Data structures for ASimOV: a demonstration of XML techniques

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Our research project ASimOV (Agent-based simulation of passenger behavior to optimize the delay management in rail transport) aims at integrating simulation and optimization methods to allow for more detail of real-world processes to be modelled. In particular, the impact of passengers' behavior on train delays, e.g., during changeovers, shall be examined.

In order to implement the simulation and optimization software, we need to define data structures for scenarios as input and simulation and optimization results as output. We chose XML (the eXtensible Markup Language) because it is a broadly adopted standard that is easily defined, transformed and processed, yet expressive enough for complex structures such as buildings or a railway network.

We will give a short introduction and a hands-on demonstration of some important means to handle XML, defining a sample XML Schema for a directed graph with geographical coordinates on the nodes. We will peek into a public dataset by DB Netz AG about the railroad network and its geometries, which happens to be provided as an XML file, inspect it by means of an XML ("NoSQL") database using XPath expressions and the XQuery language, and transform it into our own graph schema.