

OSRD

Open Source
Railway Designer

Open source platform for railway
design and timetable simulation

France



Co-funded by
the European Union



MINISTÈRE
DU DÉVELOPPEMENT
DU TERRITOIRE ET DE
LA DÉCENTRALISATION
Équipement, Transport,
Ruralité, Ville





LOÏC HAMELIN

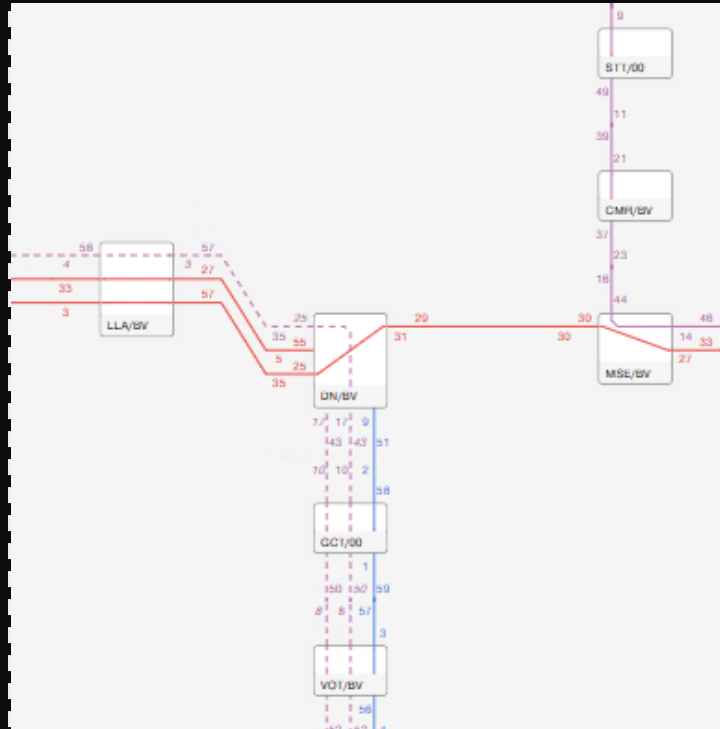
OSRD Program Director – SNCF Réseau



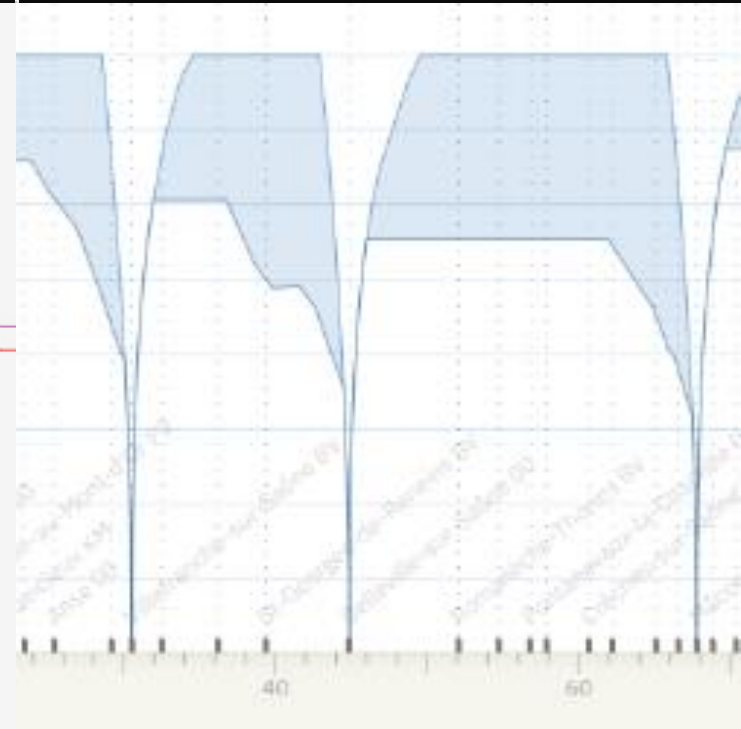
MAËLYS DUFRESNE
Product Lead, Horizon (Digital Twin)
– OSRD Program – SNCF Réseau

OSRD – Digital Twin

Equipping long-term planning for services and infrastructure projects

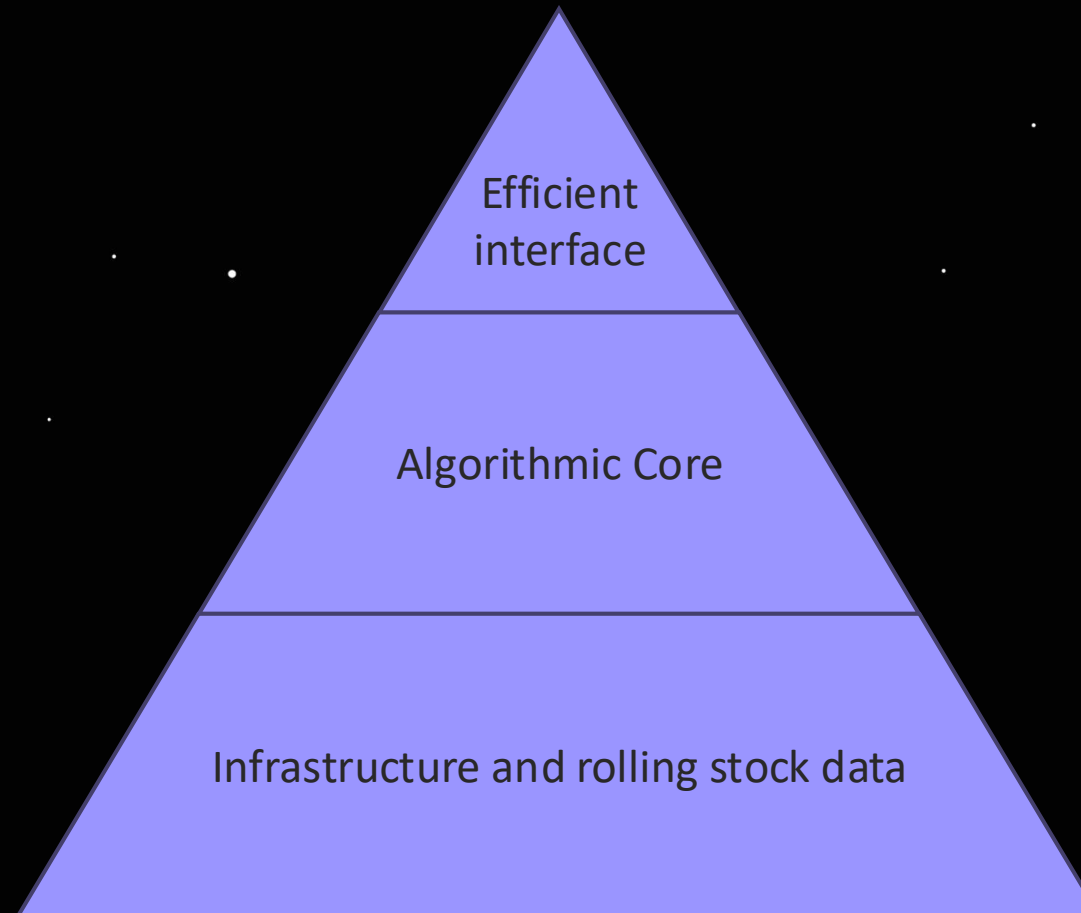


Upstream strategic schedule planning



Conducting all types of operational studies

The building blocks of OSRD – Digital Twin



- Expression of service needs:
Flow diagram

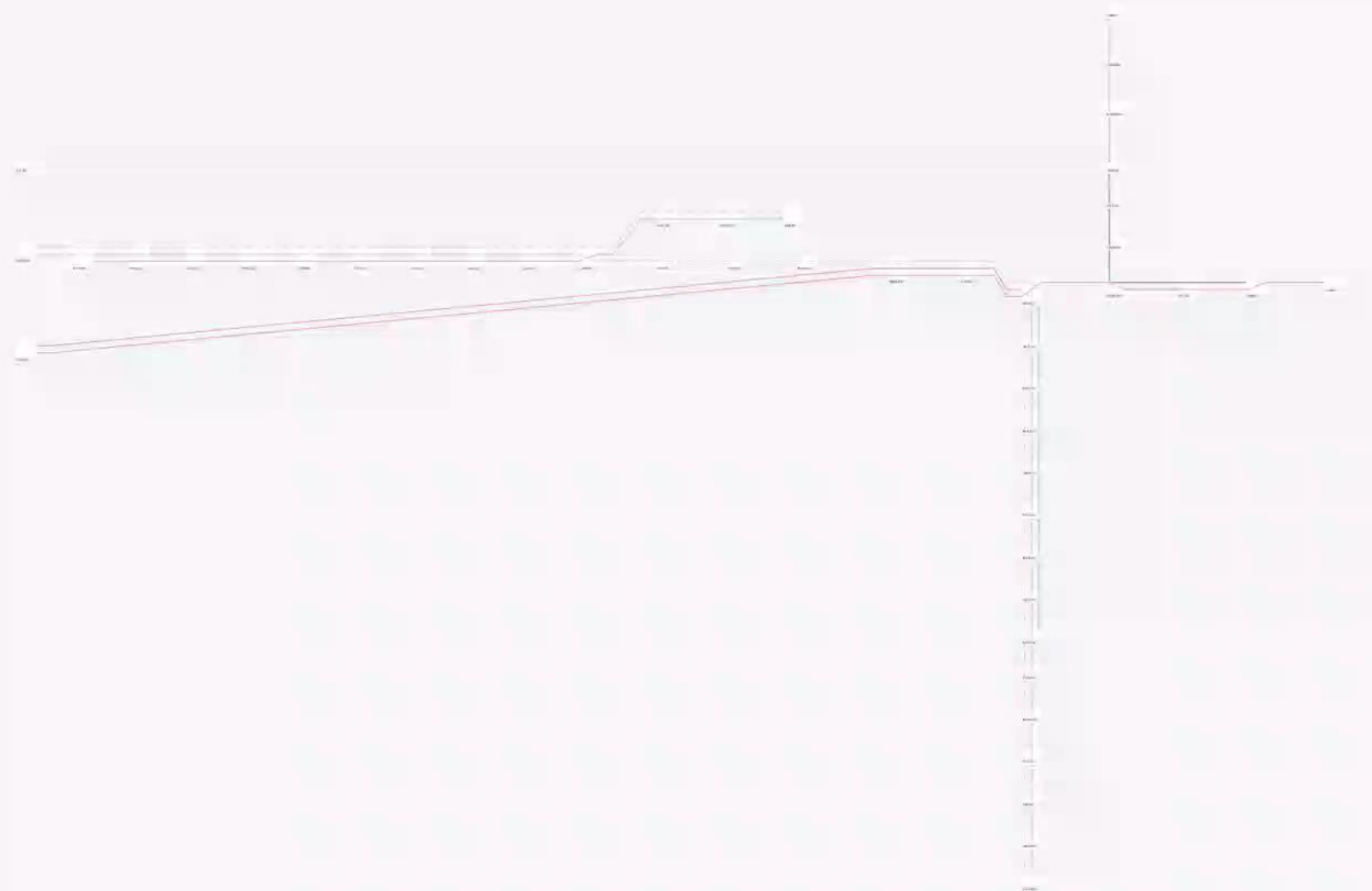
- Macroscopic study:
Network graph

- Microscopic study:
Travel time and conflicts



Expression of service needs: Flow diagram

MACRO

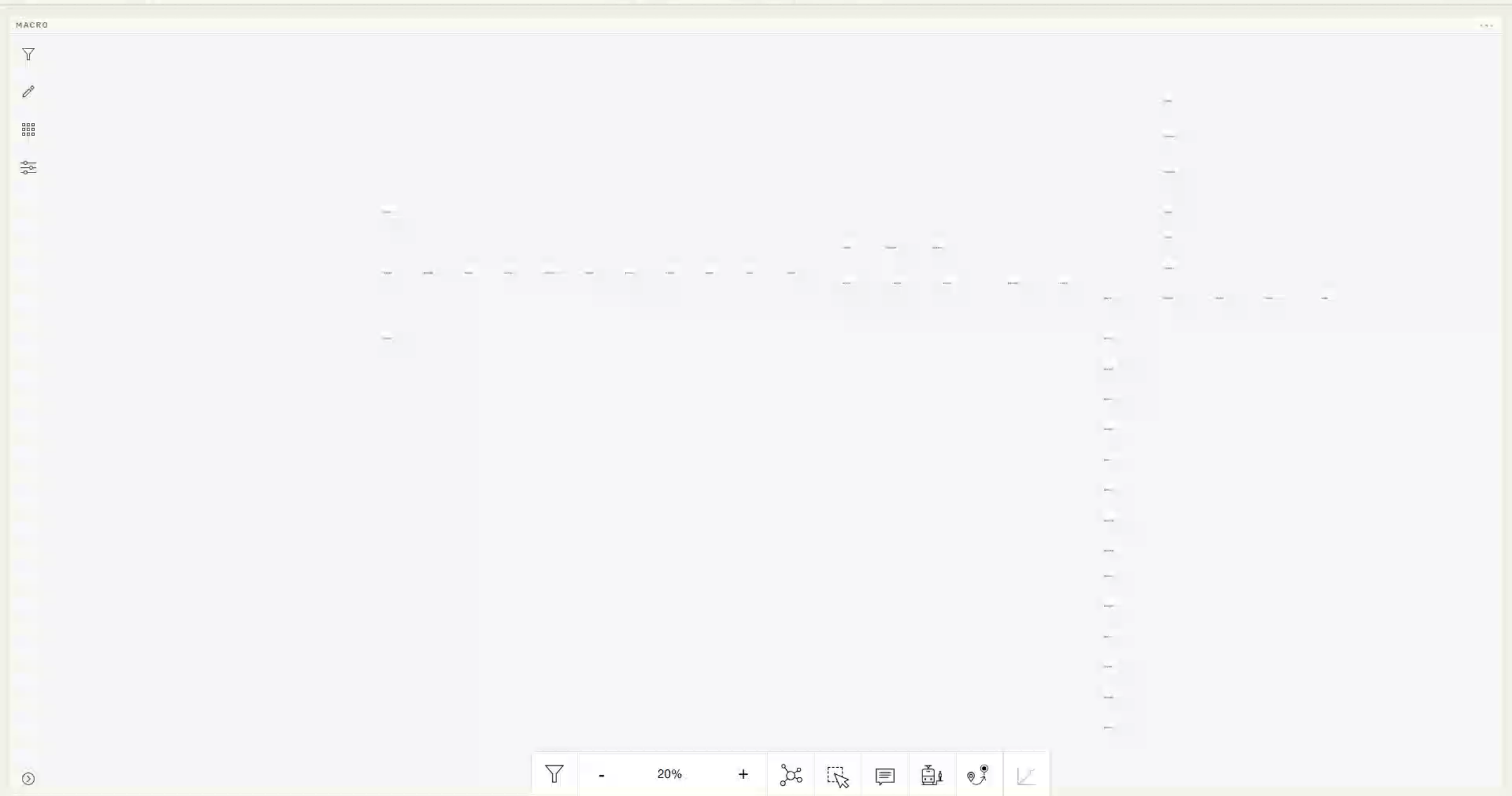


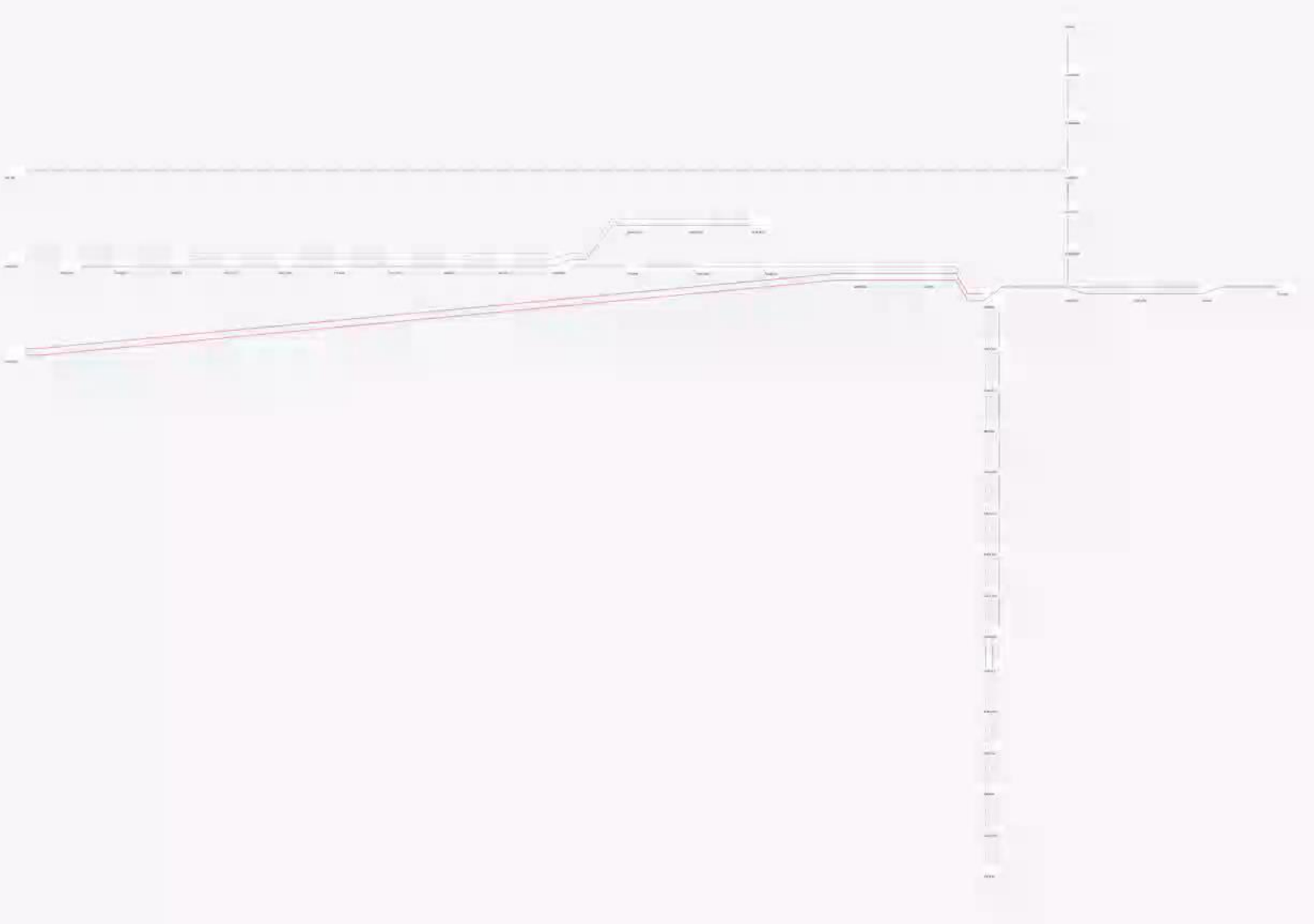
Bottom toolbar containing icons for selection, zooming, and other functions.

The toolbar includes the following elements from left to right:

- A red funnel icon.
- A minus sign (-) for zooming out.
- A percentage value of 20%.
- A plus sign (+) for zooming in.
- A network diagram icon.
- A selection tool icon (a square with a diagonal line).
- A comment icon (a speech bubble).
- A train icon.
- A location pin icon.
- A line graph icon.

Macroscopic study: Network graph





-

20%

+

Microscopic study: Travel time and conflicts

18 SERVICES

Some trains are invalid

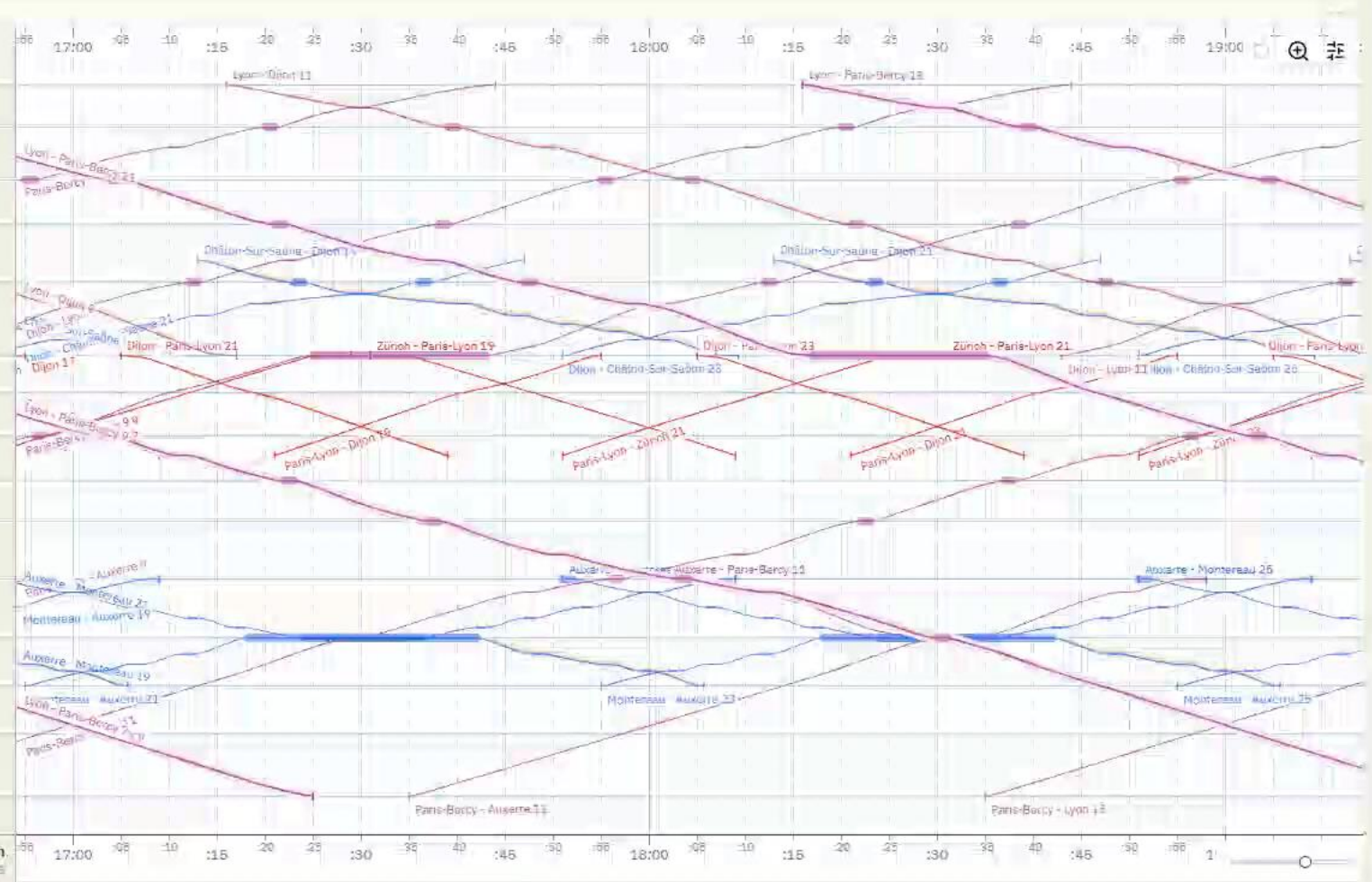
Wednesday, December 10, 2025

- 24 > Zürich - Paris-Lyon Invalid path items
- 12 > Lyon - Paris-Lyon -120min
- 24 > Auxerre - Mont... -60min
- 12 > Paris-Bercy - Ly... -120min
- 24 > Paris-Lyon - Zür... Invalid path items
- 24 > Dijon - Châlon... -60min
- 24 > Montereau - Au... -60min
- 24 > Dijon - Paris-Lyon -60min
- 12 > Paris-Est - Berlin Invalid path items
- 12 > Lyon - Dijon -120min
- 24 > Paris-Lyon - Dijon -60min
- 12 > Paris-Bercy - A... -120min
- 12 > Auxerre - Paris... -120min
- 24 > Strasbourg - Ba... Invalid path items
- 24 > Basel - Strasbo... Invalid path items
- 12 > Berlin - Paris-Est Invalid path items
- 24 > Châlon-Sur-Saô... -60min
- 12 > Dijon - Lyon -120min

STD

0	Lyon-Part-Dieu	BV
30.6	Villefranche-sur-Saône	BV
59.8	Mâcon-Ville	BV
99.8	Tournus	00
141.8	Chagny	BV
193.3	Dijon-Ville	BV
219.6	Blaisy-Bas	00
250.9	Les Laumes-Alésia	BV
282.8	Nuits-sous-Ravières	00
311.4	Tonnerre	BV
382.7	Laroche-Migennes	BV
396	Sens	BV
429	Montereau	BV
463.6	Melun	BV
607.4	Paris-Bercy	BV

Km
Lignes



SDD



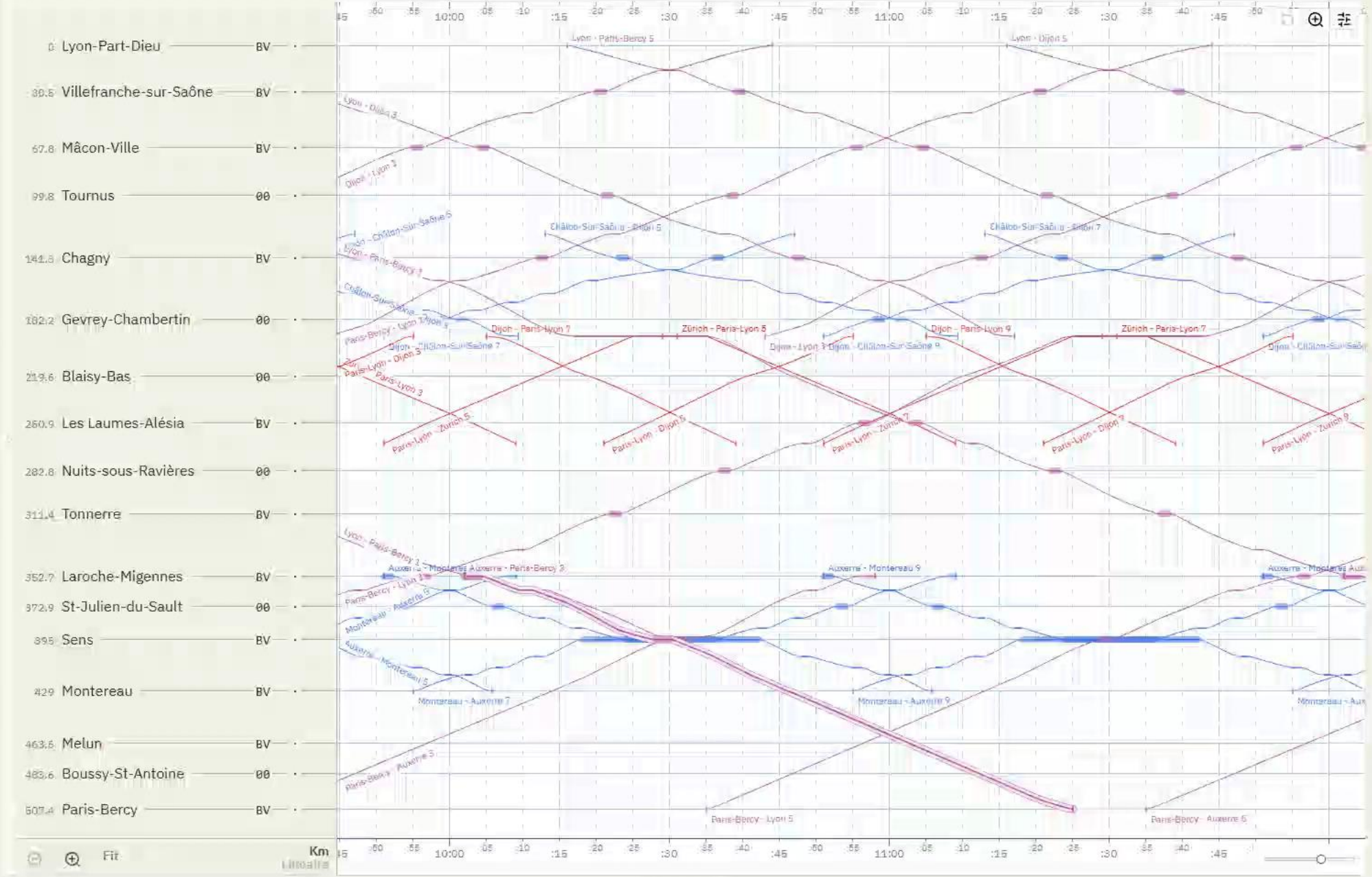
18 SERVICES

Some trains are invalid

Wednesday, December 10, 2025

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STD



500

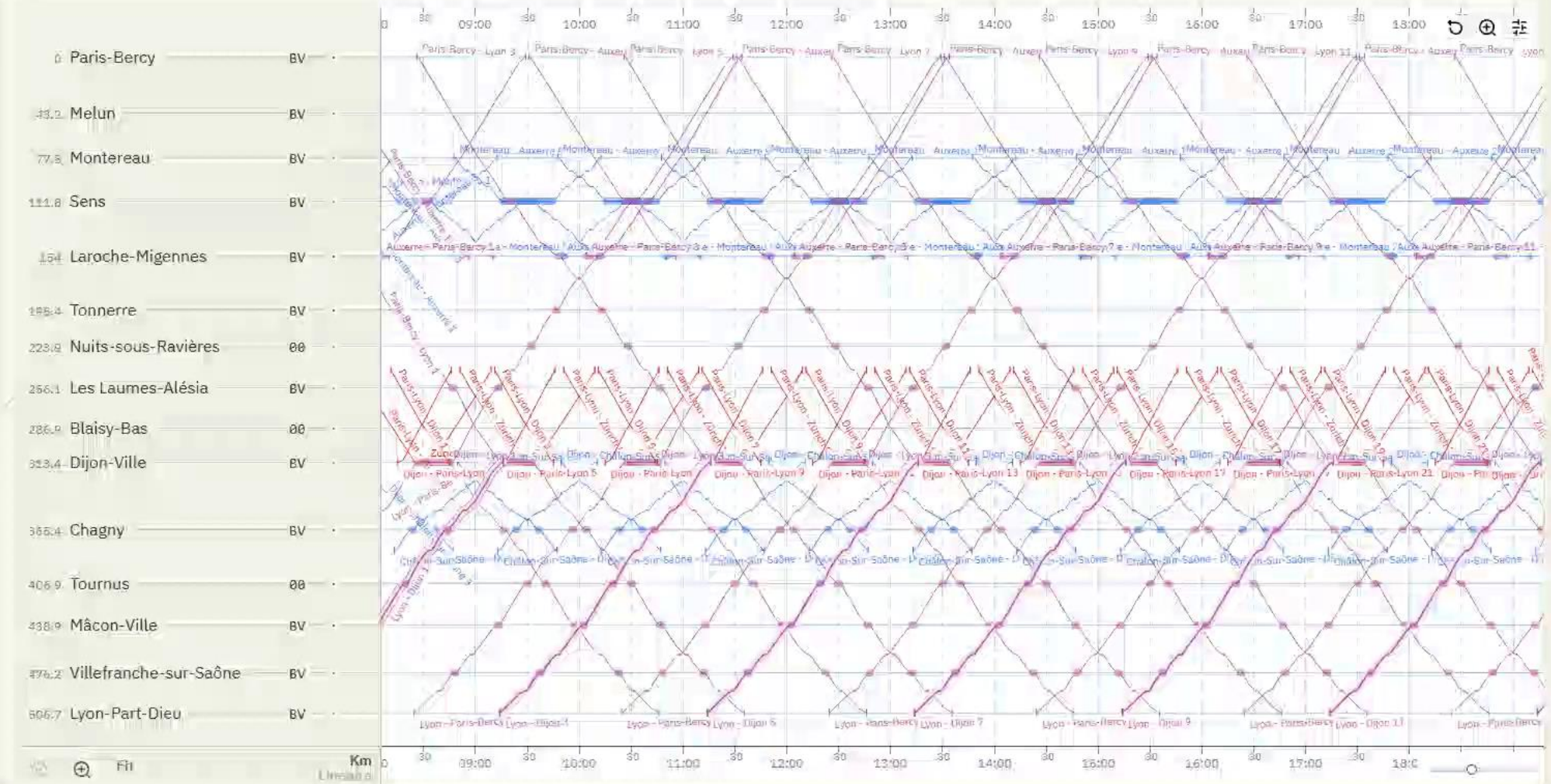
18 SERVICES

Some trains are invalid

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STD



MAP



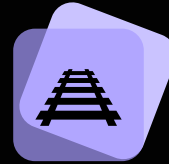
Perspectives



Planning of trains and works from
the strategic to
the operational horizon



Interface improvement

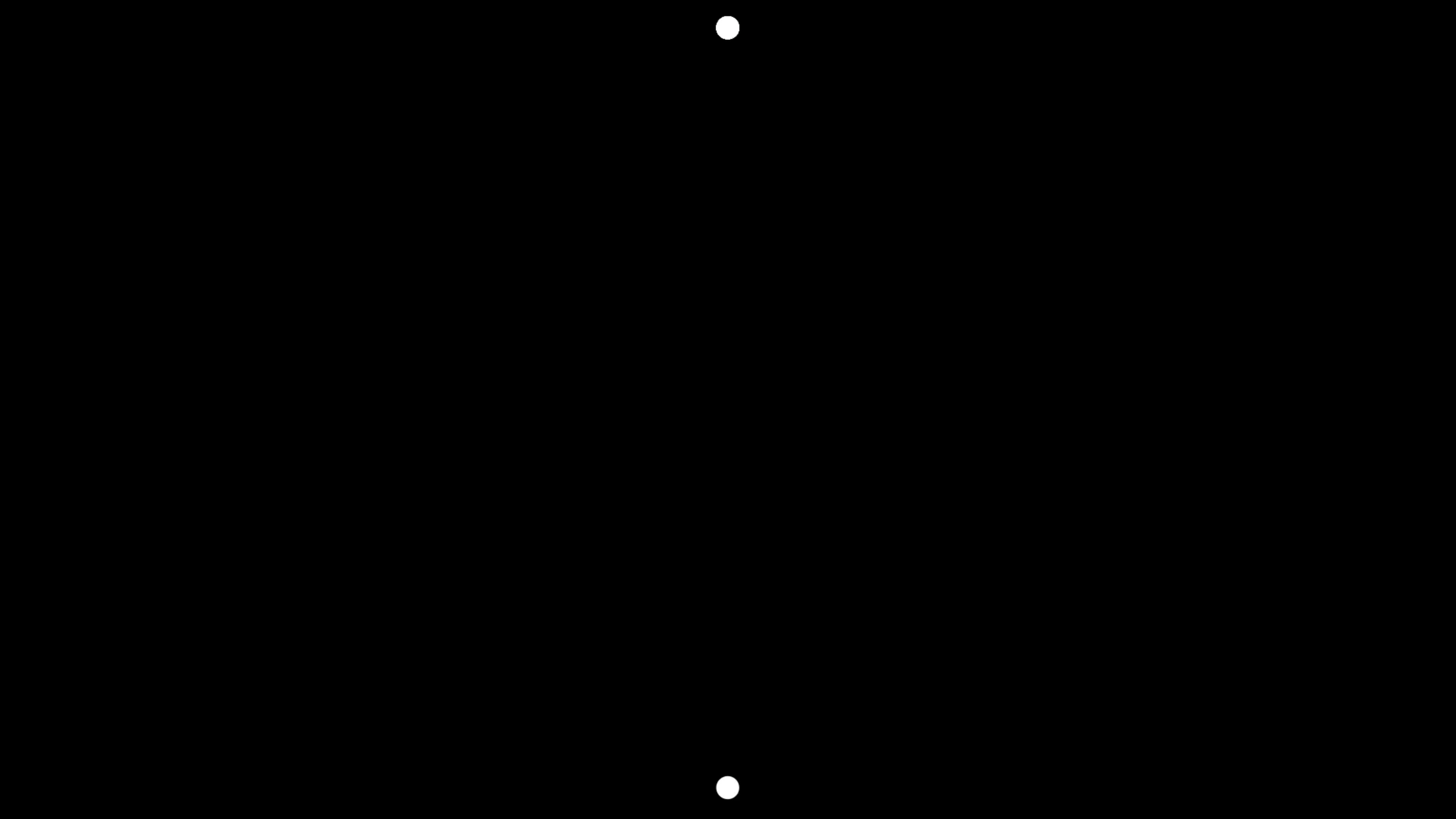


Redesign of the
infrastructure editor



Dynamic simulations

Thank you.



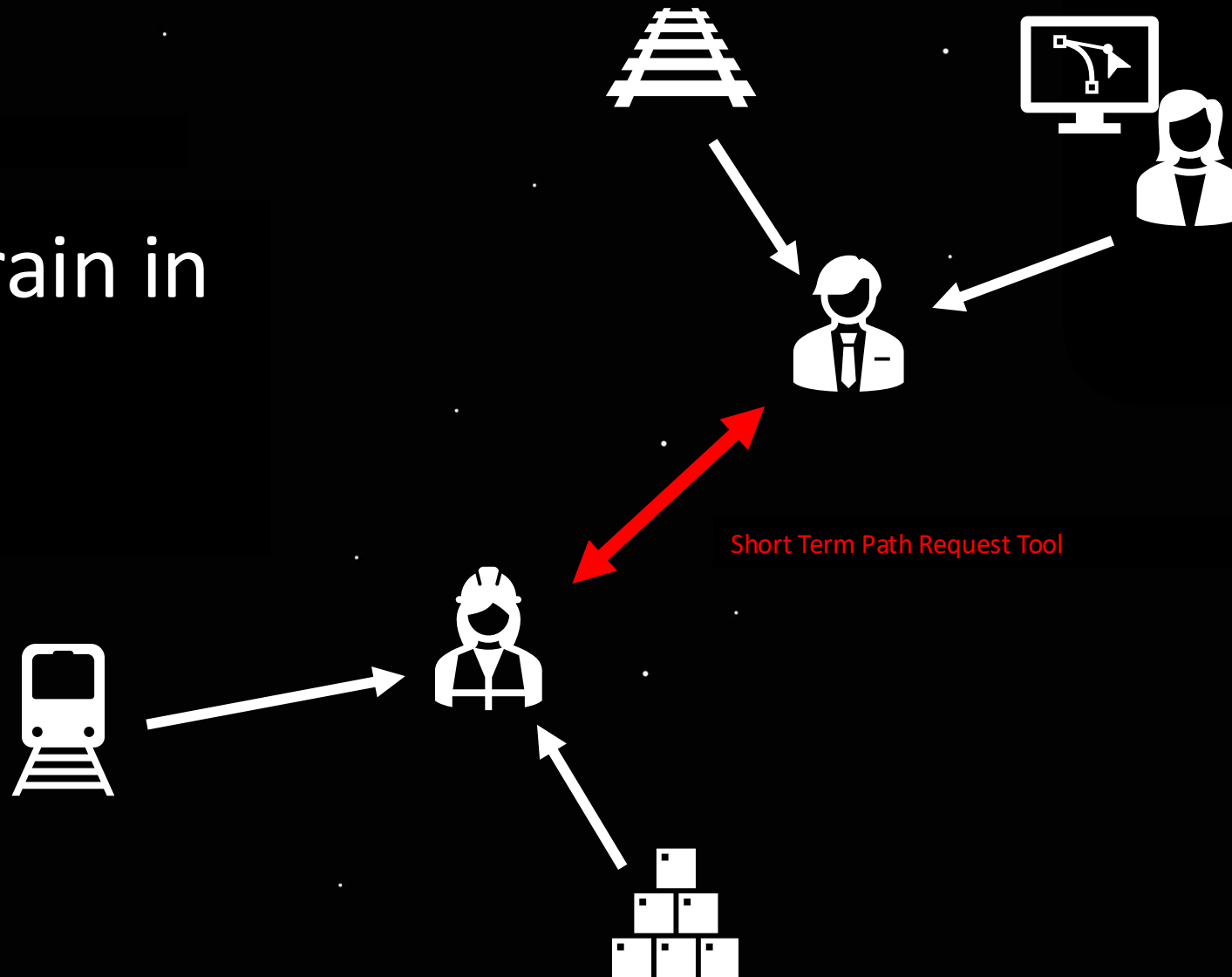


ARTHUR LEFEBVRE

Product Lead, Last Minute Request
(Short-term Path Request) – OSRD Program
– SNCF Réseau

Last Minute Request

Planning a train in last minute



Document communiqué
à titre d'information

Consist

Traction engine

Towed rolling stock

Loading gauge

Tonnage

 t

Length

 m

Code compo.

Max speed

 km/h

↑ Indicate anterior train

Origin



CI

CH

precise time



Date

16/12/25



Time

00:00

Tolerance

-30/+30

📍 Add intermediate OP

Destination



CI

CH

as soon as possible



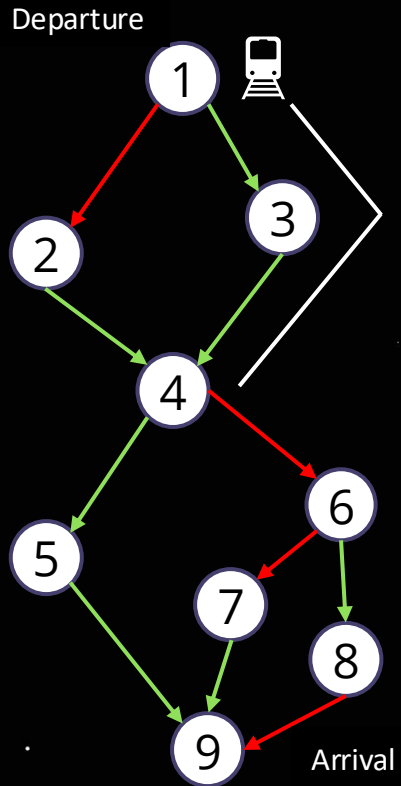
↓ Indicate posterior train

Get the simulation

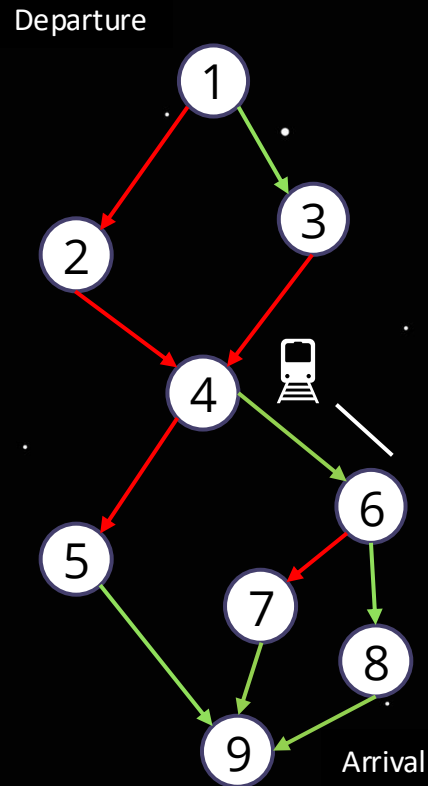


How does it work?

Time t1



Time t2



A-star Algorithm

The graph is evaluated step by step to consider all uses of capacity (other trains, works).

The dynamic simulation of the train is combined with the evolution of the free capacity to provide a result.

Consist

Traction engine

27000UM - BB 27000

✕

▼

Towed rolling stock

MA

✕

▼

Loading gauge

GA

⬆

⬇

⬆

Tonnage

180

t

Length

750

m

Code compo.

MA100

⬆

⬇

⬆

Max speed

100

km/h

Origin

CI

ZFF Zoufftgen (IE)

✕

▼

CH

XL

⬆

⬇

⬆

precise time

⬆

⬇

⬆

Date

11/12/25

📅

Time

09:00 AM

Tolerance

-00/+120

⬆

⬇

⬆

Add intermediate OP

Intermediate OP

CI

DPY Perrigny-Triage

✕

▼

CH

FE

⬆

⬇

⬆

Type

driver switch

⬆

⬇

⬆

Minimum stop time

3

minutes

⬆

⬇

⬆

Add intermediate OP

Destination

CI

LBP Le Boulou-Perthus

✕

▼

CH

00

⬆

⬇

⬆

as soon as possible

⬆

⬇

⬆

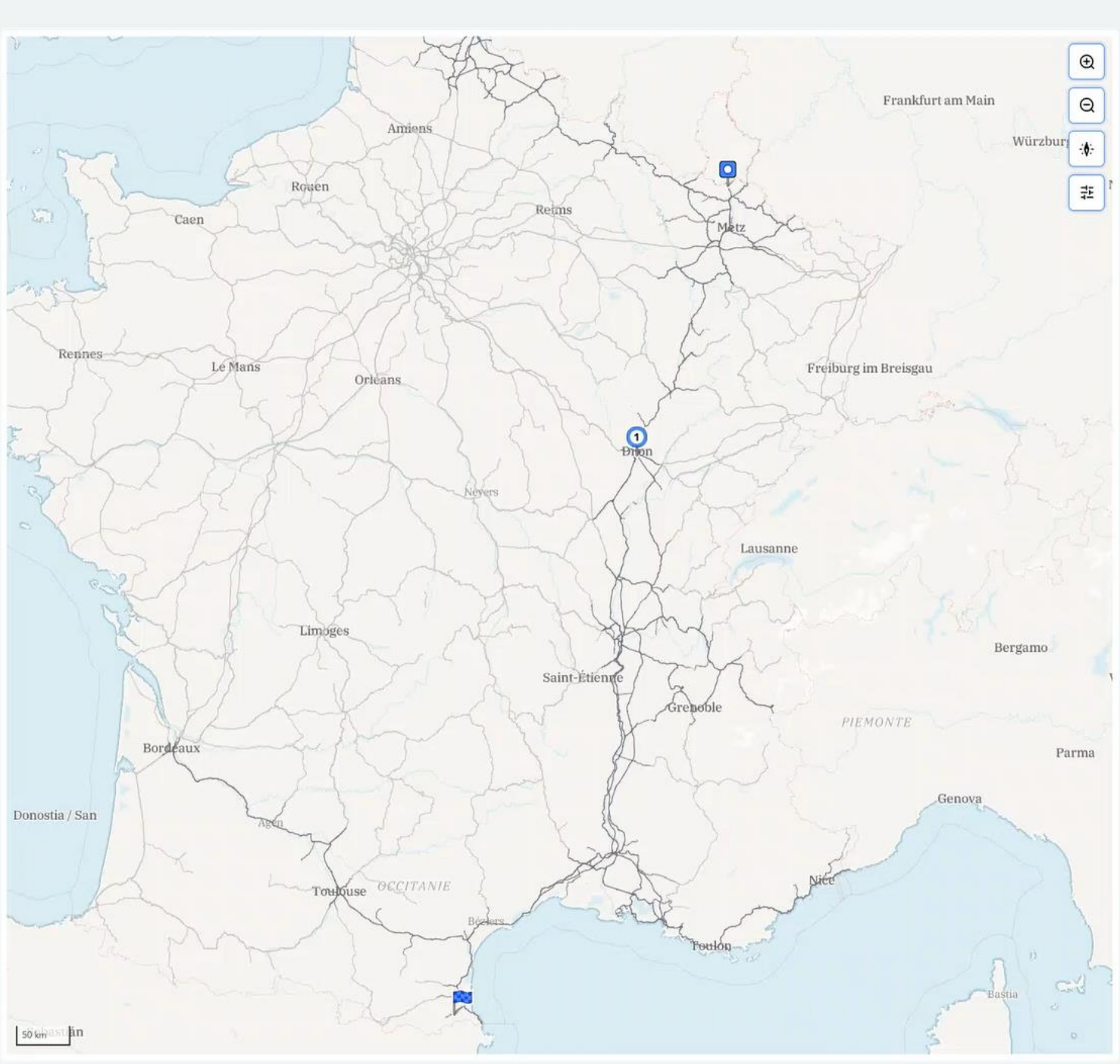
⬆

⬇

⬆

Indicate posterior train

Get the simulation



as soon as possible

↓ Indicate posterior train



Calculation completed

Simulation n°1

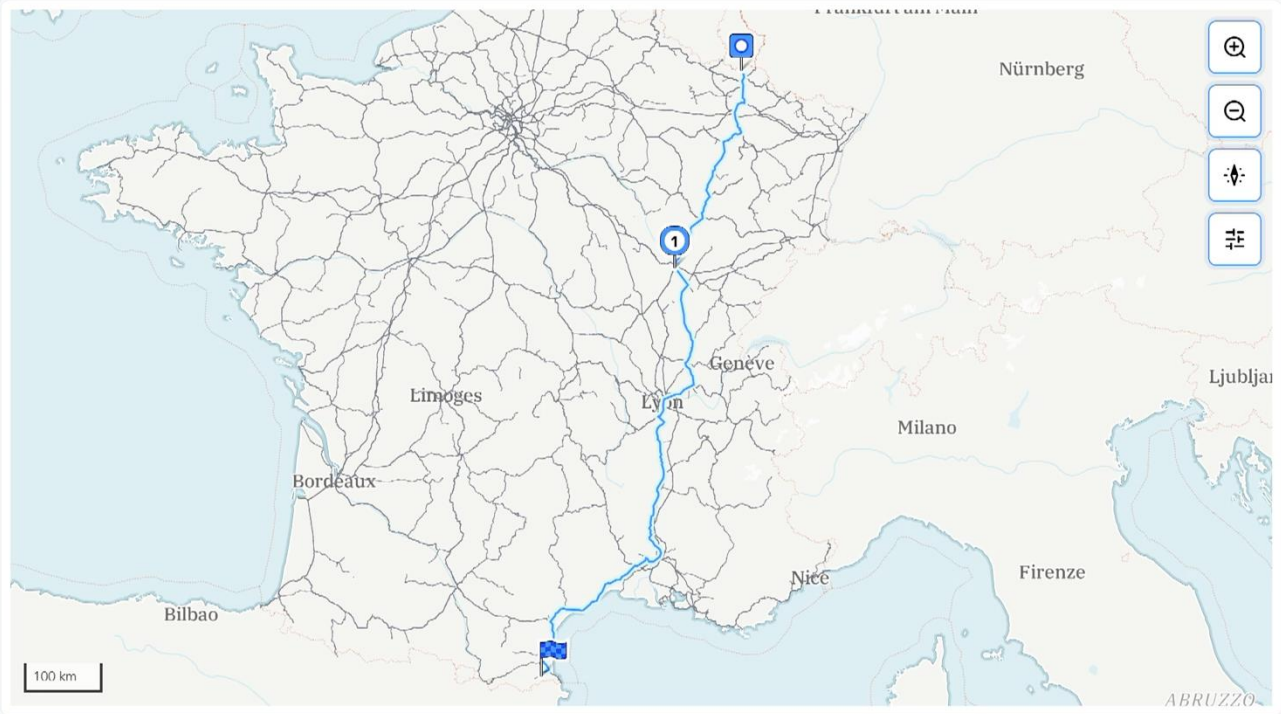
12/15/25, 03:12 PM
1052 km — 13h 40min

	OP	CH	Track	End	Passage	Start	Weight	Ref. engine
	1	Zoufftgen (IE)	XL	V2		00:06	1800t	27000
118	Culmont-Chalindrey	0	V1	02:45	7 min	02:52	=	=
136	Perrigny-Triage	FE	V1	03:45	47 min	04:32	=	=
279	Nîmes	0	V3R	10:32	7 min	10:39	=	=
339	Sète	0	V10	11:41	7 min	11:48	=	=
379	Le Boulou-Perthus	00	UNIQUE	13:46			1800t	27000

Display all operational points

Retain this simulation

Any feedback or suggestions? 
Help us improve Last Minute Request by sending us your feedback and suggestions.
[Write](#)



Thank you.

