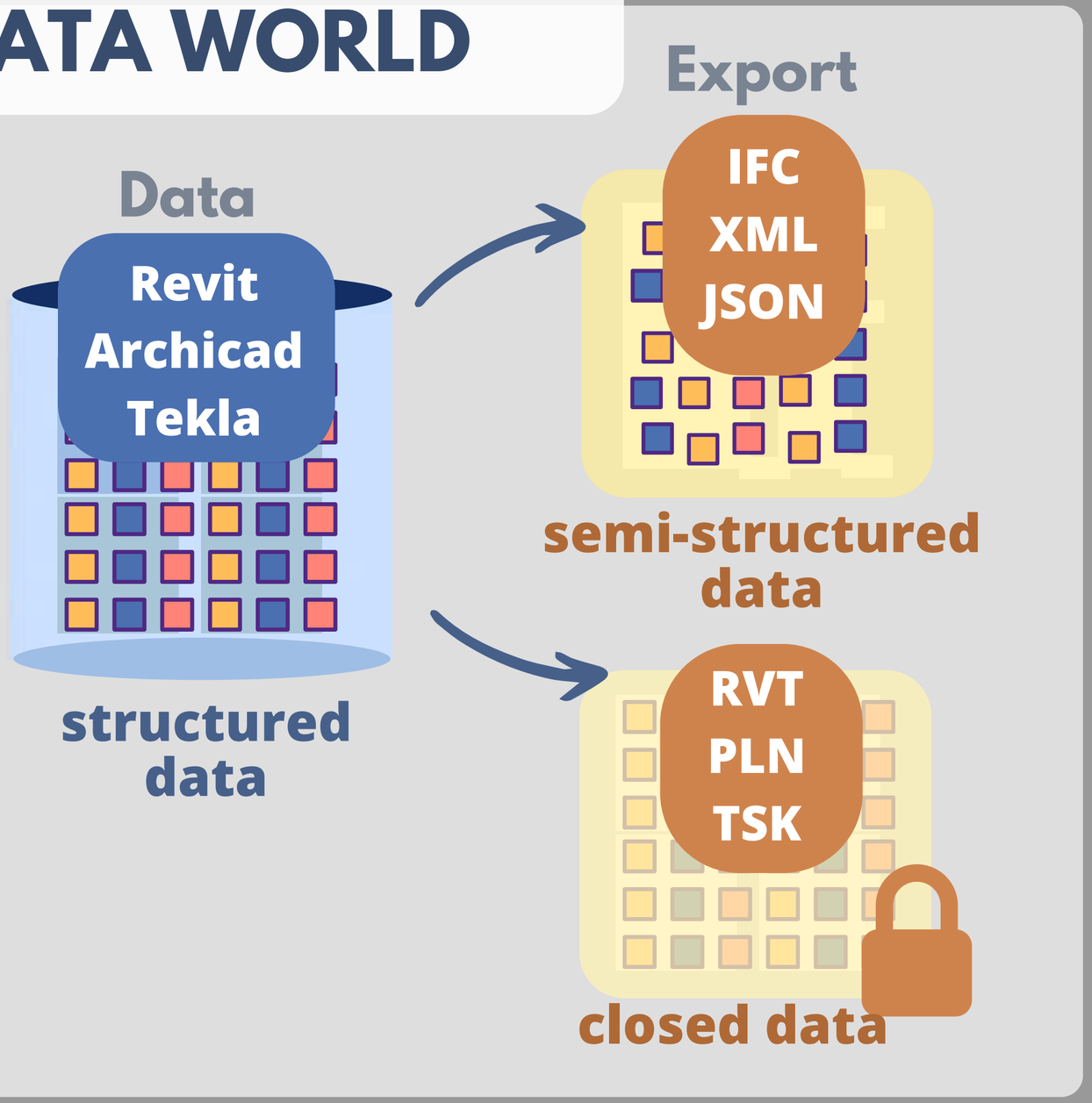
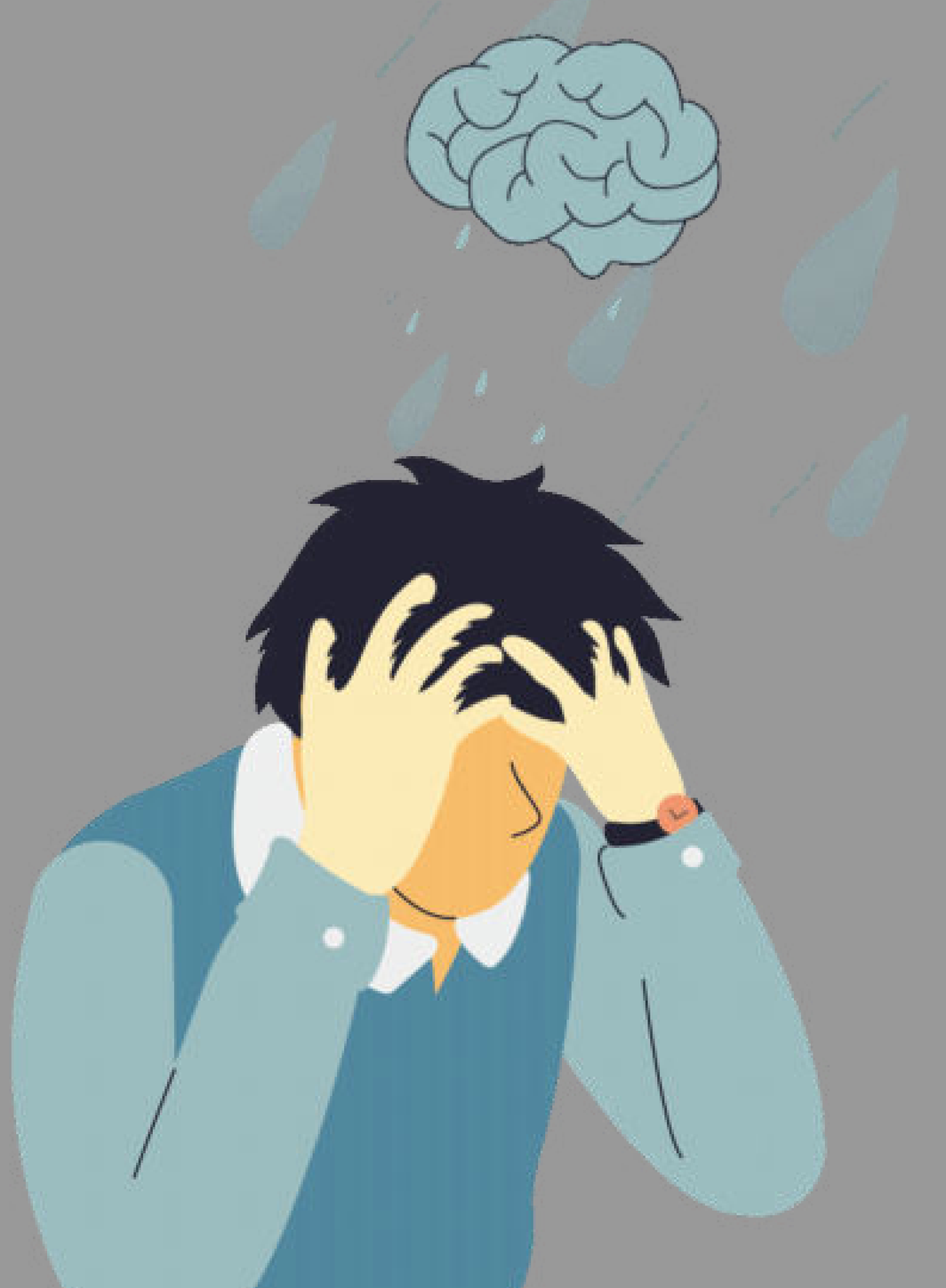
CONSTRUCTION DATA WORLD





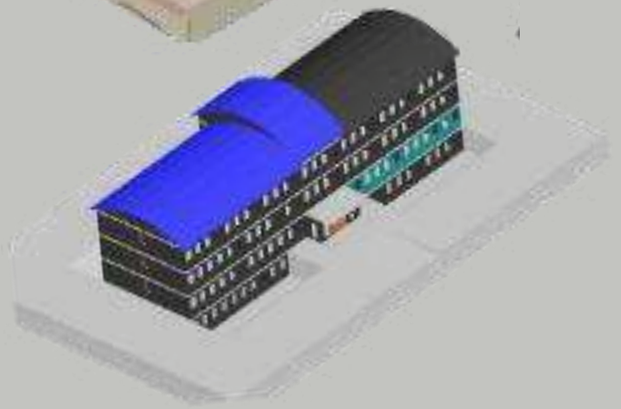
REVIT

Revit 2015
Revit 2016
Revit 2017
Revit 2018
Revit 2019
Revit 2020
Revit 2021
Revit 2022
Revit 2023

How to check the quality?

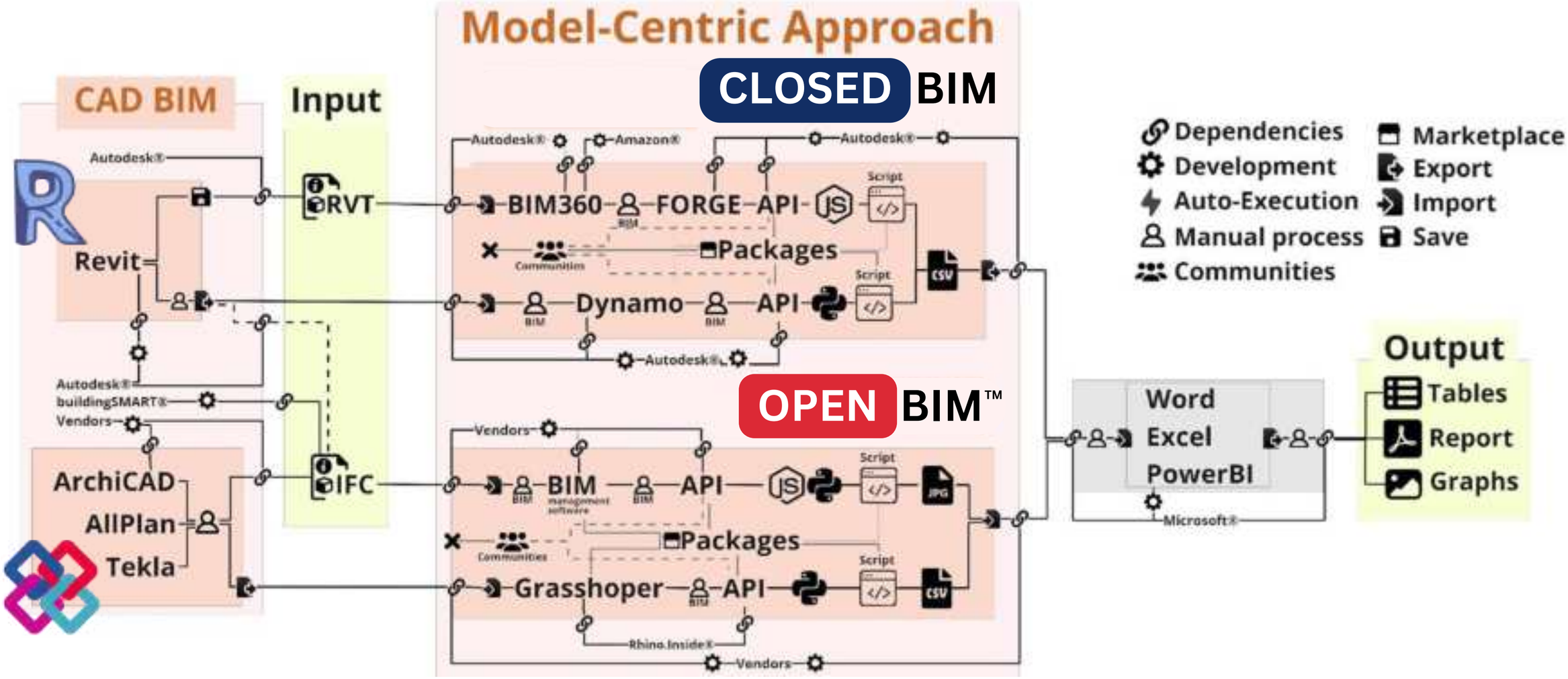
IFC

IFC2X3
IFC4
IFC4X1
IFC4X2
IFC5



BIM specialists doom themselves

to problems in the future



CLOSED BIM and OPEN BIM™ Questions

Limited technology stack and small community

Q Approach

Q Format

Q Technology

OPEN BIM™

CLOSED BIM

RVT

IFC

API BIMs

API Revit

API Revit

BIM360

Rhino API

Forge API

Dynamo

Python

Q Communities

Q Experts

Q Automation

1x

BIM Manager

BIM Coordinator

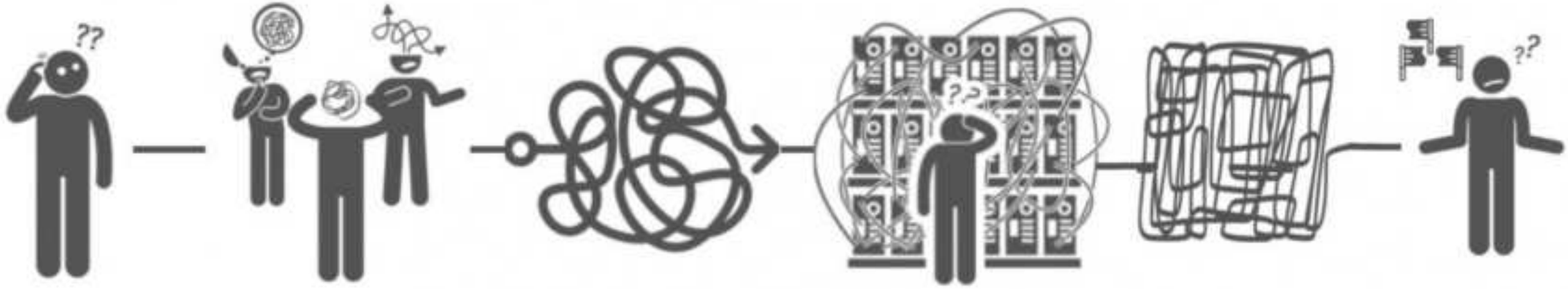
BIM Specialist

where are you?

CONSTRUCTION TODAY

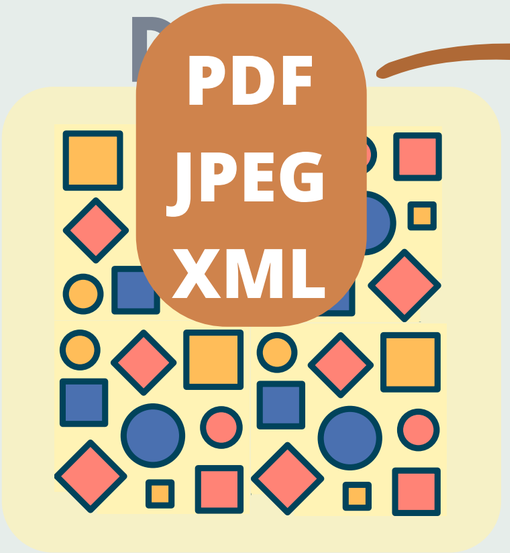
by Artem Boiko

Investor	Planning department	Data	Project management	Project data	Construction site
lack of a clear task	different qualifications and gaps between teams	various formats	various data management programs	unrelated and disparate data	different qualifications and gaps between teams



NORMAL DATA WORLD

Emails
Word Processing
Files
PDF files
Spreadsheets
Digital Images
Video
Audio
Social Media Posts



unstructured and semi-structured data

structured data

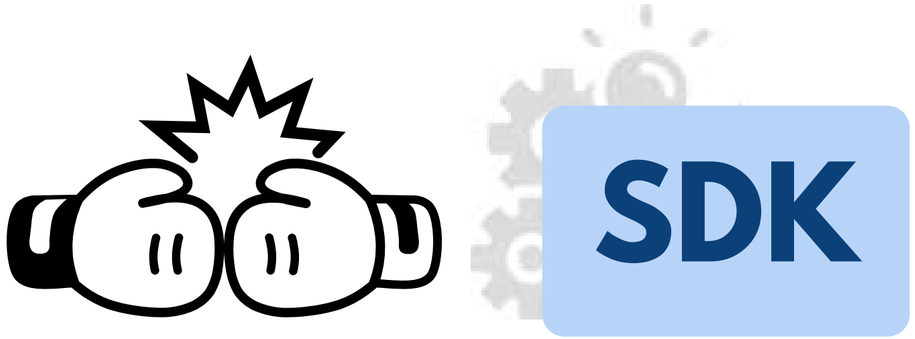
CAD- and ERP-Unternehmen
verwenden Datenöffner

AUTODESK
HEXAGON
ORACLE
SIEMENS
GRAPHISOFT Archicad
Trimble
esri
Bentley
Leica
DASSAULT SYSTEMES

SDK

2006-2007

AUTODESK



SDK

DWG

2020

AUTODESK

SDK

DWG,
RVT, IFC

Die meisten Unternehmen in der DACH-Region arbeiten **mit flachen Formaten**

ARCADIS
Deutsche Telekom
Die Autobahn
HOCHTIEF
ZECH
KOHLBECKER
Architectural Solutions from Gaggenau
ZÜBLIN
WORK ON PROGRESS
STRABAG
BURO HAPPOLD
Implenia
BILFINGER
WOLFF & MÜLLER
DREES & SOMMER
MAX BÖGL
Fortschritt baut man aus Ideen.
PETER GROSS BAU
DB BAHN

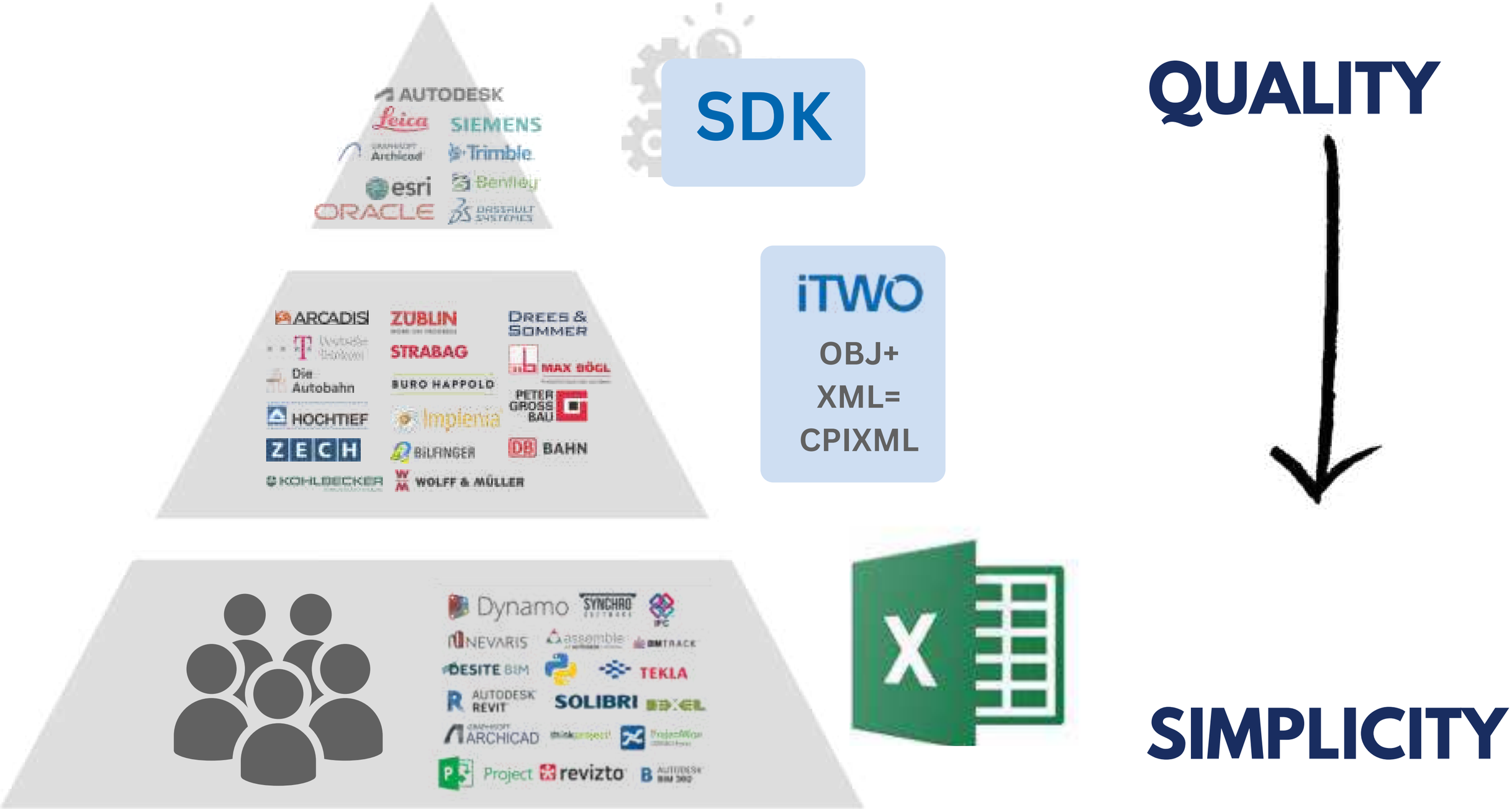
iTWO

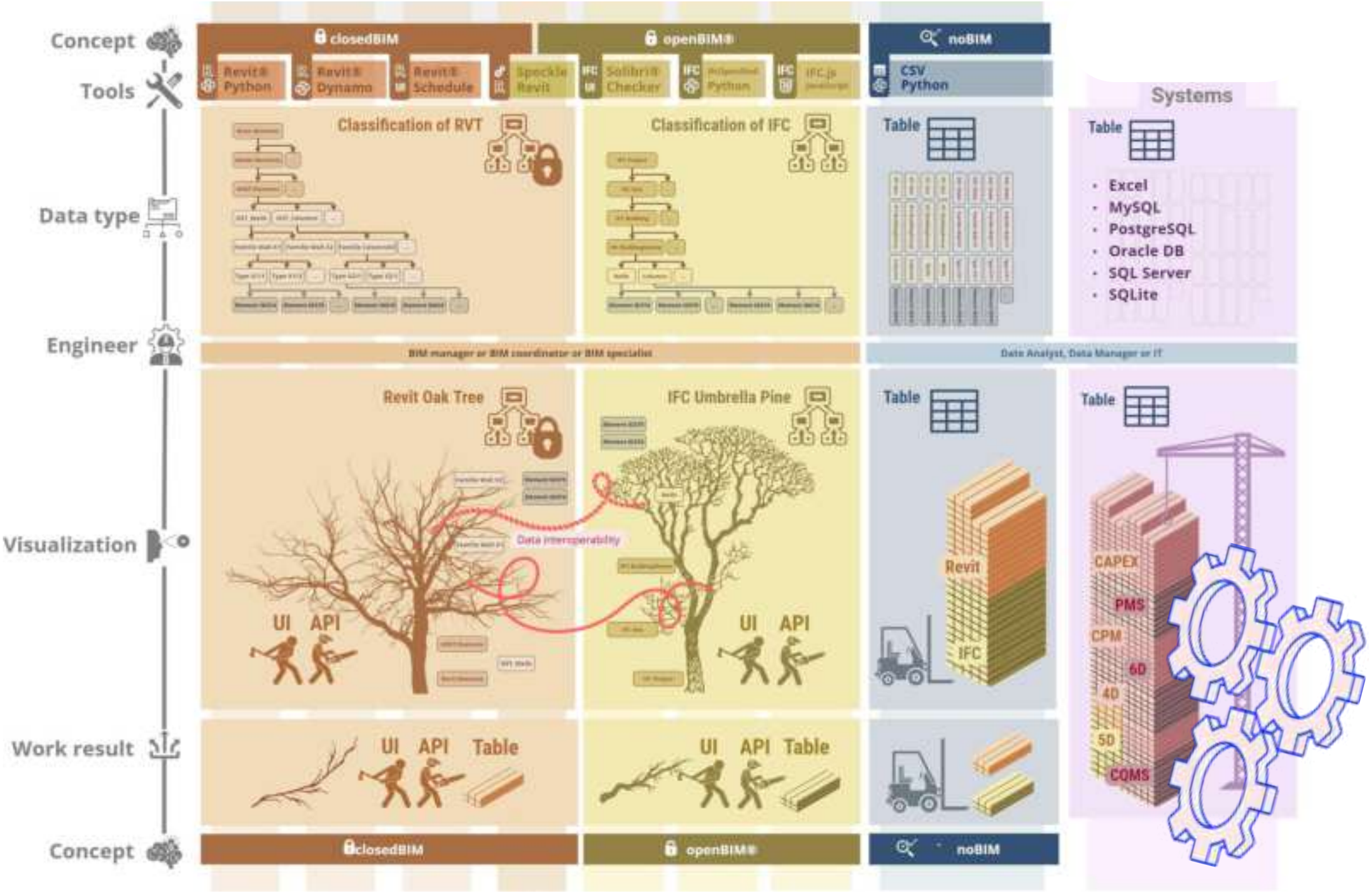
OBJ+
XML=
CPIXML

JOB DESCRIPTION

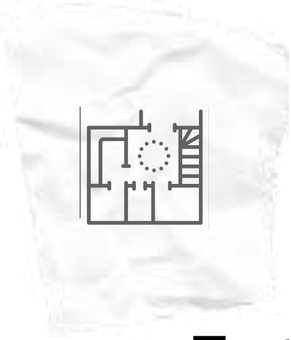
Dynamo
SYNCHRO SOFTWARE
IFC
NEVARIS
assemble AN AUTODESK COMPANY
BIMTRACK
DESITE BIM
TEKLA
AUTODESK REVIT
SOLIBRI
BEXEL
GRAPHISOFT ARCHICAD
thinkproject!
ProjectWise CONNECT Edition
Project
revizto
AUTODESK BIM 360

JOB

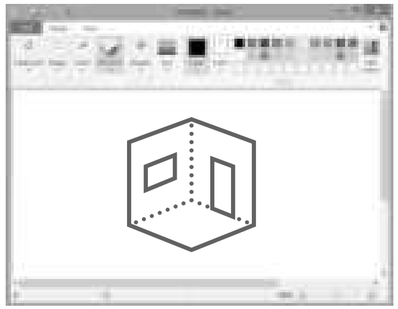

AUTODESK
Leica
SIEMENS
Archicad
Trimble
esri
Bentley
ORACLE
DASSAULT SYSTEMES
SDK
ARCADIS
ZÜBLIN
DREES & SOMMER
STRABAG
MAX BÖGL
Die Autobahn
BÜRO HAPPOLD
PETER GROSS BAU
HOCHTIEF
Impiema
ZECH
BILFINGER
DB BAHN
KOHLBECKER
WOLFF & MÜLLER
iTWO
OBJ+
XML=
CPIXML
QUALITY
Dynamo
SYNCHRO
IFC
NEVARIS
assemble
BIMTRACK
DESITE BIM
TEKLA
AUTODESK REVIT
SOLIBRI
EXCEL
ARCHICAD
thinkproject
ProjectWise
Project
revizto
AUTODESK BIM 360
SIMPLICITY


Concept
Tools
Data type
Engineer
Visualization
Work result
Concept
closedBIM
openBIM®
noBIM
Revit® Python
Revit® Dynamo
Revit® Schedule
Speckle Revit
Solibri® Checker
CSV Python
Systems
Classification of RVT
Classification of IFC
Table
Table
Excel
MySQL
PostgreSQL
Oracle DB
SQL Server
SQLite
BIM manager or BIM coordinator or BIM specialist
Data Analyst, Data Manager or IT
Revit Oak Tree
IFC Umbrella Pine
Data interoperability
UI
API
Table
Revit
IFC
CAPEX
PMS
CPM
6D
4D
5D
COMS
closedBIM
openBIM®
noBIM

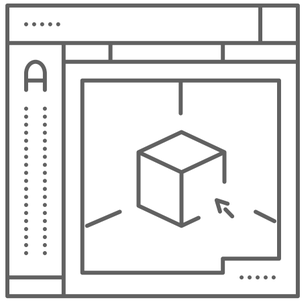
Papyrus



Paint



AutoCAD



3D CAD Software

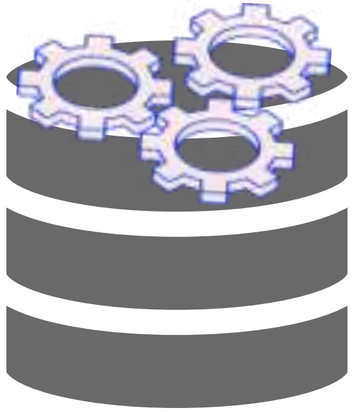
Foto & OCR

Optical Character Recognition

Plant 3D

RVT

IFC



CSV

XLSX

DAE

GLTF

ID	NAME	V	QT	PAR1	PAR2	GEOM
ID1	el1	X m³	X pcs.	ABC1	DEF1	
ID2	el2	X m³	X pcs.	ABC2	DEF2	
ID3	el3	X m³	X pcs.	ABC3	DEF3	
TEXT		FLOAT		TEXT		XML

USD

Users use flat data

AUDIO

Au Adobe Audition · Logic Pro X · Audacity · REAPER

MP3
WAV

VIDEO

Pr Adobe Premiere Pro · Sony Vegas · Shotcut

MPEG
AVI

IMAGES

Ps Adobe Photoshop · Lr Lightroom · GIMP

JPEG
PNG

3D CAD

AUTODESK REVIT · ARCHICAD · SketchUp

CSV DAE
XLSX GLTF
USD

Platforms for working with data from ODB

Processing and visualization

Excel »

Automation and Pipelines

Python and JN »

Visualize geometry

UE and Unity »

Training and simulation

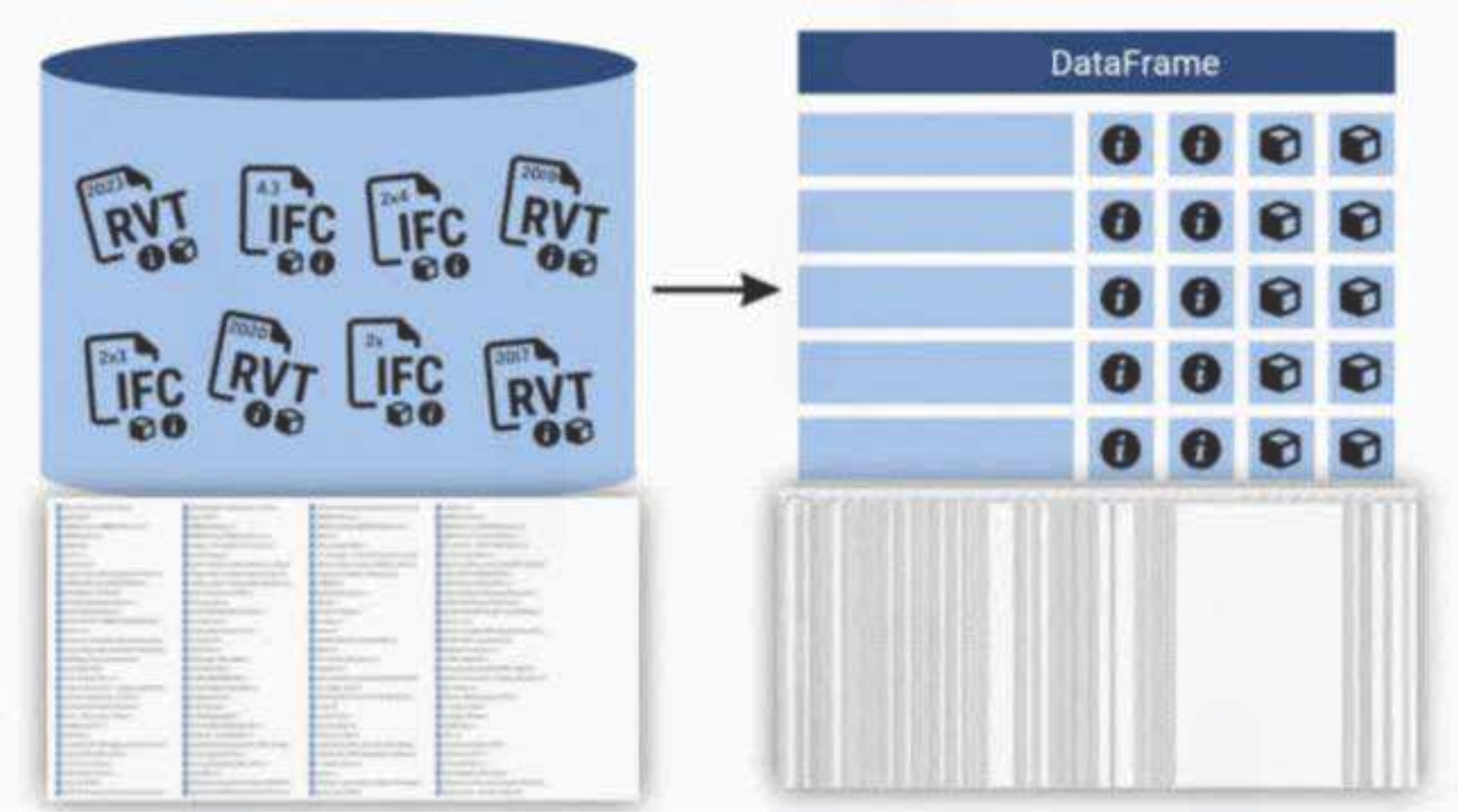
USD and Omniverse »

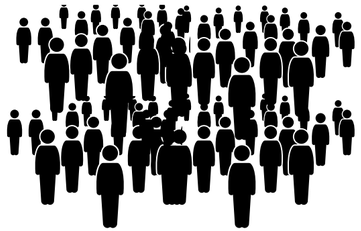
MySQL
ORACLE
MariaDB
CSV
SQLite
PostgreSQL
Microsoft
SQL Server

Processing of
single projects

Streaming Data
Batch Processing

CSV


RVT
IFC
IFC
RVT
IFC
RVT
IFC
RVT
DataFrame



CSV

4,034,915

IFC

319

pandas

Summary

PyPI link

https://pypi.org/project/pandas

Total downloads

3,056,309,124

Total downloads - 30 days

122,312,391

Total downloads - 7 days

28,244,406

ifcopenshell

Summary

PyPI link

https://pypi.org/project/ifcopenshell

Total downloads

89,362

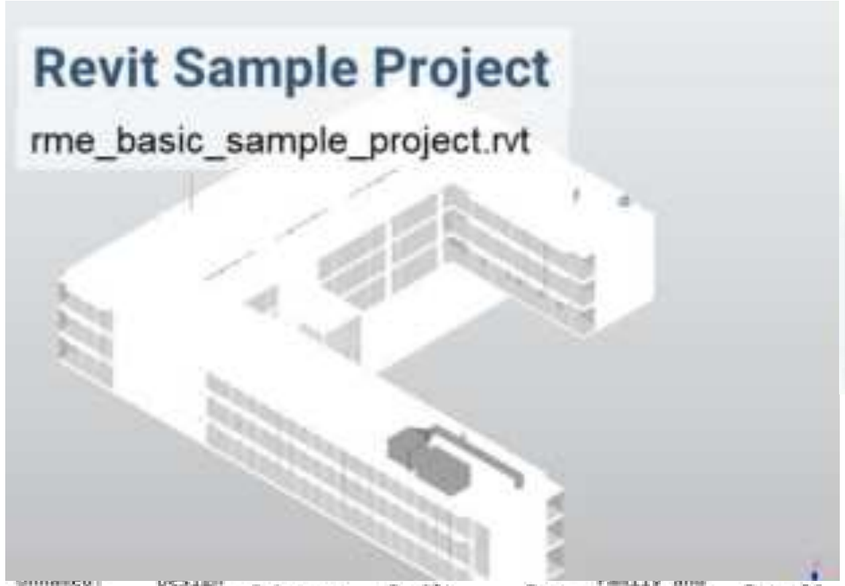
Total downloads - 30 days

13,943

Total downloads - 7 days

2,233

Source: https://pepy.tech/



0	Design Option	Category	Family	Type	Family and Type	Type Id
573298	None	OST_Walls	STB 30.0 Rot	STB 30.0 Rot	STB 30.0 Rot	STB 30.0 Rot
573299	None	OST_Walls	STB 30.0	STB 30.0	STB 30.0	STB 30.0
573316	None	OST_Walls	STB 30.0 Rot	STB 30.0 Rot	STB 30.0 Rot	STB 30.0 Rot
573317	None	OST_Walls	STB 20.0	STB 20.0	STB 20.0	STB 20.0
573318	None	OST_Walls	STB 20.0	STB 20.0	STB 20.0	STB 20.0
...	...	...	...	...	...	...
576813	None	OST_Walls	Standard	Standard	Standard	Standard
576837	None	OST_Walls	Standard	Standard	Standard	Standard
576861	None	OST_Walls	Standard	Standard	Standard	Standard
577187	None	OST_Walls	Standard	Standard	Standard	Standard
577311	None	OST_Walls	Standard	Standard	Standard	Standard

FILTERing By Multiple Parameters

Input

Filtering data in Revit and IFC projects.py

```
# Whether each element contains the values

df[df['Category'].isin(['Wall', 'Window'])]
```

Output

	Id	Category	Type	Length	Volume
0	12577	Wall	Wall WD100	3200	1.0
1	15889	Wall	Wall STB 200	5400	6.0
3	74456	Window	Window 1700w	1700	0.5

GROUPing By Multiple Parameters

Input

GroupBy Revit IFC.py

```
# Grouping a Revit or IFC project by parameters

df.groupby('Category')['Volume', 'Length'].sum()
```

Output

Category	Volume	Length
Door	0.3	1300
Wall	7.0	8600
Window	0.5	1700

PIE Chart

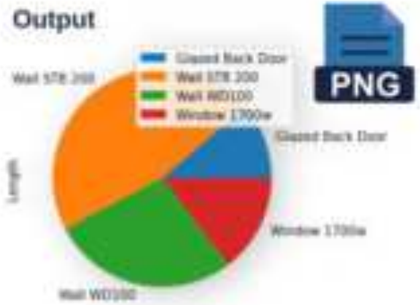
Input

Pie chart.py

```
# Create a basic pie chart

df.groupby(['Type']).sum().plot.pie(y='Length')
```

Output



Part 1

Construction Dataset

OpenDataBIM
opendatabim.io

RVT

3000
projects

IFC

2000
project

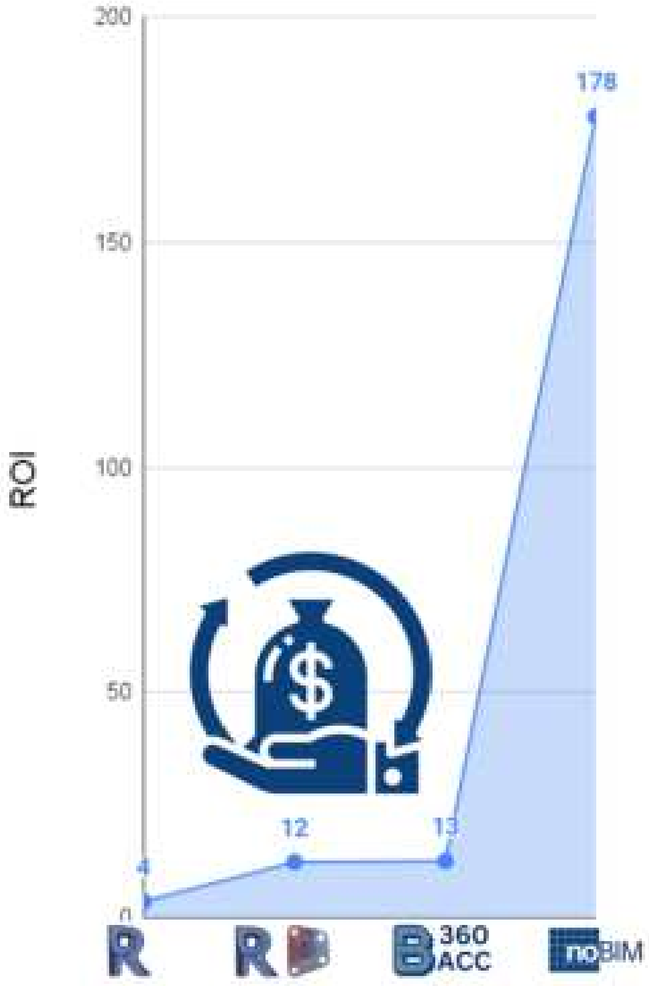
~3 000 000
elements

geometry of elements and all parameters

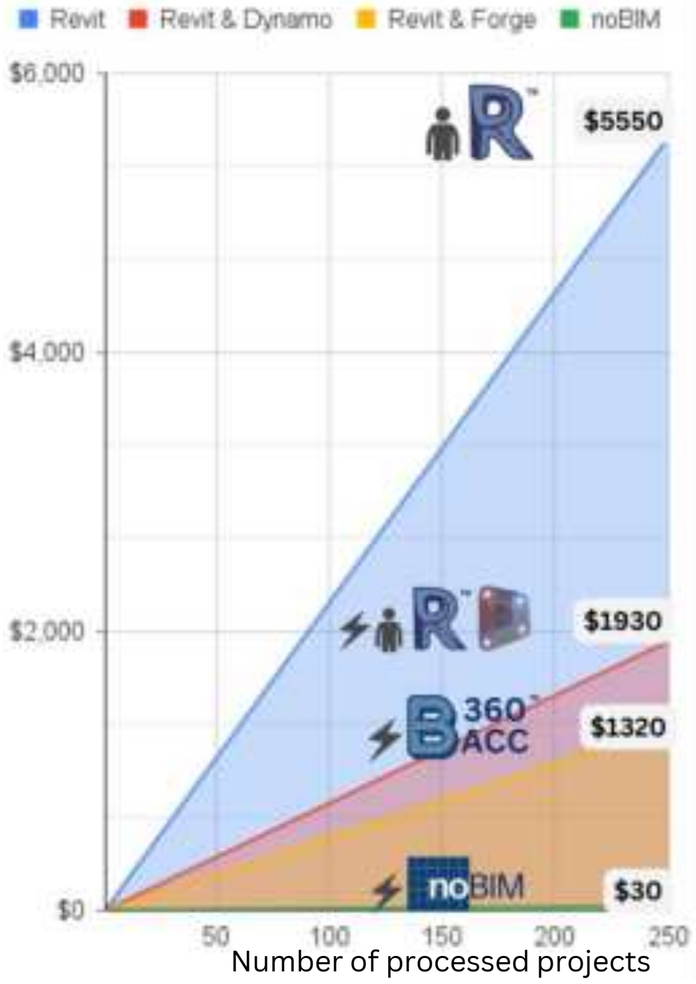
SCAN ME

Exponential reduction in the cost of work

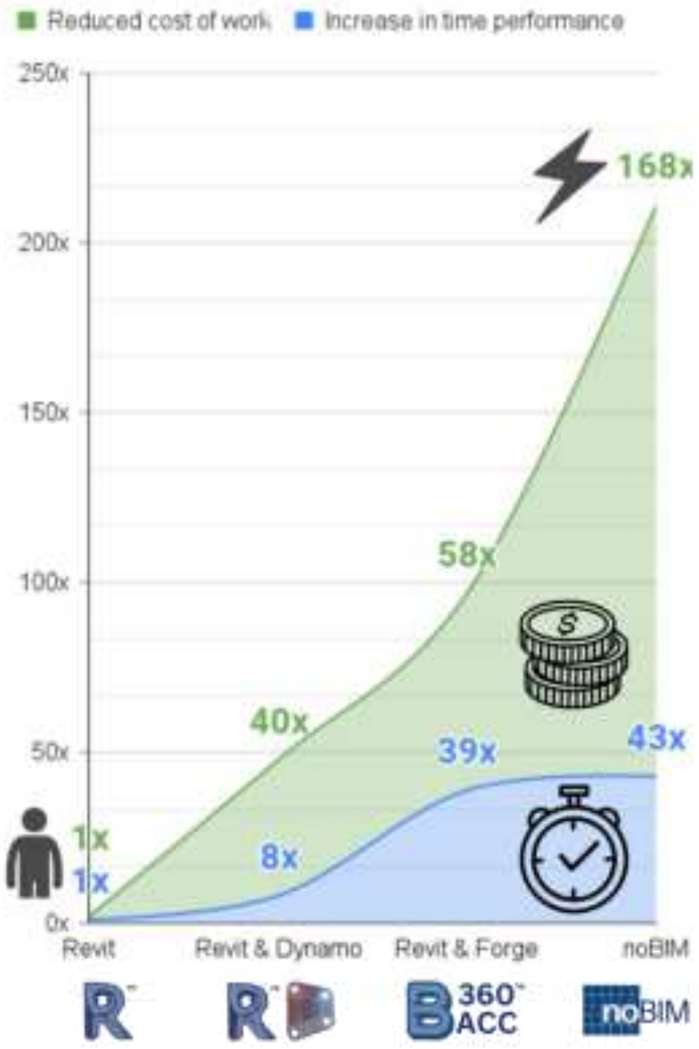
Comparison of ROI using different concepts



Comparison of the cost of work to automate the tasks of data extraction from the Revit project



Reducing the cost of work and increasing productivity over time



BIM Level 0

unstructured data

DWG
JPEG
PDF

CAD

Lines, Texts

BIM Level 1

closed data

RVT
PLN
TSK

2D,3D

Models, Objects

BIM Level 2

semi-structured data

IFC
XML
JSON

BIM

Collaboration

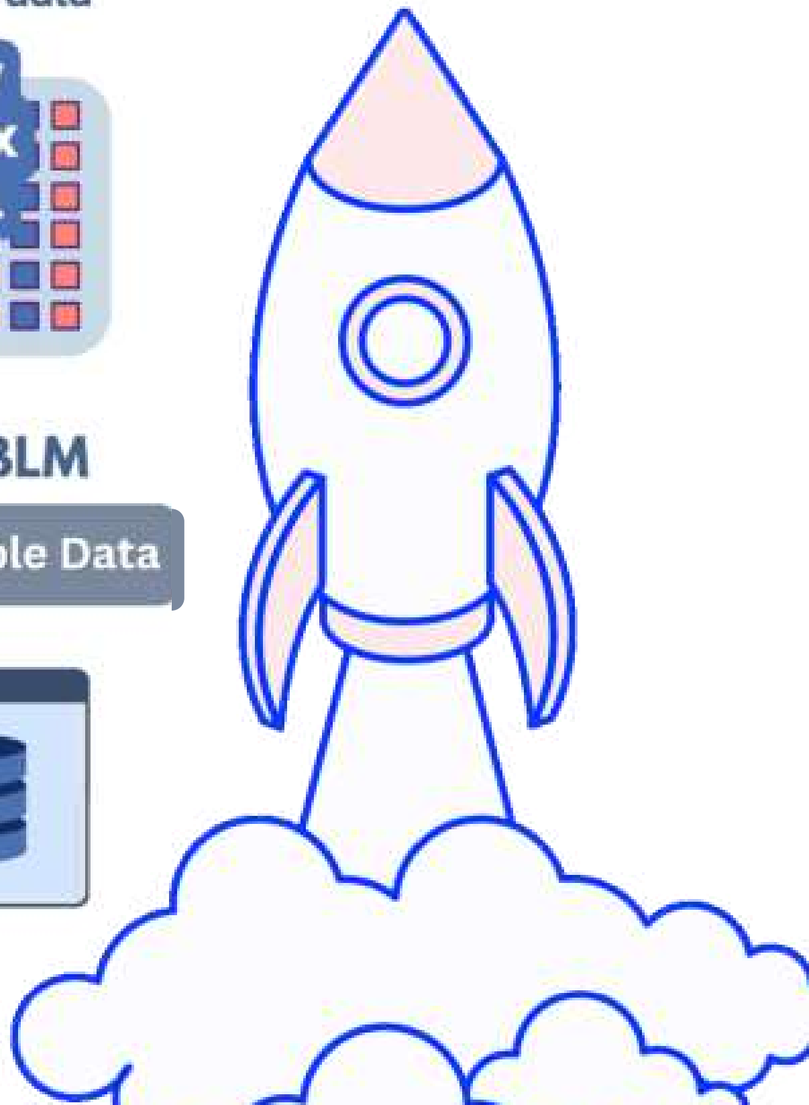
noBIM

structured data

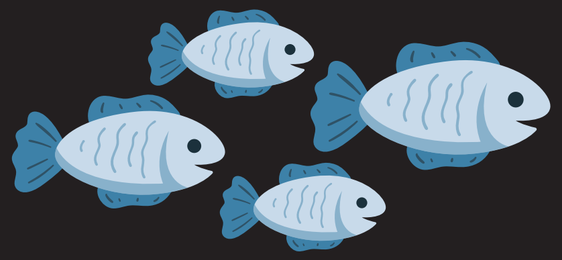
CSV
XLSX
SQL

iBIM, BLM

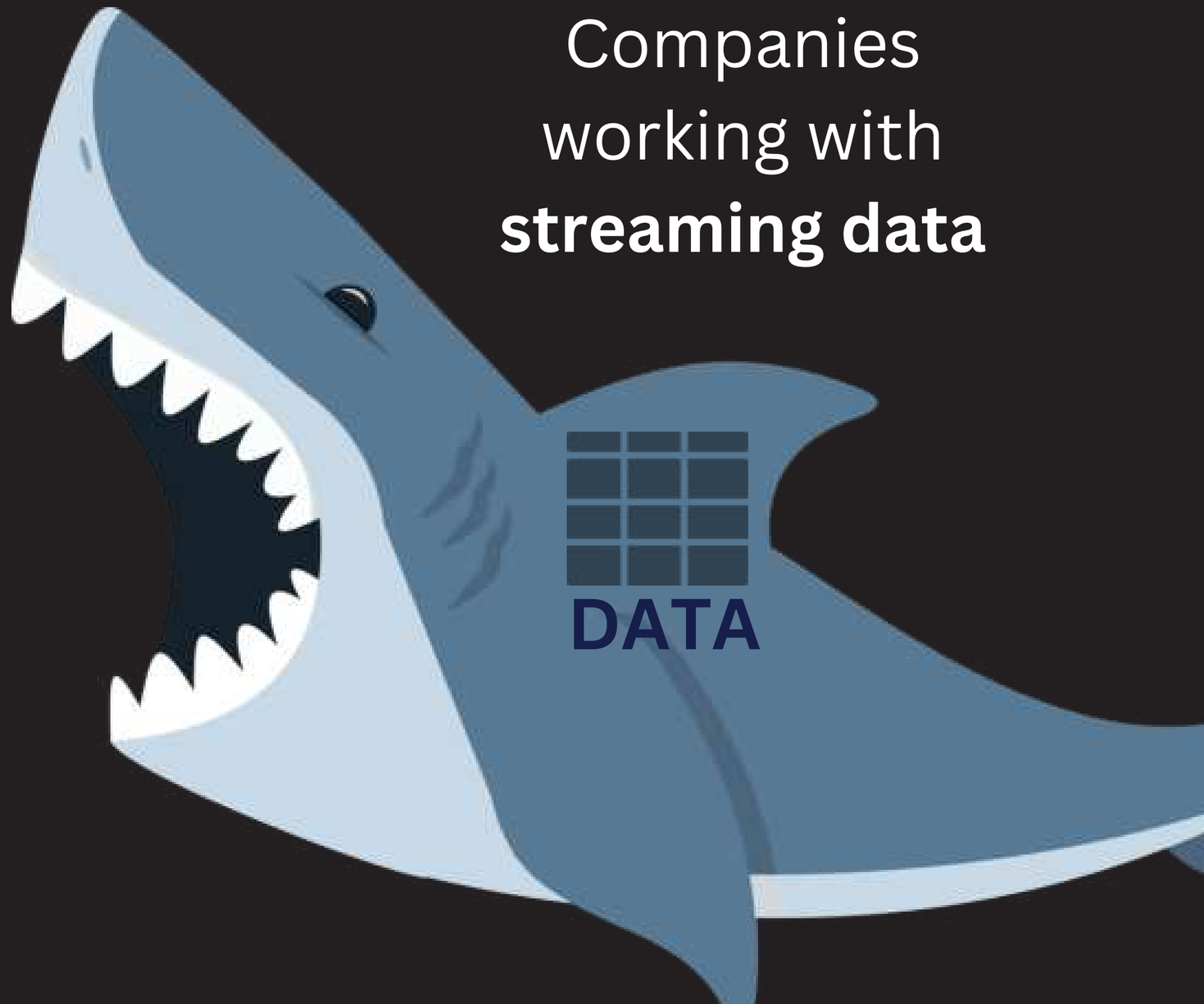
Interoperable Data



Companies
working only with
CAD and BIM



Companies
working with
streaming data



Survival formula in construction

in the digital age

make a profit

work faster

decisions faster

be efficient

actions to processes

analyze the work

analyze the data

get insights

visualize data

collect data

common format

open data

data engineers

open data

common format

collect data

data analysts

visualize data

get insights

analyze the data

data engineers and data analysts

analyze the work

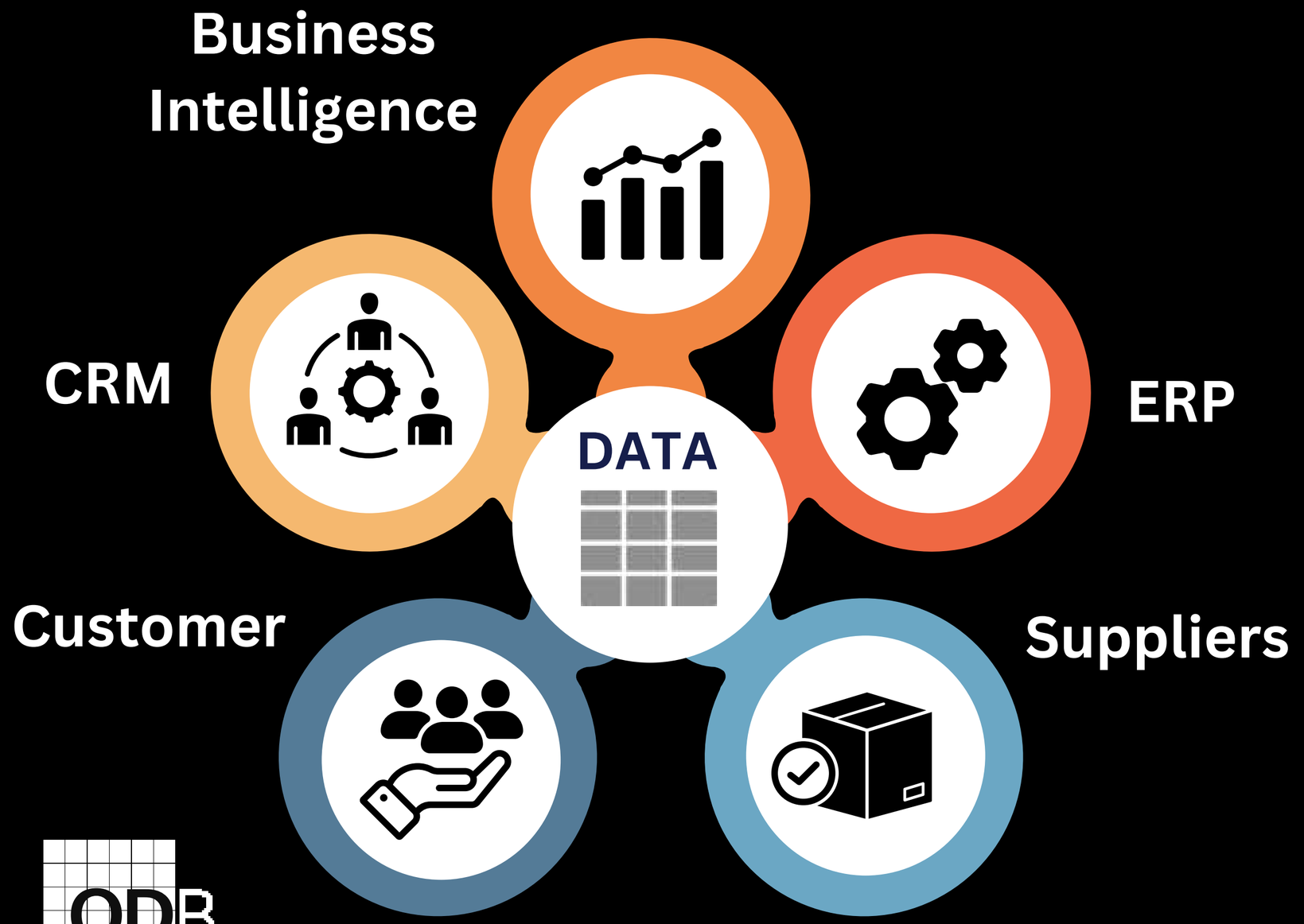
actions to processes

be efficient

decisions faster

work faster

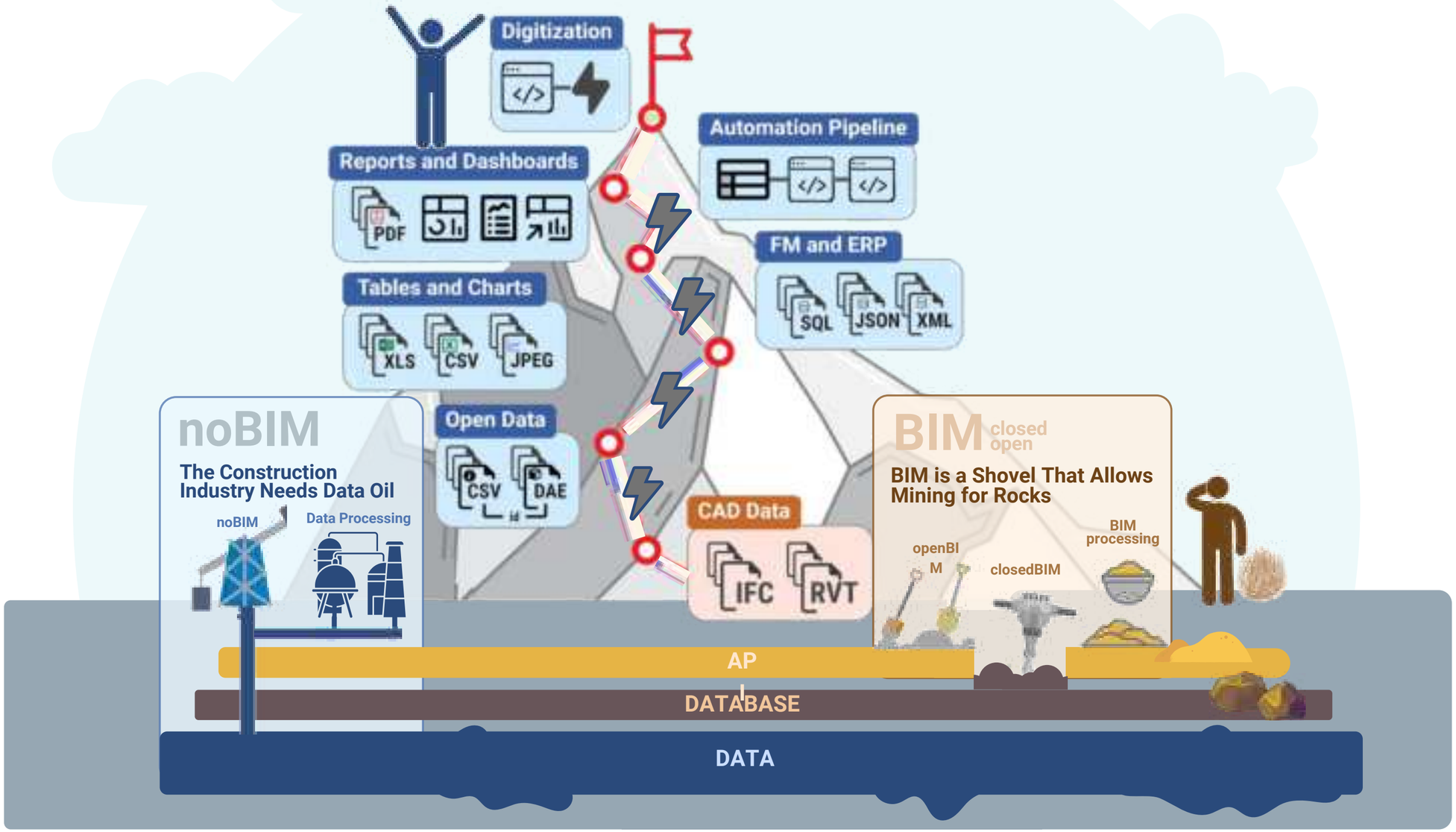
make a profit



ODB

OpenDataBIM

VENDOR FREE



opendatabim.io

Artem Boiko

Baden-Württemberg, Germany

Co-Founder
OpenDataBIM

ODB

noBIM

SCAN ME