Project Results

BIMy

An innovation engine for integrated BIM and GIS

EXECUTIVE SUMMARY
The ITEA project BIMy (BIM in the City) has created a shared space for digital representations of construction projects in their environments. This enables collaboration between multiple stakeholders within the smart city domain and paves the road for new applications.

PROJECT ORIGINS
Smart city planning involves multiple players and encompasses diverse domains. Building Information Modelling (BIM) is an important enabler of this task, yet modelling conventions differ and BIM models are often designed independently. A lack of uniform process definitions, a plethora of modelling conventions, the shallow level of BIM serialisation format (IFC) standardisation, immature collaborative model editing and limited access to models designed by different stakeholders have all hindered true exploitation of BIM. Model integration within the natural/built environment (GIS – Geographic Information Systems) and the filtering of BIM models in terms of level of detail and in time were underdeveloped. These roadblocks must be overcome if BIM is to reach its full potential.

As a generic, open intermediary, BIMy is an enabler of collaboration between existing BIM platforms. Through a unique, standardised API, it offers BIM model sharing, storing and filtering among different stakeholders and their integration and visualisation in the built environment. Such interoperability allows multiple designers to exchange information quickly and accurately, regardless of differences in their file formats/workflows. Additionally, BIMy provides a secure working environment and a digital marketplace for storing and sharing BIM models and model data. These enable new applications and facilitate new interactions that increase the usage and value of BIM and thereby develop the smart city domain.

TECHNOLOGY APPLIED
A key technological innovation of BIMy is the filterable integration of BIM with GIS to create previously unanticipated usage scenarios. The BIMy Platform allows BIM/GIS data querying and semantic filtering at various levels of detail and integrates with repositories of surrounding (GIS) environments. A data transformation layer prepares and transforms BIM and GIS data for use in new applications so that architects and city planners can download existing surroundings (BIM) and the environment (GIS) instead of redrawing these. Building regulations and fire safety compliance may be verified instantly when a BIM model is uploaded. Annotations on (parts of) a shared model can be exchanged across stakeholders in the standardised BIM Collaboration Format (BCF).

Due to the BIMy platform’s collaborative nature and high data sensitivity, security is key. Platform access is protected through two-factor authentication and managed user roles and an integrated hardware security module boosts communication security. Platform monitoring provides real-time anomaly detection and threat identification to detect (for instance) impersonation, replay attacks and brute force attacks. The BIMy platform can also be deployed in the cloud: a cloud-agnostic deployment has been designed to facilitate adoption and a prototype
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MAJOR PROJECT OUTCOMES

Dissemination
- 13 publications
- Soon to be published book: “BIM in the City”

Exploitation (so far)
7 new products:
- Automated generation of the urban context (GIS) for easy integration in a BIM modelling tool
- BIM-based tool for managing and executing on-site inspections on a construction site
- Tool to evaluate the minimum daylight salubrity criterion purely based on BIM
- Tool for integrated BIM/GIS visualisation
- Integrated semantic framework with IFC and CityGML
- Trusted BIM-GIS framework resilient to cyber attacks
- AR & VR based training tools for evacuation planning from buildings

Standardisation
- 7 contributions to standardisation, among which:
  - CEN/TC442 and NBN 442
  - ISO 23386 and 23387
  - BuildingSmart
- 2 extensions to existing standards
- 2 de facto standards

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