The whole project has been deployed with openBIM standards and methodologies. Right from the start the railway owner had the intention of proving that carrying out the project exclusively with open formats could be possible.

The first important openBIM requirement was the development of an open BIM library, based on the IFC open format. This was very important as it is the only way to guarantee to the owner that such an object library could be reused, in future, for similar projects. The choice of using properties attached to the entities is also very important, as this allows us to encode the owner information requirements directly into the BIM models and in particular into the well-known IFC entity properties and property set. The creation of this library also means that the software, which was chosen in order to create the complete railway models, is not necessarily made by the same software company that produced the object library. It is, in fact, the use of open standards that gives the owner the power to choose among the many types of software that support open formats, with the obvious benefits and without the risk of locking into a particular software vendor or software solution.

The next step is the creation of the models. Also in this case, the use of open formats and openBIM standards, methodologies and technologies was crucial. First of all, the IFC standard, even in the 4X2 version which was used at the time of the project, as the latest available, is powerful enough to express and define the concepts that needed to be modelled by the stakeholder: from the track elements to the signalling system, starting from the definition of the alignment, the IFC encapsulates the semantic definition of the railway in an open way. Of course, the 4X3 version of the IFC standard will be even better at mapping rail and other Infrastructure concepts in the IFC data structures, but the 4X2 is also a very powerful way to encapsulate a railway model with the use of specific concepts such as IfcFixedReferenceSweptAreaSolid and IfcSectionedSolidHorizontal concepts in order to sweep track profiles along the defined alignment. Also of fundamental importance is the fact that having the models in open formats makes them available for further consultation, elaboration and processes. The railway models produced, in fact, are not the end of the project. Rather, they are the beginning, in the sense that they represent the common ground for other processes to be executed with applications that consume open format data.

One of the most important aspects of this project, is, in fact, the connection with the existing maintenance management system of the railway company. This is a legacy system with its own constraints and rules. In order to have a connection between the Asset Management context (and more specifically for Maintenance systems) and the (open) BIM world, the use of open formats is a very important solution as it allows the seamless connection with the use of (open) protocols between the different systems, the CDE and the Maintenance Management systems. The BIM data is centralized on the CDE, as the IFC models represent the geo-localization of the information in a 3D environment, but the asset information is stored in the Maintenance Management system. These systems can “query” information from the CDE, and the CDE is responsible also for keeping and updating the available data, as with the use of other solutions integrated with the CDE it is possible to update the available IFC models, updating properties, geometries and other information as required. All the benefits expressed so far are not possible without the use of open formats and standards or, if possible, would not lead to a level of openness and standardization that spans far beyond the scope of the single project presented in this use case.