

Digital Sovereignty in Rail: OpenRail's Position

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The Problem: Why Digital Sovereignty Matters for Rail

Digital sovereignty is not about isolation or self-sufficiency, it is about the ability to make your own decisions. It is about having real options: the ability to choose, to switch, to adapt, and to co-develop the technology that rail depends on. Without it, organizations across the railway sector face lock-in, opaque supply chains, unpredictable pricing, and limited influence over the direction of critical tools. A market built on open foundations is one where all participants can compete fairly and innovate freely.¹

The current geopolitical context makes this an urgent and important topic. As digital infrastructure becomes a strategic asset, dependence on software governed by foreign jurisdictions, or where a single provider controls the entire stack, is a risk that rail operators, infrastructure managers, technology providers, and their regulators can no longer ignore. Digital sovereignty is becoming a procurement criterion, a regulatory expectation, and a board-level responsibility. It's part of the general movement towards digital infrastructure as a common good.

Railway is one of the main critical infrastructures worldwide. The software that runs it (from traffic management and timetabling to passenger information and maintenance systems) increasingly determines whether organizations can make independent decisions about their own systems, or whether those decisions are effectively constrained by the tools and platforms available to them.

What Open Source Offers

Open source software guarantees the freedoms to use, inspect, improve, and share software with others.² It rests on two foundations: open source licenses that secure these freedoms, and open collaboration that puts them into practice.

¹ The European Parliament defines technological sovereignty similarly: “the capacity to design, develop and scale up digital technologies needed for the competitiveness of [the] economy [...] in a globalised world” and emphasises “reducing strategic dependencies, preventing reliance on foreign actors and single service providers, and safeguarding critical technologies and infrastructure.” See European Parliament Report A10-0107/2025 on European technological sovereignty and digital infrastructure.

² See the [Open Source Definition](#) by the Open Source Initiative.

Open source software is a necessary enabler of digital sovereignty. Without access to source code, the right to modify it, and the ability to collaborate openly, technological self-determination is impossible.

In practice, open source provides:

- **Transparency:** The software stack is auditable: dependencies are visible, there are no hidden behaviors. Auditability improves quality and security. It's the opposite of a black box.³
- **Choice:** Open source alternatives prevent any single provider from controlling the full stack. Users can compare, combine, and switch between solutions and the vendors who support them.
- **Innovation:** There is no barrier to using and building on open source technology. This creates a dynamic where innovation accelerates as each contribution becomes a foundation for the next.
- **Interoperability:** Open standards and open reference implementations make data portable and systems composable across organizational boundaries.
- **Shared investment:** Competitors can collaborate on shared building blocks, reducing duplication and increasing the quality and resilience of common infrastructure.
- **Price control:** No single player can set the terms unilaterally. A competitive market for services and support can develop around shared foundations.

Open source alone does not automatically create sovereignty. Governance, maintenance, and institutional continuity matter too. But open source is one of the strongest tools to achieve digital sovereignty.

What OpenRail Delivers

OpenRail is the institutional home for open source development in the railway sector. It provides the governance, community, and neutral ground that turn open source software into a practical sovereignty asset for rail. It's run by the people and organizations who have deep knowledge of the sector, from railway for railway.

OpenRail's contribution can be summarized in three dimensions:

³ What dependency on a black box can mean in practice: in 2022, Polish trains manufactured by Newag were found to contain hidden software logic that disabled them after independent maintenance, forcing operators back to the manufacturer for repairs. Without access to the source code, the operators had no way to detect or prevent this. See [Rolling Stock World](#) and the 37C3 talk "[Breaking DRM in Polish Trains](#)".

Choice

Through the Open Rail portfolio and the open source ecosystem around it, OpenRail gives organizations across the railway sector a map of available open source alternatives across the rail software stack. Where proprietary solutions currently dominate, OpenRail projects offer credible alternatives, developed by and for the railway sector.

OpenRail offers alternatives, for example for simulation and planning of rail infrastructure in [OSRD \(Open Source Railway Designer\)](#), for creating and analyzing regular-interval timetables in [Netzgrafik-Editor](#), an open data exchange format for rail condition monitoring in [RCM-DX](#), or common building blocks such as [libLRS](#), a library for linear referencing systems.

Control

OpenRail projects are released under open source licenses that guarantee the right to use, study, modify, and distribute the software. Access, pricing, and roadmap direction are not in the hands of any single provider. Members can operate the software themselves, commission services from multiple vendors, and retain ownership of their adaptations.

This directly addresses what sovereignty frameworks identify as core requirements: portability, open interfaces, reversibility, and freedom from proprietary lock-in.⁴

Influence

OpenRail's open governance model means that members (railway operators, infrastructure managers, vendors, and public bodies) have a direct voice in the direction of the projects they depend on. This is what distinguishes open source governed through a neutral association from open source released by a single company.

Members do not consume technology like fast food. They shape it. That ability to participate actively in the development of shared infrastructure is the practical expression of sovereignty.

What This Means in Practice

For funding bodies and policy makers: OpenRail represents the institutional infrastructure that makes open source sustainable in a critical sector. Funding OpenRail, directly or through member organizations, is investment in shared digital infrastructure with measurable sovereignty outcomes, aligned with main objectives for digital sovereignty as for example laid out in the latest EU frameworks on digital resilience, the Cyber Resilience Act, and public procurement criteria for sovereignty.

⁴ See e.g. the [EU Cloud Sovereignty Framework](#) (v1.2.1, Oct 2025), which scores technology sovereignty based on open licenses, open APIs, standards-based architecture, and freedom from vendor lock-in.

For member organizations: OpenRail provides the institutional leverage to influence shared infrastructure rather than adapting to what the market offers. Membership translates into governance rights, early access to project direction, and the ability to shape procurement criteria. It provides demonstrable evidence that an organization is actively managing its digital sovereignty, not merely depending on market conditions.

For contributors (companies and individuals): Contributing to OpenRail projects is participating in the construction of the digital commons for rail. Contributions are governed neutrally, benefit the whole sector, and build the kind of shared foundation that creates a healthy market for services and integration.

For users: OpenRail projects reduce lock-in risk and provide alternatives that can be evaluated, adopted, and operated with a choice of vendors for support. The [Open Rail and Transport Landscape](#) helps map current dependencies and identify where open source software already offers viable paths and where open standards support interoperability and healthy competition in the market.

A Call to Action

Digital sovereignty in rail will not happen by itself. It requires deliberate investment in the shared infrastructure that provides the sector with the ability to act.

OpenRail is open for railway operators, infrastructure managers, technology companies, and public institutions to participate in building the digital commons for rail, not as consumers of technology but as co-owners of the shared foundations it runs on.

The open source community has proven that it can build these structures, where shared challenges are addressed by shared solutions, and all participants have the agency they need to create strategic autonomy. OpenRail's mission is to deliver this to the railway sector.

Beyond the railway sector, we call for the creation of federations of open source associations, connecting vertical initiatives like OpenRail with horizontal efforts and cross-sectoral bodies, to build the institutional weight needed to shape the new economic model of digital infrastructure. In Europe and internationally, these alliances are necessary to turn shared principles into shared action⁵.

The foundations for railway digital sovereignty are being built now. It is open source. You can be part of it.

⁵ This aligns with the support of the [EU Open Source Strategy](#) for "industrial collaboration platforms where competitors jointly develop open source building blocks to create common software stacks and increase the overall efficiency of digital transformation", published on June 3rd 2026