Abstract

This project presents a rule-based validation workflow for **CityGML 2.0 Building** datasets using **mvdXML** as an explicit, reusable specification of quality requirements.

A **Python validator** parses an mvdXML template set (buildingSMART mvdXML 1.1) and applies the defined ConceptRoots, AttributeRules, and EntityRules to CityGML instance files. The implementation checks the presence and consistency of key semantic attributes (e.g., identifiers, names, creation date, function, roof type, measured height, storeys) and validates required boundary surface components (WallSurface, RoofSurface, GroundSurface), including LOD2 geometry availability.

Beyond schema-level checks, the workflow performs additional **geometric and topological plausibility tests** on extracted coordinates, such as surface completeness, wall connectivity, roof–wall closure heuristics, gap detection, and Euler-based consistency indicators.

The tool produces detailed **pass/fail results** with human-readable error and warning messages and supports both single-file and batch (folder) validation. Overall, the approach improves transparency and repeatability of CityGML quality control by separating “what to check” (mvdXML rules) from “how it is checked” (automated evaluation and reporting).