

# OPENRAIL ASSOCIATION

CORNELIUS SCHUMACHER,  
CHAIR OF TECHNICAL COMMITTEE

JUNE 2024

# Motivation

Open Source ist omnipresent in IT ([Synopsys Open Source Security and Risk Analysis report 2022](#): 78% of analyzed code was Open Source)

Increasingly sector specific open source software in non-differentiating areas of the sector specific subject matter domains.

Examples: telecommunication, energy, automotive, logistic, and many more

Observed effect:

- Accelerated **Innovation**, because barrier of entry to using software is low
- High **Efficiency**, because costs for shared part of software stack can be shared
- Increased **Independence and interoprability**, because all vendors and users have same open access
- **Attraction of talent**, because open source addresses the needs of competent engineers



# Founding partners



<https://openrailassociation.org>

New Member



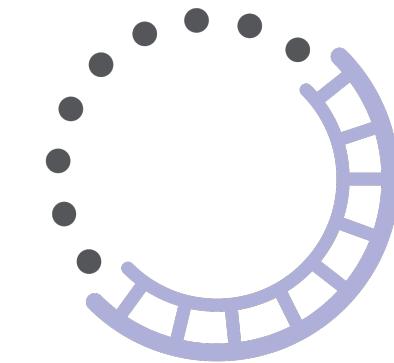
Coming soon

INFRABEL



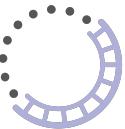
# Why did we start our own foundation?

- ▶ There are “general” open source foundations supporting IT like Eclipse or Linux Foundation at this stage, but our need is bringing Business and IT together
- ▶ Main objectives: Visibility, raise internal commitment, low-barrier entry, reasonable cost
- ▶ Founding members and interested organizations have enough significance to make it happen and raise further interest



**OPENRAIL**  
ASSOCIATION

# What is the OpenRail Association?



OPENRAIL  
ASSOCIATION

First open source association  
focused on railway specific needs.



**Not-for-profit** organisation, hosted in Europe - active internationally



**Open** to all sector stakeholders & academia



Enabling an open **network** of stakeholders and developers

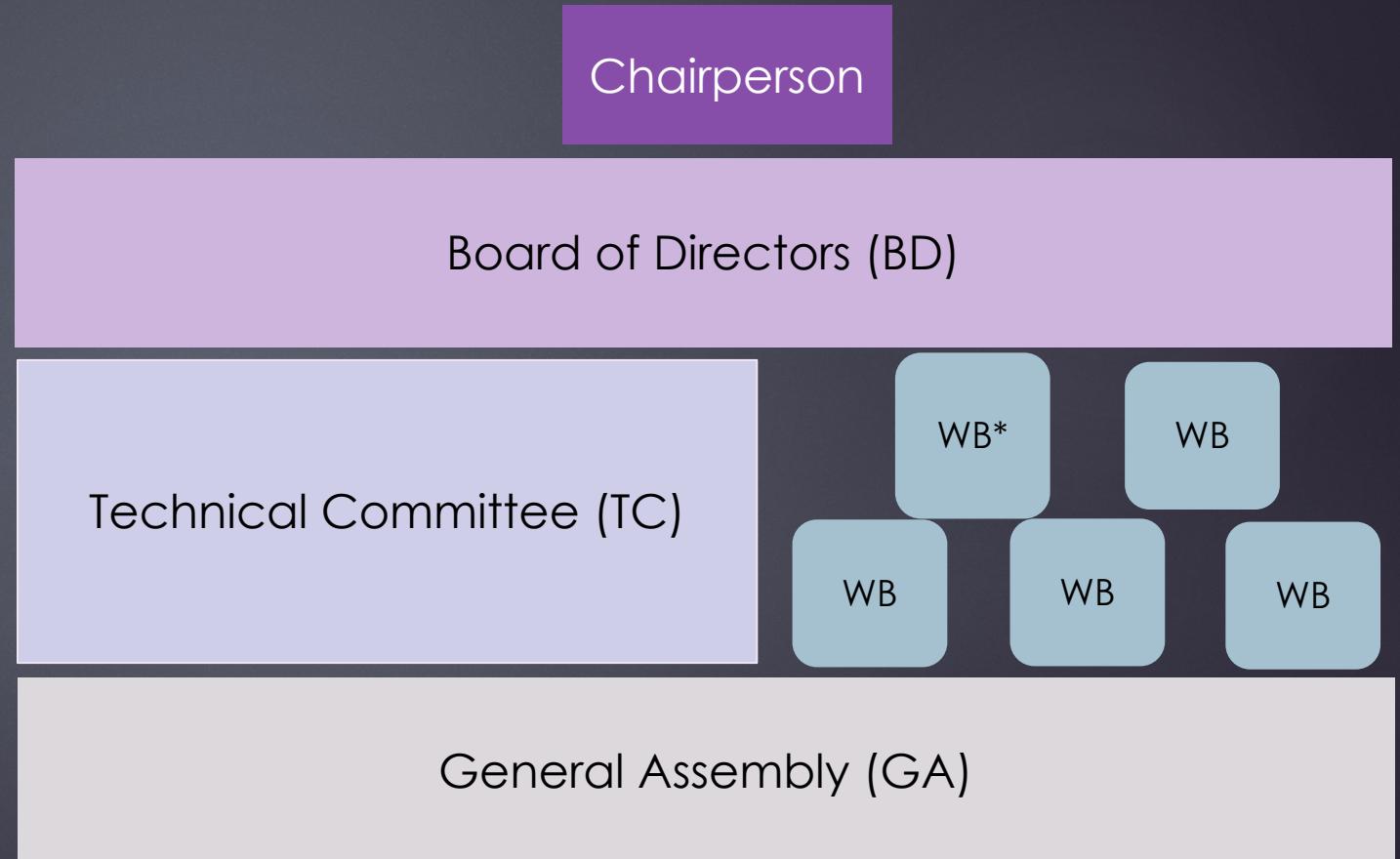
Operational since January 2024

# How the OpenRail Association works

## 4 membership categories

- Platinum
- Gold
- Silver
- Associate

Members are organizations  
and their affiliates.



\*WB= Working Body

# Board of Directors

- ▶ Chair: Jochen DECKER, CIO, **SBB**
- ▶ Vice-Chair : Nicole GÖBEL, CEO DB Systel, **DB**
- ▶ Vice-Chair : Frédéric NOVELLO, Deputy Group CIO, **SNCF**
- ▶ Vice-Chair : Jean-Michel EVANGHELOU, Director of Budgetary Control and Projects, **UIC**
- ▶ Member f the Board : Brede Dammen, Product Owner, **Entur**
- ▶ Member of the Board : Cornelius SCHUMACHER, **DB**, as Chair of Technical Committee

# What is the Technical Committee (TC)?



## In charge of:

- **Developing** & taking **care** of the **community**
- **Helping** projects in their lifecycle and maturity
- Providing appropriate **framework** for project lifecycles
- **Assessing** project developments and outputs

**The TC Chair is ex-officio member of the Board of Directors**

# Charter of the Technical Committee – Open Governance

## Principles

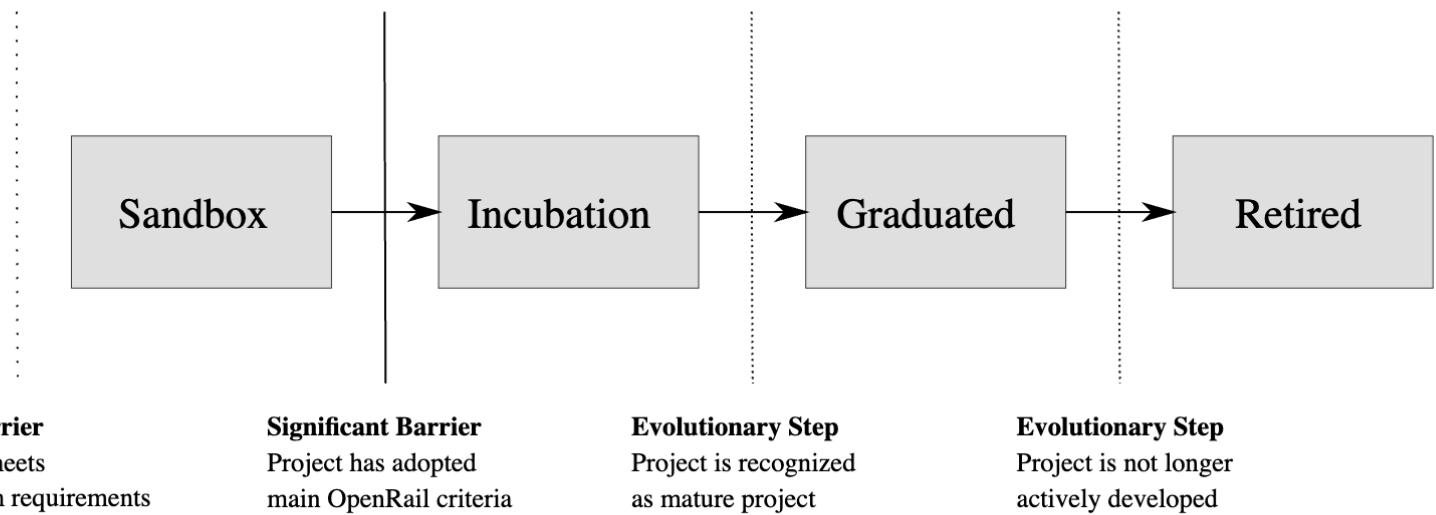
- **True to open source values** - Projects shall be run according to proven open source principles and values.
- **Equal access** - Projects shall be run in a way which provides equal access to all contributors. Decisions should be taken based on the merit of a contribution and the alignment with the goals of the project not based on status or affiliation of the contributors.
- **Transparency** - Projects shall operate in a transparent way. This applies to development as well as decisions around the project.

<https://github.com/OpenRailAssociation/technical-committee/blob/main/charter.md>

# OpenRail incubation process

<https://github.com/OpenRailAssociation/technical-committee>

## Stages of incubation process



### Low Barrier

Project meets minimum requirements

### Significant Barrier

Project has adopted main OpenRail criteria

### Evolutionary Step

Project is recognized as mature project

### Evolutionary Step

Project is not longer actively developed

# Opening up IP rights to add value.

## Output

- **Licenses:** Contributing to a Project under a license compatible to the Outbound License of the Project.
- **CLA vs. DCO:** Preference for DCOs with lower barriers to entry.

## Trademark

- **Contributions/ outputs/ projects** trademarks shall be transferred to the OpenRail Foundation.
- **OpenRail** trademark is registered.

## Antitrust policy

Open to everyone.



# Open Rail Team 2024

## Roles and responsibilities



Cornelius Schumacher

*Chair Technical Committee*

Open Source Steward at DB Systel GmbH



Loïc Hamelin

*OpenRail Team Member*

OSRD Program Director at SNCF Réseau



Mahalia Stephan

*Members – Association Development*

Product Owner Digitalization at

SBB CFF FFS



Max Mehl

*Technical Infrastructure, Communication & Community*

Open Source Strategy & Governance at  
DB Systel GmbH



Oana Vlasceanu

*Administration*

Head of Quality Management at UIC



Peter Keller

*Projects – Association Development*

Subject Matter Expert at SBB CFF FFS



Simon Clavier

*OpenRail Team Member*

Open Source Software Strategist at SNCF



OpenRail projects

# OpenRail Projects

- ▶ Open Source Railway Designer (OSRD)  
Simulation of railway infrastructure and analysis of results
- ▶ Rail Condition Monitoring (RCM OSS)  
Support for visual inspection of train tracks
- ▶ DAC Migration Decision Support System (DAC Migration DSS)  
Support for planning the migration of freight wagons to digital automated coupling
- ▶ Netzgrafik-Editor (NGE)  
Tool for creating and analyzing regular-interval timetables



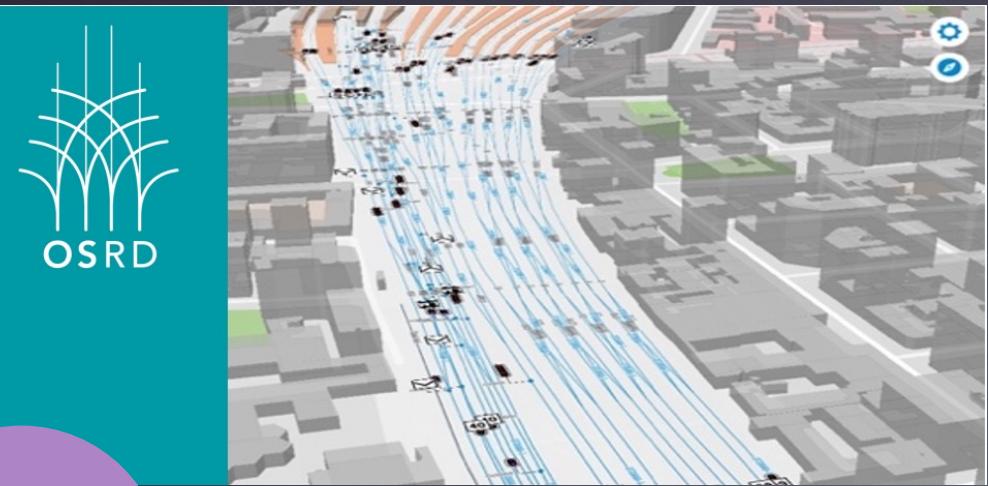
**OpenRail on GitHub:** <https://github.com/OpenRailAssociation>

**Project list:** <https://github.com/OpenRailAssociation/technical-committee/blob/main/projects.md>

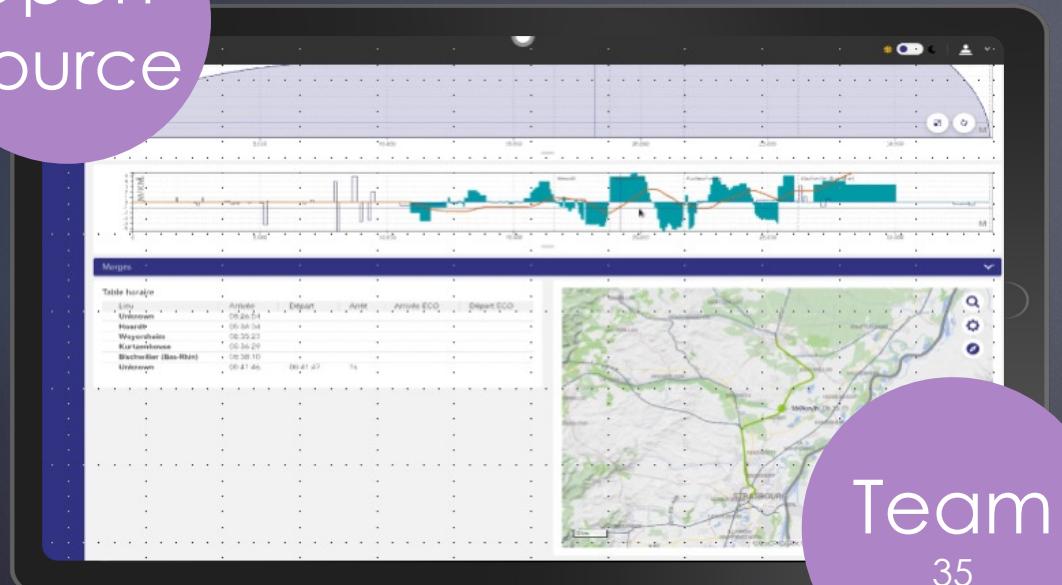
# Open Source Railway Designer (SNCF).

<https://osrd.fr/en/>

- ▶ **Web application for railway infrastructure design, capacity analysis, timetabling, and more**
  - Running time simulation
  - Infrastructure editor
  - Map rendering
  - Rail pathfinding / short term path request
  - Interlocking and signaling
- ▶ **Reasons for open source**
  - Transparency and Independence
  - Participation industry, software vendors & science
  - Public Money, Public Code



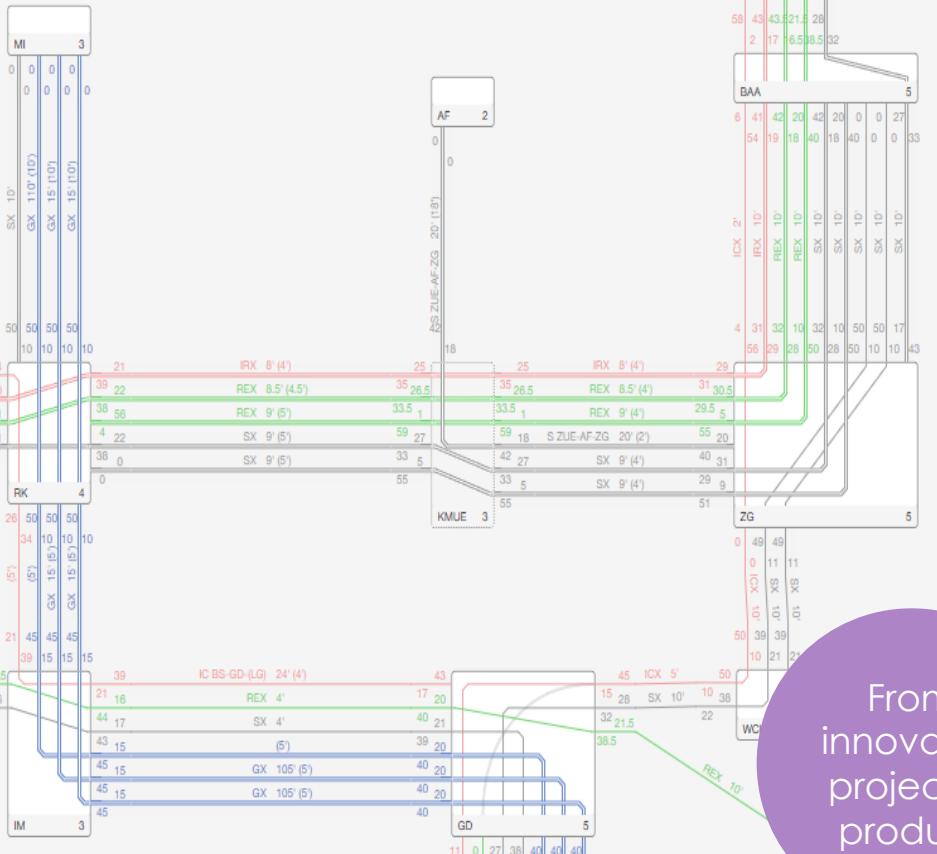
Open  
Source



Team  
35

# Netzgrafik-Editor (SBB).

Long-term cycle schedule options for network development.



## Business Value.

- More efficient timetable planning
- Digital assistant
- User-centric
- Collaboration

## Open source suitability

- **Community-building:**
  - universal & innovative
  - Broad area of application
  - Broad target group
- **Self-contained**



What else in open source railway land?



## Open Sales Distribution Model - OSDM

Open Source specification for international ticketing

<https://osdm.io/>



## Rail Condition Monitoring - RCM

Rail Measurement and diagnostic tools



Data format



Libraries



Viewer



## Flatland

Railway simulation environment to test different optimization methods

<https://flatland.aicrowd.com/intro.html>



## OSRD - Open Source Railway Designer

Microscopic simulation of the railway system

<http://osrd.fr>



Examples for open source collaboration in the railway sector

# OSDM

Open Sales and Distribution Model simplifies the booking process for customers



## Business value

- ✓ OSDM substantially simplifies the booking process for public transport customers across Europa.
- ✓ OSDM lowers the complexity and distribution costs for distributors and carriers.
- ✓ OSDM contributes to the shift of air traffic to rail and thus helps to achieve the climate targets.

## Open source suitability

- ✓ Every rail transport and travel service vendor has to solve the integration across many providers.
- ✓ OSDM provides a specification that can be used for all public transport providers.
- ✓ Open development of OSDM via defined and governance

<https://github.com/UnionInternationalCheminsdeFer/OSDM>

# AI Models for Object Recognition

- SBB opened their Machine Learning model to recognize objects around train stations by images.
- Their model can identify objects around the train stations even if they look quite different from original data inside Swiss train stations. Useful for cross-border usage!
- Goal: Standard image recognition for railway infrastructure and items in stations around Europe
- Target users:
  - People with e.g. visual impairments
  - Railway employees tasked with cleaning and maintenance tasks
- Use cases:
  - Helping customers to find their ways around the station, e.g. finding door buttons, staircases or trash cans
  - Identify broken or dirty assets
- Collaboration opportunities: Train the model with larger datasets from all over Europe and beyond
- Open Source status: ML model is Open Source, based on YOLOv8. Training data is closed.
- Links:
  - Models and annotations: <https://github.com/SchweizerischeBundesbahnen/sbb-ml-models>
  - Android library: <https://github.com/SchweizerischeBundesbahnen/sbb-ml-android>
  - iOS library: <https://github.com/SchweizerischeBundesbahnen/sbb-ml-ios>



Culture and Community are not just words:  
“Railways and Open Transport” - Track at FOSDEM 2023 (and 2024)

The OpenRailway Foundation is a developer initiative for sustainable transport

Our mission: to add open source technology where it already exists

Current initiatives: Companies believe in the Foundation for Railways



We are looking forward to your participation!

# Journey Planning

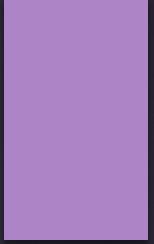
We connected with the Open Source community by organizing the “Railways and Open Transport Devroom” at [FOSDEM 2023](#) and again at [FOSDEM 2024](#). Some interesting projects:

## MOTIS (Speaker FOSDEM Felix Gündling)

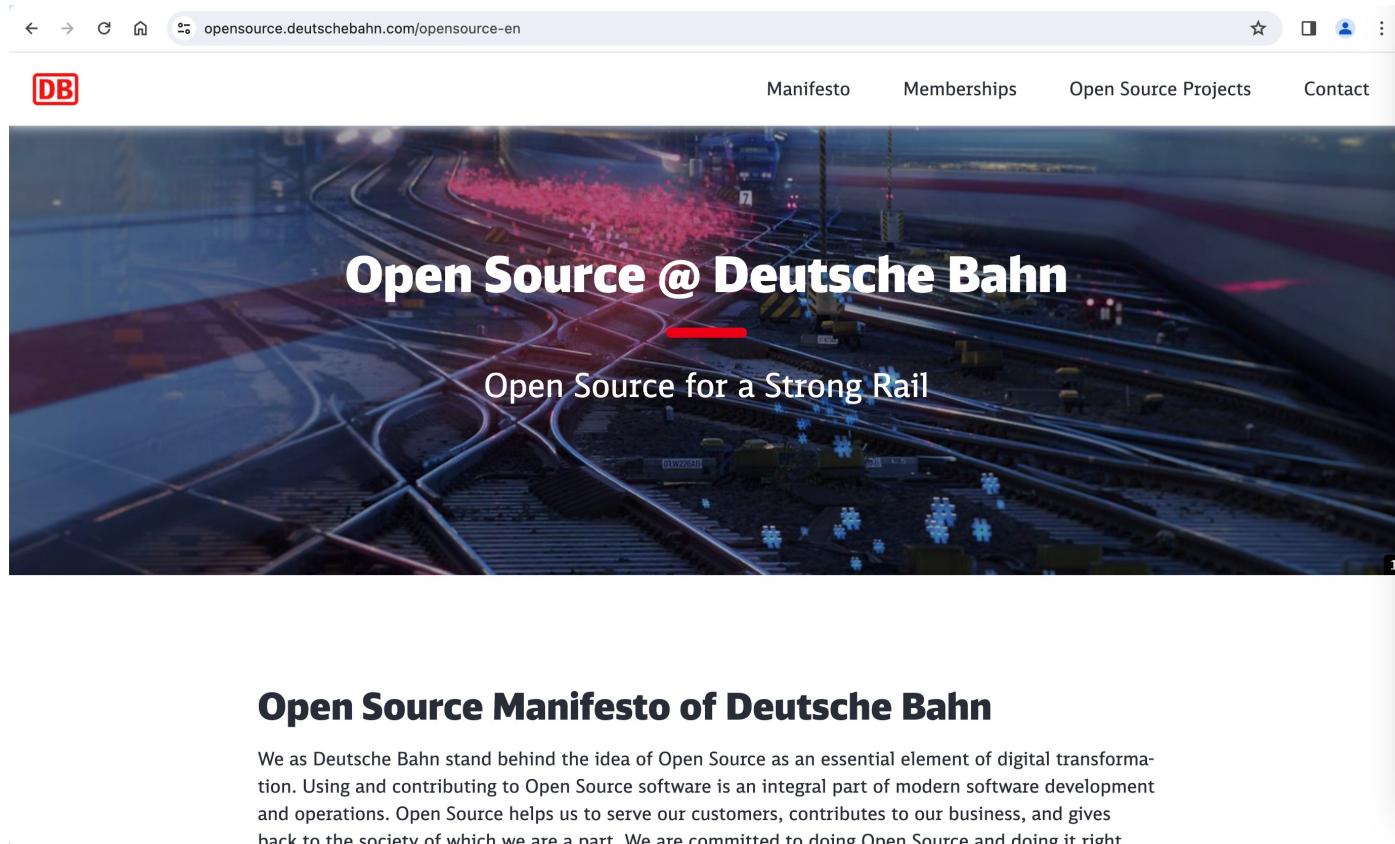
- MOTIS is an intermodal travel information system that supports GTFS Real-Time. It is open source and provides a HTTP JSON API, web and Android app. MOTIS Project was founded at the [Technical University of Darmstadt](#) in cooperation with Deutsche Bahn.
- Interesting functionality: a router that can address more complex mobility issues. The [demo](#) is appealing and shows potential. Modularised structure - Parts can also be used.
- Community within the Technical University of Darmstadt and cooperation with DB for internal applications (e.g. information and disposition decisions).

## Open Trip Planner (Speaker FOSDEM Hannes Junnila)

- Strong active community in Scandinavian countries. Proven operation for passenger information services.



How do railways see open source?



A screenshot of a web browser displaying the Deutsche Bahn Open Source website. The URL in the address bar is [opensource.deutschebahn.com/opensource-en](https://opensource.deutschebahn.com/opensource-en). The page features a large banner image of a train station at night with the text "Open Source @ Deutsche Bahn" and "Open Source for a Strong Rail". Below the banner, there's a section titled "Open Source Manifesto of Deutsche Bahn" with a paragraph about the company's commitment to open source. At the top right, there are navigation links for "Manifesto", "Memberships", "Open Source Projects", and "Contact".

DB

Manifesto Memberships Open Source Projects Contact

## Open Source @ Deutsche Bahn

### Open Source for a Strong Rail

## Open Source Manifesto of Deutsche Bahn

We as Deutsche Bahn stand behind the idea of Open Source as an essential element of digital transformation. Using and contributing to Open Source software is an integral part of modern software development and operations. Open Source helps us to serve our customers, contributes to our business, and gives back to the society of which we are a part. We are committed to doing Open Source and doing it right.

# DB Open Source Manifesto

PUBLISHED IN NOVEMBER 2023:  
[HTTPS://OPENSOURCE.DEUTSCHEBAHN.COM](https://opensource.deutschebahn.com)

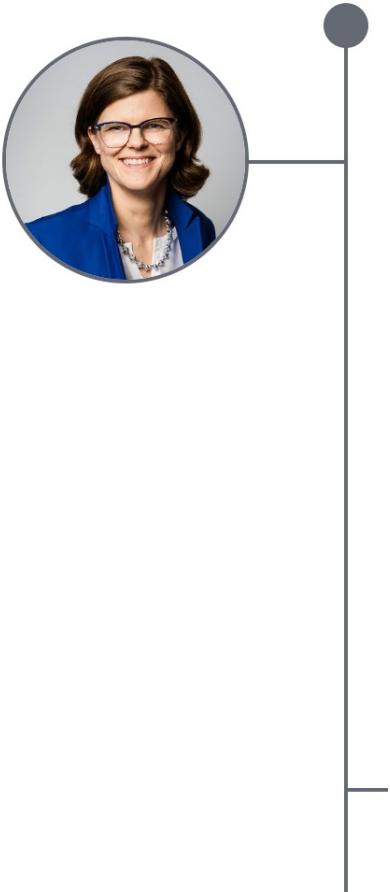


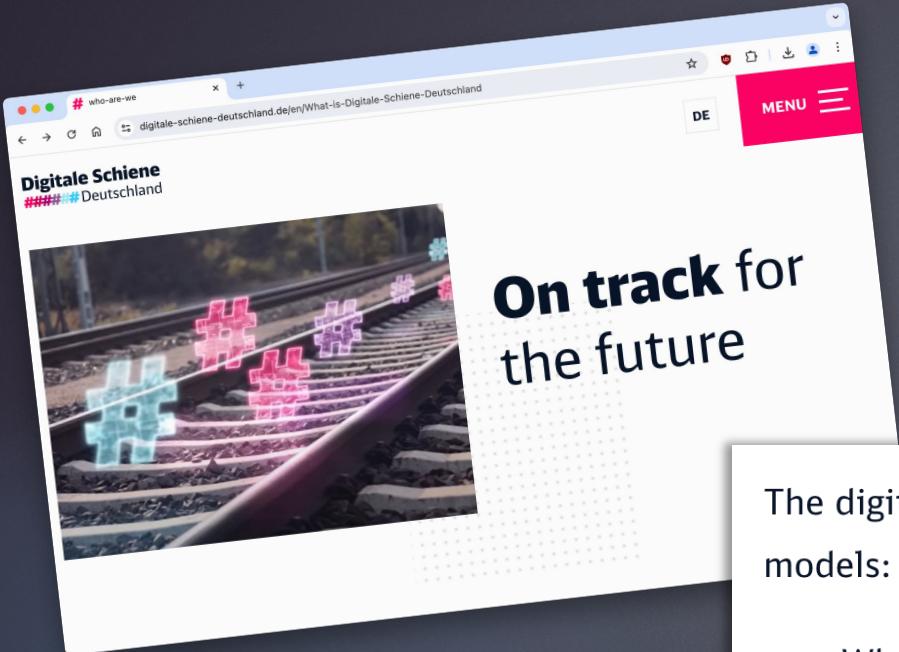
Deutsche  
Bahn strives  
to be a good  
Open Source  
citizen

## Daniela Gerd tom Markotten

"Open Source is an essential element of digitalisation. For Deutsche Bahn, it is therefore a matter of course that we use this great potential and contribute our share to the lively community. In keeping with the spirit of Open Source, we are not doing this alone. We work together with other European railway companies within the framework of the OpenRail Association and exchange ideas across company boundaries."

*Daniela Gerd tom Markotten, Member of the Management Board for Digitalization and Technology*





The digitization of the rail system requires new, cross-sector and cross-border partnership models:

- Whereas DB was previously a traditional customer, we are now entering into development partnerships with industry.
- Whereas DB was previously a mere user of technologies, it is now becoming an active co-developer.
- Whereas the systems were previously closed, there will be open platforms in the future.

The screenshot shows a web browser window with the URL [numerique.sncf.com/opensource-en/](https://numerique.sncf.com/opensource-en/). The page title is "Open Source @SNCF Group". The content discusses SNCF's belief in Open Source as an essential element of digital transformation for sustainable mobility and logistics. It states that using and contributing to Open Source software is an integral part of modern software development and operations. The page also outlines the company's intentions and principles regarding Open Source.

We as SNCF Group believe that Open Source is an essential element of digital transformation for sustainable mobility and logistics. Using and contributing to Open Source software is an integral part of modern software development and operations. Open Source helps us to serve our customers, contributes to our business, and gives back to the society of which we are a part.

We intend to do Open Source professionally, responsibly, and according to the proven practices of the open-source ecosystem.

We use Open Source to :

- **Accelerate innovation**, because it lowers the barriers to entry
- **Increase efficiency**, because efforts can be shared
- **Foster independence and interoperability**, because all users and providers have open access
- Provide an environment for people to learn and apply their skills because that is what they expect from a modern company

We intend to engage with Open Source under the following principles :

- **Use and contribute to Open Source** : Take open source software into account when choosing or developing software. This includes contributing and giving back changes to open source software as well as starting open source initiatives where we can be stronger together with others.
- **Provide clear guidelines** : Provide a clear path and guidelines to using and contributing to open source software
- **Take responsibility** : Be a « good open source citizen » which means taking responsibility as part of the ecosystem.
- **Act responsibly** : Always act responsibly in open source communities with care and respect in content and communication

# SNCF's commitment to open source

[HTTPS://OPENSOURCE.SNCF.COM/](https://opensource.sncf.com/)



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Friday 25 March 2022

## UIC and its members begin work on the OpenRail Foundation

Estimated reading time: 1 mn

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24 March 2022

UIC and three of its members - SNCF, DB and SBB - are working on a joint initiative to create an open-source association dedicated to railway business.

As announced by UIC's Director General, François Davenne, at the association's most recent General Assembly in December 2021, the aim of the association, to be called the 'OpenRail Foundation', will be to provide an open space enabling cooperative innovation and software development for railways.

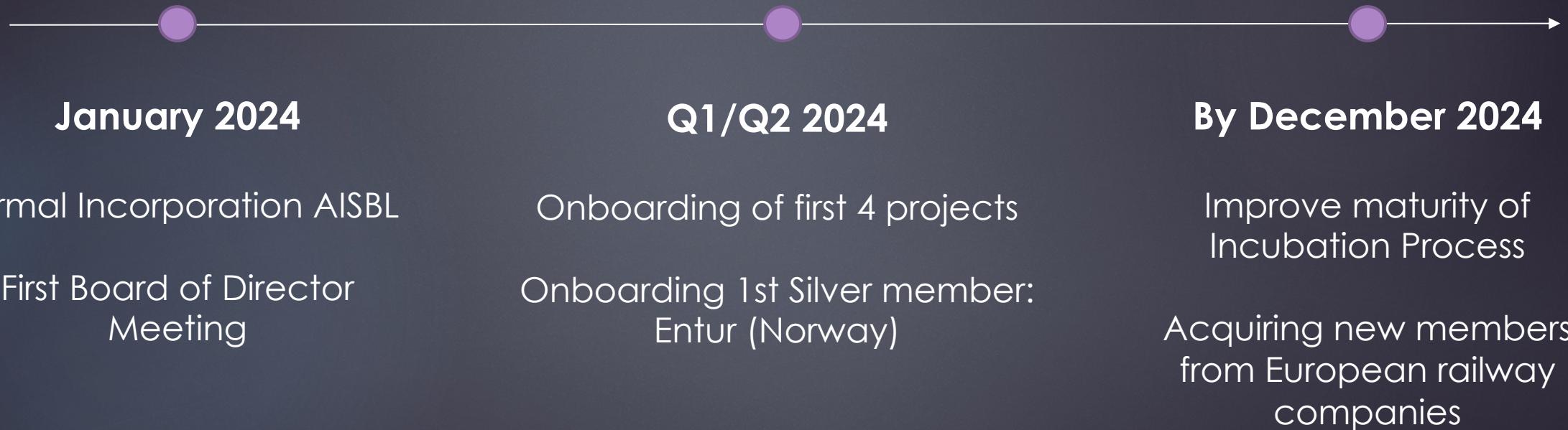
The OpenRail Foundation intends to welcome any contributors interested in sharing knowledge, developing code and contributing to collaborative projects for the use of the

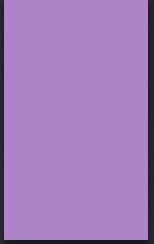




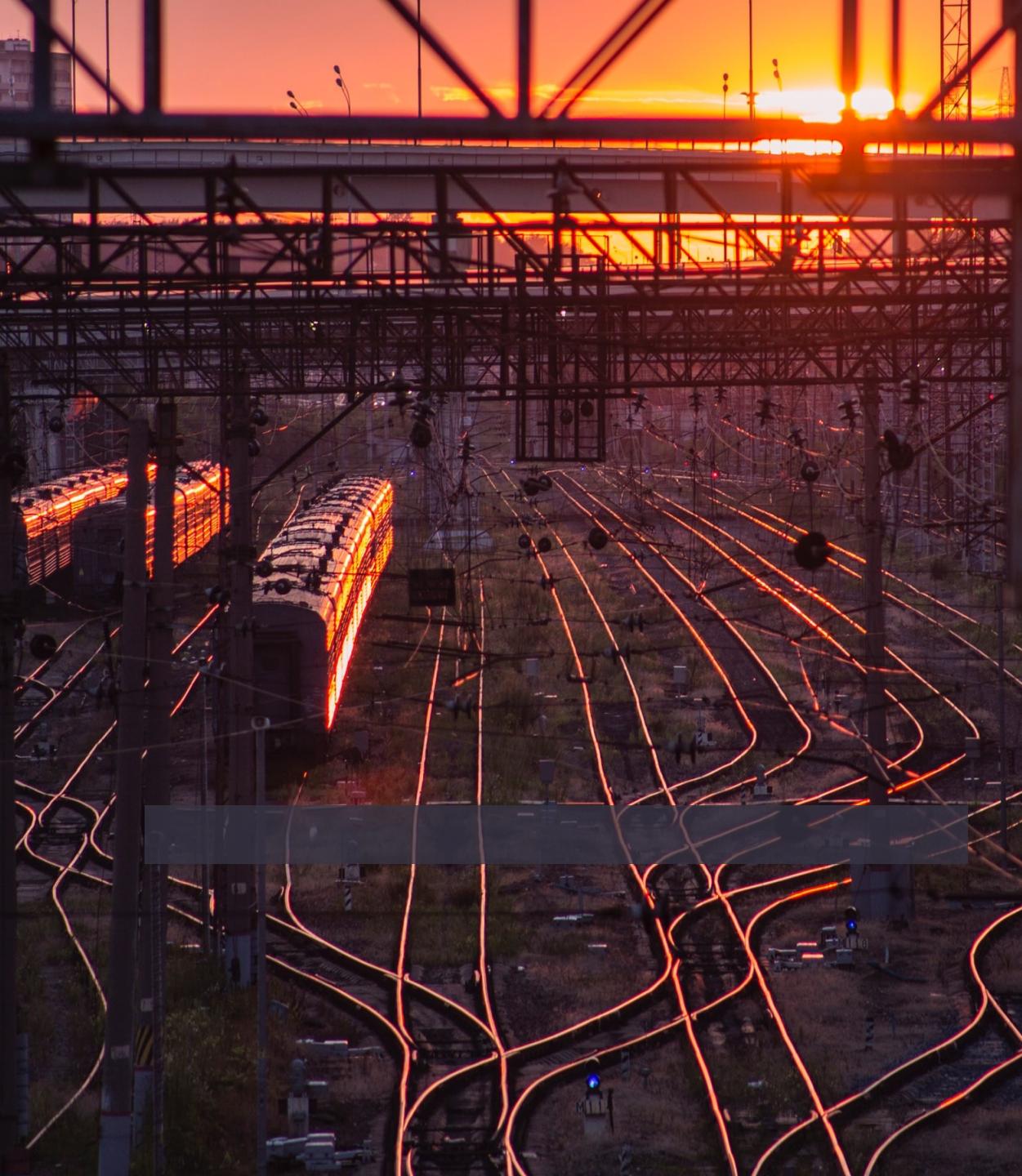
What's next?

# Roadmap



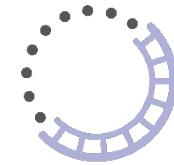


How to become a member?



## OpenRail Association

We create an open, autonomous and collaborative space for rail-specific software initiatives, by promoting open source developments in the railway sector.



**OPENRAIL**  
ASSOCIATION

### Topics – active open source

Maintenance  
e.g. [RCM](#)

Timetable planning  
e.g. [OSRD](#)

Netdesign  
e.g. [Netzgrafik-Editor](#)

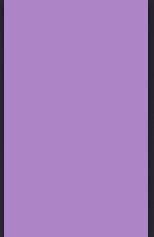
### Membership opportunities – Influence the future

1. Platinum: Comprehensive influence strategic direction.
2. Gold: Notable at the Board of Directors
3. Silver: Selected seats at the Board of Directors
4. Associate: Non-profit organizations and individuals.

Join us: <https://openrailassociation.org/about>

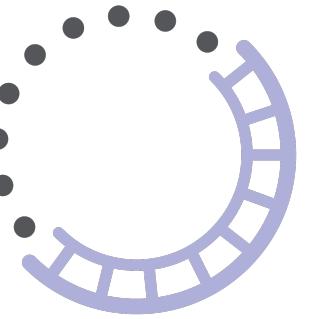


# Conclusion



**„You can't master digital transformation  
without mastering the art of open source“**

*Mike Milinkovich, Executive Director Eclipse Foundation*



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