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infraBIMOPEN

TAMPERE **2023** JAN 30 - FEB 1



Nästa steg inom BIM för Trafikverket

- Enhetliga leveranser baserade på öppna standarder
- Bättre koppling mellan kravställning och leveransspecifikationer
- Öka mognadsgraden på kravspecifikationer för strukturerad tillgångsdata





Maturity of: Open standards Ontologies Machine readable Information

Öppna standarder, som IFC, är bra men vi måste visa det i projekt och få ledningen att inse fördelarna. Detaljerade BIM-användningar är ett sätt att göra detta

Ontologier, objektstrukturer och länkad data är metoder och tekniker som hjälper oss att använda öppna standarder i M2M-kommunikation.

Maskinläsbar information kommer att bli viktigare. Både för krav och verifiering av dataleveranser

Koppla samman kravställning och leveransspecifikationer



Upprätta

- Gemensam struktur, hierarki, identifiering och klassificering
- Strukturerad och maskinläsbar kravställning
- Standardiserad kravställning och leverans för strukturerad tillgångsdata baserat på IFC
- Dra nytta av moderna verktyg som ontologier och länkade data

Vinst

- Automatiserad verifiering av leveranser av tillgångsdata
- Automatiserad uppdatering av tillgångsinformationssystem
- Datadriven analys och beslutsstöd
- Underlag för digitala tvillingar

Rail Baltica - Järnvägskorridor genom Baltikum.

Implementering av Robotic Process Automation (RPA) och Python verktyg i BIM-koordinering.



BIM-model med attributdata -> IFC -> Tillgångsregister

Properties: Building Element Proxy (1 of 172) - filtered

| rbr | Value Type |
|-------------------------------|---------------------|
| RBR-Exposure | XC2 |
| RBR-Functional_classification | CV-BR-OPSS-RD |
| RBR-IsTemplate | <no value> |
| RBR-Length | <no value> |
| RBR-Local_Code | TS |
| RBR-Location | 0009 |
| RBR-LoG | 300 |
| RBR-LoI | 300 |
| RBR-Material_Description | Reinforced Concrete |
| RBR-Material_Designation | C30/37 |
| RBR-Native_Unique_ID | <no value> |
| RBR-Number | <no value> |
| RBR-Object_ID | STR-FND-006 |
| RBR-OCC | 307 |
| RBR-Originator | IDO |
| RBR-Position | A-2 |
| RBR-Pr_Code | N/A |
| RBR-Product_Description | N/A |
| RBR-Product_Name | N/A |

BIM-attribut

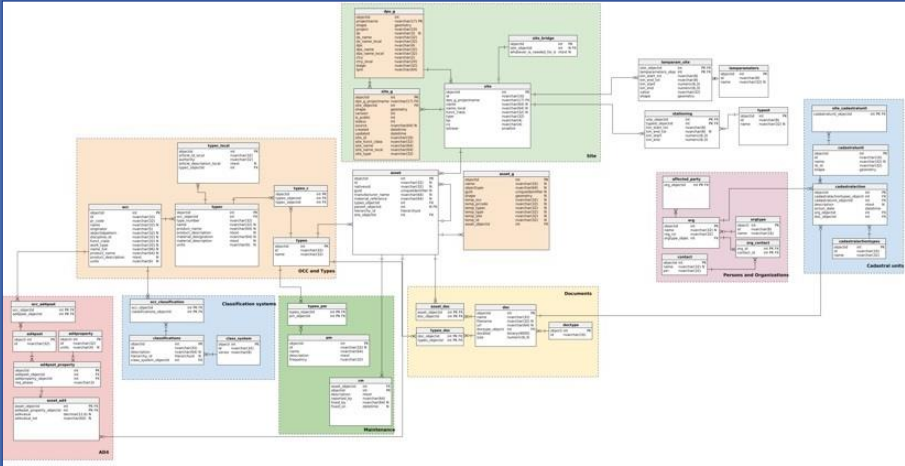


IFC

Tillgångsregisterdatabas

Properties

| Item | AllgenAttributes | RBR-DATA | Material | TimeLiner | IFC |
|--------------------------------------|------------------|------------------------|----------|-----------|-----|
| Property | | Value | | | |
| GLOBALID | | 1x0hCN5FDEDPFZSd2_nY3 | | | |
| RBR-OCC | | 300 | | | |
| RBR-Object_ID | | STR-DCK-001 | | | |
| RBR-Material_Designation | | C45/55 | | | |
| RBR-Material_Description | | Posttensioned Concrete | | | |
| RBR-Product_Name | | Varies | | | |
| RBR-Product_Description | | Varies | | | |
| RBR-Pr_Code | | Varies | | | |
| RBR-Type_number | | Varies | | | |
| RBR-Units | | Varies | | | |
| RBR-Exposure | | XC4/ND3/XF4 | | | |
| RBR-Concrete_Volume | | 9474.36 m³ | | | |
| RBR-Steel_Mass | | 2694373.80 kg | | | |
| RBR-Steel_Mass-Prestressing | | 604371.80 kg | | | |
| RBR-Reinforcement_Ratio | | 285.0 kg/m³ | | | |
| RBR-Reinforcement_Ratio-Prestressing | | 65.00 kg/m³ | | | |
| RBR-Project_ID | | | | | |
| RBR-Section_ID | | | | | |
| RBR-SubSection_ID | | | | | |
| RBR-Originator | | | | | |
| RBR-VolSysZone | | | | | |
| RBR-Location | | 0011 | | | |
| RBR-Discipline_Code | | BR | | | |
| RBR-Local_Code | | SK | | | |
| RBR-Project_Stage | | MD | | | |
| RBR-Revision | | 001 | | | |
| RBR-LoG | | 300 | | | |
| RBR-LoI | | 300 | | | |
| RBR-Design_Life | | 100 | | | |
| RBR-Start_Kilometre | | | | | |
| RBR-End_Kilometre | | | | | |
| RBR-Functional_classification | | | | | |
| RBR-Position | | North | | | |
| RBR-Type | | Postent | | | |
| RBR-Depth | | Variable | | | |





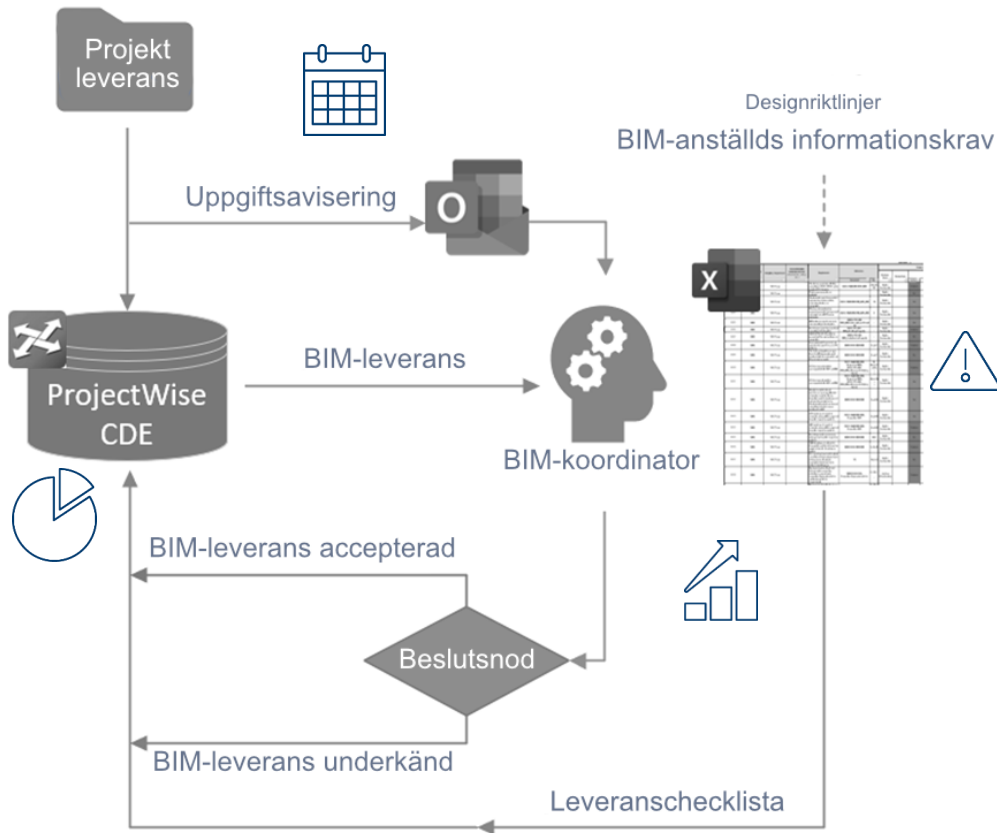
**Hur bibehåller man produktiviteten och
granskningskvaliteten vid högre arbetsbelastning?**

Tillvägagångssätt: Medborgarutvecklare



En **medborgarutvecklare** är en användare med liten eller ingen kodningserfarenhet som bygger applikationer med IT-godkänd teknik och processer.

BIM-granskningsprocess och möjligheter för automatisering



✓ Kan vi få en tydlig bild av kommande och väntande BIM-uppgifter?



✓ Kan vi få BIM-teamets prestandaanalys?

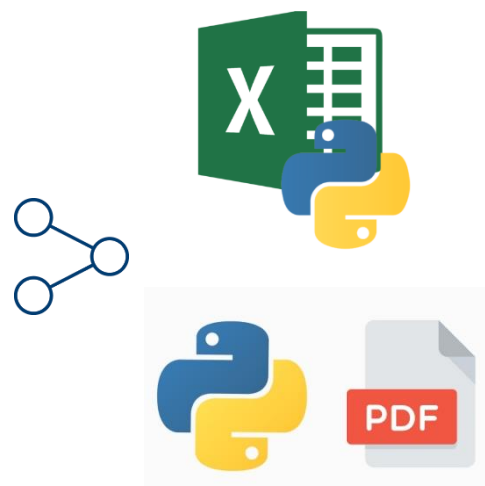


✓ Kan vi använda BIM-data för att svara på checklistfrågor?



✓ Kan vi få BIM-ärende analys baserat på checkliststatusar?

Verktyg för automation och tidsoptimering av granskning



Verktyg för automation och tidsoptimering av granskning



Power Automate



Power BI Desktop



simplebim®



WinPython

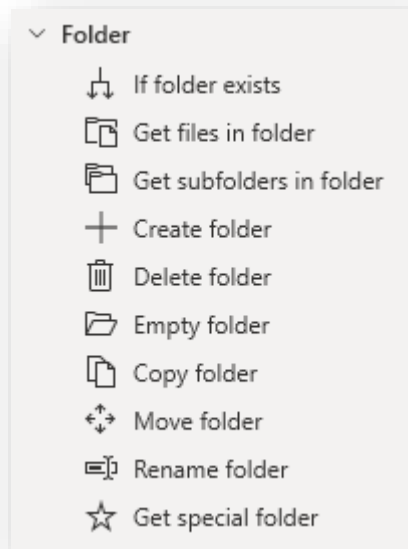
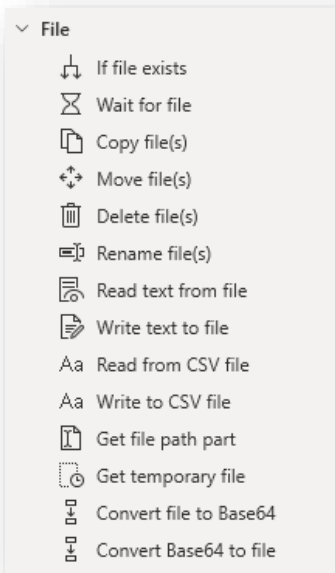
```
QEXvsDD.ipynb
+ 🔍 📄 ▶ ⏪ ⏩ Code 🔍 ⌚ git 🗑️
[1]: import pandas as pd_
import os

dDrop_excel = 'dd.xlsx'
all_qex_xls = []
path = os.getcwd()
files = os.listdir(path)
for i in files:
    if i.startswith("qex"):
        all_qex_xls.append(i)
print(all_qex_xls)

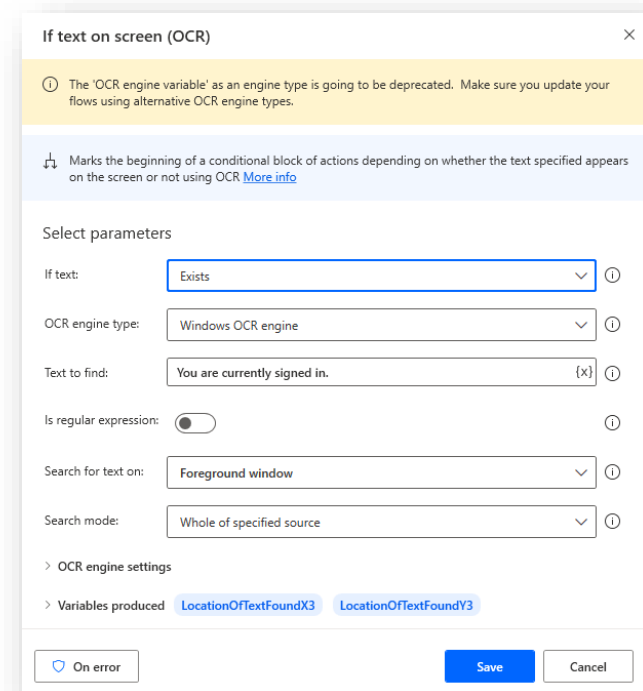
dfs = []
for file in all_qex_xls:
    dfs.append(pd.read_excel(file))
merged_qexs = pd.concat(dfs)
header_qex = merged_qexs.iloc[11]
qex_df1 = pd.DataFrame(merged_qexs.values[1:], columns=header_qex)
qex_cleaned = qex_df1[["Object ID", "Qty", "Unit", "VolSysZone"]]
qex_cleaned.rename(columns={'Object ID': 'RBR-Object_ID'}, inplace=True)
qex_cleaned.rename(columns={'VolSysZone': 'RBR-Vol_sys_zone'}, inplace=True)
qex = qex_cleaned.fillna(0)
qex.drop(qex.loc[qex["RBR-Object_ID"]==0].index, inplace=True)
qex.drop(qex.loc[qex["Qty"]==0].index, inplace=True)

qex.to_excel("takealook.xlsx")
```

Verktyg för automation och tidsoptimering av granskning



Power BI Desktop



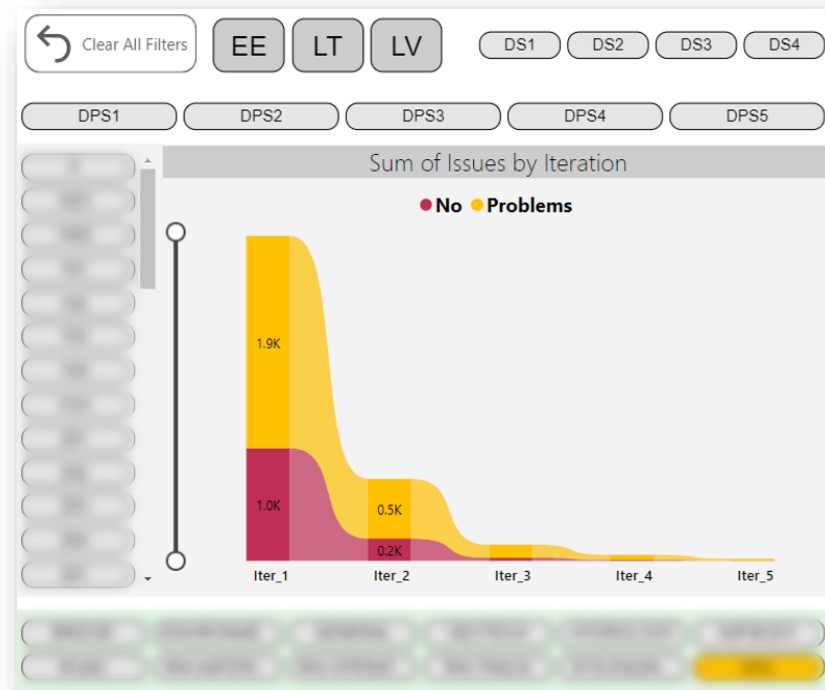
Verktøy for automation och tidsoptimering av granskning



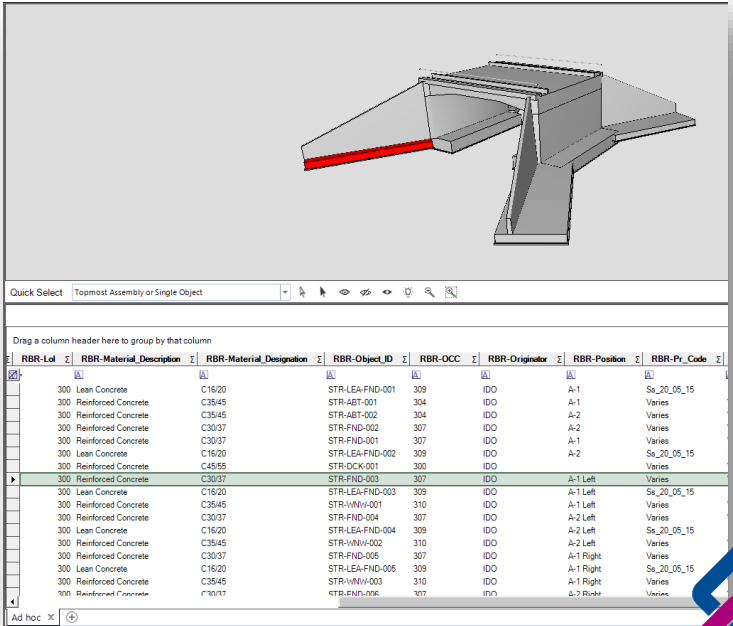
| Rail Baltica Coordinated by RB Rail | Design Review Iteration 1 | | | | | | | | | | | | | | | | | | | | | |
|--|---------------------------|------------|------------------|---------------|-----------------------|-----------|---------------|--------------------|--------------------|-----------|----------------------|--------------|-----------------------------------|--------------|--------------------|--------------|---------------------|-----------|------------------|---------------|----------|--|
| | Reviewer's Remarks | | | | Consultant's Response | | | | Reviewer's Opinion | | Coordination Meeting | | Client Decision coordinated by PM | | Reviewer's Remarks | | | | | | | |
| | Number of comments: | Problems: | Recommendations: | Total Issues: | Accepted: | Rejected: | Duplications: | Missing Responses: | Accepted: | Rejected: | Open Issues: | Open Issues: | Open Issues: | Open Issues: | Open Issues: | Open Issues: | Number of comments: | Problems: | Recommendations: | Total Issues: | | |
| RBR General | 7 | 7 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR Roads | 95 | 77 | 0 | 77 | 0 | 0 | 0 | 77 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR Railway Track | 113 | 29 | 8 | 37 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR Structures | 145 | 73 | 1 | 74 | 0 | 0 | 0 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR Geotech & Materials | 135 | 77 | 21 | 98 | 0 | 0 | 0 | 98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR Hydrology & Stations | 72 | 29 | 18 | 47 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR Spatial Planning & Environment | 85 | 52 | 0 | 52 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR Railway Operations | 21 | 9 | 0 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR BIM | 122 | 82 | 11 | 93 | 0 | 0 | 0 | 93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| RBR RAMS | 8 | 8 | 0 | 8 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP General | 15 | 0 | 3 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP Roads | 210 | 105 | 9 | 114 | 0 | 0 | 0 | 114 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP Railway Track | 117 | 24 | 8 | 32 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP Structures | 173 | 41 | 22 | 63 | 0 | 0 | 0 | 63 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP Geotech & Materials | 86 | 6 | 31 | 31 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP Hydrology & Stations | 96 | 39 | 13 | 52 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP Spatial Planning & Environment | 110 | 9 | 21 | 30 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP WOP | 23 | 10 | 3 | 13 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP Utilities | 33 | 25 | 1 | 26 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total Summary | | | | | | | | | | | | | | | | | | | | | | |
| RBR Rail Comments | 803 | 443 | 99 | 502 | 0 | 0 | 0 | 502 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ESP Comments | 863 | 253 | 111 | 364 | 0 | 0 | 0 | 364 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total | 1666 | 696 | 110 | 866 | 0 | 0 | 0 | 866 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |



Power BI Desktop



Verktøy for automation och tidsoptimering av granskning



Power BI Desktop

| RBR-Project_ID | RBR-Section_ID | RBR-SubSection_ID | RBR-Originator | RBR-Discipline Code |
|----------------|----------------|-------------------|----------------|---------------------|
| Text | Text | Text | Text | Text |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
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| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |



Användningsfall: BIM-teamets uppgiftshantering



✓ Kan vi få BIM-teamets prestandaanalys?



✓ Kan vi få en tydlig bild av kommande och väntande BIM-uppgifter?

Save Run Stop Run next action Recorder

Subflows Main

- 1 Open CMD session
Start a new CMD session with working directory 'C:\Users\Dmitri.Garbuzenko\OneDrive - RB Rail AS\0_CTOrep from Sharepoint\OUTPUTS' and store it into CmdSession
- 2 Write to CMD session
Execute the command 'python3 output.py' and then send Enter at CMD session CmdSession
- 3 Click UI element in window
Click on UI element Power BI Desktop
- 4 Click UI element in window
Click on UI element List Item 'RB Rail CTO MasterFile'
- 5 Wait 60 seconds
- 6 Focus window
Focus window with title 'RB Rail CTO MasterFile - Power BI Desktop' and class 'WindowsForms10.Window.8app.0.9fe31_r8_ad1'
- 7 Click UI element in window
Click on UI element Button 'Refresh' 6
- 8 Wait for image
Wait for an image on the list to appear on the foreground window
- 9 Loop LoopIndex from 1 to 100 with step 1
- 10 If text on screen (OCR)
If text 'We couldn't authenticate with the credentials provided. Please try again.' exists on Foreground window using OCR engine
- 11 Click UI element in window
Click on UI element Button 'Connect'
- 12 End
- 13 Wait 2 seconds
- 14 If text on screen (OCR)
If text 'The current user isn't signed in' exists on Foreground window using Windows OCR engine
- 15 Click UI element in window
Click on UI element Button 'Sign in as different user' 2
- 16 End



Clear All Filters Last Update 12/30/2022 9:39:50 AM NEXT YEAR

BIM Team Dashboard 2022

Rail Baltica

Approved Pending Rejected

DTD MD VE

| DS-abbr | reviewerFirstna... | Package Name | Review Du... | Review Da... | Review deadline st... | |
|---------|--------------------|--------------|--------------|--------------|-----------------------|------------------|
| EE-DS1 | Dmitri | | 27.12.2022 | 27.12.2022 | Reviewed, on time | https://fc107... |
| LT-DS1 | | | 27.12.2022 | 27.12.2022 | Reviewed, on time | https://0706... |
| LV-DS4 | | | 23.12.2022 | 21.12.2022 | Reviewed, on time | https://cad1... |
| EE-DS1 | | | 21.12.2022 | 21.12.2022 | Reviewed, on time | https://fc107... |
| EE-DS1 | | | 19.12.2022 | 19.12.2022 | Reviewed, on time | https://fc107... |
| LT-DS1 | | | 16.12.2022 | 16.12.2022 | Reviewed, on time | https://0706... |
| LT-DS1 | | | 16.12.2022 | 16.12.2022 | Reviewed, on time | https://0706... |
| EE-DS2 | | | 15.12.2022 | 15.12.2022 | Reviewed, on time | https://85b6... |
| LV-DS3 | | | 14.12.2022 | 14.12.2022 | Reviewed, on time | https://92b7... |
| EE-DS2 | | | 12.12.2022 | 12.12.2022 | Reviewed, on time | https://85b6... |
| LT-DS1 | | | 09.12.2022 | 06.12.2022 | Reviewed, on time | https://0706... |
| LT-DS1 | | | 09.12.2022 | 05.12.2022 | Reviewed, on time | https://0706... |
| EE-DS1 | | | 08.12.2022 | 08.12.2022 | Reviewed, on time | https://fc107... |
| EE-DS2 | | | 02.12.2022 | 02.12.2022 | Reviewed, on time | https://85b6... |

Review Status

3.72% Reviewed, late
96.28% Reviewed, on time

Deliverables Distribution

Martins 254
Dmitri 225
Rokas

Användningsfall: Dataanalys av checklista



✓ Kan vi använda BIM-data för att svara på checklistfrågor?

1 Get current date and time
Retrieve the current datetime and store it into `CurrentDateTime`

2 Convert datetime to text
Convert datetime `CurrentDateTime` to text using format 'yyyyMMd' and store it into `FormattedDateTime`

3 Launch Excel
Launch Excel and open document 'C:\Users\Dmitri.Garbuzenko\OneDrive - RB Rail AS\Desktop\Employees.xlsm' using a new Excel process and store it into Excel instance `ExcelInstance`

4 Get first free column/row from Excel worksheet
Get the first free column/row in the active worksheet of the Excel document whose instance is stored into `ExcelInstance` and store them into `FirstFreeColumn` and `FirstFreeRow`

5 Read from Excel worksheet
Read the values of the cells ranging from column 'A' row 1 to column `FirstFreeColumn` - 1 row `FirstFreeRow` - 1 and store it into `ExcelData`

6 [x] Set variable
Assign to variable `RowNumber` the value 2

7 For each `CurrentItem` in `ExcelData`

8 Convert text to number
Convert text `CurrentItem` [Q1Q2] to number and store it into `Q1Q2`

9 Convert text to number
Convert text `CurrentItem` [Q3Q4] to number and store it into `Q3Q4`

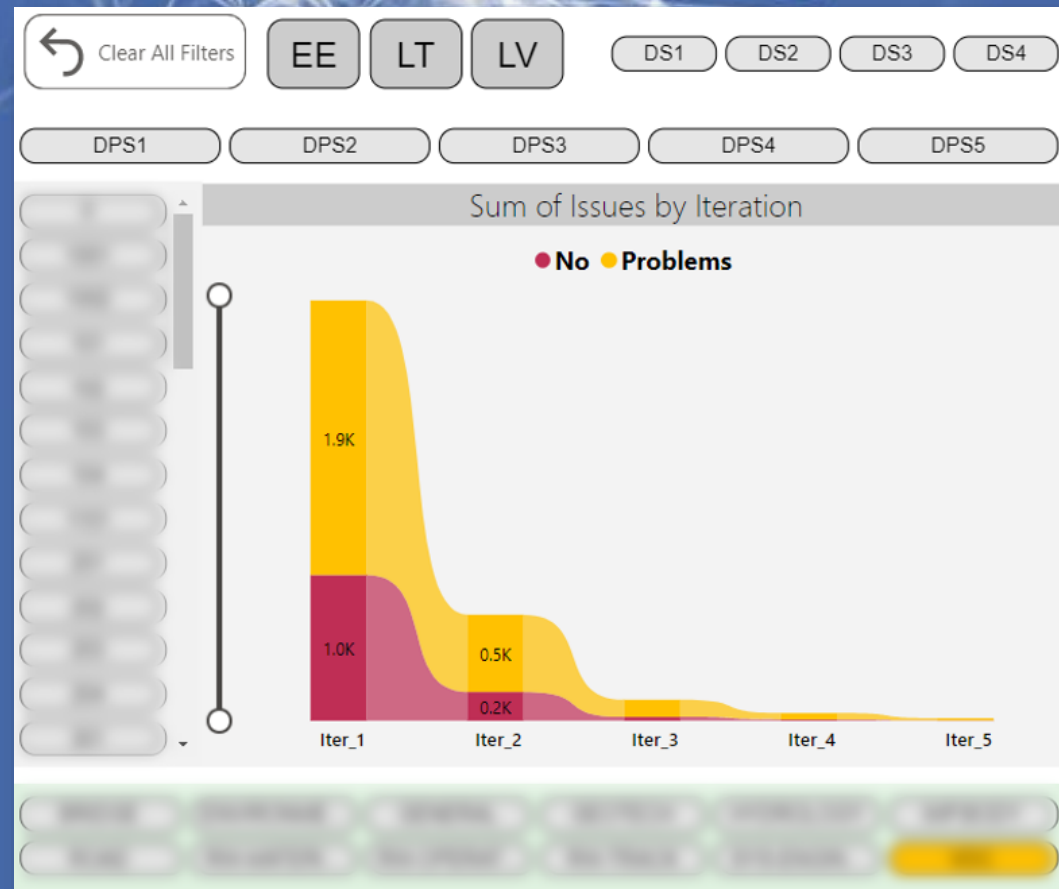

10 Write to Excel worksheet
Write the value `Q1Q2` + `Q3Q4` into cell in column 5 and row `RowNumber` of the Excel instance `ExcelInstance`

11 [x] Set variable
Assign to variable `MonthlySales` the value (`Q1Q2` + `Q3Q4`) / 12

12 Truncate number
Round `MonthlySales` at 3 decimal digits and store it into `MonthlySales`

13 Write to Excel worksheet
Write the value `MonthlySales` into cell in column 6 and row `RowNumber` of the Excel instance `ExcelInstance`

14 Run Excel macro
Run macro "ColorCode" `MonthlySales` ; `RowNumber` on the Excel document whose instance is stored into `ExcelInstance`



Användningsfall: Mängdning och IFC-data jämförelse



simplebim[®]

| RBR-Project_ID | RBR-Section_ID | RBR-SubSection_ID | RBR-Originator | RBR-Discipline Code |
|----------------|----------------|-------------------|----------------|---------------------|
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |
| RBDTD-EE | DS1 | DPS4 | IDO | GEO |

```

QEXvsDD.ipynb

[1]: import pandas as pd
import os

dDrop_excel = 'dd.xlsx'
all_qex_xls = []
path = os.getcwd()
files = os.listdir(path)
for i in files:
    if i.startswith("qex"):
        all_qex_xls.append(i)
print(all_qex_xls)

dfs = []
for file in all_qex_xls:
    dfs.append(pd.read_excel(file))
merged_qexs = pd.concat(dfs)
header_qex = merged_qexs.iloc[11]
qex_df1 = pd.DataFrame(merged_qexs.values[1:], columns=header_qex)
qex_cleaned = qex_df1[["Object ID", "Qty", "Unit", "VolSysZone"]]
qex_cleaned.rename(columns={"Object ID": "RBR-Object_ID"}, inplace=True)
qex_cleaned.rename(columns={"VolSysZone": "RBR-Vol_sys_zone"}, inplace=True)
qex = qex_cleaned.fillna(0)
qex.drop(qex.loc[qex["RBR-Object_ID"]==0].index, inplace=True)
qex.drop(qex.loc[qex["Qty"]==0].index, inplace=True)

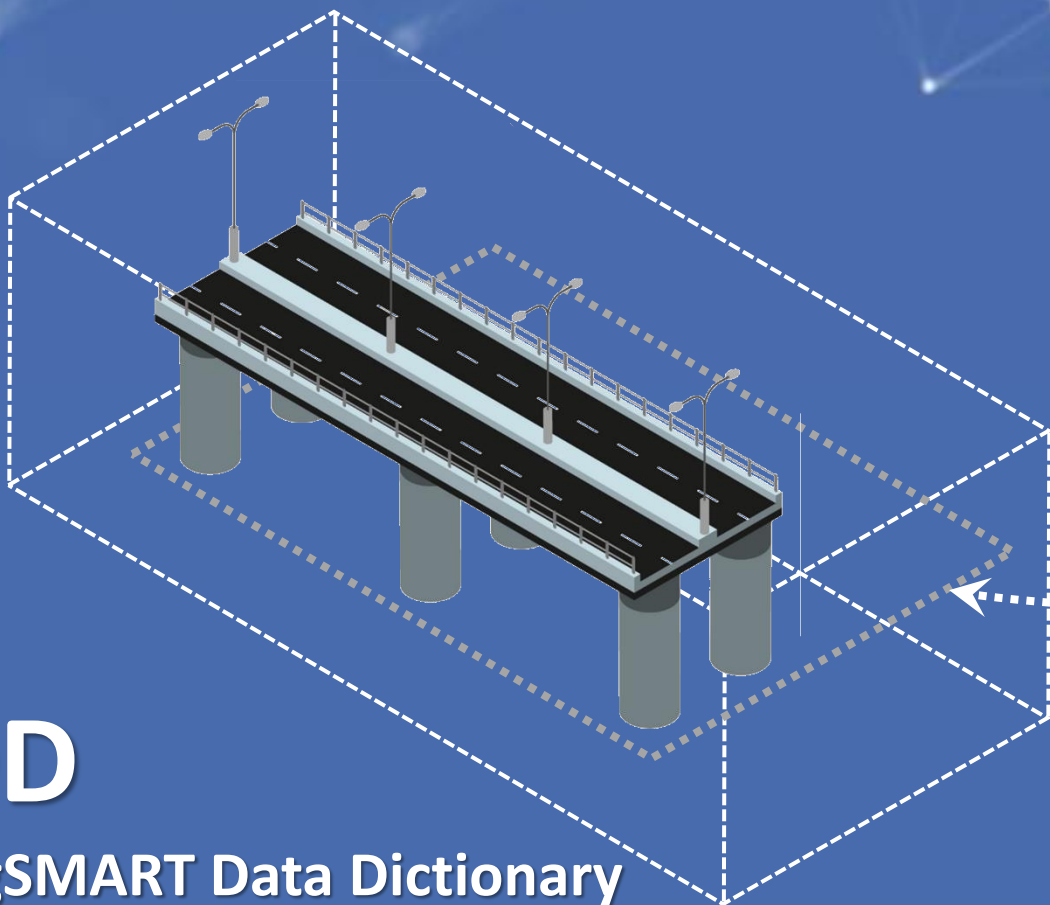
qex.to_excel("takealook.xlsx")
    
```

| Spec Code | RBR-Occ | QUANTITIES | | | | | | | | |
|-----------|---------|--|-------------|--|--|--|--|---------|---------|---------|
| | | UNICLASS 2015 Product Code(Pr_Code) | Type number | Product Description | | | | Qty | % Cont | Cont |
| | N/A | Pr_35_31_68 | | Waterproofing on rail structures decks consists of all works and expenses necessary to achieve the specified end result, e.g. workforce, materials, equipment and transportation (incl. fuel, insurance, etc.). This item is meant for waterproofing systems applicable to bridges, viaducts and underpass structures on viaduct deck the ballast of the railway tracks is directly supported or has earth filling on top. In these structures, each system will consist of a membrane, formed by one or more layers of heat-welded elastomer bitumen sheets, adhered to the deck, on which a protection will be placed. This protection will be measured separately, including sealing with epoxy at the edges of the membrane in the deck. | | | | m2 | 184,500 | 184,500 |
| | | | 000302 | | | | | 184,500 | 0 | 184,500 |
| | N/A | Pr_35_31_68 | | Waterproofing asphalt protection course consists of all works and expenses necessary to achieve the specified end result, e.g. workforce, materials, equipment and transportation (incl. fuel, insurance, etc.). This item is meant for supply and placement of a 3.00 cm thick asphalt layer to protect the waterproofing system. It includes all the materials and work necessary for its completion | | | | m2 | 145,500 | 145,500 |
| | | | 000308 | | | | | 145,500 | 0 | 145,500 |

| RBR-Object_ID | RBR-Concrete_Volume | RBR-Length | RBR-Steel_Mass | RBR-Volume | RBR-Area | RBR-Quantity | RBR-Number | RBR-Vol sys zone | Qty | Unit | Ok/Not |
|-------------------|---------------------|------------|----------------|------------|-----------|--------------|------------|------------------|---------|------|--------|
| STR-DCK-001 | 2852.96 | 131.00 m | 460934.18 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 2852.96 | m3 | TRUE |
| STR-TRS-001 | 33.31 | 0 | 4587.91 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 33.31 | m3 | TRUE |
| STR-TRS-002 | 33.55 | 0 | 4587.91 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 33.55 | m3 | TRUE |
| STR-PTH-001 | 24.15 | 132.05 m | 1252.92 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 24.15 | m3 | TRUE |
| STR-PTH-003 | 24.14 | 132.05 m | 1253.03 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 24.14 | m3 | TRUE |
| STR-PTH-002 | 6.96 | 144.90 m | 1666.41 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 6.96 | m3 | TRUE |
| STR-PTH-004 | 6.92 | 144.15 m | 1657.76 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 6.92 | m3 | TRUE |
| STR-LEA-FND-022 | 12.52 | 0 | 0 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 12.52 | m3 | TRUE |
| STR-LEA-FND-021 | 5.7 | 0 | 0 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 5.7 | m3 | TRUE |
| STR-FND-018 | 189 | 0 | 14116.39 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 189 | m3 | TRUE |
| STR-PIL-026 | 28.84 | 25.50 m | 2131.57 | Not in DD | Not in DD | 0 | 1 | BR0350ZZ | 1 | pc | TRUE |
| STR-PIL-027 | 28.84 | 25.50 m | 2131.57 | Not in DD | Not in DD | 0 | 1 | BR0350ZZ | 1 | pc | TRUE |
| STR-PIL-028 | 28.84 | 25.50 m | 2131.57 | Not in DD | Not in DD | 0 | 1 | BR0350ZZ | 1 | pc | TRUE |
| STR-PIL-029 | 28.84 | 25.50 m | 2131.57 | Not in DD | Not in DD | 0 | 1 | BR0350ZZ | 1 | pc | TRUE |
| STR-PIL-030 | 28.84 | 25.50 m | 2131.57 | Not in DD | Not in DD | 0 | 1 | BR0350ZZ | 1 | pc | TRUE |
| STR-RTW-005 | 41.65 | 0 | 4065.58 | Not in DD | Not in DD | 0 | 0 | BR0350ZZ | 41.65 | m3 | TRUE |
| DR-PIPE-STEEL-001 | 0 | 0 | 0 | Not in DD | Not in DD | 1 | 0 | BR0350ZZ | 0 | 0 | FALSE |
| DR-PIPE-STEEL-002 | 0 | 0 | 0 | Not in DD | Not in DD | 1 | 0 | BR0350ZZ | 0 | 0 | FALSE |
| DR-PIPE-STEEL-003 | 0 | 0 | 0 | Not in DD | Not in DD | 1 | 0 | BR0350ZZ | 0 | 0 | FALSE |
| DR-PIPE-STEEL-004 | 0 | 0 | 0 | Not in DD | Not in DD | 1 | 0 | BR0350ZZ | 0 | 0 | FALSE |
| DR-PIPE-STEEL-005 | 0 | 0 | 0 | Not in DD | Not in DD | 1 | 0 | BR0350ZZ | 0 | 0 | FALSE |
| DR-PIPE-STEEL-006 | 0 | 0 | 0 | Not in DD | Not in DD | 1 | 0 | BR0350ZZ | 0 | 0 | FALSE |
| DR-PIPE-STEEL-007 | 0 | 0 | 0 | Not in DD | Not in DD | 1 | 0 | BR0350ZZ | 0 | 0 | FALSE |
| DR-PIPE-STEEL-008 | 0 | 0 | 0 | Not in DD | Not in DD | 1 | 0 | BR0350ZZ | 0 | 0 | FALSE |



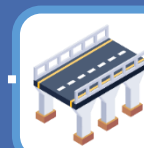
Öppet BIM-arbetsflöde - Broteknik



Bromodellering med geometri + data



Data
[t.e. från bSDD]



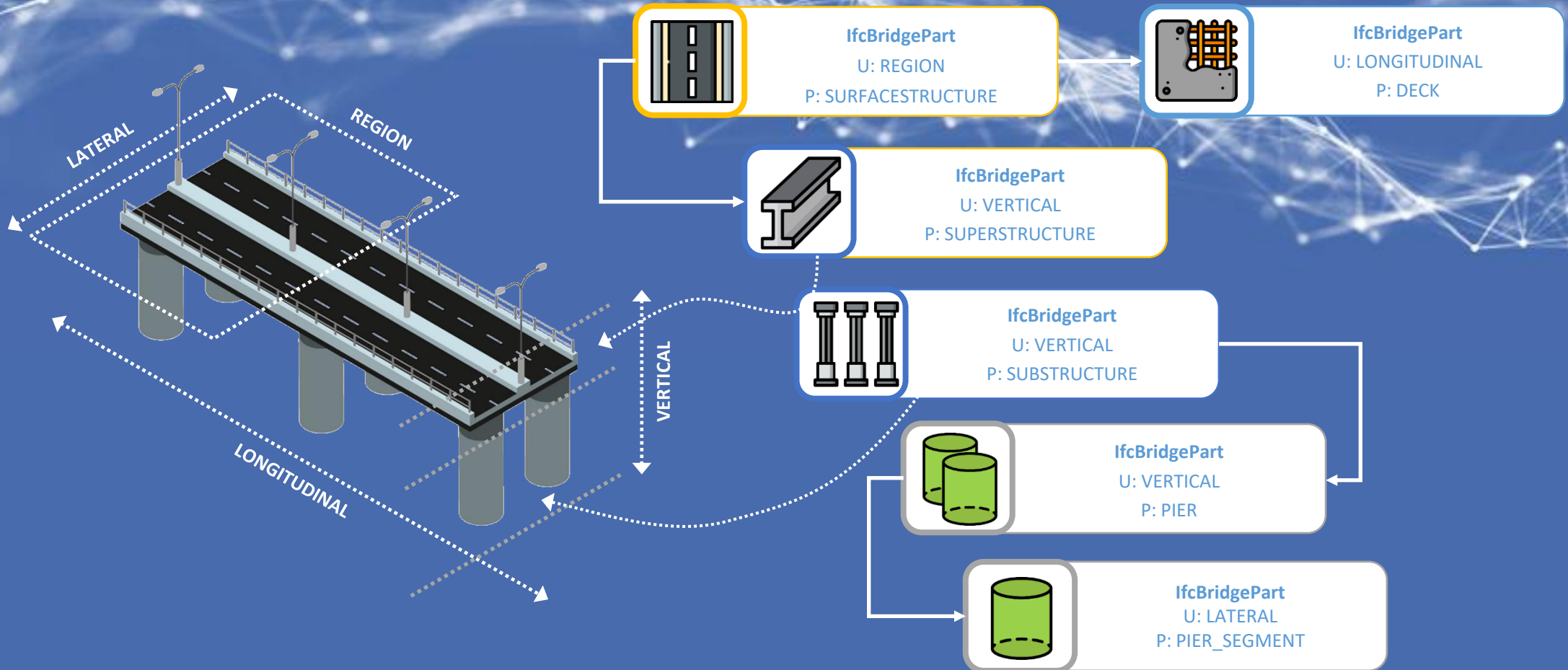
Geometri
[t.e. från BIM
Bibliotek]

bSDD

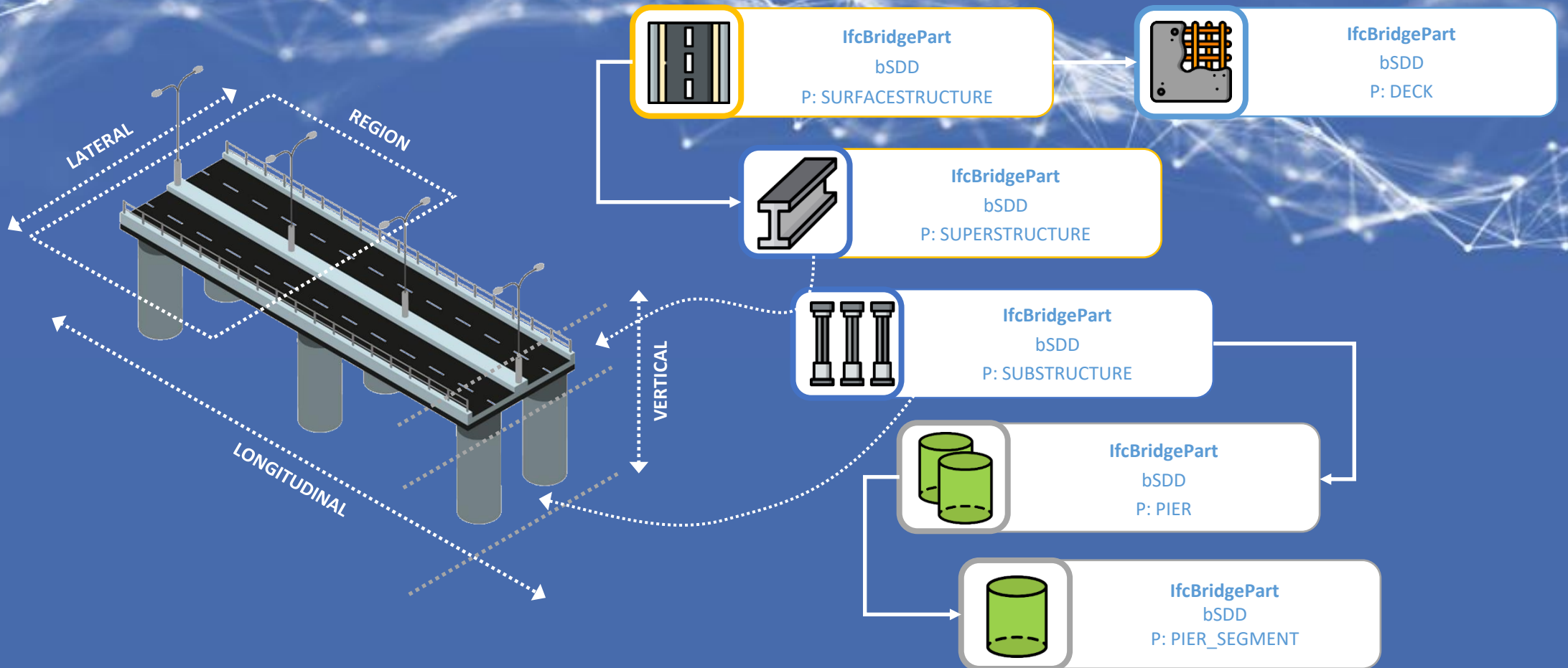
buildingSMART Data Dictionary



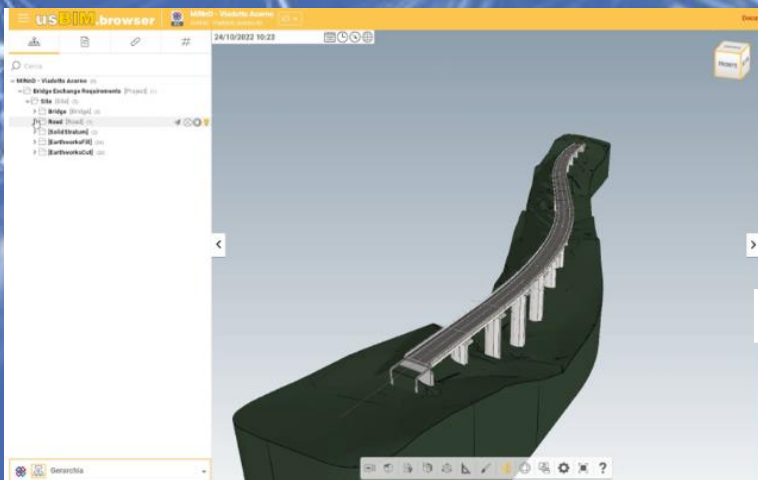
Bromodelling - Geometri IFC 4.3



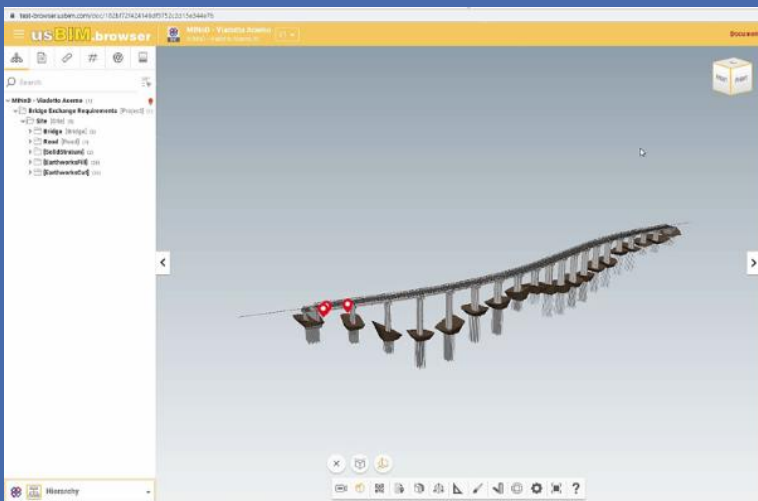
Bromodelling - Data från bSDD



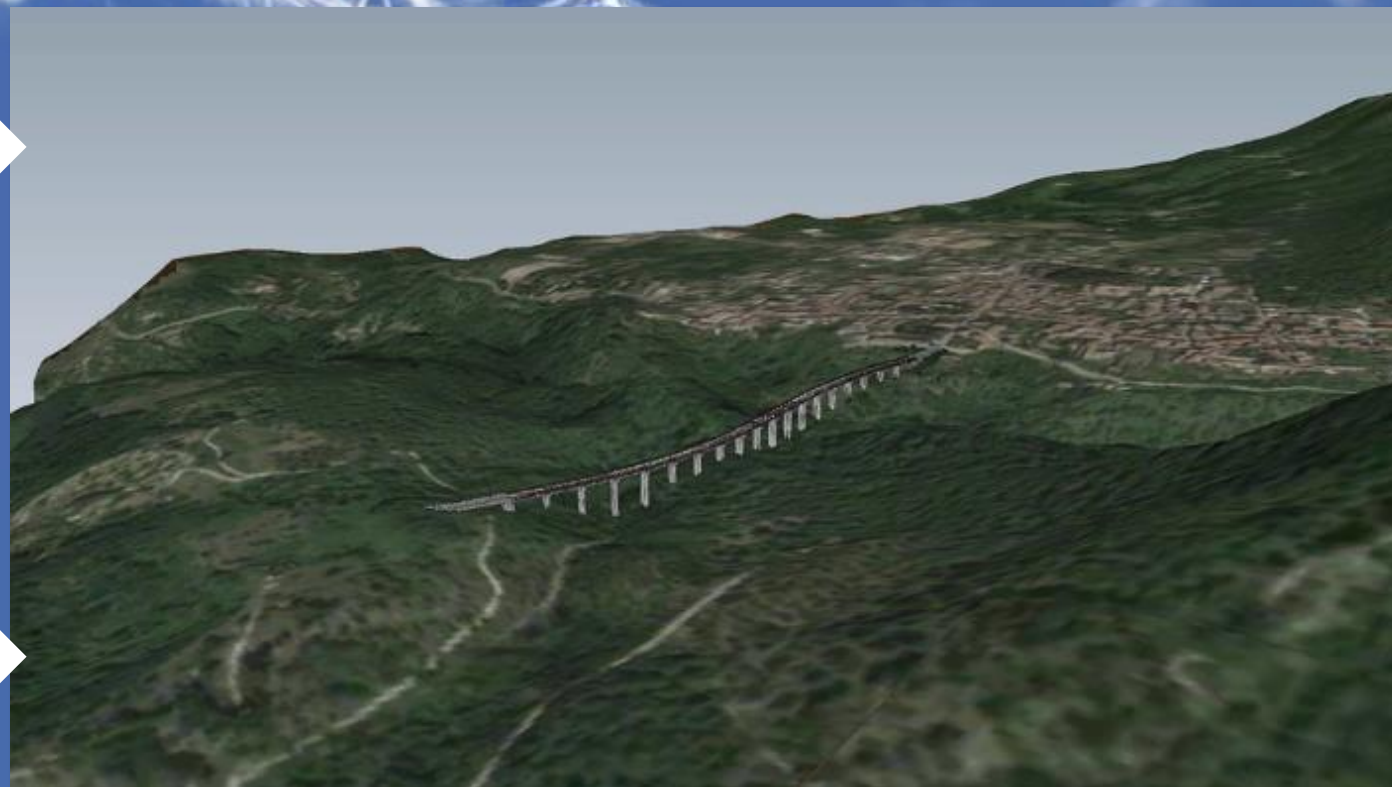
IFC 4.3



bSDD



Bromodell
- Geometri och data



Alfonso Perna

ACCA software

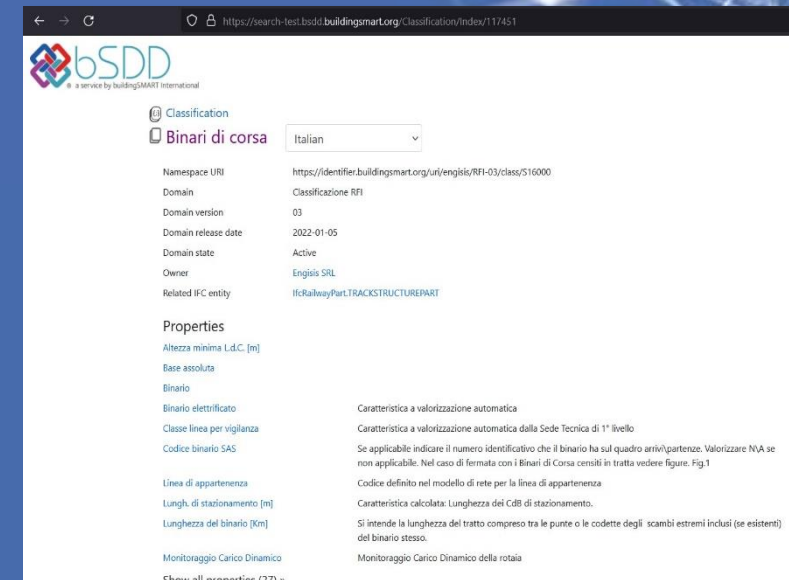
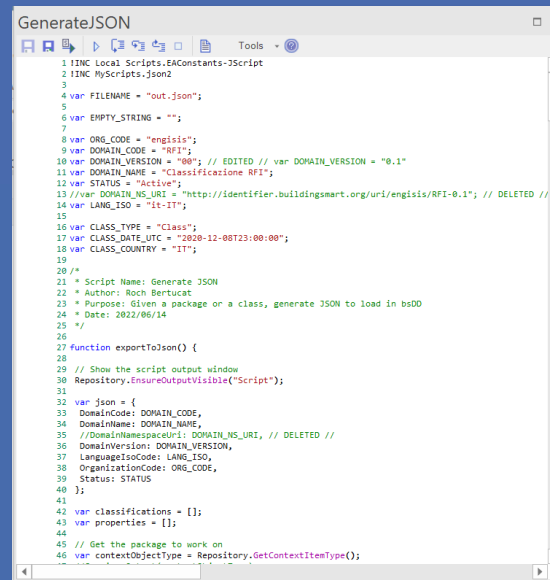
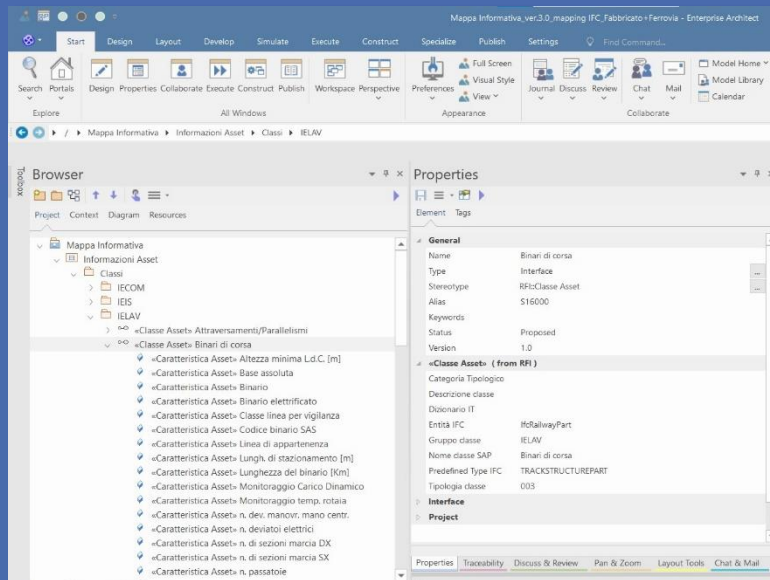


IFC4.3 och bSDD för järnsvägsteknik

IFC-objekt under
strukturerade
mappar

Automation: UML
(Unified Modeling
Language)-till-Json
via skript

Ladda upp på
bSDD testmiljö



Giulia Minnucci

IFC4.3 och bSDD för järnsvägsteknik

IFC-objekt under
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via skript

Ladda upp på
bSDD testmiljö

| | |
|-----------------------------|--------------------|
| Status | Proposed |
| Version | 1.0 |
| «Classe Asset» (from RFI) | |
| Categoria Tipologico | |
| Descrizione classe | |
| Dizionario IT | |
| Entità IFC | IfcRailwayPart |
| Gruppo classe | IELAV |
| Nome classe SAP | Binari di corsa |
| Predefined Type IFC | TRACKSTRUCTUREPART |
| Tipologia classe | 003 |
| Interface | |

IFC4.3 och bSDD för järnvägsteknik

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Ladda upp på
bSDD testmiljö

| Information Map | bsDD |
|--|----------------|
| CaratteristicaAsset/Alias | Code |
| CaratteristicaAsset/Name | Name |
| CaratteristicaAsset/Notes | Description |
| Look at the Type of CaratteristicaAsset: <ul style="list-style-type: none">If CaratteristicaAsset/Type is stereotyped as ListaValori Asset, or if CaratteristicaAsset/Type is stereotyped as ListaValori_NumElenco Asset, then insert here the list of attributes.Otherwise, leave empty. Code = Valore/RFI Tags/Valore caratteristica Value = Valore/Name | AllowedValues |
| Fixed: "IT" | CountriesOfUse |
| ... | ... |

```
GenerateJSON
1 IINC Local Scripts\EAConstants-JScript
2 IINC MyScripts.Json2
3
4 var FILENAME = "out_json";
5
6 var EMPTY_STRING = "";
7
8 var ORG_CODE = "engisis";
9 var DOMAIN_CODE = "RFI";
10 var DOMAIN_VERSION = "00"; // EDITED // var DOMAIN_VERSION = "0.1"
11 var DOMAIN_NAME = "Classificazione RFI";
12 var STATUS = "Active";
13 //var DOMAIN_NS_URI = "http://identifier.buildingsmart.org/uri/engisis/RFI-0.1"; // DELETED //
14 var LANG_ISO = "it-IT";
15
16 var CLASS_TYPE = "Class";
17 var CLASS_DATE_UTC = "2020-12-08T23:00:00";
18 var CLASS_COUNTRY = "IT";
19
20 /*
21 * Script Name: Generate JSON
22 * Author: Roch Bertucat
23 * Purpose: Given a package or a class, generate JSON to load in bsDD
24 * Date: 2022/06/16
25 */
26
27 function exportToJson() {
28
29 // Show the script output window
30 Repository.EnsureOutputVisible("Script");
31
32 var json = {
33   DomainCode: DOMAIN_CODE,
34   DomainName: DOMAIN_NAME,
35   //DomainNamespaceUrl: DOMAIN_NS_URI, // DELETED //
36   DomainVersion: DOMAIN_VERSION,
37   LanguageIsoCode: LANG_ISO,
38   OrganizationCode: ORG_CODE,
39   Status: STATUS
40 };
41
42 var classifications = [];
43 var properties = [];
44
45 // Get the package to work on
46 var contextObjectType = Repository.GetContextItemTypeInfo();
```

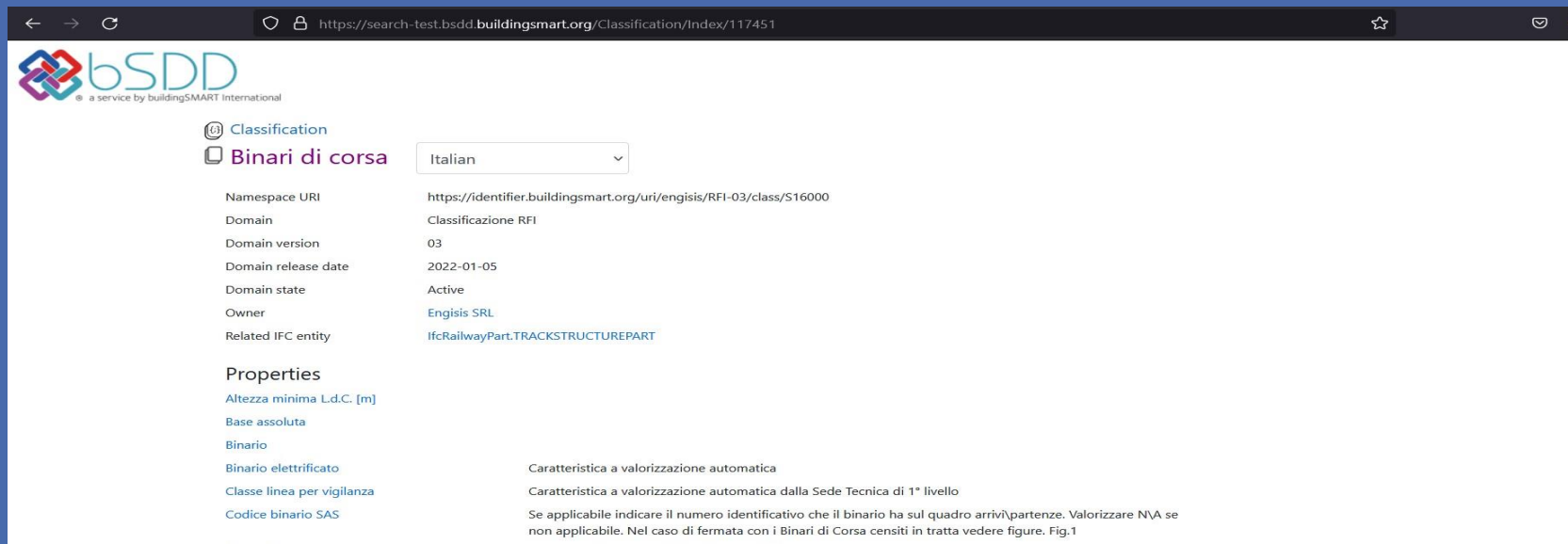



IFC4.3 och bSDD för järnsvägsteknik

*IFC-objekt under
strukturerade
mappar*

*Automation: UML
(Unified Modeling
Language)-till-Json
via skript*

*Ladda upp på
bSDD testmiljö*



← → ↻ <https://search-test.bsdd.buildingsmart.org/Classification/Index/117451> ☆

bSDD
a service by buildingSMART International

@ Classification
📁 Binari di corsa

| | |
|---------------------|---|
| Namespace URI | https://identifier.buildingsmart.org/uri/engis/RFI-03/class/S16000 |
| Domain | Classificazione RFI |
| Domain version | 03 |
| Domain release date | 2022-01-05 |
| Domain state | Active |
| Owner | Engisis SRL |
| Related IFC entity | IfcRailwayPart.TRACKSTRUCTUREPART |

Properties

| | |
|----------------------------|---|
| Altezza minima L.d.C. [m] | |
| Base assoluta | |
| Binario | |
| Binario elettrificato | Caratteristica a valorizzazione automatica |
| Classe linea per vigilanza | Caratteristica a valorizzazione automatica dalla Sede Tecnica di 1° livello |
| Codice binario SAS | Se applicabile indicare il numero identificativo che il binario ha sul quadro arrivi\partenze. Valorizzare NVA se non applicabile. Nel caso di fermata con i Binari di Corsa censiti in tratta vedere figure. Fig.1 |

Giulia Minnucci



IFC

+



+



bSDD



Frågor?



Ett modernt och hållbart transportsystem bygger på hållbar information.



Arvid Gudmundsson

Tack!



Victor Garde

