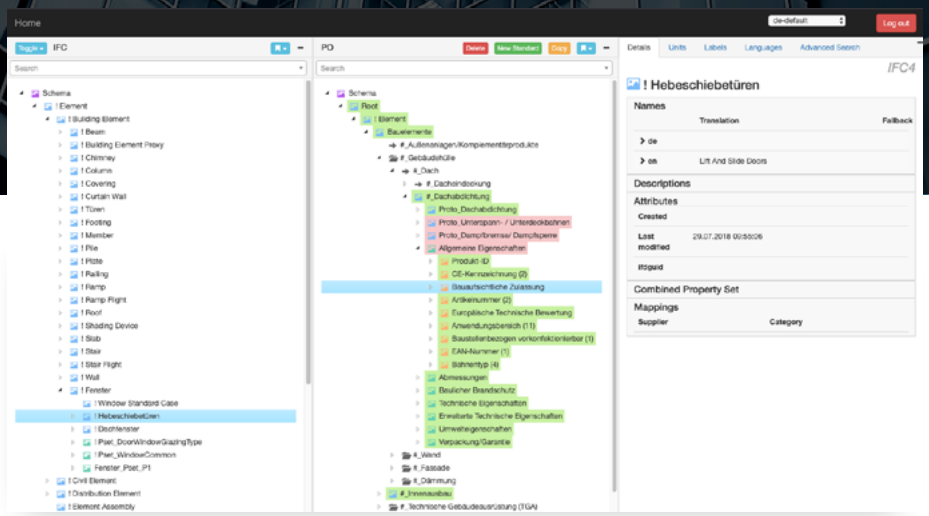
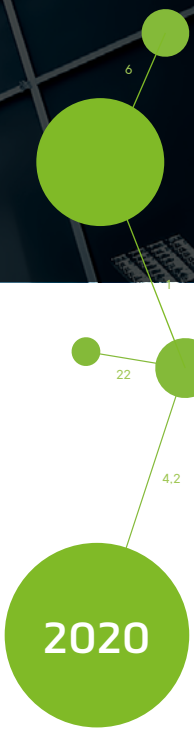
structr

SUCCESS STORY
PLAN1.

MASTERING COMPLEX PRODUCT DATA WITH STRUCTR

How Plan.One benefits from graph technology to manage complex metadata





Industry

Construction Industry – Building Services Engineering and Architecture

Challenges

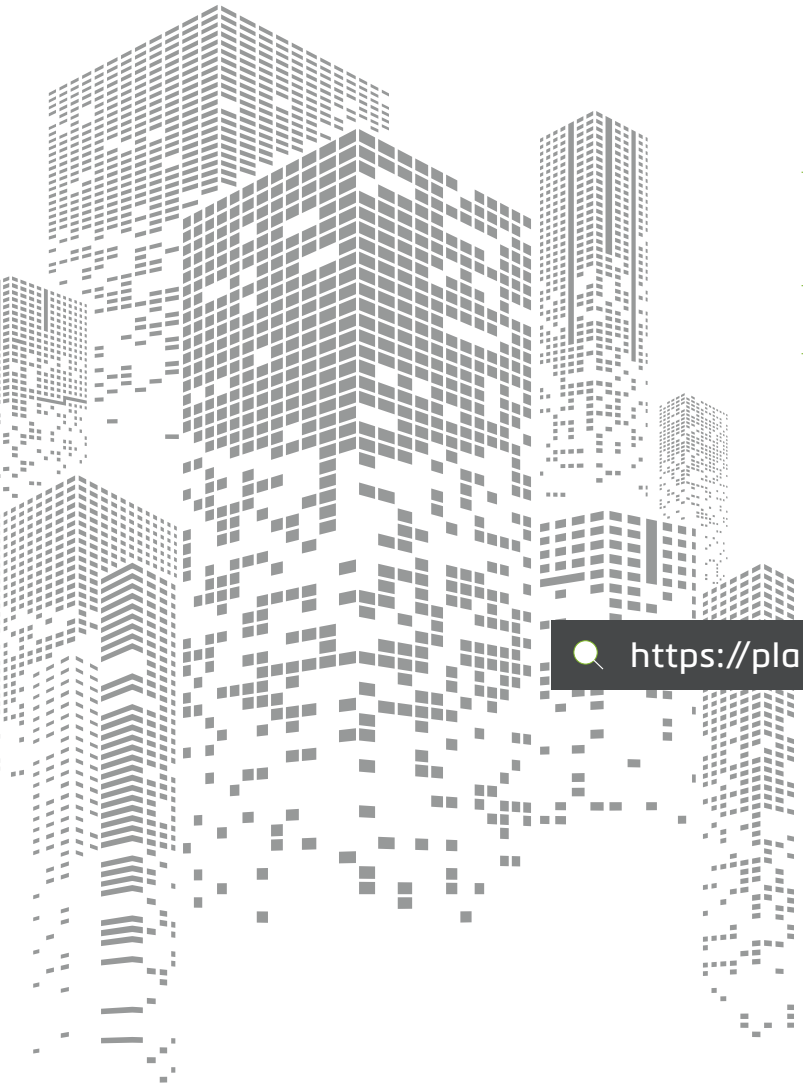
- Provision of building products in a digital marketplace
- Support of BIM data exchange formats, such as IFC
- Import of product data into the planning environments of the customers

Solution

Flexible, customer-specific meta-scheme management tool as development and runtime environment

Advantages

- Maximum flexibility and clarity
- Support of industry standards
- Central location for maintenance and extension of the meta-scheme
- Easy definition and extension of rules and relationships
- Real-time status queries over complex data structures



PLAN1.

- Digital marketplace for building products
- Metadata model based on IFC
- Products from customers such as Schüco, Knauf, Nelskamp, Lamilux, Roma, Teckentrup, Keuco

https://plan.one/

CUSTOMER

Plan.One

Plan.One is an online platform that allows architects and engineers to search, filter and compare relevant building products easily and quickly.

The goal of Plan.One is to offer a comprehensive portfolio of products that enable true transparency in the market.

The company already provides its customers with a large – and constantly growing – portfolio of manufacturers and products that are both global and serve niches. These include such well-known manufacturers as Schüco, Knauf, Nelskamp, Lamilux, Roma, Teckentrup and Keuco. Relevant product details and planning information on the respective products of these manufacturers can be transferred directly into the architects' and engineers' own planning environment with the help of Plan.One.

CHALLENGE

Initial situation

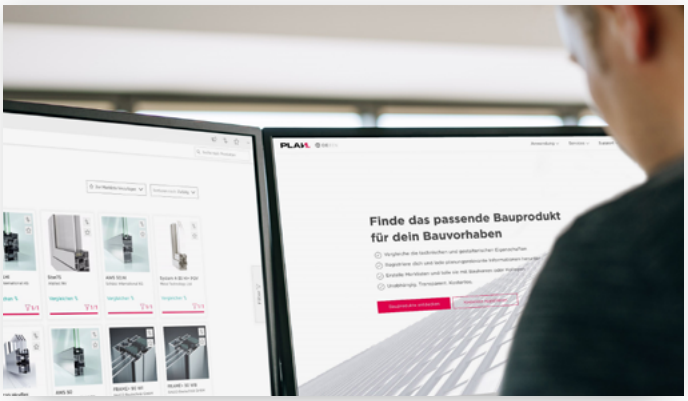
Building Information Modeling (BIM) is currently revolutionizing the entire construction industry as an essential part of digitalization.

A significant accelerator of this radical change is that the format of the digital data to be exchanged between the actors has been defined by the open, platform-independent ISO standard DIN EN ISO 16739 Industry Foundation Classes (IFC).

IFC defines tree-like structures with a multitude of product-specific attribute sets. Although their complexity can be reduced with the help of Model View Definitions (MVD – subsets of the IFC data model) for project-specific requirements during data exchange in the BIM processes, it is still necessary – also in order to make construction products comparable and reusable in the planning process, e.g. with regard to the IFC Design Transfer View – to enrich predefined IFC formats and categories with additional information, or to map product information provided by actors in the construction process to already existing structures.

Many existing CAD and / or BIM systems do have functionality for editing IFS data and structures, but these systems have the following restrictive features, among others:

- They can only be used as a component of these closed monolithic overall systems and thus bind the customer to the use of all functionalities of this system.
- The editing functionalities are usually not customer-specific expandable.
- They often supplement the IFC formats used with proprietary system information that cannot be processed by the customer himself, making data exchange with other players more difficult.
- They do not allow free access to the original database structures of the system used and are therefore closed, proprietary systems.



Simple search for the appropriate building product via Plan.One

It quickly becomes clear that such monolithic, proprietary systems ("Closed BIM") cannot fulfill the BIM promise that with an open data exchange format all degrees of freedom of the processing possibilities of IFC data formats are available.

Rather, they prove to be a decisive bottleneck in the flexible processing of IFC structures and thus prevent the development of platform services such as Plan.One, whose goal is to make the most diverse manufacturer information comparable based on the IFC standard.

It is now clear that the fixed editing options for product-specific modifications of IFC data are not sufficient to provide flexible import and export functions. Rather, a solution is needed that offers the possibility of individually modifying, enriching and assembling categories and attribute sets – quickly, flexibly, and sustainably.

One solution approach is to model not only the IFC structures but also the company-specific product and process-dependent additions as coherent graphs. This obvious approach is now regarded as particularly powerful and efficient for the BIM area (see TU Dresden 2017, TUM 2018).

BIM

(Building Information Modeling / Management): BIM is used to digitally model, combine and capture all relevant building data.

IFC

(Industry Foundation Classes, DIN EN ISO 16739): Denotes a primary, worldwide, open standard for data exchange in the construction industry. This includes the logical building structures (e.g. window opening – wall – floor – building), associated properties (attributes) and optional geometry.

Solution

Plan.One offers a manufacturer-neutral, independent platform that brings together the producers of building products (e.g. doors, windows, insulation materials) with the consumers (e.g. architects, property developers) and, in particular, enables consumers to search, filter and compare products according to their individual technical or design requirements.

Building products based on BIM are made available on a single digital marketplace, both for import by producers and for the transfer of relevant product details and planning information directly into the planning environments of the demanders. The data exchange takes place via the open and manufacturer-independent data exchange format IFC.

The Plan.One solution is particularly noteworthy because it allows the comparison of all contained building products based on their respective type-specific attributes in a wide range of product properties. For example, fire doors and roof windows may have some common characteristics such as dimensions or material. In addition, however, the comparison based on component-specific properties, such as fire protection class or thermal conductivity coefficient, is also interesting.

Strategy

To enable this flexibility Plan.One uses a graph database, in which a complex metadata model based on IFC is mapped and maintained with a meta-schema editor.

Using their own development and runtime environment, the experts at Structr GmbH have created a flexible, customer-specific meta-schema editor for this purpose. In an agile development process this editor is continuously expanded with additional functions, such as the integration of customer-internal release processes for new product categories or extensive search functionalities.

The combination of the graph data model and meta-model editor enables Plan.One not only to maintain the graph data model in a comfortable web-based editor, but also to define product-specific integrity and consistency conditions.

Plan.One's digital marketplace for building products based on BIM

Experience

Plan.One made the right decision from the beginning and built its business model on a database that offers maximum flexibility, growth opportunities and expandability: a graph database. The company also achieved the best possible solution by choosing Structr, a strategic development- and integration platform that enables the company to leverage the power of a graph database.

A particular advantage in the cooperation between Plan.One and Structr GmbH was that the functionalities of the meta-schema editor were not only extended according to the requirements of Plan.One, but that these extensions could even be implemented at the database level in an agile process (Scrum) without endangering the data integrity during operation.

In view of the fact that the further development of the IFC standard is being driven forward particularly intensively and quickly at this time (IFC5 etc.), this approach ensures the future viability of the platform and creates the possibility to react sustainably and agilely to the needs of the market.

> **"Together with Structr, we have developed a tool that enables our employees outside development to independently manage the areas in our database that are relevant to them."**

Dr. Nikita Mattar
Director of Technical Development & Infrastructure – Plan.One GmbH

ABOUT STRUCTR

The graph experts at Structr GmbH offer an integrated low-code development and runtime environment for web-based enterprise applications in which the entire definition of an application, from data model to business logic to user interface, is mapped in a graph database.

This unique approach enables unprecedented speed and flexibility in application development and maintenance, resulting in enormous time and cost savings. Structr stands for sustainable information management that creates good working environments.

The Structr team supports customers worldwide in projects and creates integrated, holistic solutions that can be easily expanded and adapted to individual circumstances at any time.

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