

Use case

Product Data Provision from Manufacturers to the Construction Industry

Version 1.0

Table of contents

| | |
|--|---|
| 1. Description of the use case | 3 |
| 1.1. Name of use case | 3 |
| 1.2. Version management | 3 |
| 1.3. Scope and objectives of use case | 3 |
| 1.4. Use case type | 3 |
| 1.5. Relationship with other use cases | 3 |
| 1.6. References | 3 |
| 2. Purpose of the use case | 4 |
| 2.1. Narrative of use case | 4 |
| 2.2. Impacts and benefits | 4 |
| 2.3. Actors | 4 |
| 2.4. Objectives of the information exchange | 4 |
| 2.5. Assumptions | 4 |
| 2.6. Conditions | 5 |
| 2.7. Identified challenges | 5 |
| 2.8. Potential problems | 5 |
| 2.9. Other comments | 5 |
| 3. Information exchange workflow | 6 |
| 3.1. BIM objects | 6 |
| Description of the steps and tasks involved in the information exchange: | 6 |
| Process map: | 6 |
| 3.2. Linked Data: Description of steps and tasks, process map | 7 |
| Description of the steps and tasks involved in the information exchange: | 7 |
| Porcess map: | 7 |
| 4. Examples for Proposed Information Exchange Formats | 8 |
| 4.1. IFC BIM object via BIM object database | 8 |
| 4.2. Linked Data to be directly integrated from manufacturer | 9 |

1. Description of the use case

1.1. Name of use case

| ID | Industry | Name of use case |
|----|------------------|--|
| | Building Control | Product Data Provision from Manufacturers to the Construction Industry |

1.2. Version management

| Ver. # | Date | Author(s) | Changes | Status |
|--------|------------|---------------|---------------|--------|
| 1.0 | 24.04.2024 | Benno Jochems | First version | draft |
| | | | | |

1.3. Scope and objectives of use case

| | |
|--------------------------|---|
| <i>Scope</i> | The scope of this use case is to describe the means of product data provision, as could be applied in selected building control use cases (see section Relationship with other use cases). These means complement the project “ Digitala datablad baserat på datamallar ”, which explores and specifies information needs in regard to requirements and properties associated to products in the context of the building industry. |
| <i>Objectives</i> | The means of information exchange described in this use case realise the satisfaction of information needs defined in the related use cases. They constitute two possible approaches how product information can be stored and shared between actors and applications, realising a traceable, digital, and machine-interpretable information flow throughout a building’s life cycle. |
| <i>Business need</i> | Availability of product data throughout the building’s life cycle, enabling efficient information-based fulfilment of predefined requirements, as well as use of materials transcending the building’s life cycle. |
| <i>Short description</i> | <p>Smart Built Environment aims to foster innovation in the Swedish construction sector, increasing knowledge among stakeholders and future-proofing the national industry by providing a strategy for the transition towards a sustainable and digital built environment. The referred project aims to explore information requirements, define standardised product data templates, and delineate means of realising information exchanges.</p> <p>The project has defined exchange requirements for different building elements in the building control process (see section Relationship with other use cases). This use case illustrates how these requirements could be represented in the IFC or RDF format.</p> |

1.4. Use case type

| Type of use case |
|---------------------------------|
| Exchange of Product Information |

1.5. Relationship with other use cases

| # | Related use cases | Type |
|---|---|------------------------|
| 1 | Materialpass mit Produktklassifizierung | Possible superordinate |

1.6. References

| # | Reference | Impact | Type | Published by |
|---|---|--|---------|-------------------------|
| 1 | Digitala datablad baserat på datamallar | Project developing open access to digital product specifications for product properties based on data templates. | Project | Smart Built Environment |

2. Purpose of the use case

2.1. Narrative of use case

| | |
|-------------------------|--|
| <i>Long description</i> | <p>Smart Built Environment aims to foster innovation in the Swedish construction sector. Funded by multiple companies of the industry, it provides a strategy for the transition towards a sustainable and digital built environment and supports the generation of knowledge among stakeholders. In combination, this is thought to future-proof the national industry.</p> <p>The referred project (see section References) aims to explore information requirements, define standardised product data templates, and delineate means of realising information exchanges. It plans to leverage classification systems such as CoClass and AMA. For the exchange of information, the industry standard IFC format as well as semantic web technologies are considered possible means of realisation.</p> <p>This use case illustrates how exchange requirements that will be developed in the context of this project, but also exchange requirements defined in other existing use cases (see section Relationship with other use cases), could be realised leveraging IFC or RDF format.</p> <p>To allow application in a wide range of scenarios, no specific attributes to be exchanged are defined. Instead, this use case shall be seen as a reference guide on how to represent any given attribute, depending on whether IFC objects or Linked Data shall be used as means to distribute product information.</p> |
|-------------------------|--|

2.2. Impacts and benefits

| # | Impact/Benefit | Further information |
|---|---|--|
| 1 | The examples for data exchange formats provided in this document allow the information exchange requirements defined in related use cases to be realised using the IFC or RDF format. | Use cases are listed in the section Relationship with other use cases. |
| | | |

2.3. Actors

| # | Party | Task/role | Further information |
|---|----------------------|---|--|
| 1 | Manufacturer | Generating and providing product data. | Provision of data. When using Linked Data: digital provision, enabling sharing across applications. |
| | BIM objects platform | Generating and providing IFC BIM objects. | Translating manufacturers Product Data into BIM objects. When using Linked Data, this party is skipped. |
| 2 | Any actor | Using product data. | Actors of the industry use product data according to various use cases throughout the building's life cycle. |

2.4. Objectives of the information exchange

| # | Objectives |
|---|---|
| 1 | The aim of the information exchange is to realise a traceable, digital, and machine-interpretable information flow. |
| | |

2.5. Assumptions

| # | Assumptions |
|---|-------------|
| | |

2.6. Conditions

| # | Conditions |
|---|------------|
| | |
| | |

2.7. Identified challenges

| # | Identified challenges |
|---|-----------------------|
| | |
| | |
| | |

2.8. Potential problems

| # | Potential problems |
|---|--------------------|
| | |
| | |

2.9. Other comments

| # | Other comments |
|---|---|
| 1 | The requirements for product information are being simultaneously developed and not yet published. The exchanged information presented here are based on assumptions about the future content of the referenced use case. |
| | |

3. Information exchange workflow

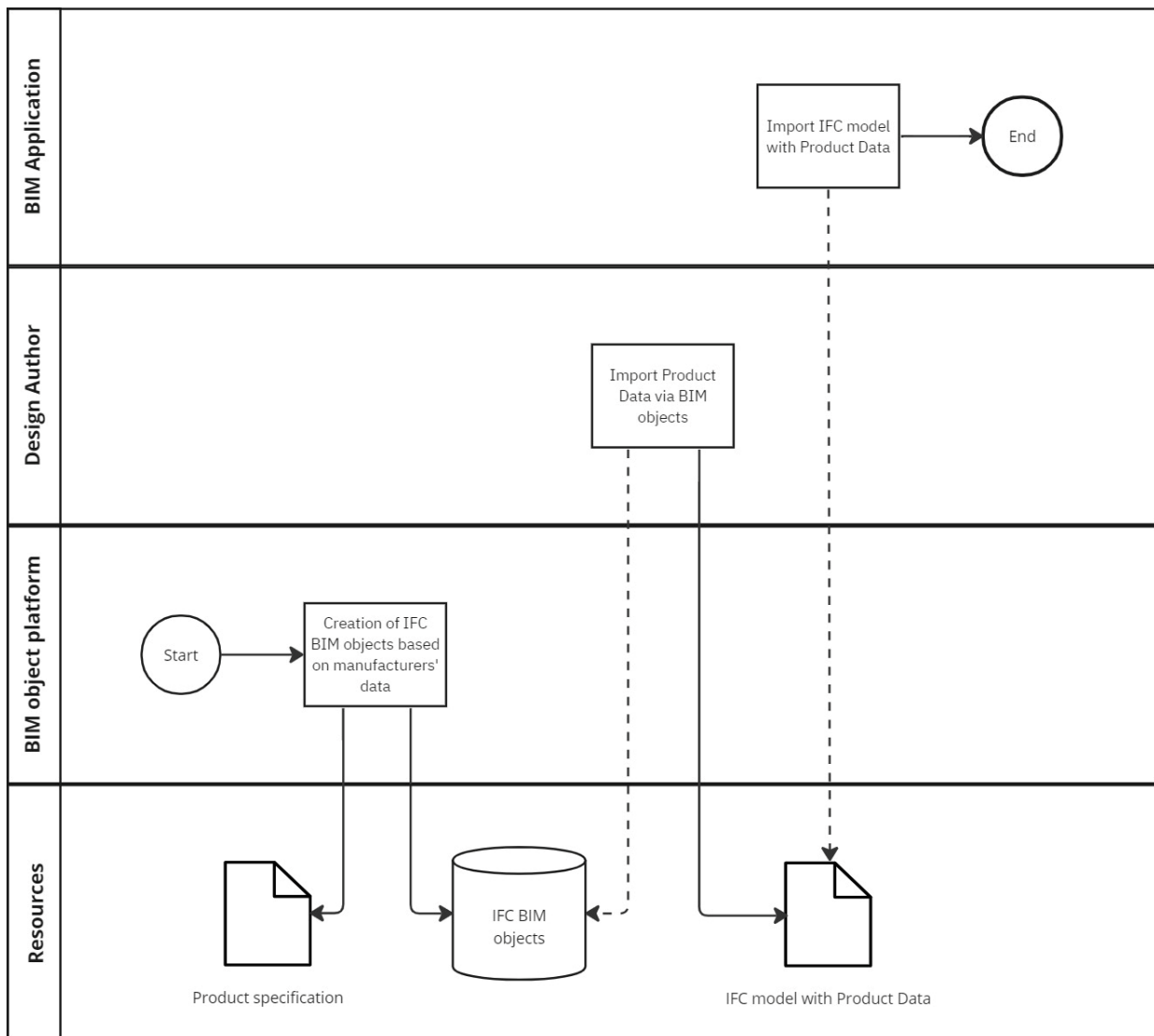
Information exchange workflows using IFC BIM objects from a BIM object database and direct retrieval of information using Linked Data, respectively.

3.1. BIM objects

Description of the steps and tasks involved in the information exchange:

| # | Mission statement | Actor |
|---|---|---------------------|
| 1 | Creation of IFC BIM objects based on data from manufacturers. | BIM object platform |
| 2 | Import of Product Data via BIM objects available in the BIM object platform's database. | Design Author |
| 3 | Import of IFC model including Product Data. | Any actor |

Process map:

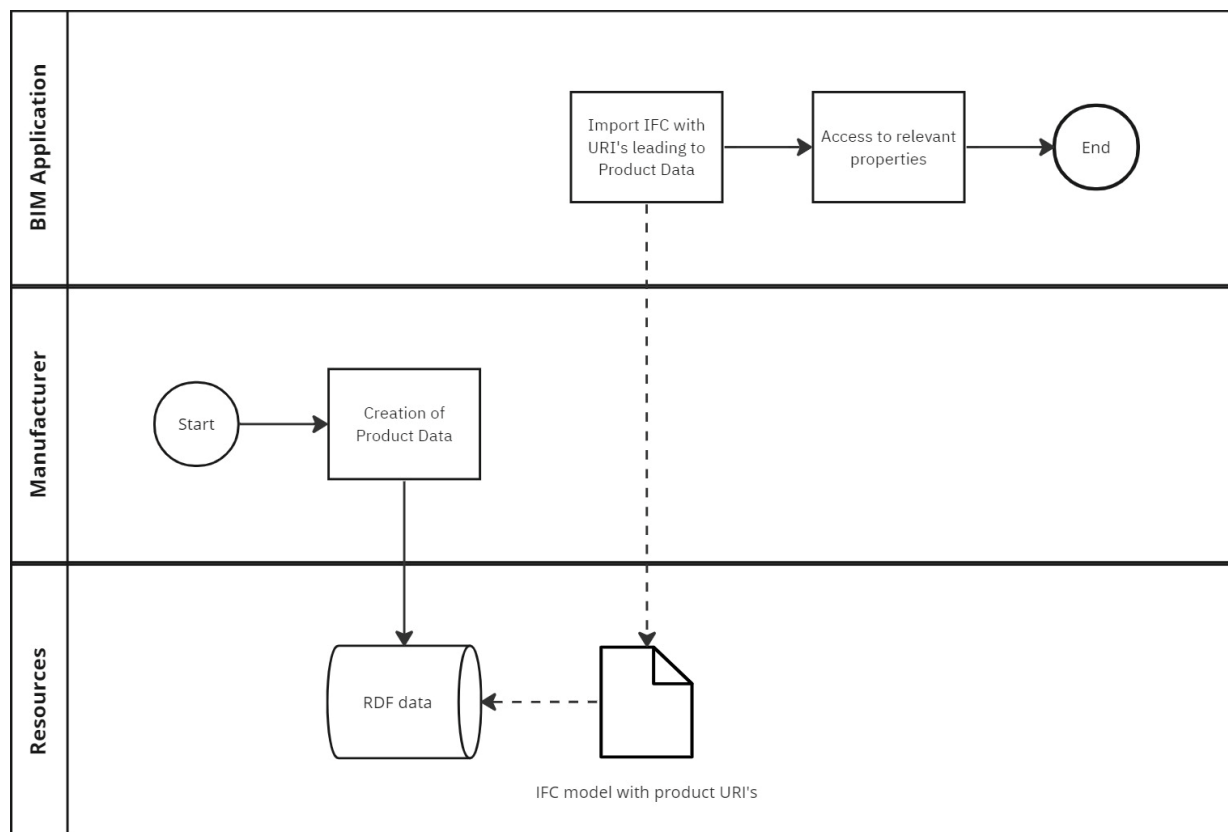


3.2. Linked Data: Description of steps and tasks, process map

Description of the steps and tasks involved in the information exchange:

| # | Mission statement | Actor |
|---|--|--------------|
| 1 | Creation of Product Data, provision in RDF format. | Manufacturer |
| 2 | Import of IFC model containing URI's leading to Product Data, providing access to relevant properties. | Any actor |

Process map:



4. Examples for Proposed Information Exchange Formats

4.1. IFC BIM object via BIM object database

| | | |
|---------------------------------|---------------------------|--|
| Component | | External and internal walls, other wall structures |
| IFC Entity | | IfcWall |
| Geometric information | | |
| Detail | | <ul style="list-style-type: none"> The geometry of the outer surface (shrinkwrap) of the component must correspond to the geometry of the physical component corresponding to the design. To include product information, a representation of the layers of a multi-layer wall structure in an IFC data model is required. |
| Dimensionality | | <ul style="list-style-type: none"> The overall dimensions of the IFC component will be defined in the moment of implementation of the BIM object into the design model. |
| Location | | No requirements |
| Appearance | | No requirements |
| Parametric behaviour | | <ul style="list-style-type: none"> The IFC BIM object must be scalable to correctly represent the overall dimensions of the IFC component after implementation of the BIM object into the design model. |
| Alphanumeric information | | |
| IFC Object Name | | No requirements |
| IFC PredefinedType | | PredefinedType must be defined. |
| IFC Properties | | |
| Assembly Level | | |
| | Data content needs | Assembly Property: Native Property |
| | Limitations | Limited to properties native to the IFC schema. E.g., ThermalConductivity, SpecificHeatCapacity |
| | Propertyset | As specified by IFC schema |
| | Property | As specified by IFC schema |
| | Allowed values | As specified by IFC schema |
| | Data content needs | Assembly Property: Non-Native Property |
| | Limitations | - |
| | Propertyset | ePset_ExamplePropertySet |
| | IfcProperty.Name | As specified by referenced property in bSDD |
| | IfcProperty.Specification | URI to referenced property in bSDD |
| | Allowed values | As specified by referenced property in bSDD |
| Layer Level | | |
| | Data content needs | Manufacturer Name |
| | Limitations | - |
| | Propertyset | ePset_MaterialProduct |
| | IfcProperty.Name | 35185082-a84e-4254-94cb-cd10807235fd |
| | IfcProperty.Specification | https://identifier.buildingsmart.org/uri/cei-bois.org/wood/1.0.0/prop/35185082-a84e-4254-94cb-cd10807235fd |
| | Allowed values | string |
| | Data content needs | Product Name |
| | Limitations | - |
| | Propertyset | ePset_MaterialProduct |
| | IfcProperty.Name | 35185082-a84e-4254-94cb-cd10807235fd |
| | IfcProperty.Specification | https://identifier.buildingsmart.org/uri/LCA/LCA/3.0/prop/productname |
| | Allowed values | string |
| | Data content needs | Product URI |
| | Limitations | - |
| | Propertyset | ePset_MaterialProduct |
| | IfcProperty.Name | ST12-IDPR |
| | IfcProperty.Specification | https://identifier.buildingsmart.org/uri/promaterial/universaltypes/1.0/class/MT12-PREF/prop/undefined_set/ST12-IDPR |
| | Allowed values | string |
| | Data content needs | Product Property: Native Property |
| | Limitations | Limited to properties native to the IFC schema. E.g., ThermalConductivity, SpecificHeatCapacity |
| | Propertyset | As specified by IFC schema |
| | Property | As specified by IFC schema |
| | Allowed values | As specified by IFC schema |
| | Data content needs | Product Property: Non-Native Property |
| | Limitations | - |

| | | |
|--|---------------------------|---|
| | Propertyset | ePset_ExamplePropertySet |
| | IfcProperty.Name | As specified by referenced property in bSDD |
| | IfcProperty.Specification | URI to referenced property in bSDD |
| | Allowed values | As specified by referenced property in bSDD |

4.2. Linked Data to be directly integrated from manufacturer

| Component | | External and internal walls, other wall structures |
|------------|------------------------|--|
| Properties | | |
| | Product Initialisation | |
| | Data content needs | Entity type |
| | rdf:type | owl:NamedIndividual |
| | rdf:type | bpo:Product |
| | schema:manufacturer | |
| | rdf:type | schema:Organization |
| | schema:name | "ExampleName"^^xsd:string |
| | schema:url | <https://www.manufacturer-url.com/> |
| | schema:identifier | <https://www.product-url.com/> |
| | Data content needs | Attribute |
| | bpo:has Attribute | |
| | rdf:type | owl:NamedIndividual |
| | rdf:type | bpo:Attribute |
| | qudt:unit | unit:ExampleUnit |
| | schema:value | "123"^^xsd:double |
| | bpo:hasBSDDGUID | bSDD identifier as string |