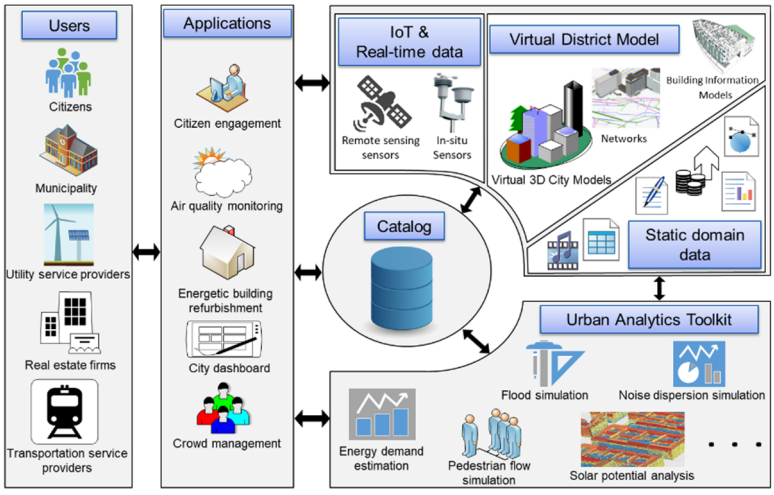
Master's Thesis Proposal

Managing Digital Twins in the Construction Sector with an Extended Catalog Service

The construction site is a complex system. It has different actors who provide and use different information about objects during construction phases. The process of integrating information from distributed sources is a common challenge in many construction projects. In the context of distributed data infrastructures, catalog systems make a significant contribution to solving the challenge of data integration. However, the existing frameworks for the management of construction processes (e.g., Common Data Environment) are not designed for the management of Digital Twins.

Example of different data types used on the *Building Lab* construction site
(from left: spreadsheet, IFC Model, map, image)

The conceptual part of the thesis explores the requirements necessary for the successful management of Digital Twins in the construction industry. Diverse data (e.g., IFC Models, point clouds, maps, images, spreadsheets, sensors and sensor measurements, …), which originate from different stakeholders, have different relevant metadata. It should be analyzed how to ensure that all changes are registered in such a system and that the loss of information is reduced to a minimum. It should be researched which metadata standards are relevant and essential for such ecosystems.



SDDI framework overview

The practical part of the work includes implementing and modifying a CKAN-based catalog that follows the *Smart District Data Infrastructure* (SDDI) framework developed by the Chair of Geoinformatics. Based on the conclusions in the conceptual part, the customized metadata schema should be designed and implemented to meet the requirements for a construction site, which will be demonstrated in a use case. Furthermore, it should be shown how the automatic creation of new datasets can be triggered when new data is recorded for a construction site.

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