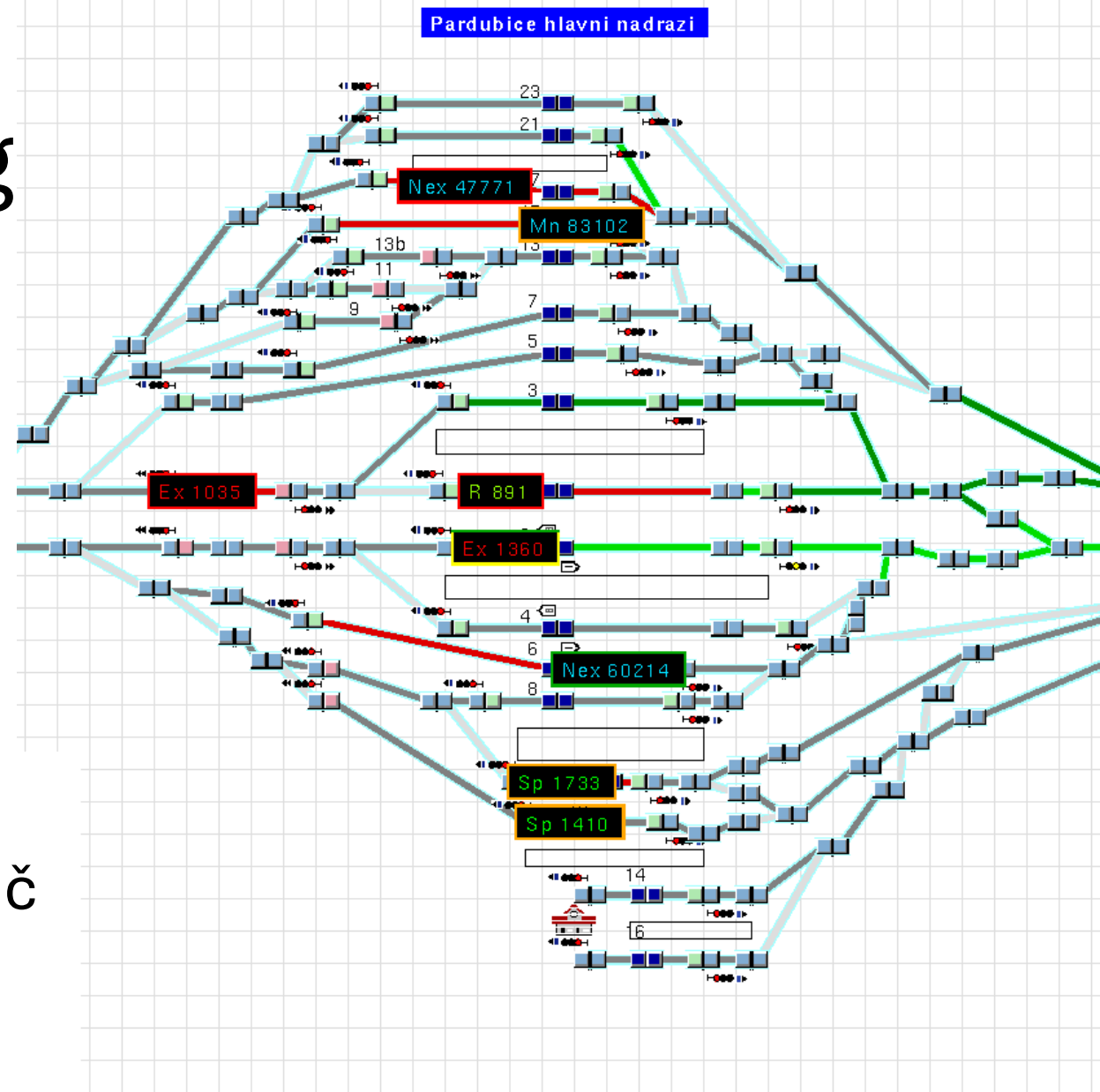


Current problem solving

- Delay based metrics
- Comparison with real system
- Expert evaluation

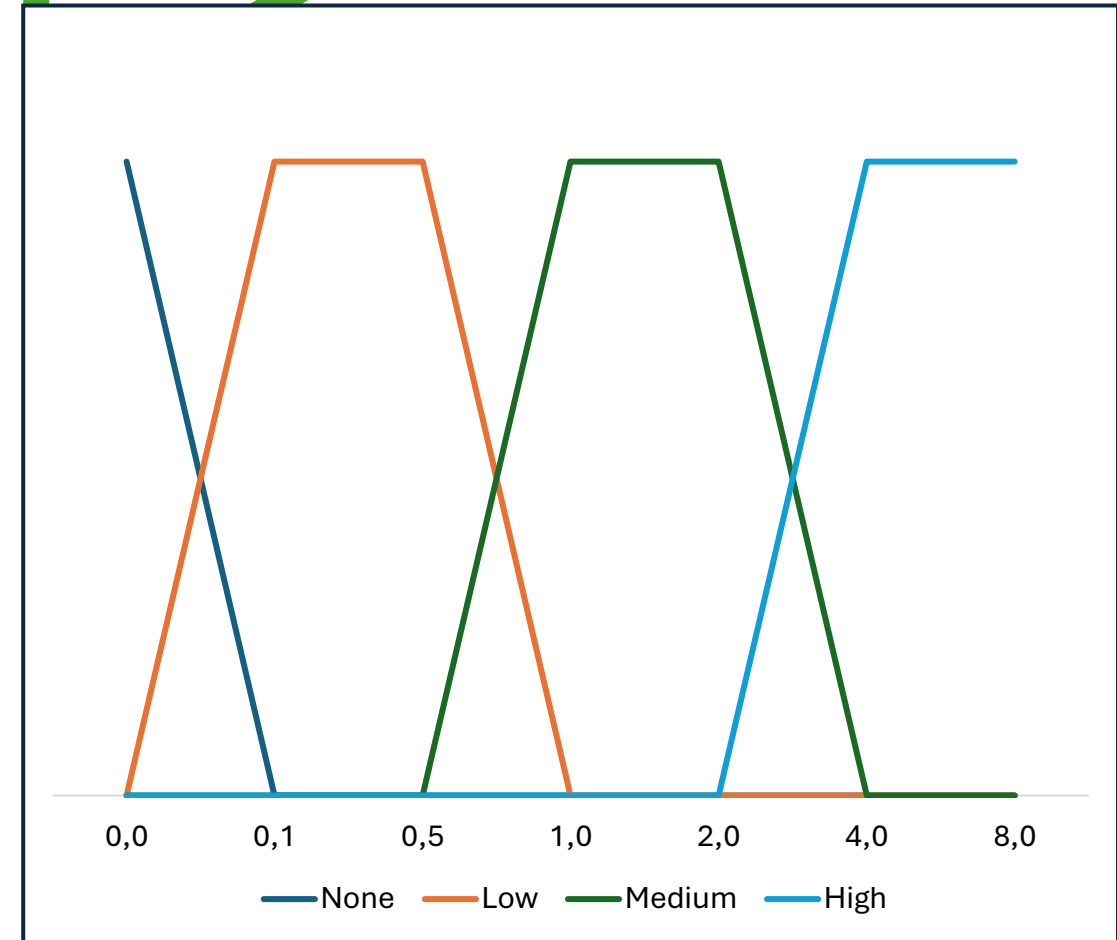
Simulation model

- Opentrack
- From Brandýs nad Orlicí to Přelouč
- Randomized delay scenarios (SM124)



Rules for Pair of trains evaluation

- IF stop conflicts before IS none AND slowdown conflicts before is none AND stop conflicts after IS many THEN penalization IS high
- IF stop conflicts before IS none AND slowdown conflicts before is none AND slowdown conflicts after IS many THEN penalization IS medium
- IF track used for waiting IS corridor track THEN penalization IS high
- ...



KPI

Core idea:
Fuzzy rules
assign penalties

Based on
execution of the
maneuver

Timetable
independent
evaluation

Inputs for Pair of trains evaluation

Conflicts before overtaking

Conflicts after overtaking

Added travel time for used passing siding compared to the fastest

The use of corridor track for waiting

Context

- Infrastructure data
- Rolling stock data
- Train positions



A scenic view of a train traveling through a mountainous landscape. The train, consisting of several passenger cars, is seen from the side as it moves along a track that curves through a lush green valley. In the background, majestic mountains with significant snow cover rise against a clear blue sky. The foreground is filled with dense evergreen trees and a rocky embankment. The overall atmosphere is serene and picturesque.

Thank you for your
attention