

Curating and Preserving Architectural 3D Data: Meeting Stakeholders' Needs Along and Past a Building's Lifecycle

Michelle Lindlar, Michael Panitz - TIB German National Library of Science and Technology
 michelle.lindlar@tib.uni-hannover.de ; michael.panitz@tib.uni-hannover.de

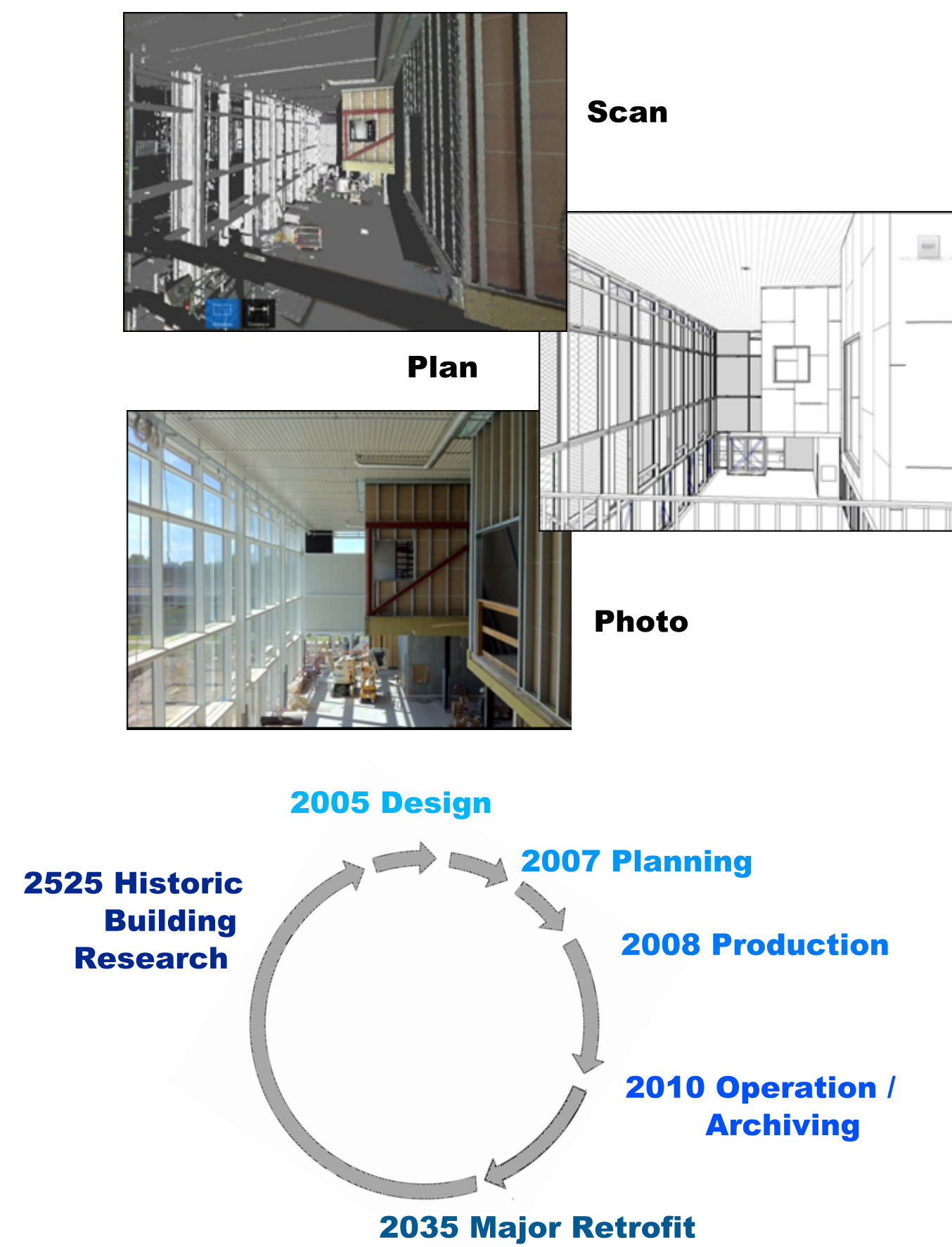
The challenge

Diversity of data

The planning-to-construction process of today is dominated by electronic output. Involved stakeholders benefit greatly from the vast amount of different digital representation forms available. Two dominating representation types are 3D point-cloud scans and semantically rich Building Information Models (BIM). Digital preservation processes and methods for architectural data need to support diverse content types.

Diversity of stakeholders along the lifecycle

Several stakeholders are involved in a building's lifecycle. In the design-to-construction process architects, engineers and construction companies produce a vast amount of data, which is later used by building owners and facility managers while the building is "in-use". As part of major retrofit events the original data needs to be revisited. All data may become of interest to the cultural heritage community at a much later stage - or even after the end of the structure's lifecycle.



Consistency and stability of semantic information

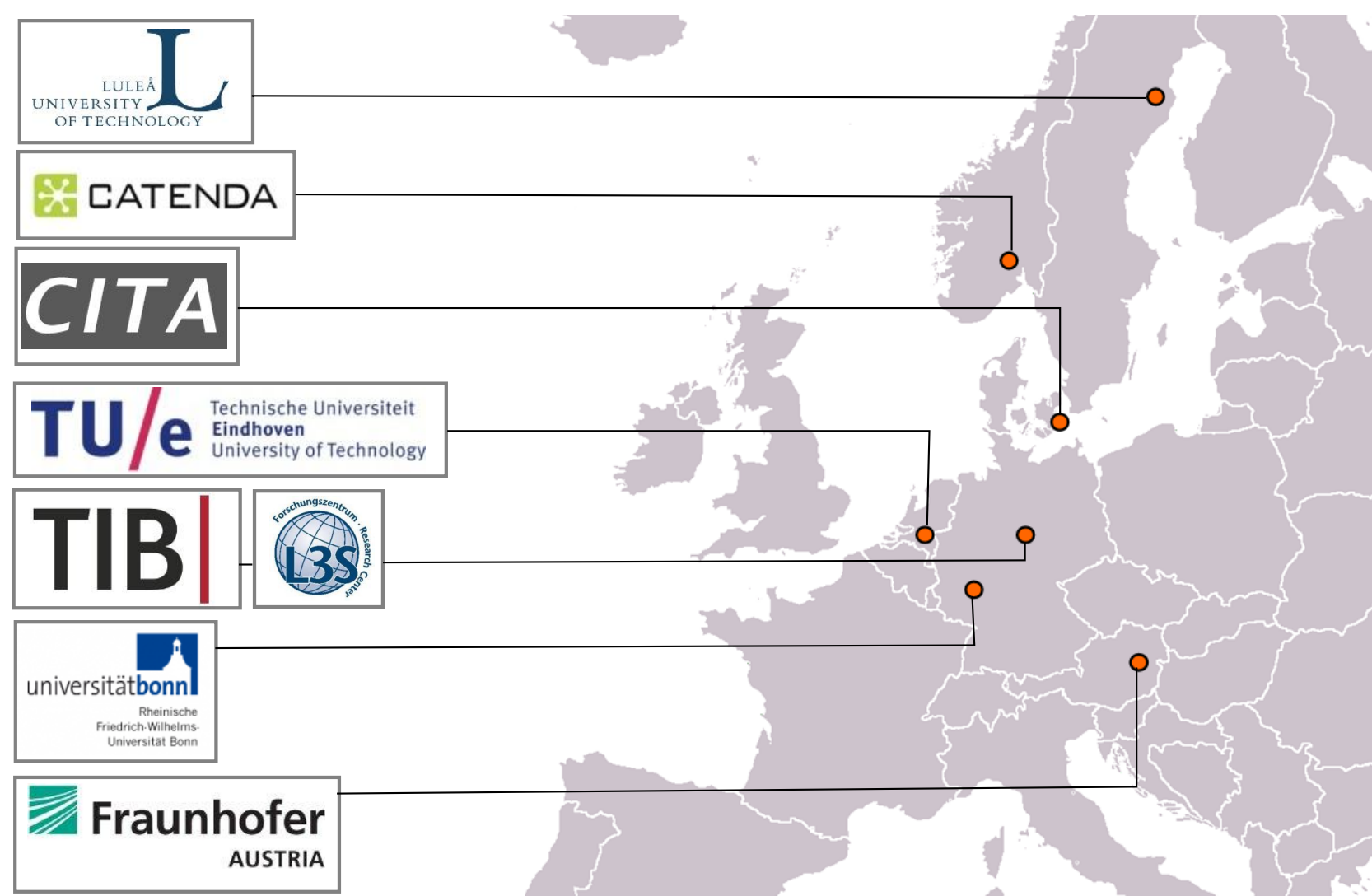
Semantic technologies are increasingly being exploited by various domains for the enrichment of digital objects. In design-to-construction practise, objects may be enriched with information from vendor or other knowledge databases. Inconsistent vocabularies and lacking persistence of the sources pose a problem for digital preservation processes.

Digital curation and preservation tools and processes

There is no universal approach for digital curation and preservation. Maintaining accessibility and understandability of digital objects over the long term requires tools and processes which are specifically tailored towards the respective content type, the file formats as well as towards the expectations of the designated community who will be accessing the information in the future. Currently no de-facto standard processes for digital preservation of architectural 3D data exists.

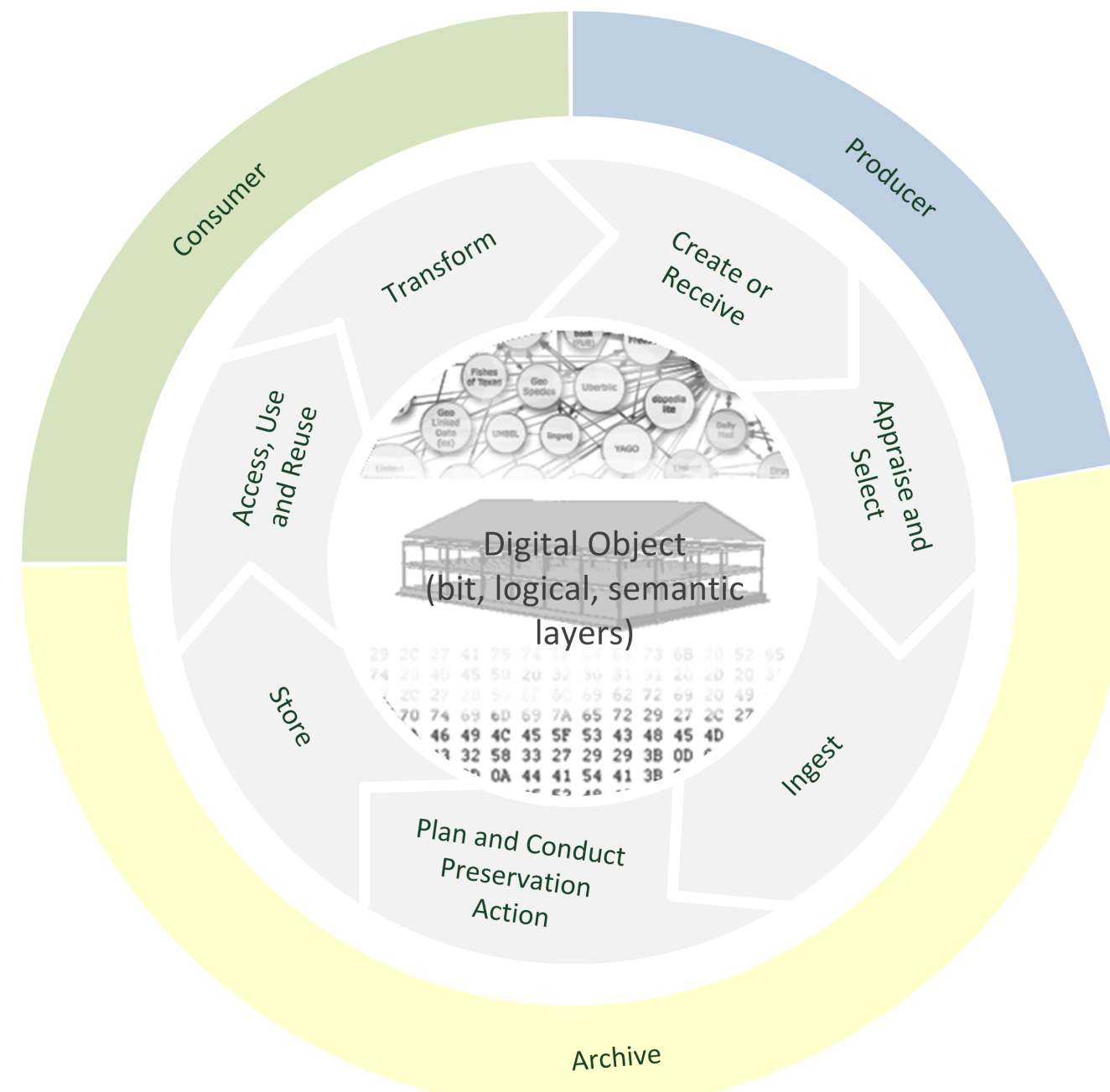
About DURAARK

DURAARK (DURable ARchitectural Knowledge) is an EU funded project which started in February 2013 and will run through January 2016. The goal of the project is to develop tools and processes tailored towards the requirements of the curation and preservation of architectural 3D data.



A holistic digital preservation view

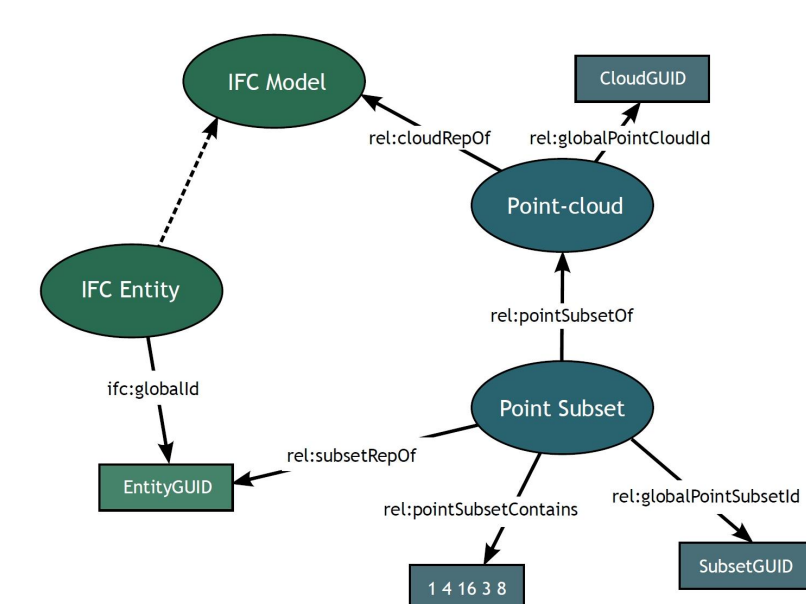
The DURAARK project follows a holistic digital preservation view, which takes into consideration the requirements of producer, consumer and archive along an object's lifecycle as well as on the object's layers - the bitstream, the logical (format) and the semantic layer.



Use cases

Group 1

Meta-use cases for the integration of DURAARK results into an OAIS compliant archive
 e.g., User wants to enrich objects with data from SDA

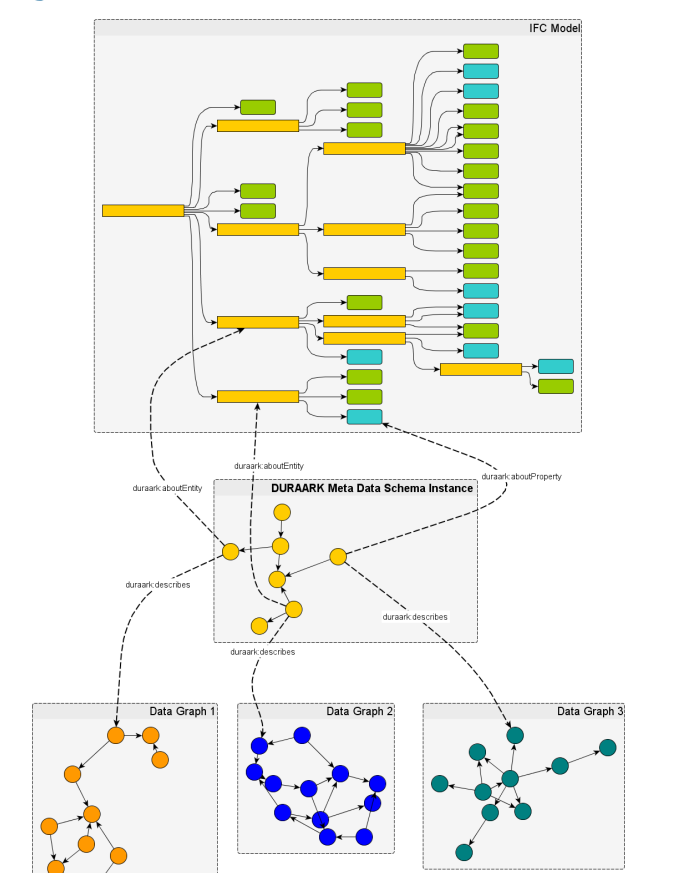


Group 3

Curational use cases on the geometric level
 e.g., User wants to Compare as-planned to as-built state

Group 2

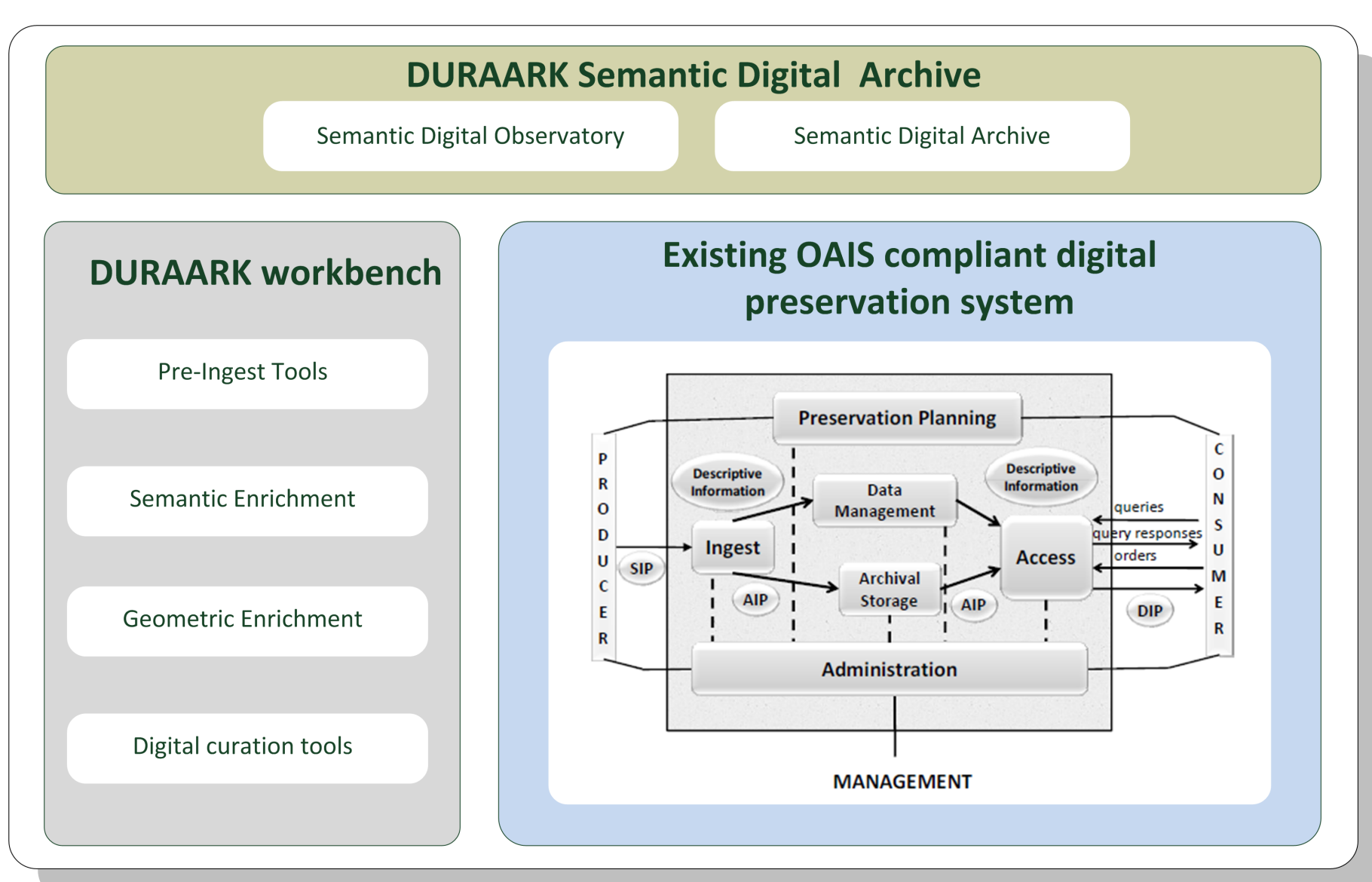
Meta-use cases for the development and implementation of a Semantic Digital Archive
 e.g., User wants to deposit objects into archive



Group 4

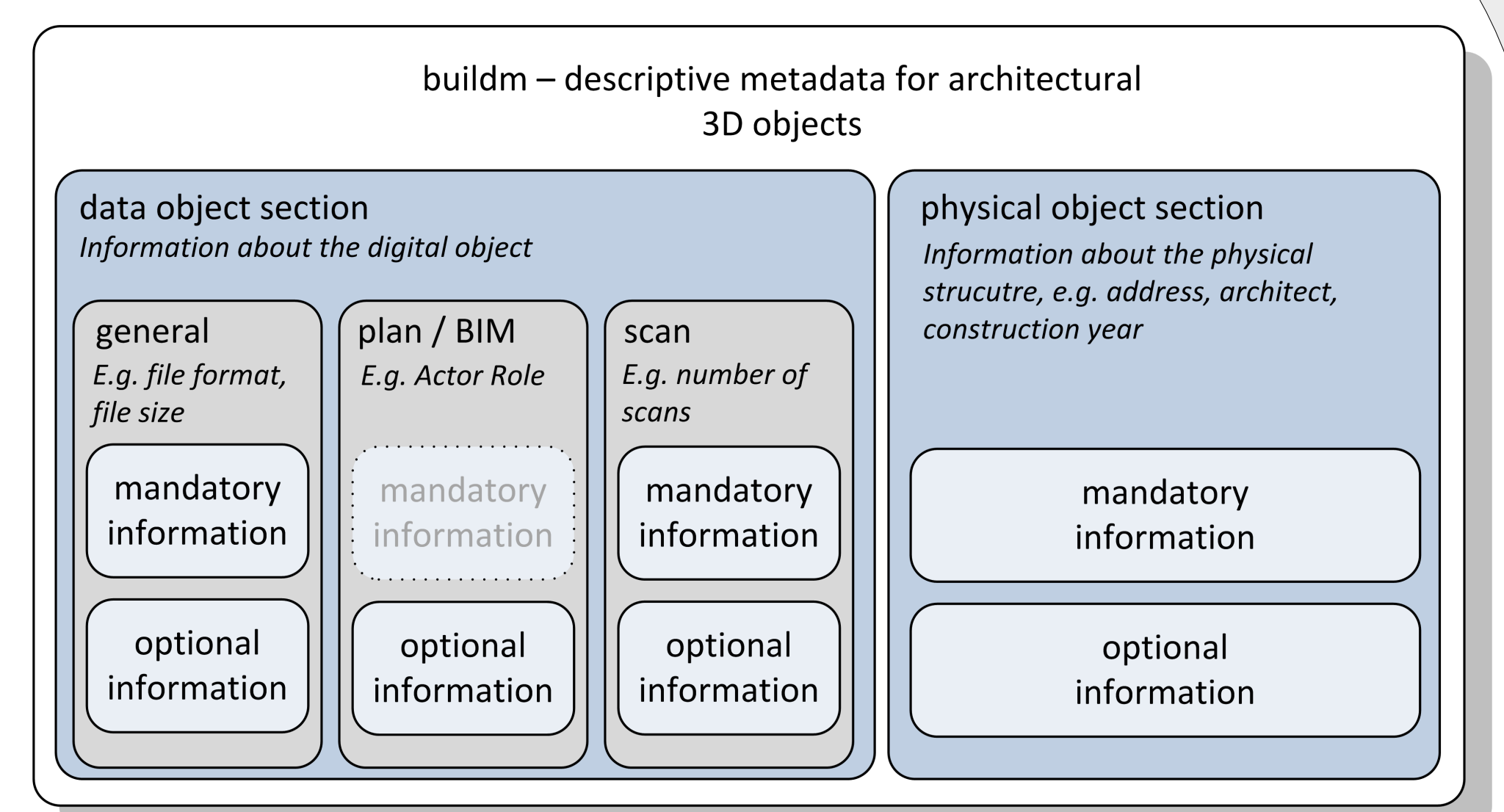
Curational use cases on the semantic level
 e.g., User wants to exploit data for urban planning

First project results



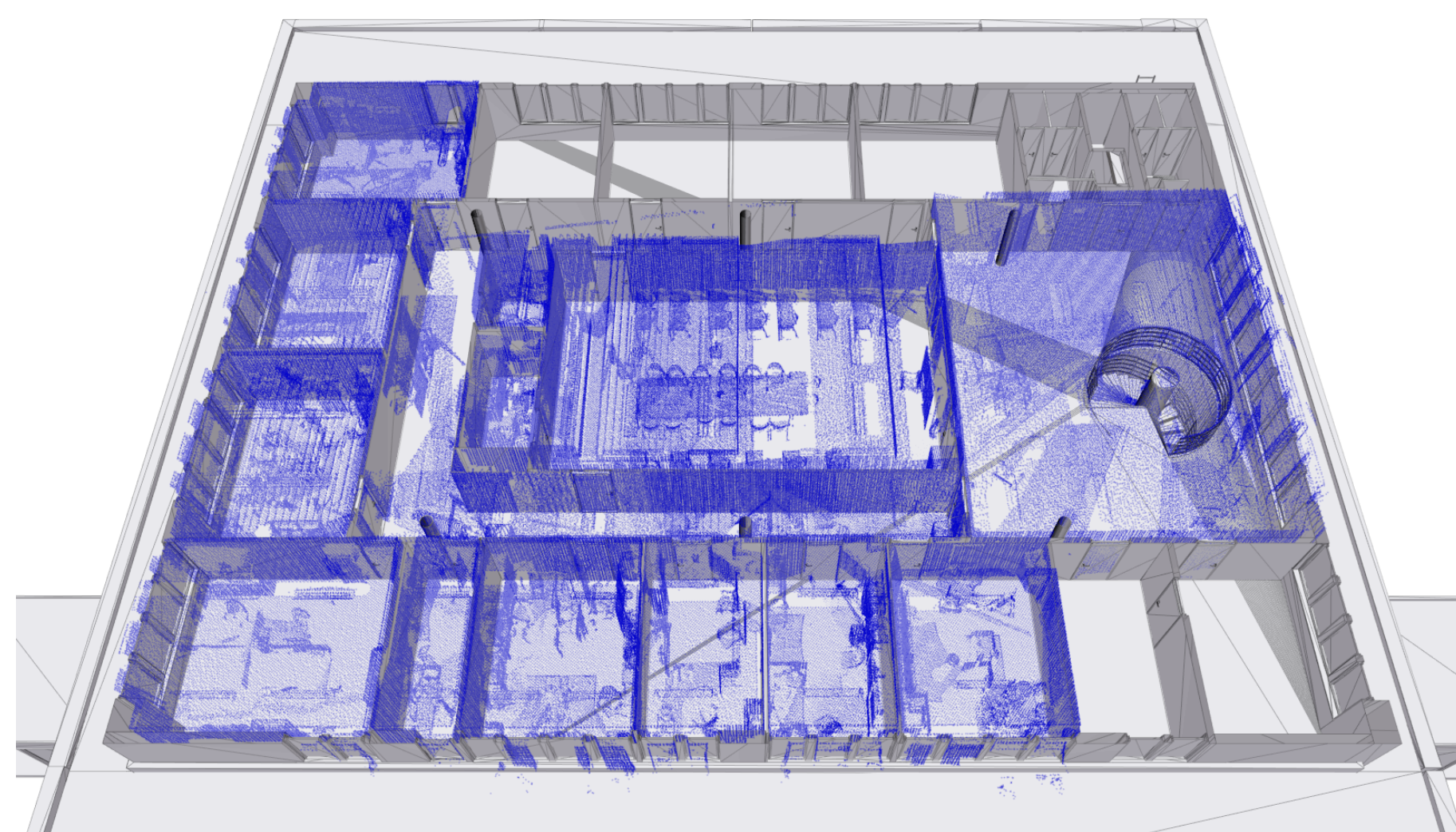
Curation and Preservation Tools

While the DURAARK workbench integrates a number of tools and processes, these tools and methods may be used outside of the workbench as well. The geometric enrichment component, for example, registers a point-cloud against an IFC-SPF plan. While this allows for additional representation information to be captured in the archive, it may also be used by a consumer as the basis to compare objects of these content types at a later stage in the lifecycle - or to evaluate contextual similarities of objects of varying content type within an archive.



First DURAARK prototype

As a result of the project work so far, a first prototype of the DURAARK workbench has been developed. The DURAARK workbench incorporates pre-ingest tools, such as file format identification via DROID, as well as geometric enrichment and semantic enrichment tools. Semantic enrichment is realized through the integration of a second prototype: the DURAARK Semantic Digital Archive.



Buildm metadata schema

Long-term understandability of any digital object requires context information, which is usually captured in metadata. Within the DURAARK project a first draft of a buildm metadata schema was developed, which captures descriptive information about the physical object described in the digital representation as well as the data object itself. The schema identifies mandatory fields which are needed to support the pre-defined use cases.

