



LUXEMBOURG
INSTITUTE OF SCIENCE
AND TECHNOLOGY



Digital Deconstruction

Transnational Innovation Hub

11/05/2023

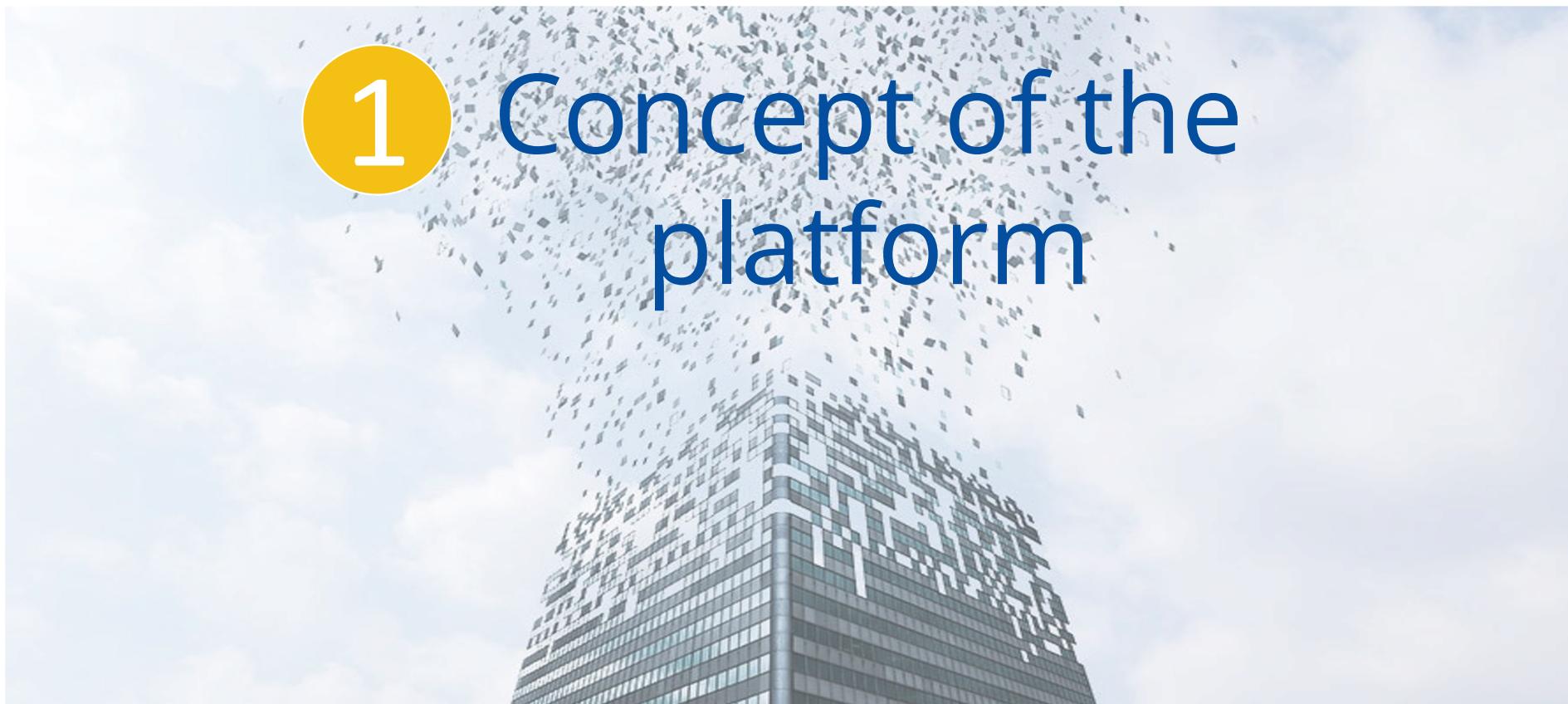


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European Regional Development Fund

1 Concept of the platform



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Decision support system

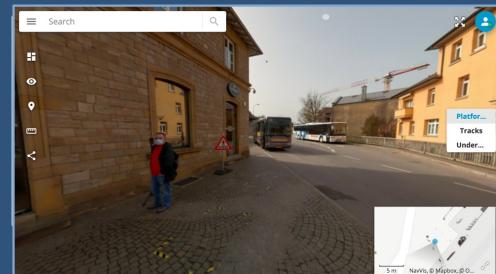
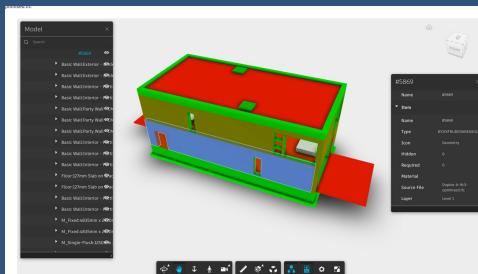
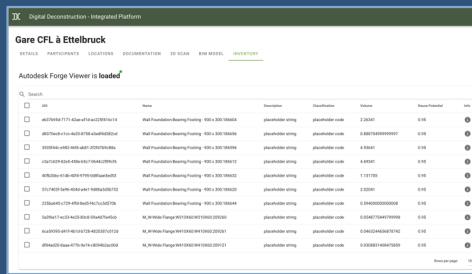
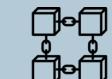


+ Environmental criteria



+ Economic criteria



**M1****3D SCAN & SCREENING****M2****REVERSIBLE BIM****MATERIALS INVENTORY****M3****MATERIAL PASSPORT / BLOCKCHAIN**

- **BIM visualization**
- **Economic indicators**

Digital Deconstruction Platform

Decision support interface for deconstruction & reuse strategies

- **Material data**
- **Sustainable indicators**

- **Material passport**
- **Scenarios analysis**

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Endusers



PUBLIC OR PRIVATE OWNER



DECONSTRUCTION EXPERT



3D SCAN EXPERT



ARCHITECT, ENGINEER
INVENTORY EXPERT

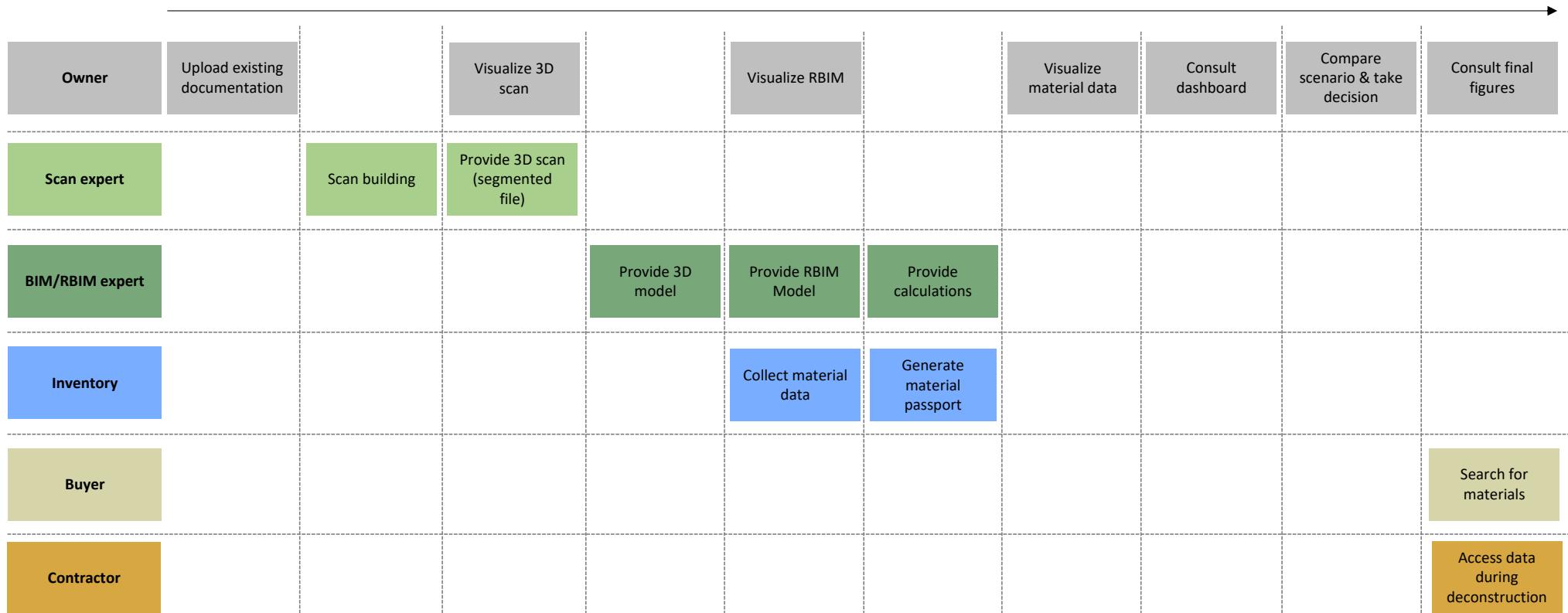


BUYERS

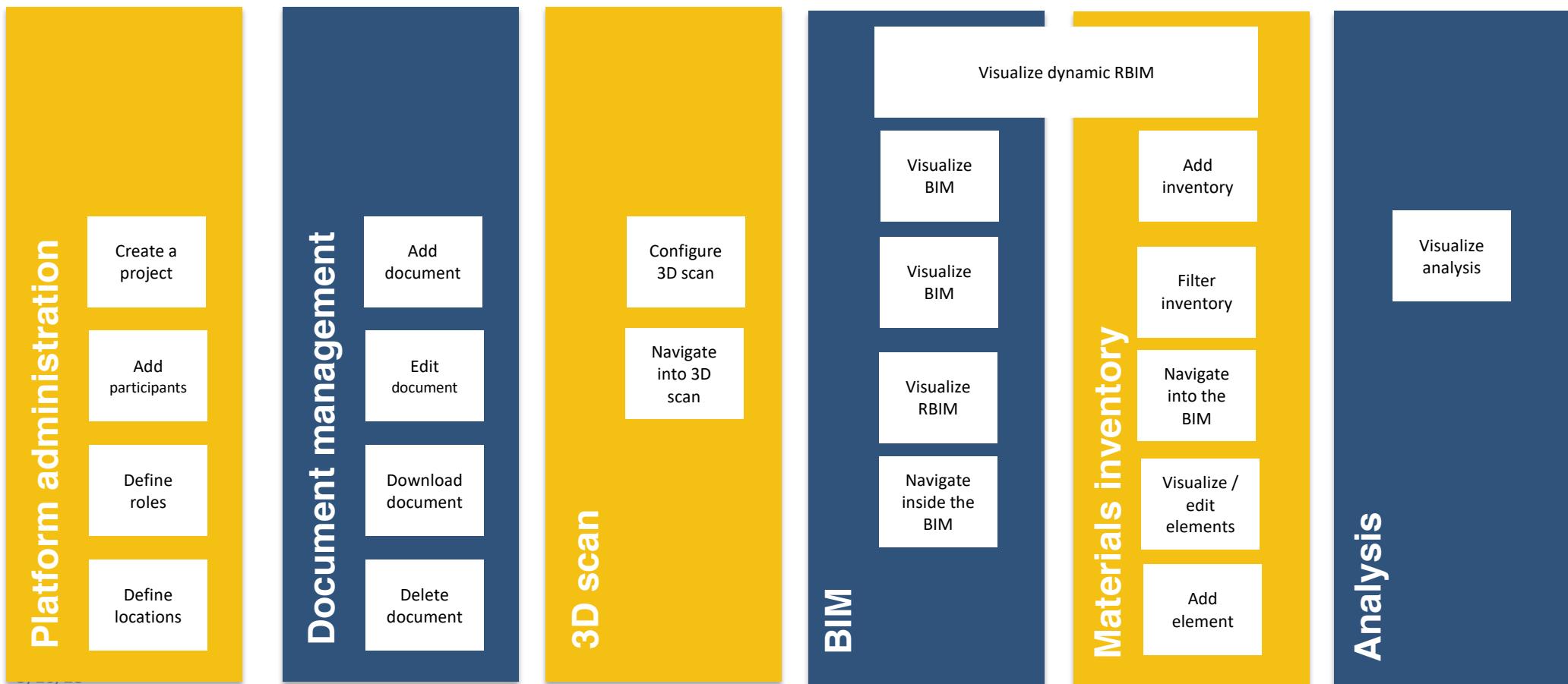


CONSTRUCTION FIRMS





DDC platform functionalities



DDC platform functionalities



Platform administration

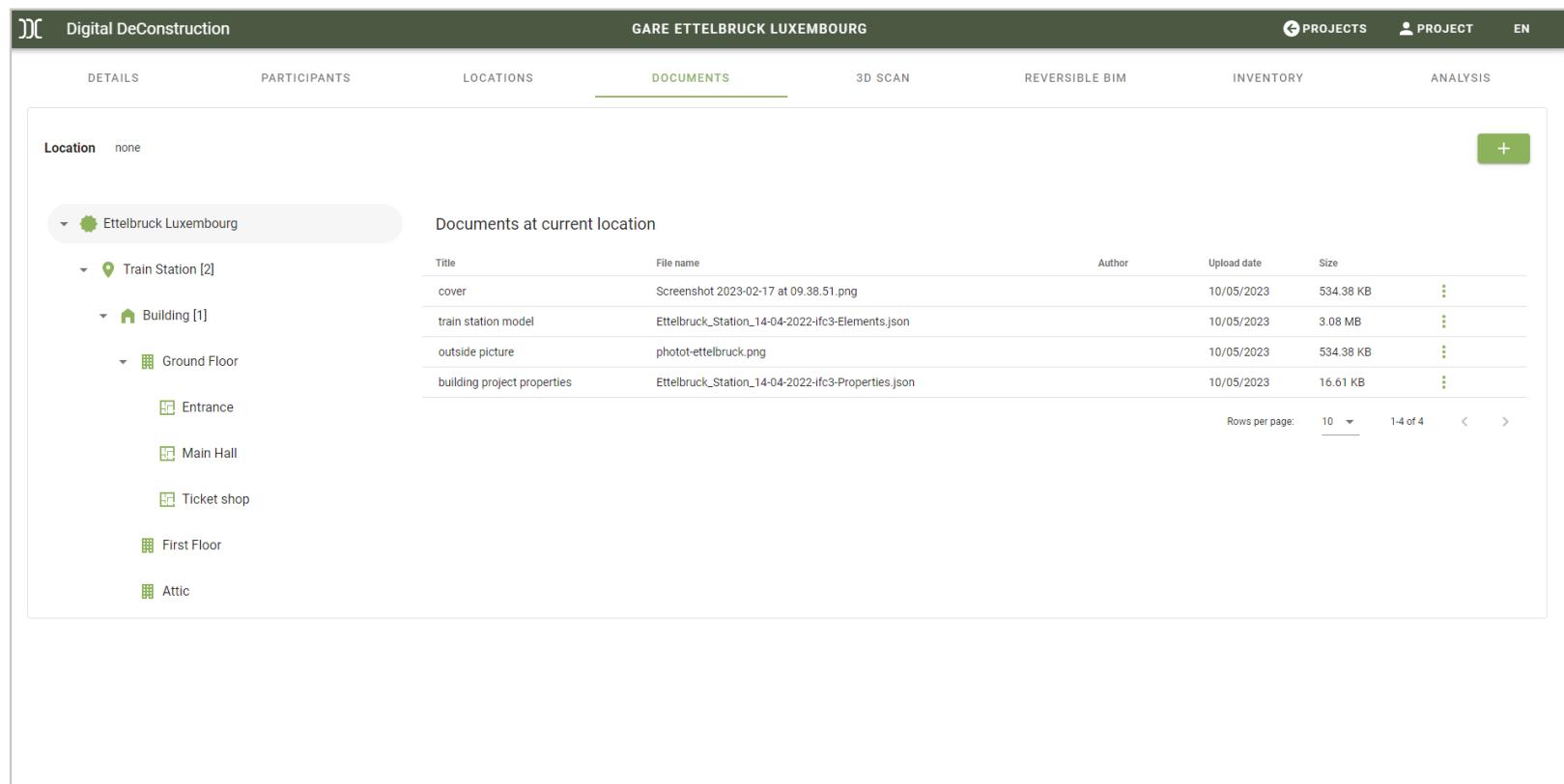
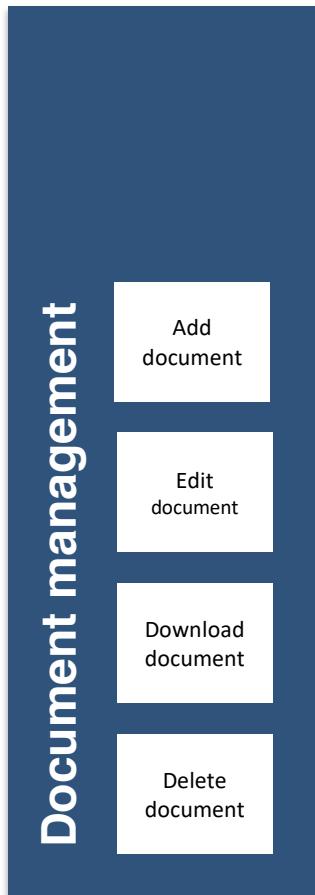
Create a
project

Add
participants

Define roles

Define
locations

DDC platform functionalities



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DOCUMENTS

Location: none

Documents at current location

Title	File name	Author	Upload date	Size
cover	Screenshot 2023-02-17 at 09.38.51.png		10/05/2023	534.38 KB
train station model	Ettelbruck_Station_14-04-2022-ifc3-Elements.json		10/05/2023	3.08 MB
outside picture	photot-ettelbruck.png		10/05/2023	534.38 KB
building project properties	Ettelbruck_Station_14-04-2022-ifc3-Properties.json		10/05/2023	16.61 KB

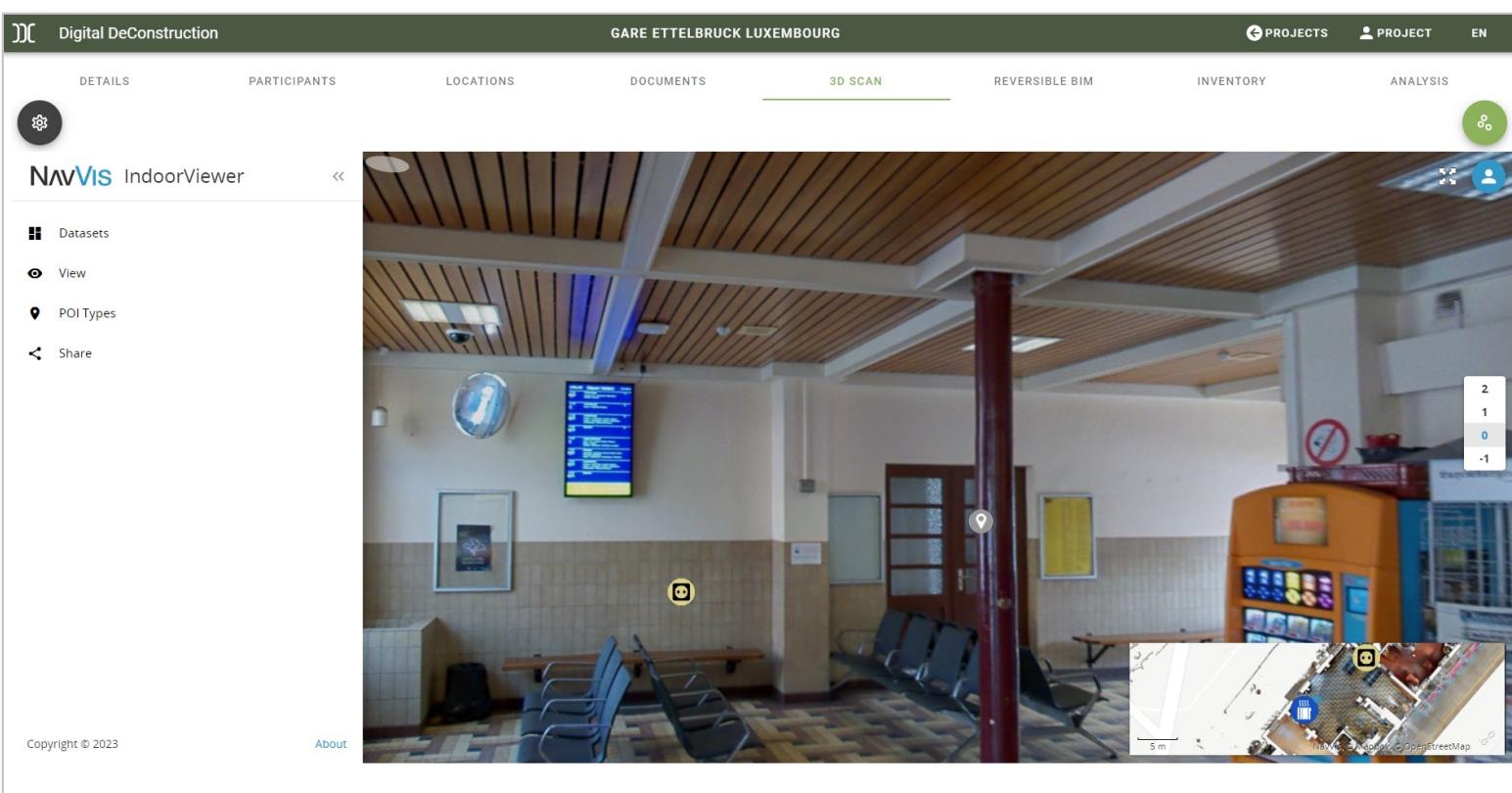
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DDC platform functionalities

3D scan

Configure 3D scan

Navigate into 3D scan



Digital DeConstruction

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PROJECTS PROJECT EN

DETAILS PARTICIPANTS LOCATIONS DOCUMENTS 3D SCAN REVERSIBLE BIM INVENTORY ANALYSIS

NavVis IndoorViewer

Datasets

View

POI Types

Share

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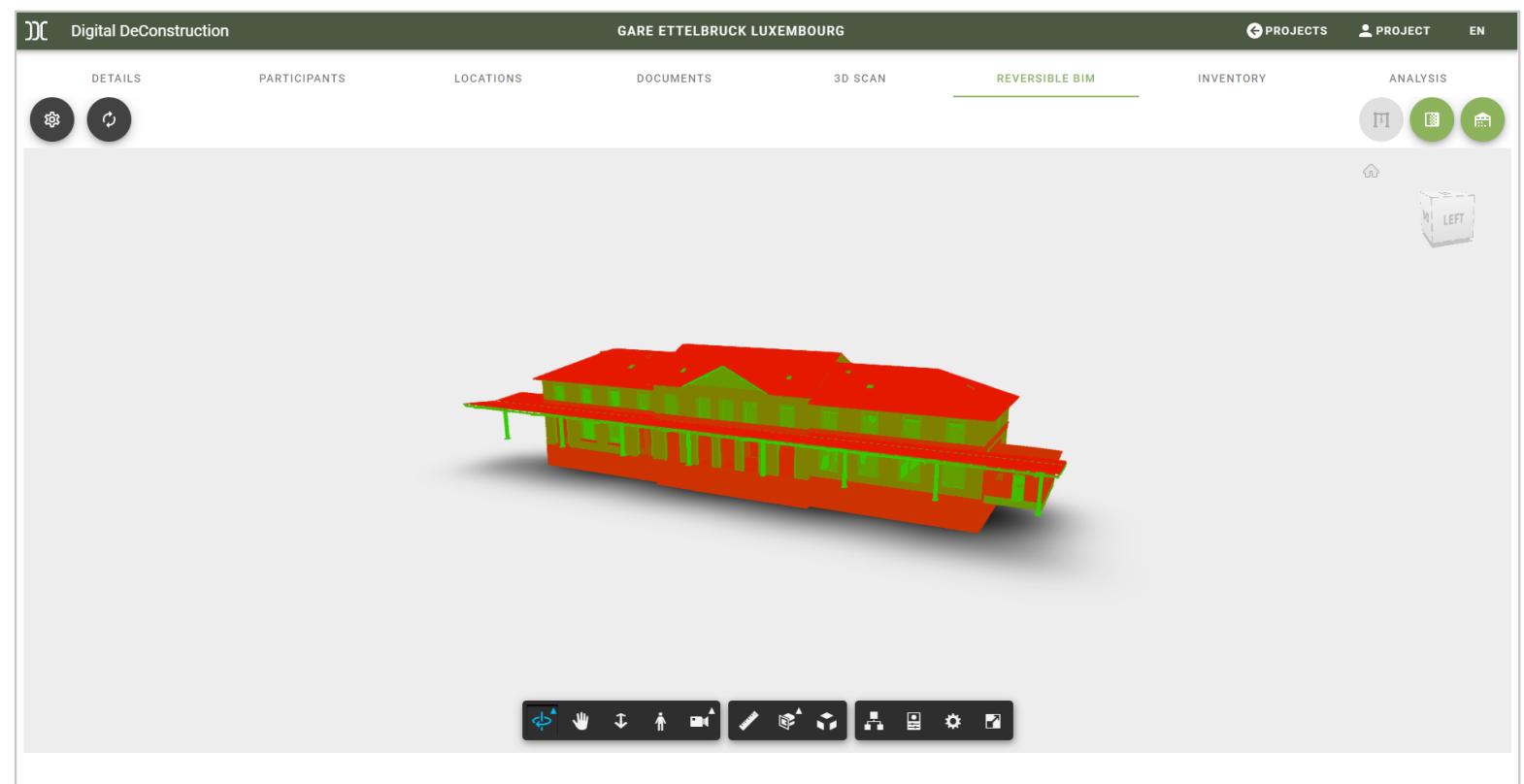
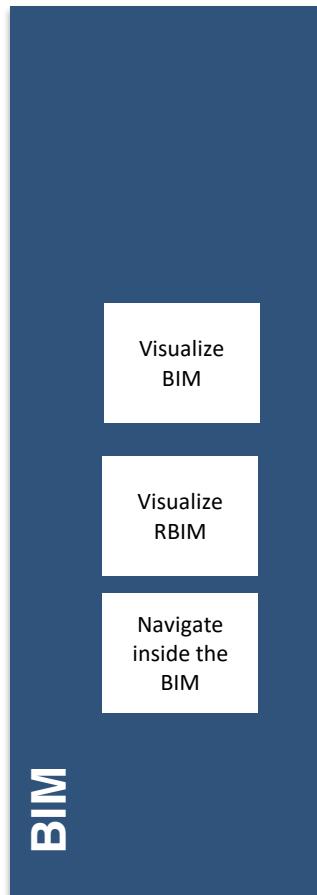
About

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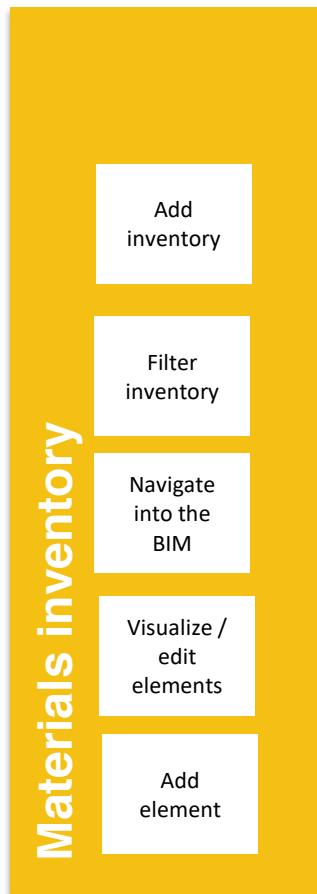
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NavVis IndoorViewer OpenStreetMap

DDC platform functionalities



DDC platform functionalities



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PROJECTS PROJECT EN

DETAILS PARTICIPANTS LOCATIONS DOCUMENTS 3D SCAN REVERSIBLE BIM INVENTORY ANALYSIS

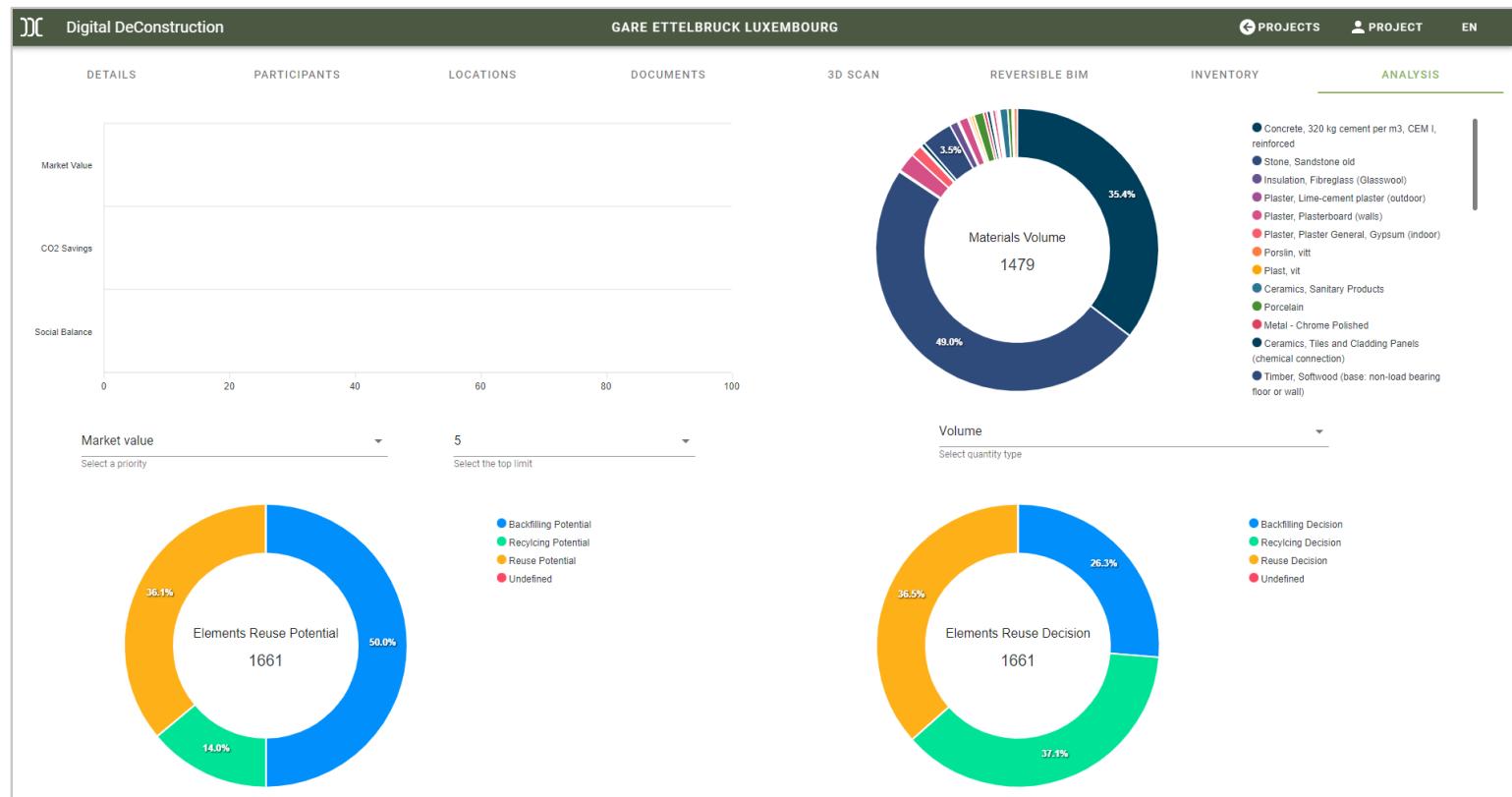
ELEMENTS

BIM loaded & static

	Description	Surface Damage	Reuse Potential	Reuse Decision	Hazard Assessment	Hazard Assessment Status	Info	3D view	Actions
<input type="checkbox"/> Name	Load-bearing - Timber Wood:Load-bearing - Beam 100x80 Wood:2176203	Low	0.8	Reuse	None	Requested	i	3D	...
<input type="checkbox"/> Name	Finish - Int. Wall Plaster 15 Gypsum:_74:Finish - Int. Wall Plaster 15 Gypsum:_74:2309850	High	0.2	Backfilling	None	Requested	i	3D	...
<input type="checkbox"/> Name	Finish - Int. Wall Plaster 15 Gypsum:_45:Finish - Int. Wall Plaster 15 Gypsum:_45:2495442	High	0.2	Backfilling	None	Requested	i	3D	...
<input type="checkbox"/> Name	Finish - Wall Plaster Gypsum:Finish - Wall Plaster Gypsum:2420689	High	0.2	Backfilling	None	Requested	i	3D	...
<input type="checkbox"/> Name	Finish - Wall Plaster Gypsum:Finish - Wall Plaster Gypsum:2385468	High	0.2	Backfilling	None	Requested	i	3D	...
<input type="checkbox"/> Name	Load-bearing - Timber Wood:Load-bearing - Beam 150x150 Wood:3066526	Low	0.79	Reuse	None	Requested	i	3D	...
<input type="checkbox"/> Name	Enclosure - Facade Decorative Element Stone:_6:Enclosure - Facade Decorative Element Stone:_6:2536001	High	0.2	Backfilling	None	Requested	i	3D	...
<input type="checkbox"/> Name	Finish - Int. Wall Plaster 15 Gypsum:_23:Finish - Int. Wall Plaster 15 Gypsum:_23:2479680	High	0.2	Backfilling	None	Requested	i	3D	...
<input type="checkbox"/> Name	Load-bearing - Beam Ext.120x100 Steel:Load-bearing - Beam Ext.120x100/800 Steel:2198880	None	0.88	Reuse	None	Requested	i	3D	...
<input type="checkbox"/> Name	Vertical Communication - Stairs Landing Int. Wood:_3:Vertical Communication - Stairs Landing Int. Wood:_3:2260624	Low	0.79	Reuse	None	Requested	i	3D	...

Rows per page: 10 1-10 of 1661

DDC platform functionalities



Several Pilots

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GRID

CREATE A NEW PROJECT

Items per page ▼

Test of technologies

User feedback

Cost/benefit analysis

At the end of the project



- Prototype **TRL 7**.
- The platform will be available under an **opensource** licence.
- The business model is under progress.

TRL 1 –basic principles observed

TRL 2 –technology concept formulated

TRL 3 –experimental proof of concept

TRL 4 –technology validated in lab

TRL 5 –technology validated in relevant environment

TRL 6 –technology demonstrated in relevant environment

TRL 7 –system prototype demonstration in operational environment

TRL 8 –system complete and qualified

TRL 9 –actual system proven in operational environment

HORIZON 2020 - Technology readiness levels (TRL)

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GRID

CREATE A NEW PROJECT

Gare Ettelbruck Luxembourg
10/05/2023

Gare du Nord Paris
10/05/2023

PetiteMaison
20/09/2022

VSG
20/09/2022

Hofterlaken-2
20/09/2022

Hofterlaken-1
20/09/2022

Vilogla
20/09/2022

Items per page ▼

Page 1 of 1 ◀ ▶

Live demo



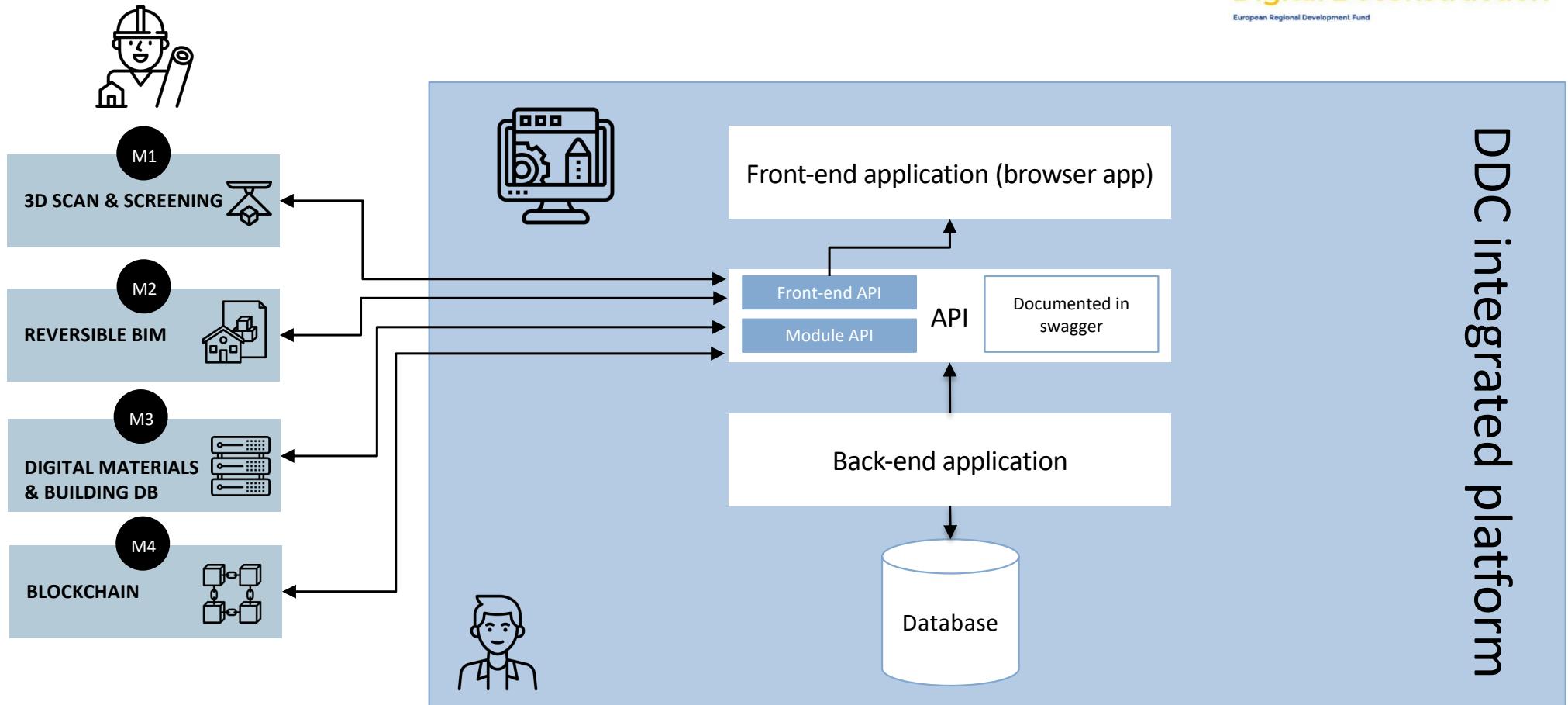
2

Technical implementation

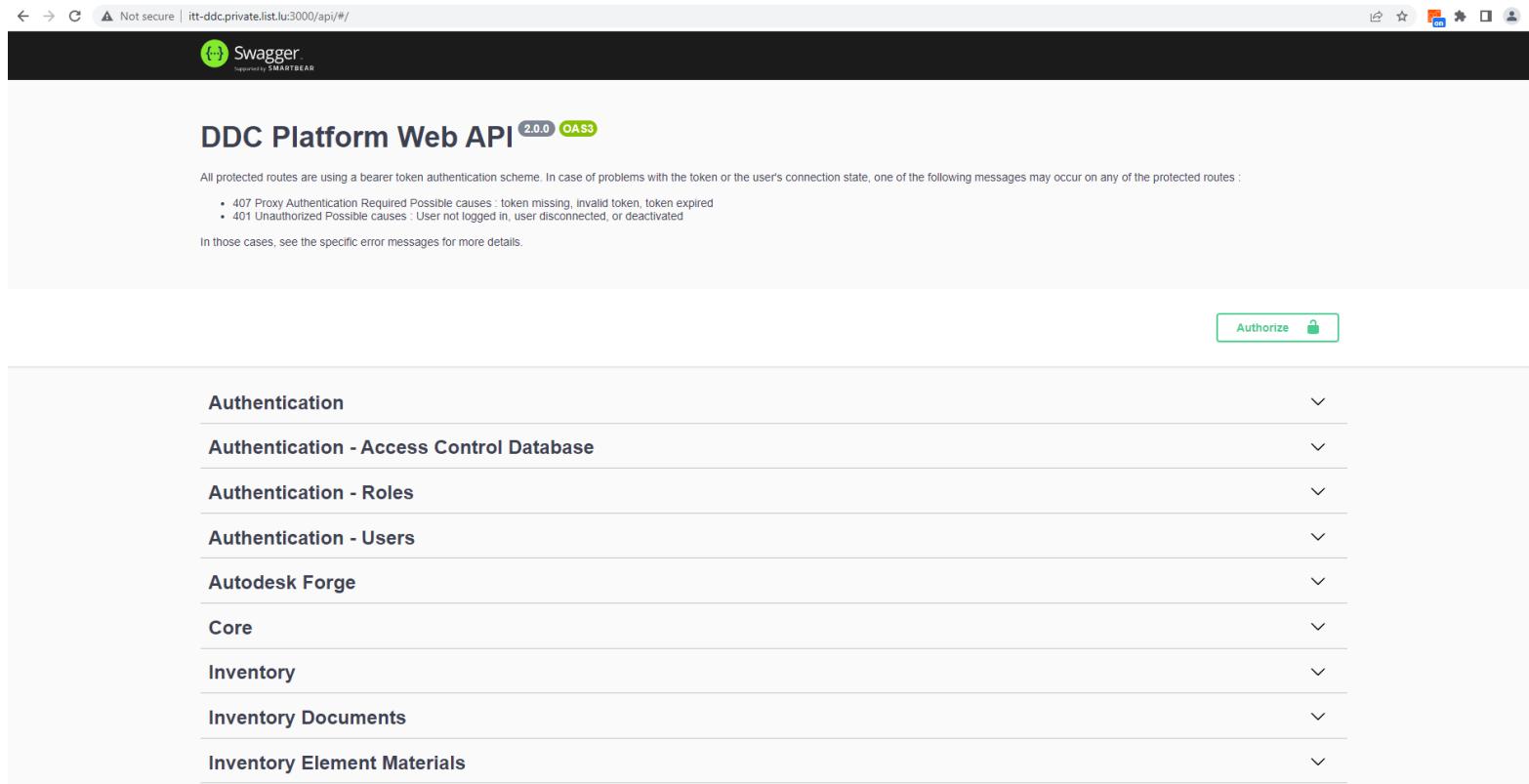


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DDC integrated platform



Module API

A screenshot of the DDC Platform Web API documentation generated by Swagger. The page title is 'DDC Platform Web API 2.0.0 OAS3'. It includes a note about bearer token authentication and a list of error codes (407, 401). A 'Authorize' button with a lock icon is located at the top right. The main content is a tree view of API endpoints under categories like 'Authentication', 'Core', and 'Inventory'.

Not secure | itt-ddc.private.list.lu:3000/api/#/

Swagger
Supported by SMARTBEAR

DDC Platform Web API 2.0.0 OAS3

All protected routes are using a bearer token authentication scheme. In case of problems with the token or the user's connection state, one of the following messages may occur on any of the protected routes :

- 407 Proxy Authentication Required Possible causes : token missing, invalid token, token expired
- 401 Unauthorized Possible causes : User not logged in, user disconnected, or deactivated

In those cases, see the specific error messages for more details.

Authorize 

Authentication

Authentication - Access Control Database

Authentication - Roles

Authentication - Users

Autodesk Forge

Core

Inventory

Inventory Documents

Inventory Element Materials

Example:Uploading an inventory (as a file)

Inventory

POST /projects/{projectId}/inventory Create or update a project inventory

Create or update a project inventory by uploading a well-formatted json file.
Example:

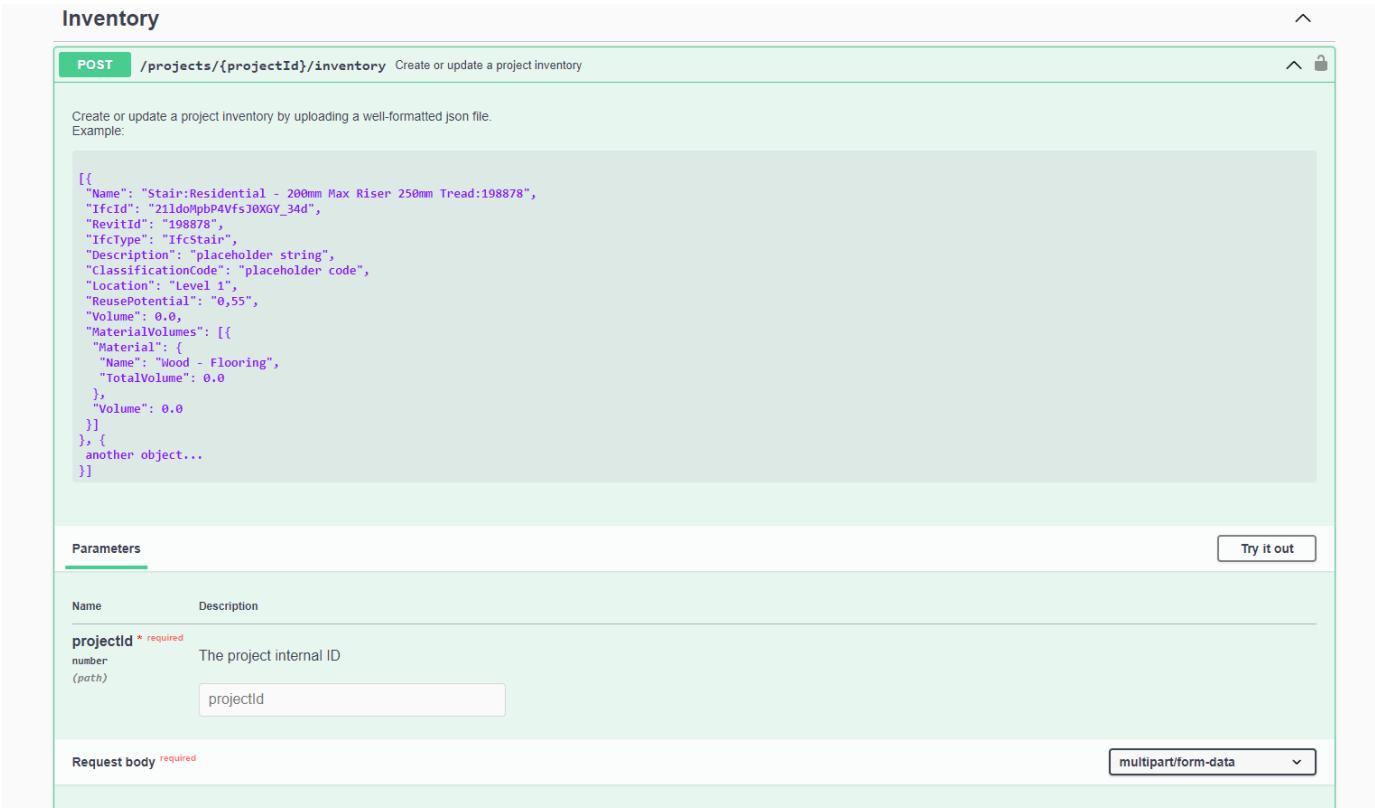
```
[[{"Name": "Stair:Residential - 200mm Max Riser 250mm Tread:198878", "IfcId": "21ido0pbp4Vt5J0XGY_34d", "RevitId": "198878", "IfcType": "IfcStair", "Description": "placeholder string", "ClassificationCode": "placeholder code", "Location": "Level 1", "ReusePotential": "0,55", "Volume": 0.0, "MaterialVolumes": [{"Material": {"Name": "Wood - Flooring", "TotalVolume": 0.0}, "Volume": 0.0}], {"another object..."}]]
```

Parameters

Try it out

Name	Description
projectId <small>required</small>	The project internal ID (path) <input type="text" value="projectId"/>

Request body required



Example: managing pois



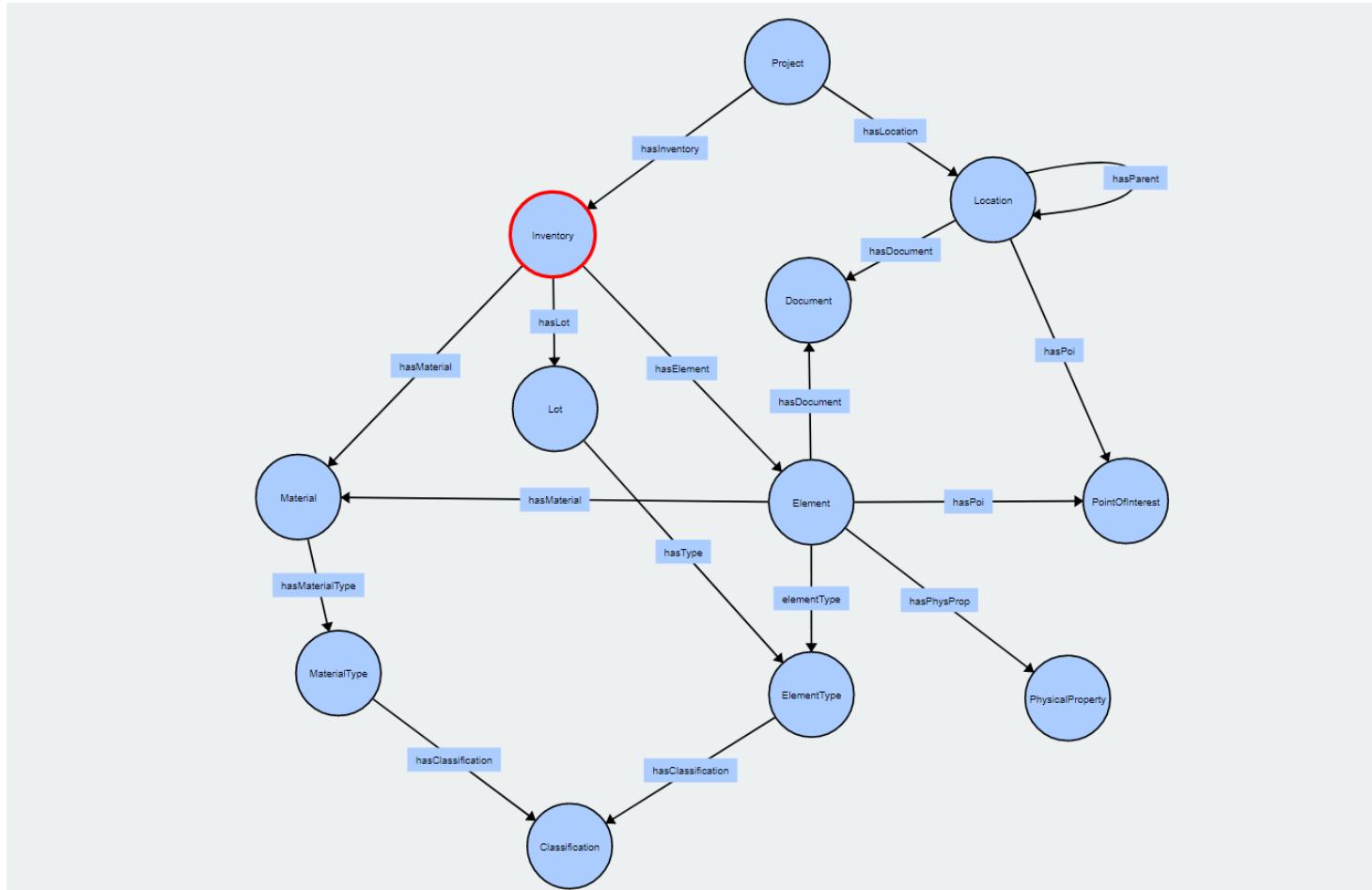
European Regional Development Fund

Point of Interests ^

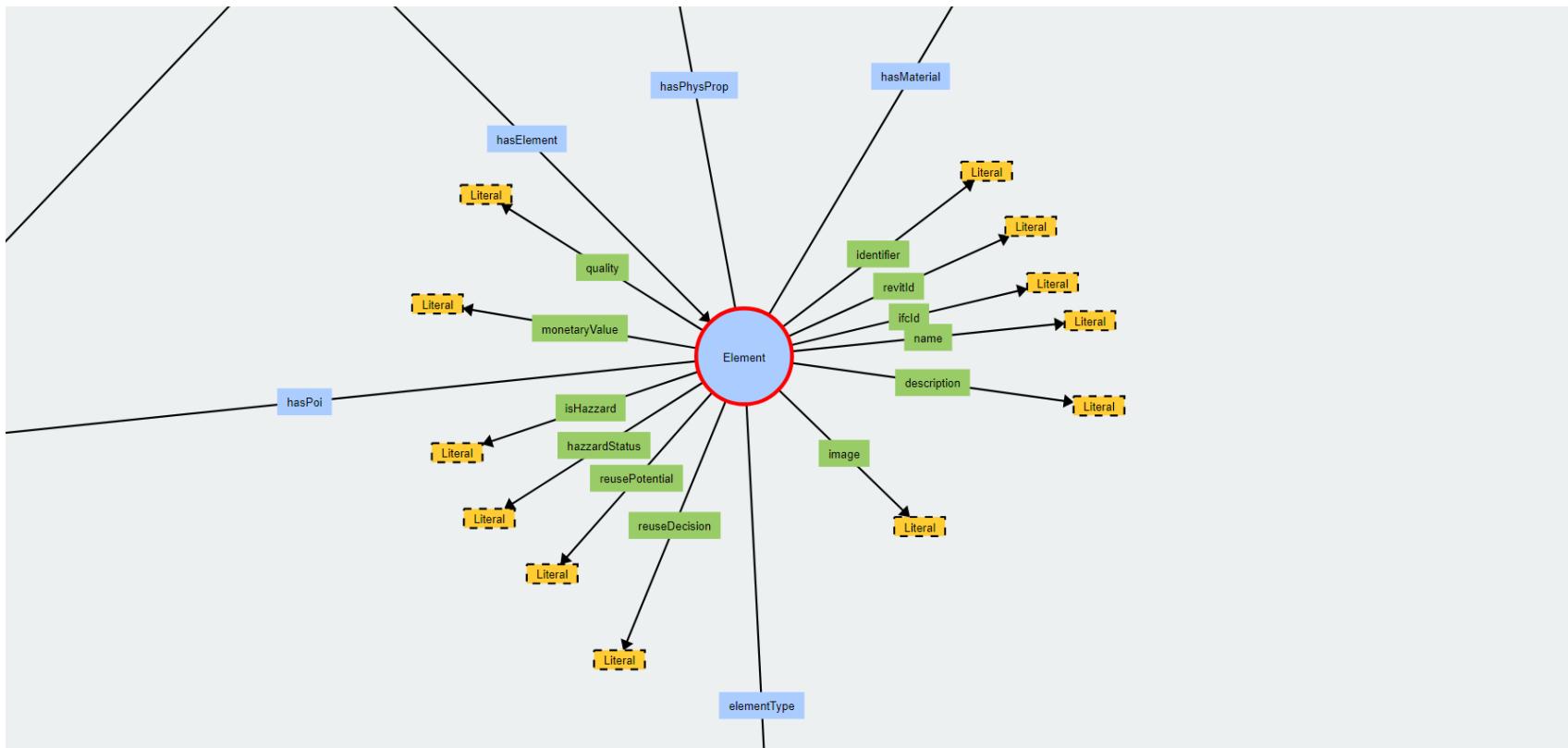
POST	<code>/projects/{projectId}/scan/points-of-interest</code>	Create a point of interest	▼ 
GET	<code>/projects/{projectId}/scan/points-of-interest</code>	List the points of interest of a project	▼ 
POST	<code>/projects/{projectId}/scan/points-of-interest/{pointOfInterestUid}</code>	Update a point of interest	▼ 
DELETE	<code>/projects/{projectId}/scan/points-of-interest/{pointOfInterestUid}</code>	Delete a point of interest	▼ 
POST	<code>/projects/{projectId}/scan/points-of-interest/import</code>		▼ 

Projects ▼

DDC Data model



Example: Element data model



Deconstruction Element



Field	Type	Example	Provider	Manual
Identifier	string	5202A90A-FD83-4840-8A50-663F083C7B	Platform	
IfcIdentifier	string	3vLLsYoGj5dAFIE0JP4Rqb	GTBLab	
RevitIdentifier	string/int	7787597	GTBLab	
ReusePotential	float	0,2 / 0.2	GTBLab	
Quality	Enum<string>	“High”, “Low”, “Medium”	Platform/GTBLab(auto)	
ElementCost	[obj]	5 (EUR)?	?	✗
Image(s)	List<[obj]>	“Image1.png” (reference)	?	✗
HazardStatus	Enum<string>	“Requested”, “In progress”, “Done”	GTBLab(auto) – client docs	
IsHazard?	Boolean	true/false (“Yes/No”)	GTBLab(auto)	
ReuseDecision	Enum<string>	“Reuse”, “Recycling”, “Landfill”, etc.	? – GTBLab has a recommendation info	✗
Name	string	“Door205.1”	?	
Description	string	“Door of the second floor. Scratched”	?	✗

Thank you for your attention

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Calin Boje, calin.boje@list.lu

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