



Rail4Future

Projekttitel:	Resilient Digital Railway Systems to enhance performance
Projektnummer:	882504
Deliverable:	Deliverable 1.1.3 Multi Domain Model Description

This deliverable aims to show and describe a multi domain model, which is used to integrate different digital subsystem assets (model+data) belonging to the holistic large-scale railway infrastructure system into the Rail4Future platform. The model is based on an IT system architecture, proposed by Zhou et.al. [1], and consists of software, hardware, integration process for demonstration of the asset integration, and semantic modelling and ontology development used to enhance traceability and reusability of the assets. Figure 1 shows an overview of a typical integration process (see an example in Zhou et.al. [2]), the integration approach followed for the VTI use case, scenarios for building ontologies, and the class model of the RFF ontology, where the logos of used software tools can also be noticed (e.g. Python, Jenkins, GitLab).

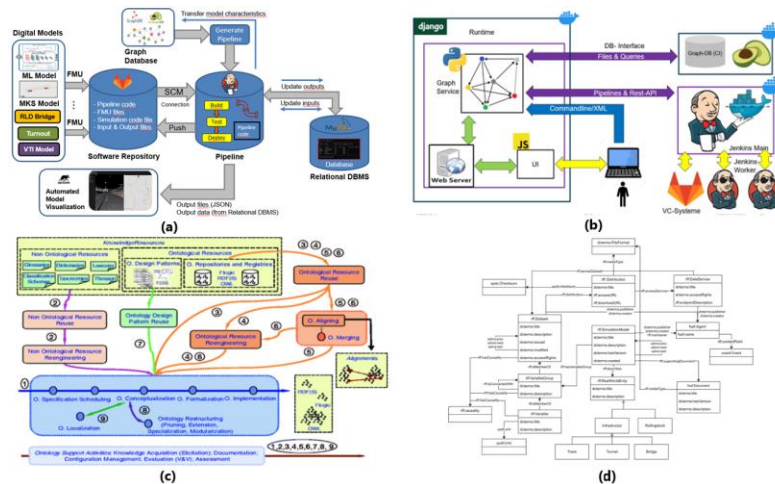


Figure 1: a) The demonstrated integration process of different assets. (© TU Wien MIVP); b) Integration approach for the VTI use case. (© ViF); c) Scenarios for building ontologies; d) Class Model of the RFF Ontology.

[1] Zhou, S., Dumss, S., Nowak, R., Riegler, R., Kugu, O., Krammer, M. and Grafinger, M., 2022. A Conceptual Model-based Digital Twin Platform for Holistic Large-scale Railway Infrastructure Systems. *Procedia CIRP*, Vol. 109, pp.362-367, <https://doi.org/10.1016/j.procir.2022.05.263>.

[2] Zhou, S., Meierhofer, A., Kugu, O., Xia, Y., & Grafinger, M. (2023). A Machine-Learning-based Surrogate Modeling Methodology for Submodel Integration in the Holistic Railway Digital Twin Platform. *Procedia CIRP*, Vol. 119, pp. 345-350. <https://doi.org/10.1016/j.procir.2023.02.141>.