Gli obiettivi del BIM per le Stazioni Appaltanti

The objectives of BIM for contracting and procurement

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EU BIM Task Group:
Representatives from 21 EU Member States

The public sector: driver for innovation

As large public procurers they are:

- Non-competitive
- Transparent
- Non-discriminating

By investing public money, they

- Underlie certain rules and regulations
- Lead and influence the market through procurement
- Have the power to create fertile environment

Risks to the EU market of not collaborating

- Adding cost burden

- Slowing economic growth

- Confusing the market

- Closing markets

EU BIM Task Group

- Deliver greater value for public money

- Increased openness, fairness, competitiveness and productivity

- Stimulating innovation and growth in the construction and digital economies through better alignment

Value proposition of BIM

- **Economic**: increase productivity, potential for growth, enhance position of European industry on international markets (construction, IT), …

- **Environmental**: less waste, lean supply chain, lower energy demands, lighter carbon footprint, …

- **Social**: facilities aligned with societal needs, job creation including for the "otherwise unemployable", …

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Manuale per l'introduzione del BIM da parte della domanda pubblica in Europa

Un'azione strategica a sostegno della produttività del settore delle costruzioni:
un fattore trainante per l'incremento del valore, l'innovazione e la crescita

Co-funded by the European Union

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Common EU BIM Performance Level

Common EU BIM Performance Level

Settore della definizione	Descrizione ad alto livello delle caratteristiche
Politiche	■■ Le questioni di natura commerciale, giuridica e contrattuale sono concordate e documentate in un formato adeguato e diventano parte degli accordi contrattuali tra le parti interessate. ■■ La procedura di gara comprende una valutazione adeguata della capacità, delle risorse e dell'intenzione del fornitore di rispettare i requisiti BIM. ■■ I requisiti in materia di informazioni associati a un intervento sono specificati ed espressi in termini di fasi della commessa o del procedimento, che il committente del progetto o la catena di approvvigionamento intendono utilizzare. Adottando requisiti specifici in materia di informazioni si dovrebbe rispettare il principio fondamentale che prevede si eviti una generazione e un trattamento eccessivi di dati. ■■ I dettagli in merito alle modalità per il rispetto dei requisiti in materia di informazioni e di fornitura delle informazioni richieste sono concordati e documentati in un formato appropriato.
Aspetti tecnici	■■ I requisiti in materia di informazioni specificano i dati da fornire in formati non proprietari, non legati a un particolare fornitore. ■■ Un approccio orientato agli oggetti costituisce il principio fondamentale per la specificazione, modellazione e organizzazione dei dati.
Processo	■■ I processi di pianificazione e fornitura delle informazioni richiedono l'adozione di principi del lavoro collaborativo e basati su oggetti contenitore. ■■ È necessario un ambiente di condivisione dei dati (ACDat, in inglese, *Common Data Environment* - CDE) come mezzo per disporre di un ambiente sicuro e collaborativo per la condivisione delle attività. ■■ Sono necessari dei metodi e strumenti di ingegneria per comprendere in maniera olistica tutte le esigenze e i requisiti di tutte le parti interessate in maniera esaustiva, comprendendo tutte le visioni architettoniche (operative, funzionali, organiche) per tutti gli stati dei beni immobiliari o infrastrutturali lungo il loro ciclo di vita, nonché per strutturare in maniera adeguata tutte le informazioni.
Persone	■■ La competenza per la gestione dei dati e delle informazioni è conferita in base alla complessità dell'intervento.

Responsabilità
Competenze
Capacità
Incentivi
Persone

Politiche
Aspetti legali e contrattuali
Appalti
Requisiti specifici in materia di dati
Piano di consegna

Scambio di dati
Lavoro collaborativo e coordinamento
Gestione delle informazioni
Ingegneria dei sistema
Processo

Aspetti tecnici
Sicurezza
Informazioni tecniche
Convalida
Uso

Common EU BIM Performance Level in "BIM language"

EIR: Employer's Information Requirements

   Specify your data needs for good decision making and managing your risks

BEP: BIM Execution Plan

   Agree with your supply chain how this project (and the data requirements will be delivered)

CDE: Common Data Environment

   The data management processes, conventions and technology

LOD: Level of Development

   Quality criteria to define the model content like the scale in 2D drawings

BIM Model: Usually a 3D Model, surface or volumetric, that contains objects

BIM Protocol: Contractual document

Relevant Standards

STRATEGIC

AIMED AT THE PROCESS OF DEVELOPING A CLEAR AND EFFECTIVE OVERALL SMART CITY STRATEGY

PD8100
Smart Cities Overview

PD8101
Smart City Planning Guidelines

PROCESS

PROCURING AND MANAGING SMART CITY PROJECTS

ISO37100
Vocabulary

ISO37106
Strategy

ISO30182
Smart city concept model

PAS185
Security

TECHNICAL

IMPLEMENTING SMART CITY PROJECTS

ISO19650:1
Concepts and principles

ISO19650:2
Delivery phase of the assets

ISO19650:3
Operational phase of the assets

ISO19650:5
Security minded

Does BIM cost or save money?

Higher investments for more clarity and better decisions are often avoided in early phases when risks for the project are high and the value of the project is still low

Digital technologies and standardized processes can be used to
- Make approval processes faster and more transparent
- Manage risks
- Improve decision making by providing relevant information

What does this look like?
- Process reliability - Common Data Environment
- Simulation, automation, linked data visualization
- Information deriving from models
- Accelerated commissioning
- Improved documentation
- prefabrication
- modular design
- IoT, LEAN, etc.

Ability to impact cost and performance

Cost of design change

Traditional process
Preferred design process

Idea | Concept Design | Detailed Design | Construction | Operations | Decommiss-ioning

Patrick McLeamy, 2004

Strategic Outline Business Case for the delivery of Digital Built Britain Programme Level 3

Digital enabled transformation of the full lifecycle of the built environment to increase productivity, improving economic and social outcomes.
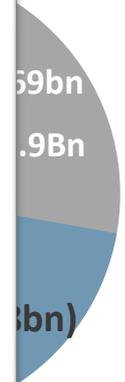
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810351/18.1139_141_SOBC_Digital_Built_Britain.pdf

EY
Building a better working world

£89bn

€1.9B

?

69bn

.9Bn

bn)

PCSG

EY

Data Feedback Loops

Flow of information

Constructors

Infrastructure and facilities managers

Service providers

Citizens

CapEx

OpEx

Service Provision

£808bn Use of s

Shape dema

Optimise su

...to enable even greater economic output

Plan/Brief Design Build Maintain Operate

£89bn

£122bn

£597bn

PCSG

EY
Building a better working world

Linear construction process

Strategic Planning	Brief	HOA / HOAI / VOB / ….			Maintain	Operate	Service	Socio-economic
		Design and Build						
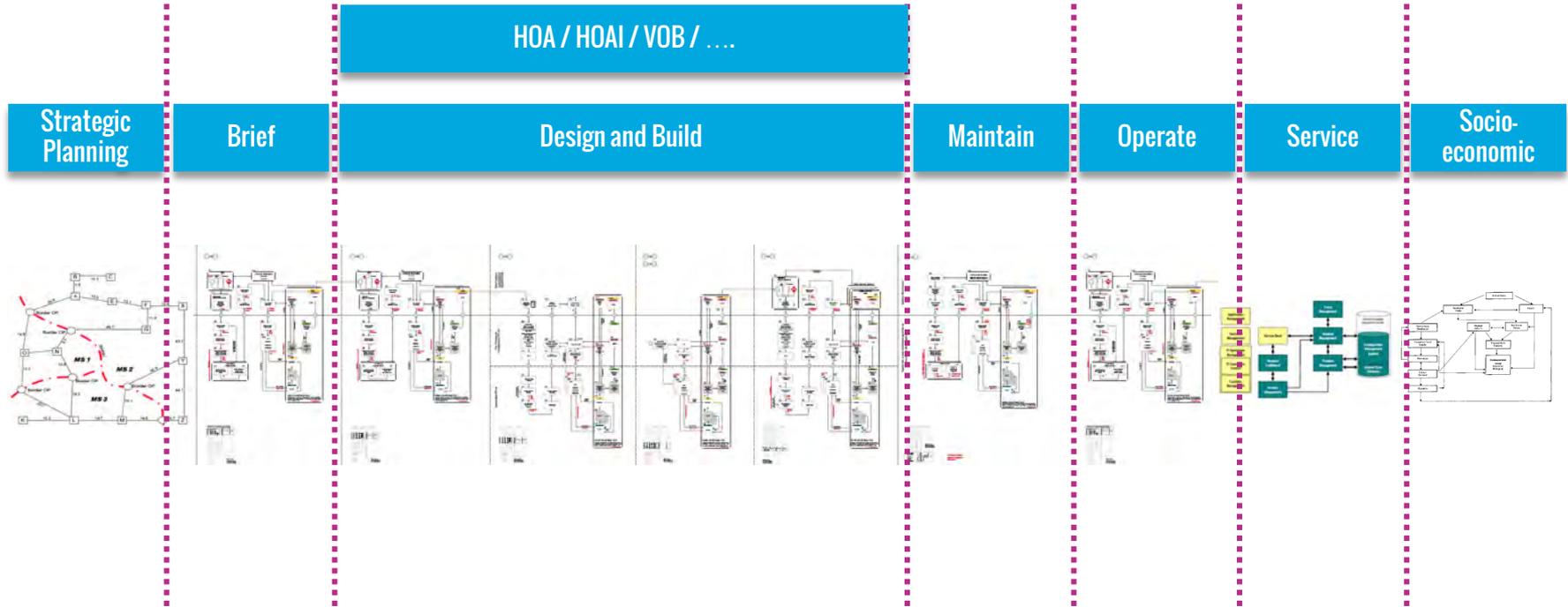
The Systems Engineering "V-Process"
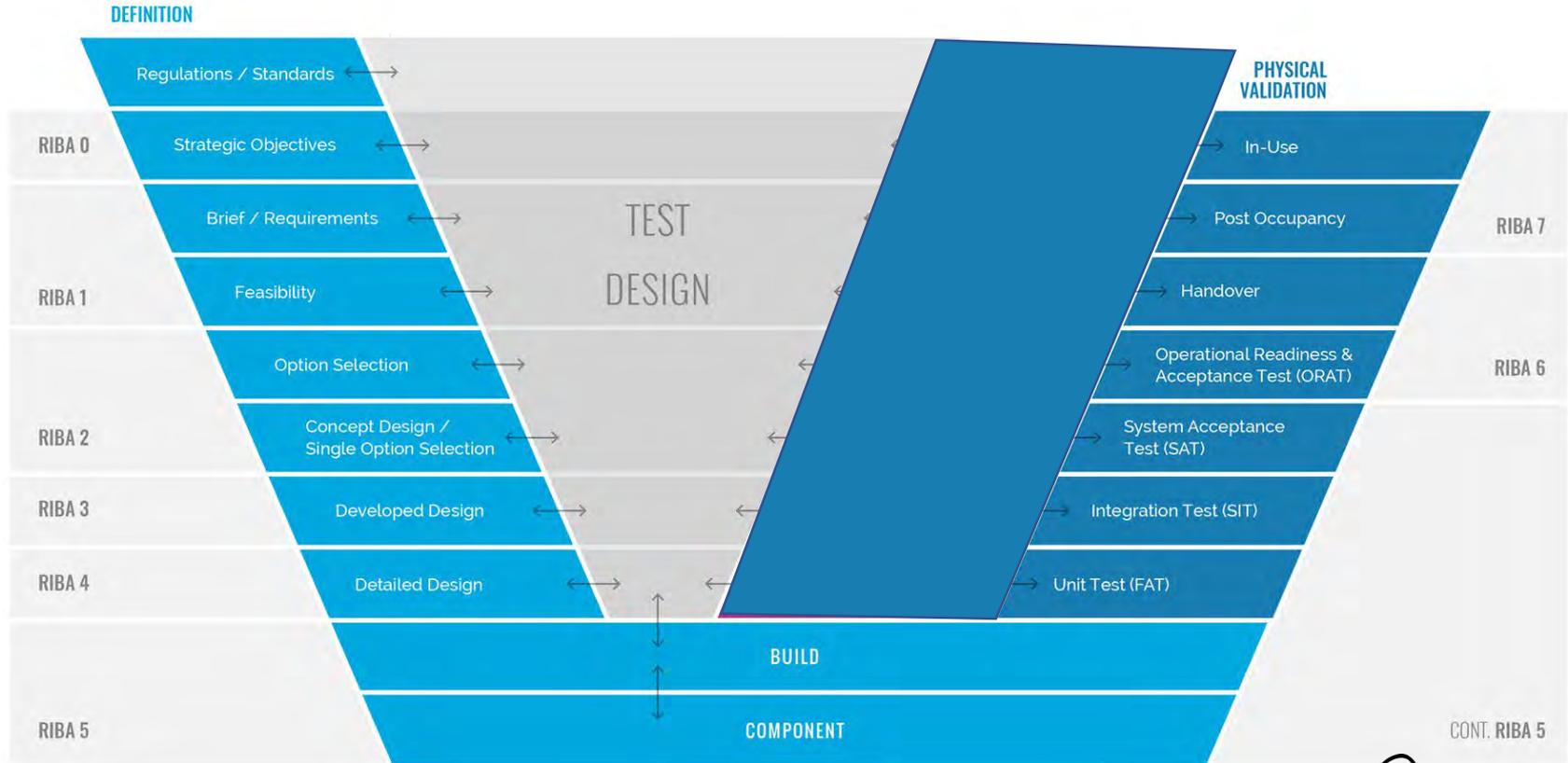
The Challenge

- Ability to find key information

- Models, maps, drawings and data all in different places

- No common open standards

- Information is often poor or of unknown quality

- Unknown security measures

- Need to use complex unfamiliar systems to access information

- Lack of integration limits good understanding

- Information doesn't often get to those who need it

Digital Twins

How do you want them to be?

For example..

... cheap?

... fit for purpose?

... available quickly?

... based on open standards?

... small file size?

... semantic?

Use games technology!
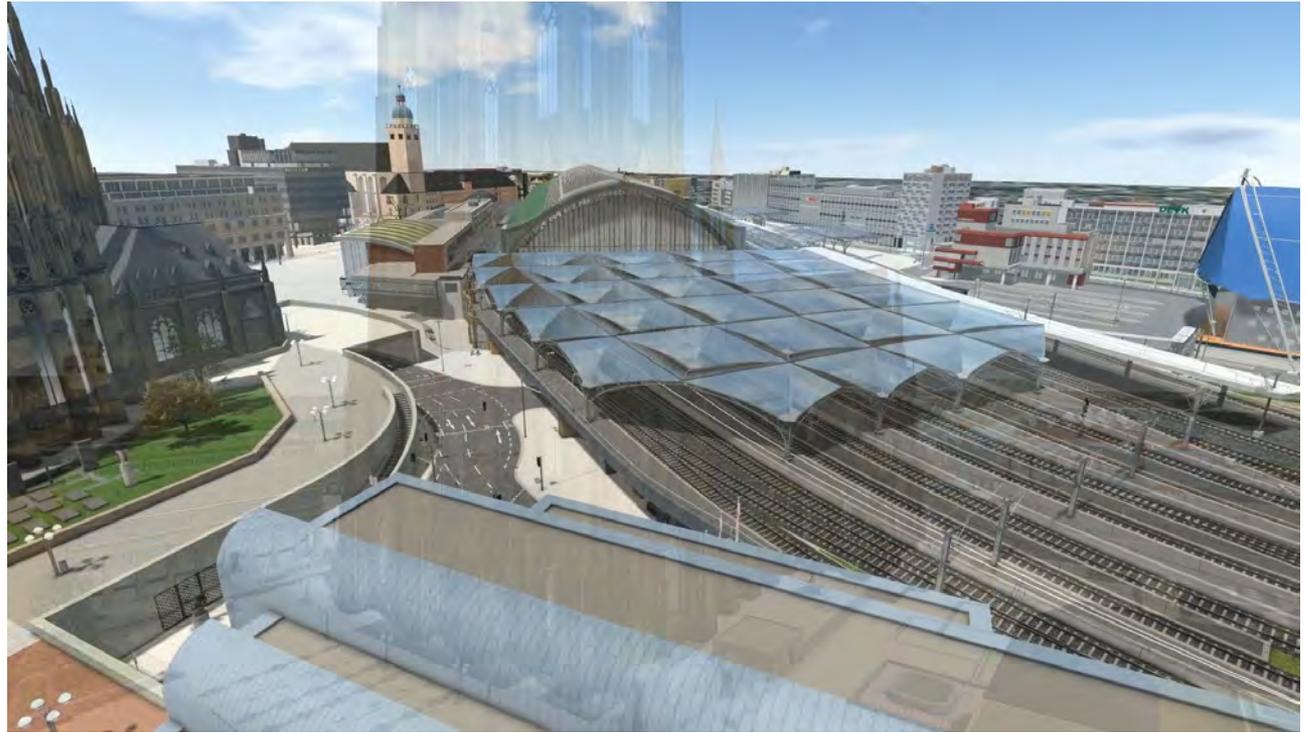
More efficiency in data capturing

Quiz time:

Data capturing of all public areas, including outdoor areas, station concourses, all platforms and pedestrian tunnels, at a city center station with around 60,000 passengers per day and 14 long-distance tracks.

How long do you think it took? How much did it cost?

3 man-hours
100 EUR
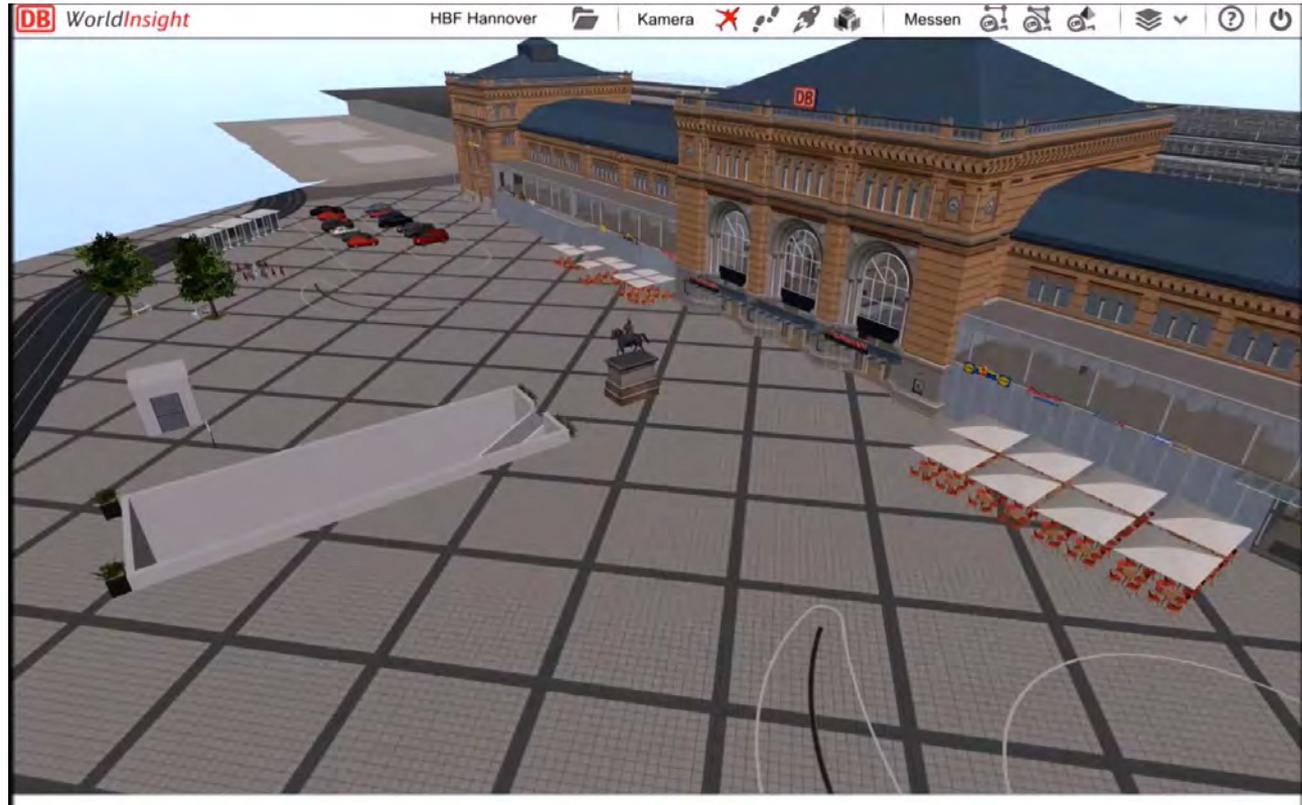
Reduce data volume

Quiz time:

Which one is real?

What is the file size of one of these buildings in the model?

What is the file size of a 3D city model with more than 1200 buildings?

Answers:

~ 80 kb

~250 MB

Automation using games technology

What do you think was the processing time to produce this model of Milan Central Station?

~ 1 week

# Low-cost and automated 3D production

3D Production:

- In-house developed ToolChain for semi-automated data processing and modelling
- Data synchronizing and –standardization
- Calculations based on terrestrial photogrammetry
- Detection-software (pattern recognition)
- Use of structured libraries

Data Input — GIS, DTM, 2D Plans, CAD, photographs, measures, point cloud

ToolChain — Standardization, Calculation, Detection, Modelling, Material-Lab, Instance

Data Output — 3D CAD, BIM, 3D DGN, quantities, 3D DWG, semantics, SHP, gen. 3D formats, volumes, surfaces, VR / AR, 3D-real time
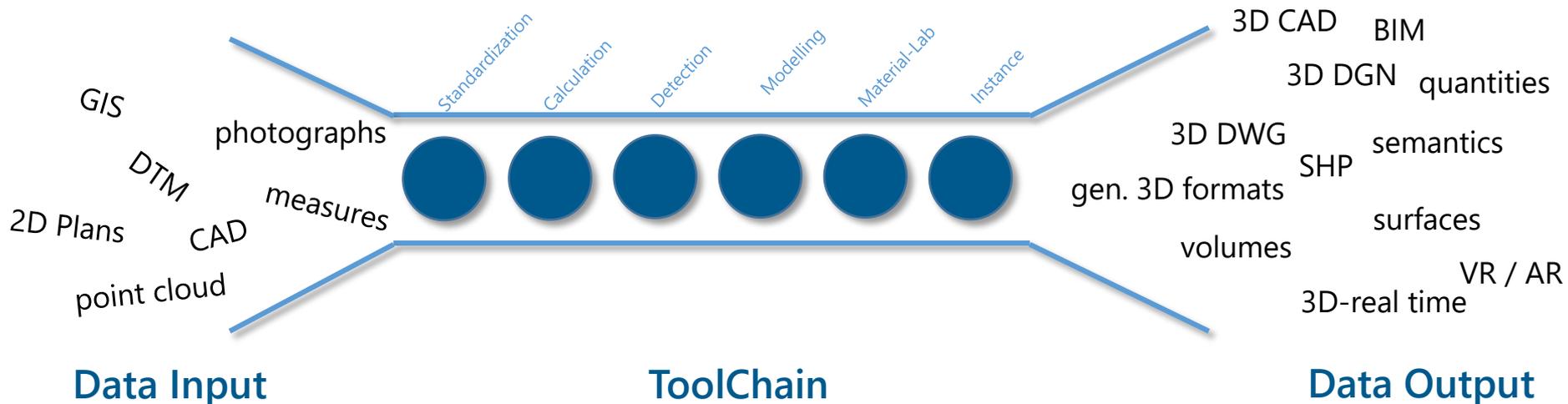
Low-cost and automated 3D production

Step 1: creating the 3D geometry based on the principles of descriptive geometry
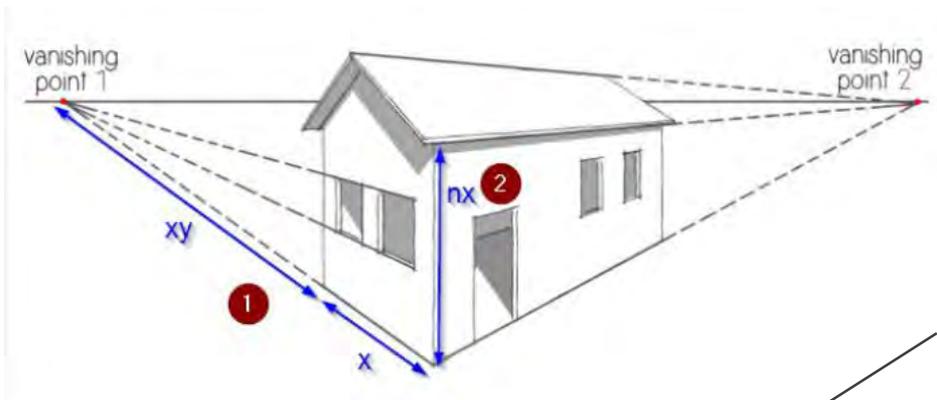
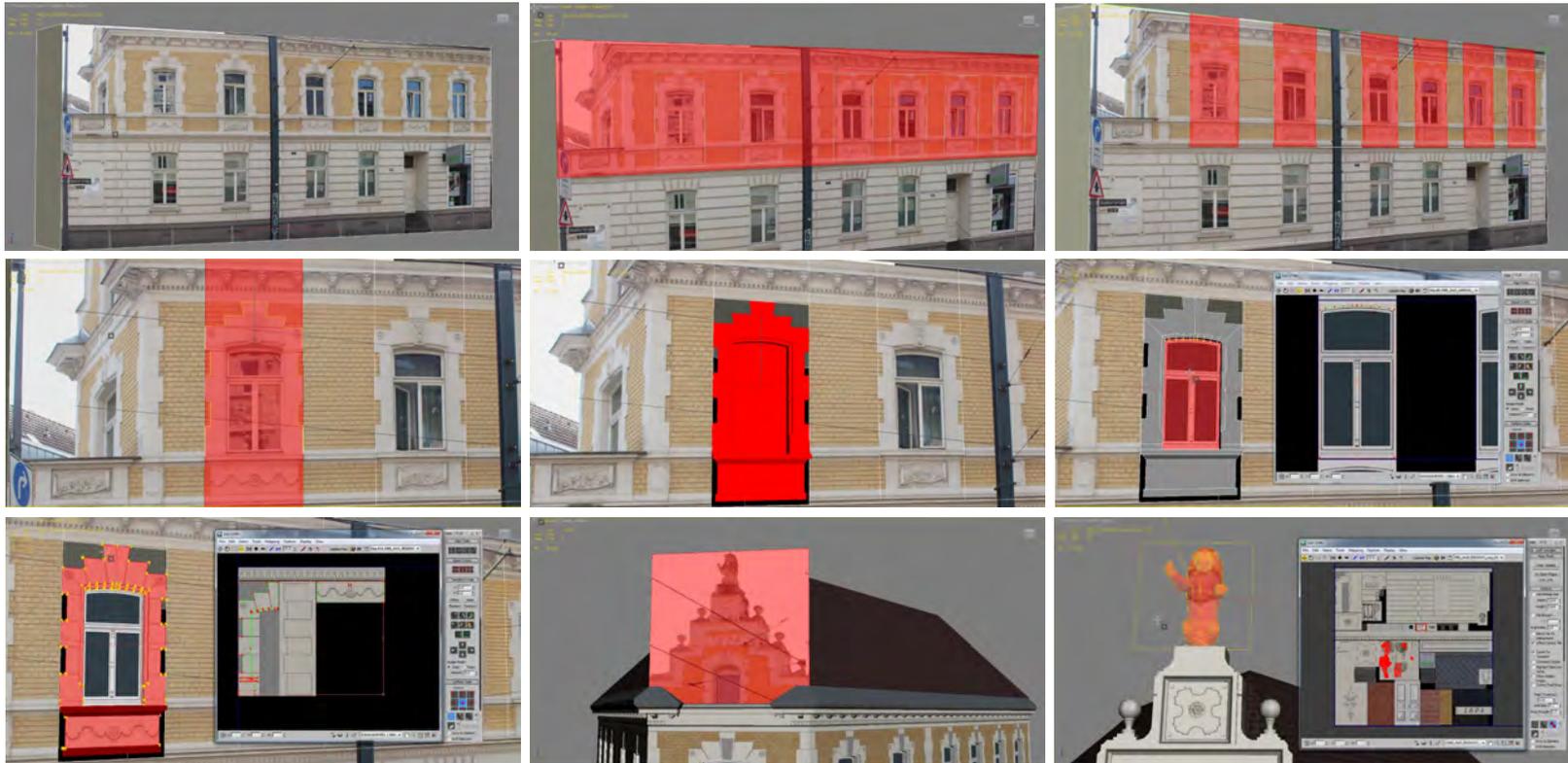Step 2: Vector, material and object recognition and instancing
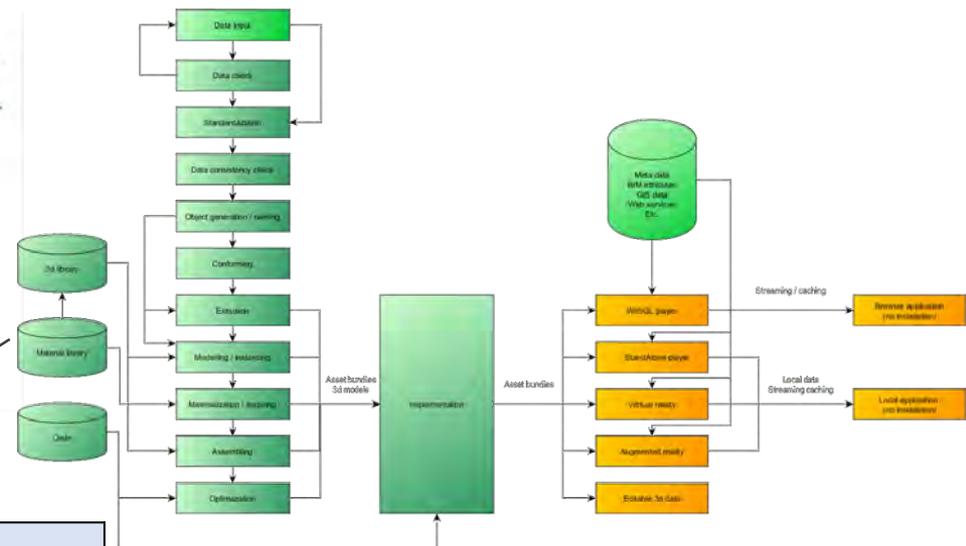
Library structure

Type		Description
	Global	Objects that are globally the same (i.e. concrete, a car etc.)
UK DE CH	Regional	Objects that are specific to countries (i.e. traffic lights, road signs etc.)
	Local	Objects that are unique (i.e. a house etc.)

Efficient 3D production using learning algorithms

Object-based by default

A vast object library is at the heart of our technology, containing digital representations of real world objects. Started 15 years ago, it now contains a vast amount of street furniture, building components, rail equipment, technical objects, materials and textures from all over the world. The library enables the semantics in our digital twins.
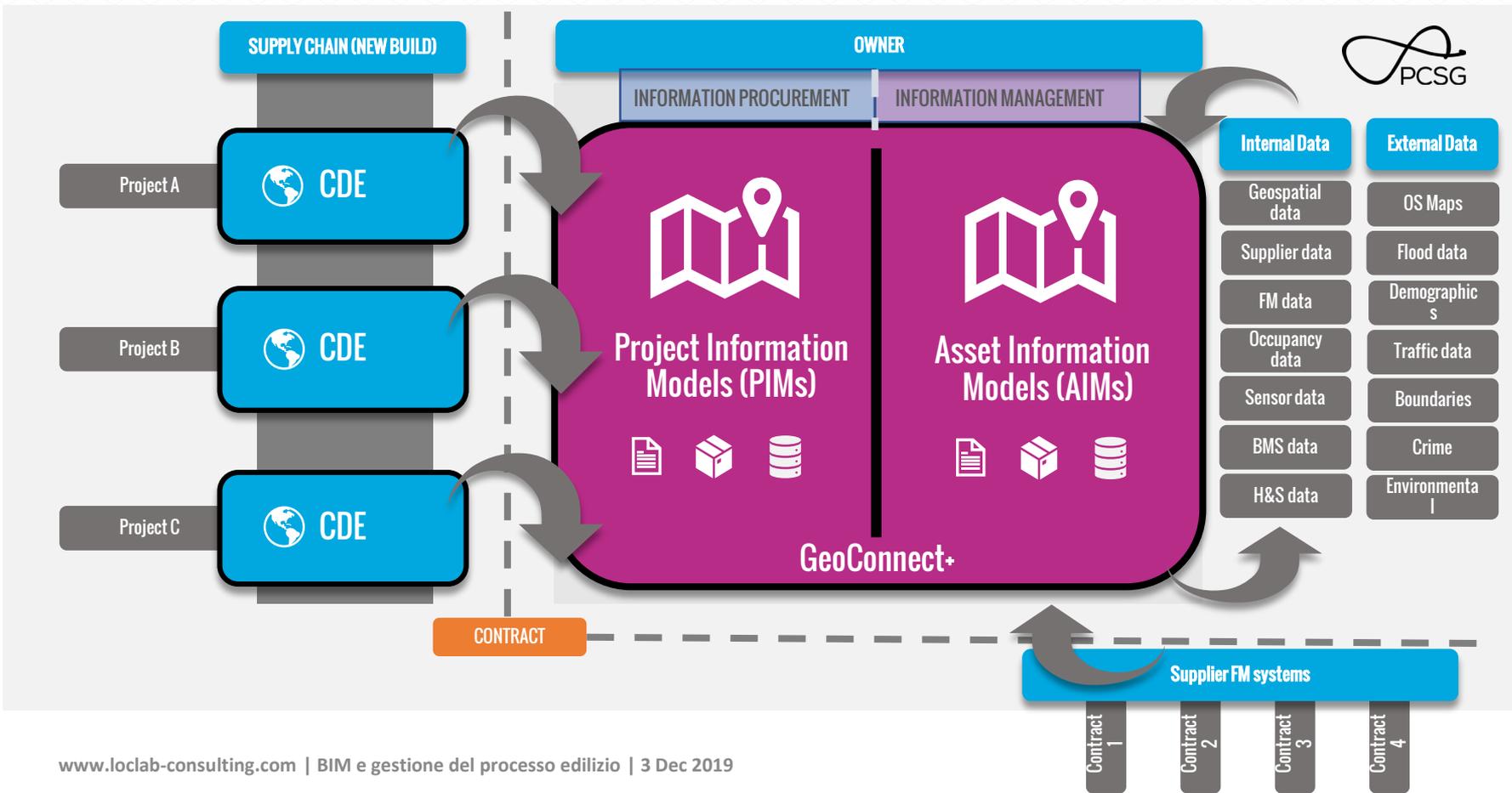
3D Models as the backbone for data integration

The is no better place to store information than a 3D model..
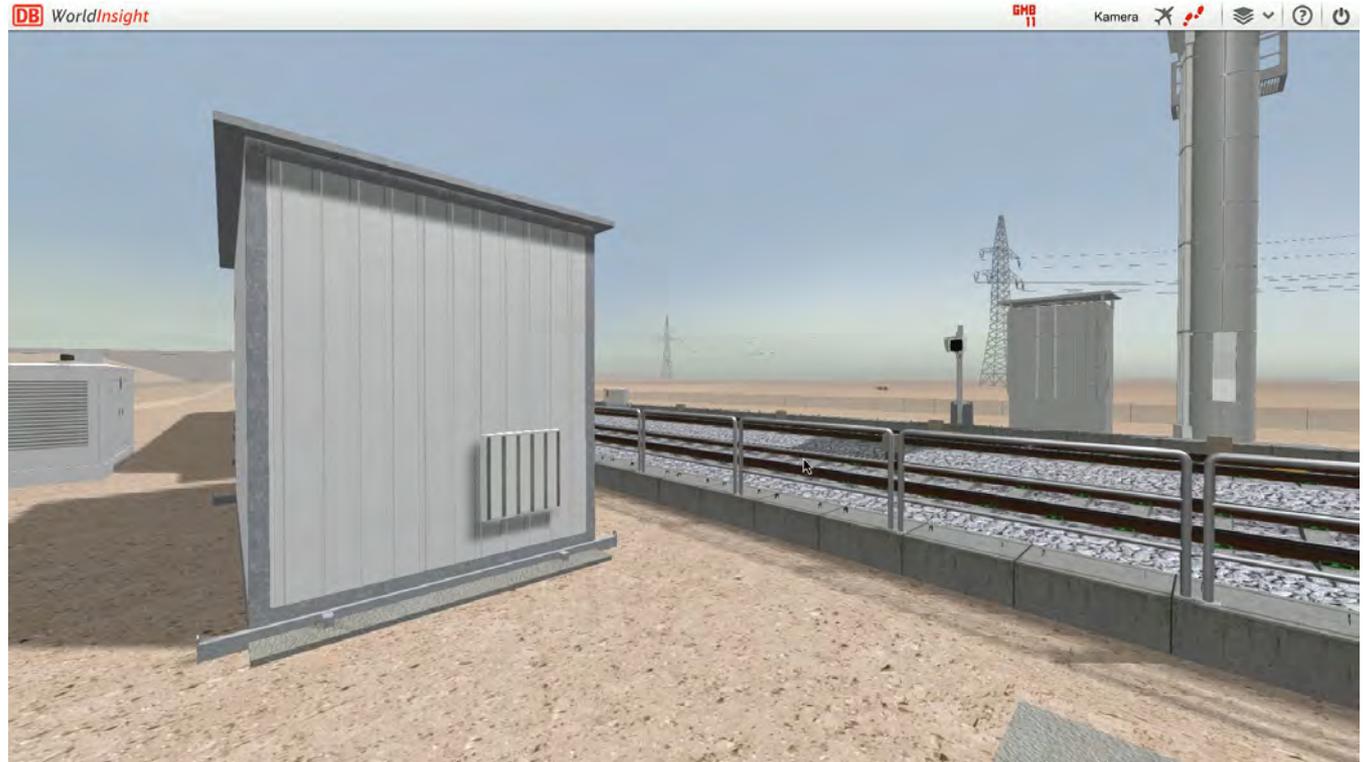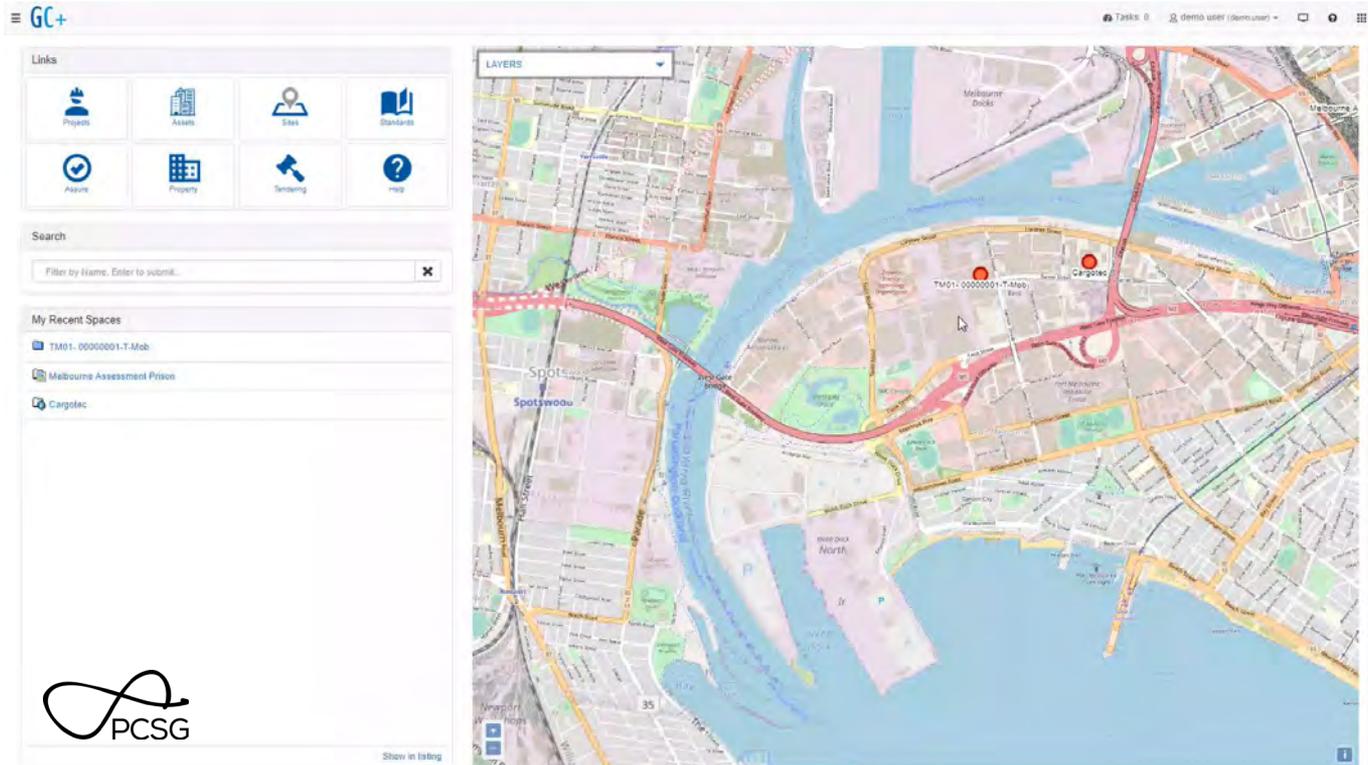
Data Integration

Data Integration

A 3D model is the most intuitive place for finding information!

GeoConnect+ provides web-based integration of asset data, BIM and IFC viewers, digital twins and real-time sensor data.

Vielen Dank für Ihre Aufmerksamkeit.

Bei Rückfragen stehen wir Ihnen gerne zur Verfügung:
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