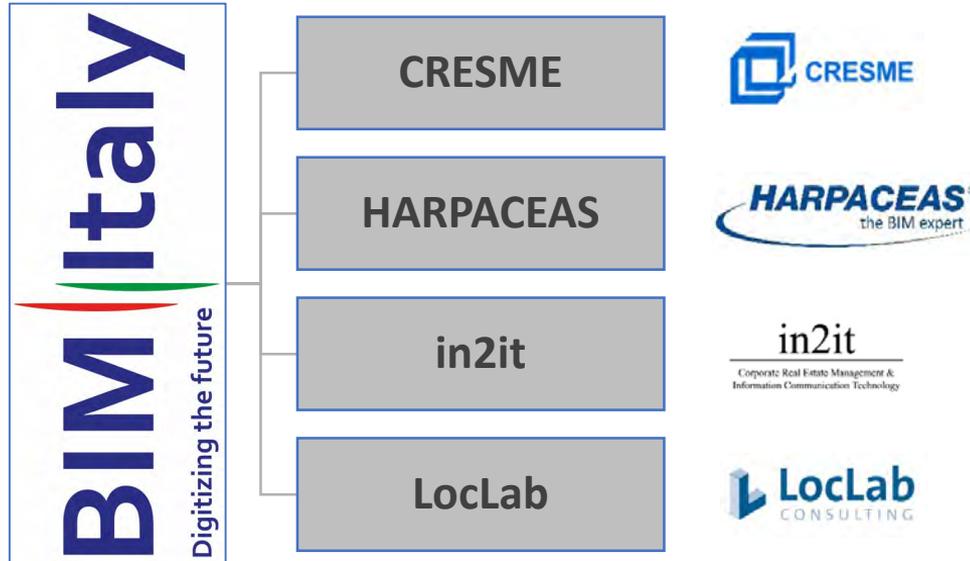




Digital Twins – Games Technology in Asset Design and Management

Dr. Ilka May, LocLab & Dr. Mario Caputi, in2it

Introduction BIM Italy



CRESME provides the private sector and public institutions with information and know-how to describe and predict the development of the construction economy and market at the local, national and international levels.

HARPACEAS is the technological partner for the whole process of conception and construction: design, construction, maintenance and management.

In2it's mission is to maximize the impact that new technologies bring to business processes, primary and support, to extract the maximum possible value and increase the performance of our customers.

LocLab Consulting GmbH is a team of experts specializing in the digitization of the construction sector, who create semantic and volumetric 3D models of buildings, infrastructure and technical equipment that are interactive, software-independent.

"We accompany the world of design, construction, real estate, facility management and public services towards new production and management performances"

Our Digital Twins

We create "Digital Twins" - virtual copies of existing or planned assets and spaces, three-dimensional, technically perfect and amazingly real.

Digital Twins are increasingly used across many industries, mostly in transport, energy, nuclear, telecoms, maritime, aviation and security. The market is global and growing.

Our digital twins are different from most others. Have a look..



Copies of „existing stuff“

Our clients want their digital twins to be..

... cheap

... fit for purpose

... available quickly

... based on open standards

... small file size

... semantic

Use games technology!



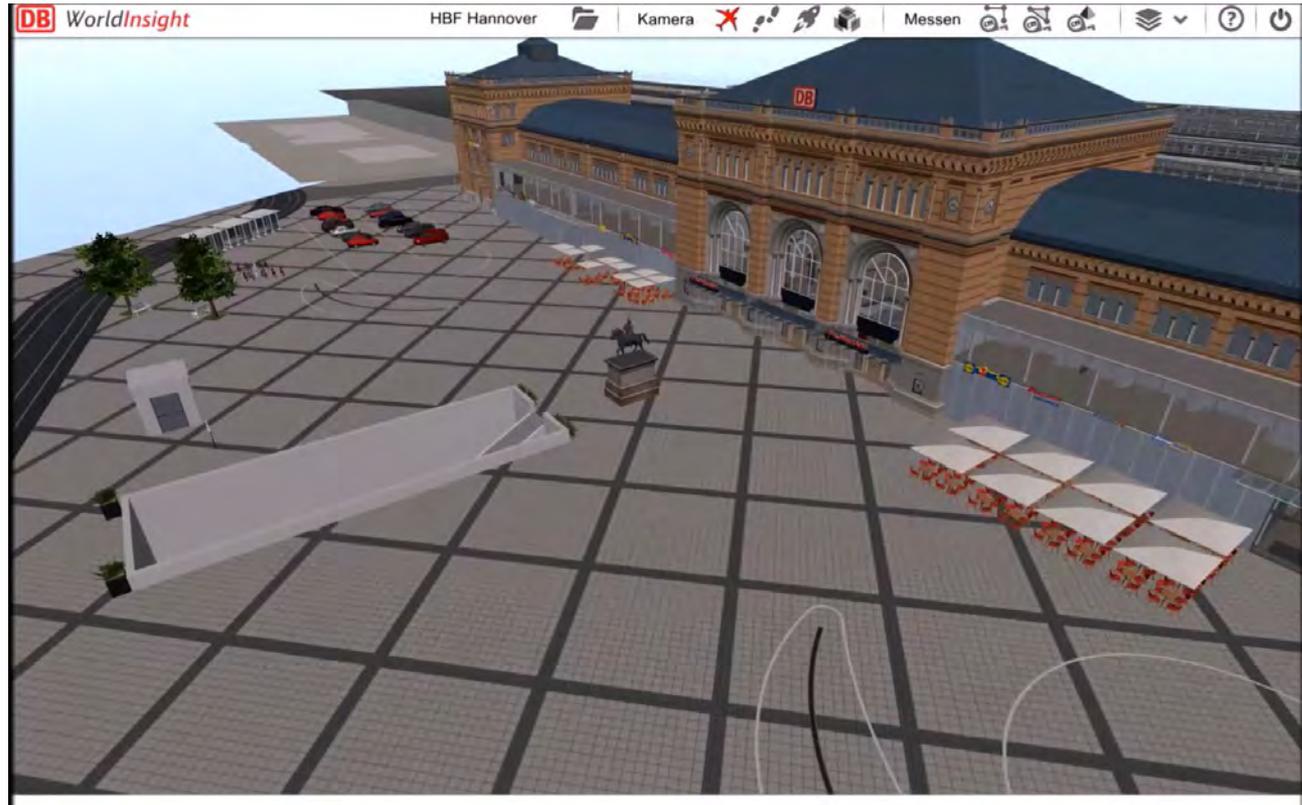
More efficiency in data capturing

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?

3 man-hours



Automation using games technology

**More quiz time:
Data processing**

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

~ 1 week



Reduce data volume



**Even more quiz time:
Data load**

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?

~ 80 kb

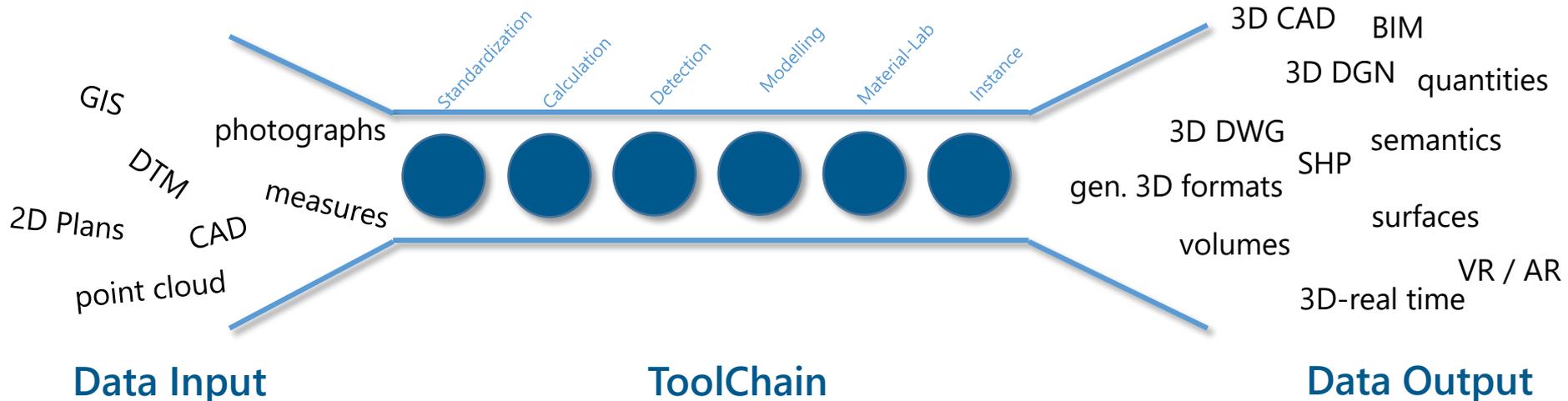
~250 MB



Low-cost and automated 3D production

3D Production:

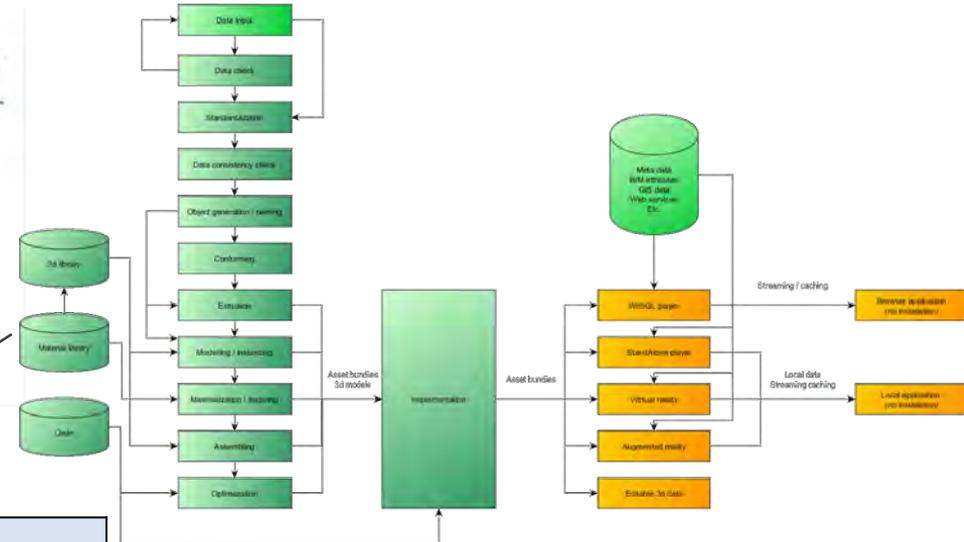
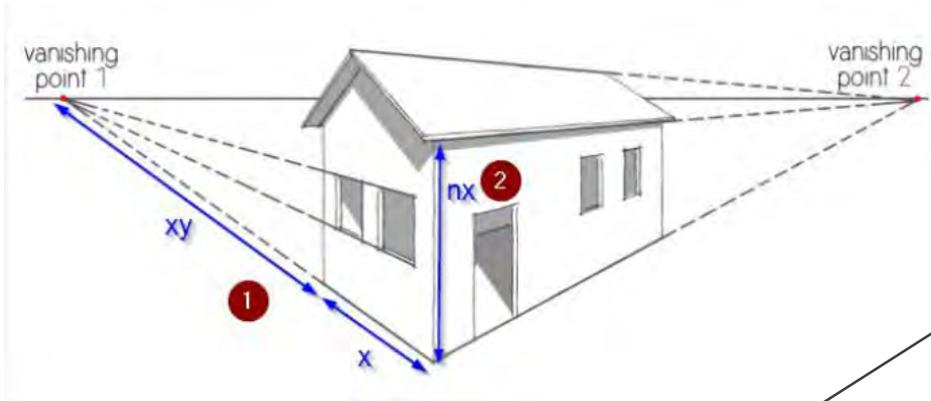
- In-house developed ToolChain for semi-automated data processing and modelling
- Data synchronizing and –standardization
- Calculations based on terrestrial photogrammetry
- Detection-software (pattern recognition)
- Use of structured libraries



Low-cost and automated 3D production

Step 1: creating the 3D geometry based on the principles of descriptive geometry

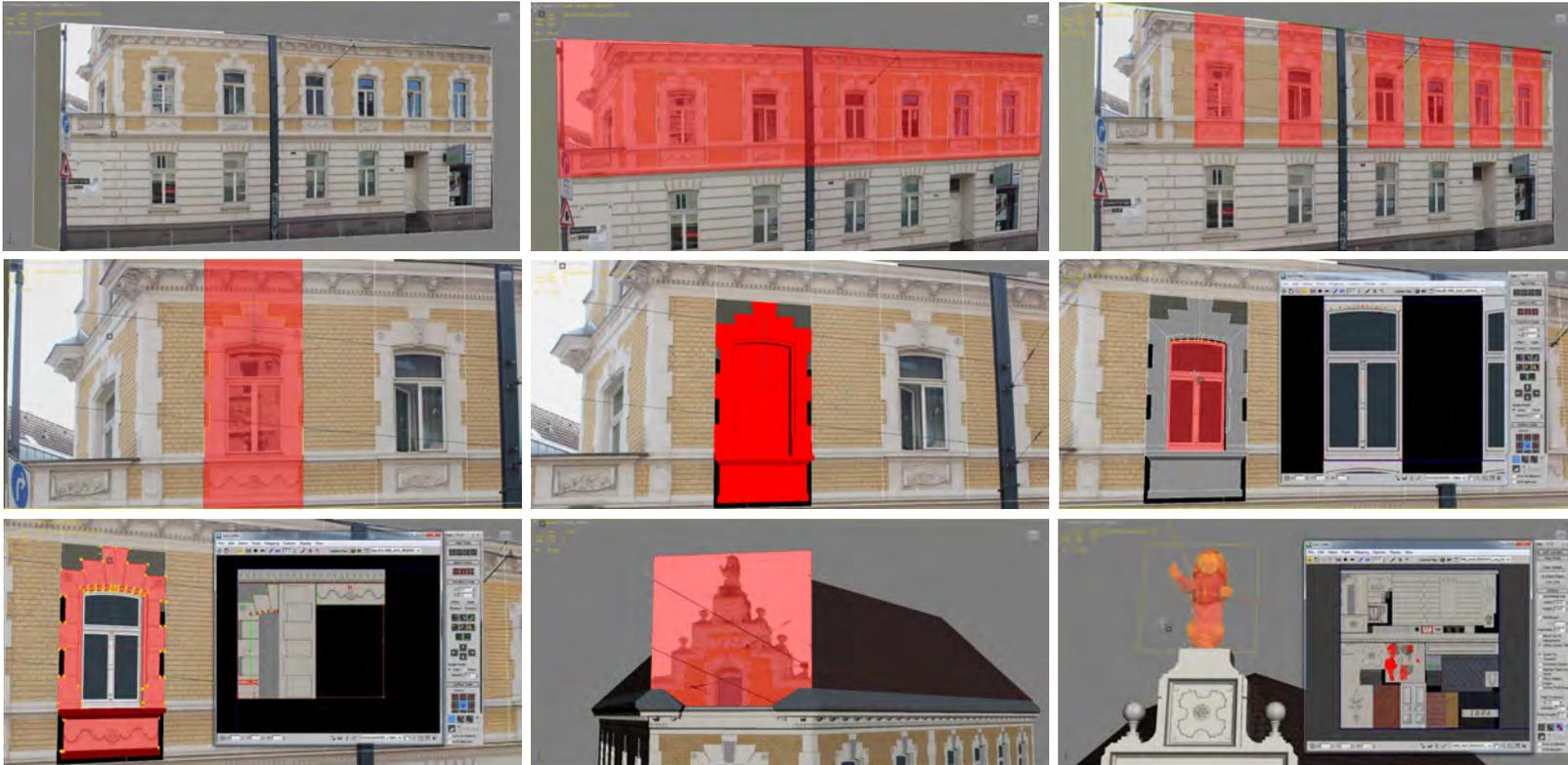
Step 2: Vector, material and object recognition and instancing



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 AI



From Input to Output



Video captured with GoPro Hero 5



Digital Model for two use cases

- 1) Train Driver Simulator**
- 2) Upgrading technical equipment**

From Input to Output

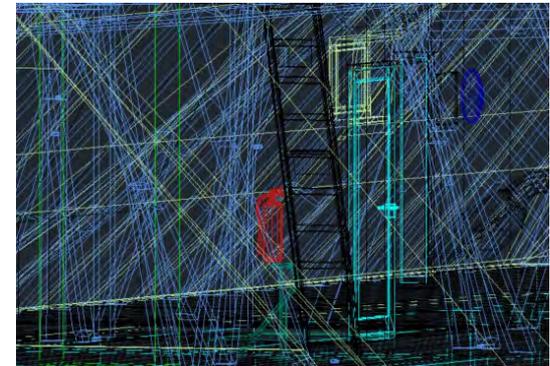
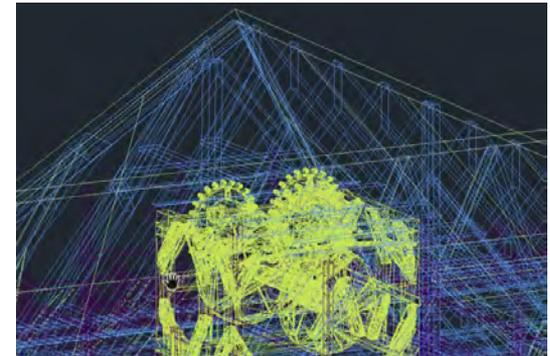
Photographs



Digital Twin



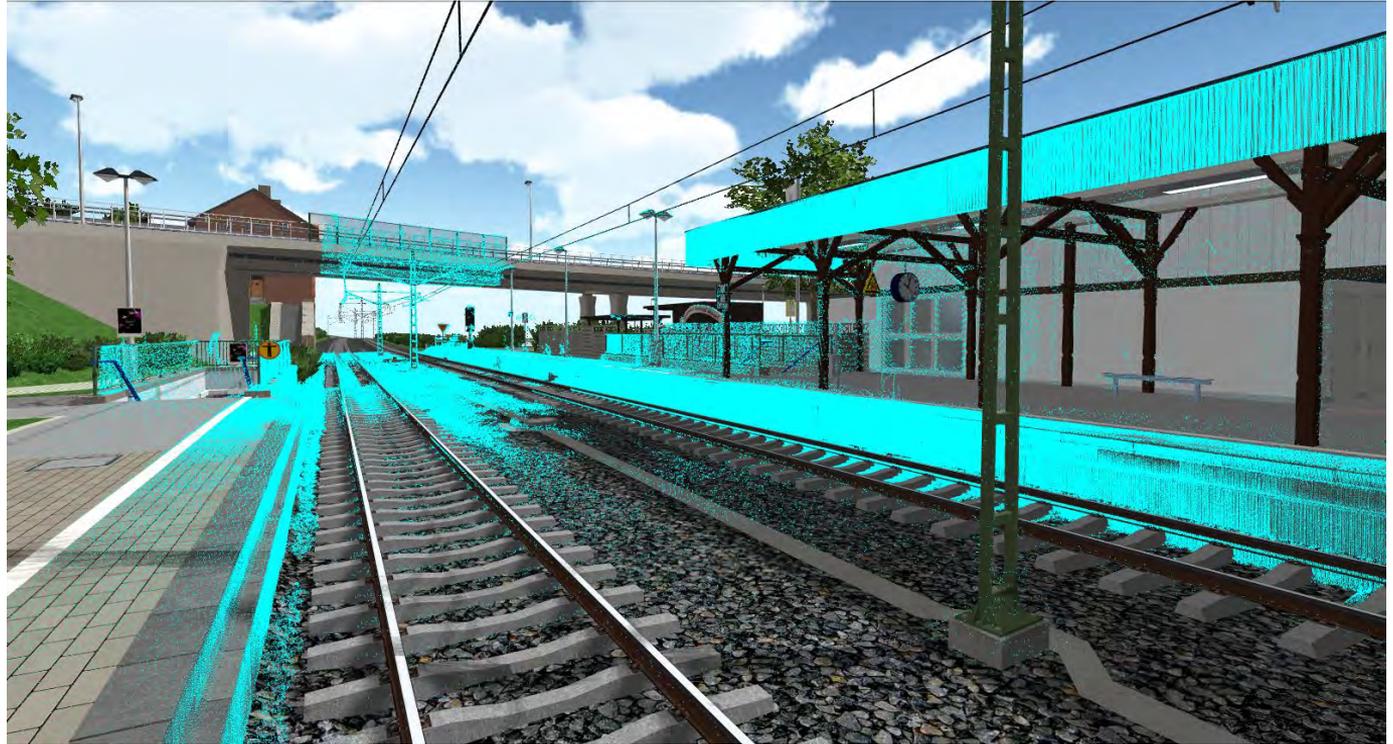
BIM Model



LOA – Level of Accuracy

We can be as accurate as the input data, to the millimetre if needed..

However, most use cases for digital twins don't require that level of accuracy.

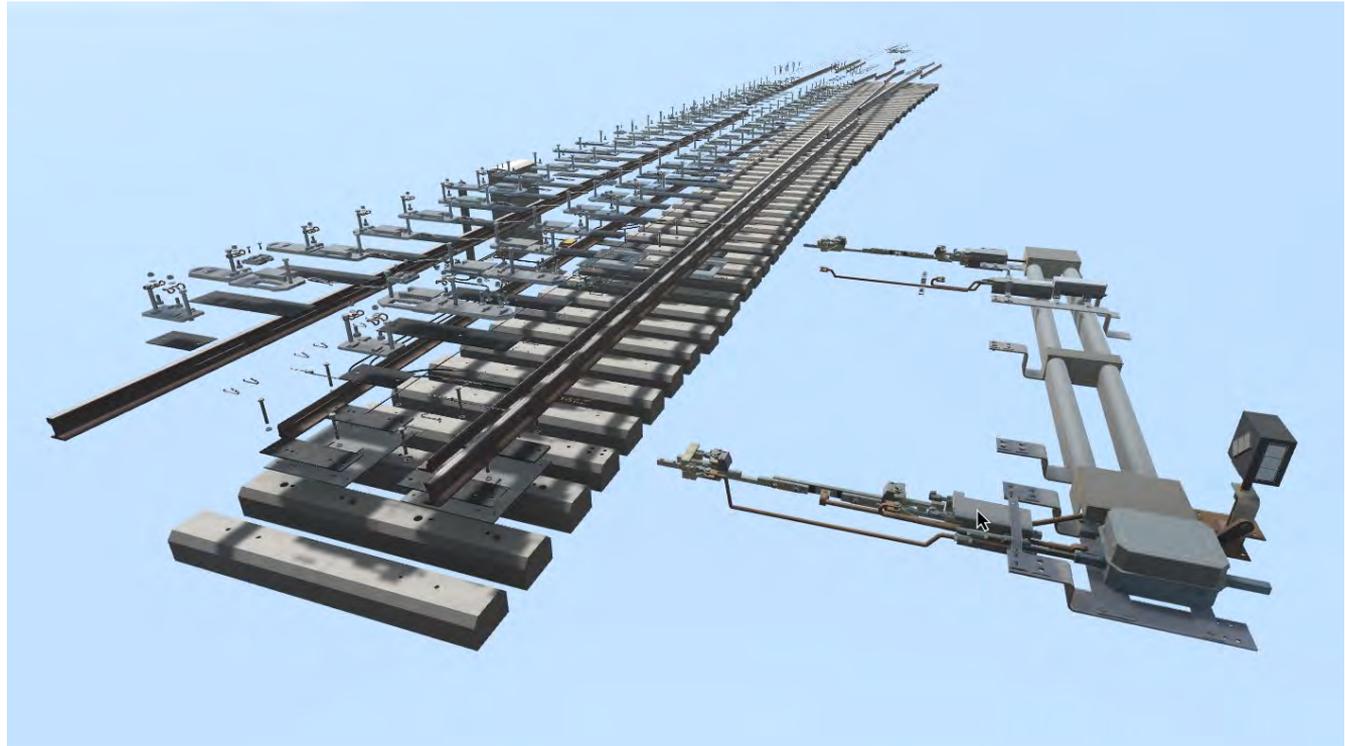


Object-based by default

This switch consists of 7000 individual parts.

Every nut and bolt is linked to its technical place in SAP.

Orders for spare parts can be placed directly through the model.



Managing Data: The Challenge



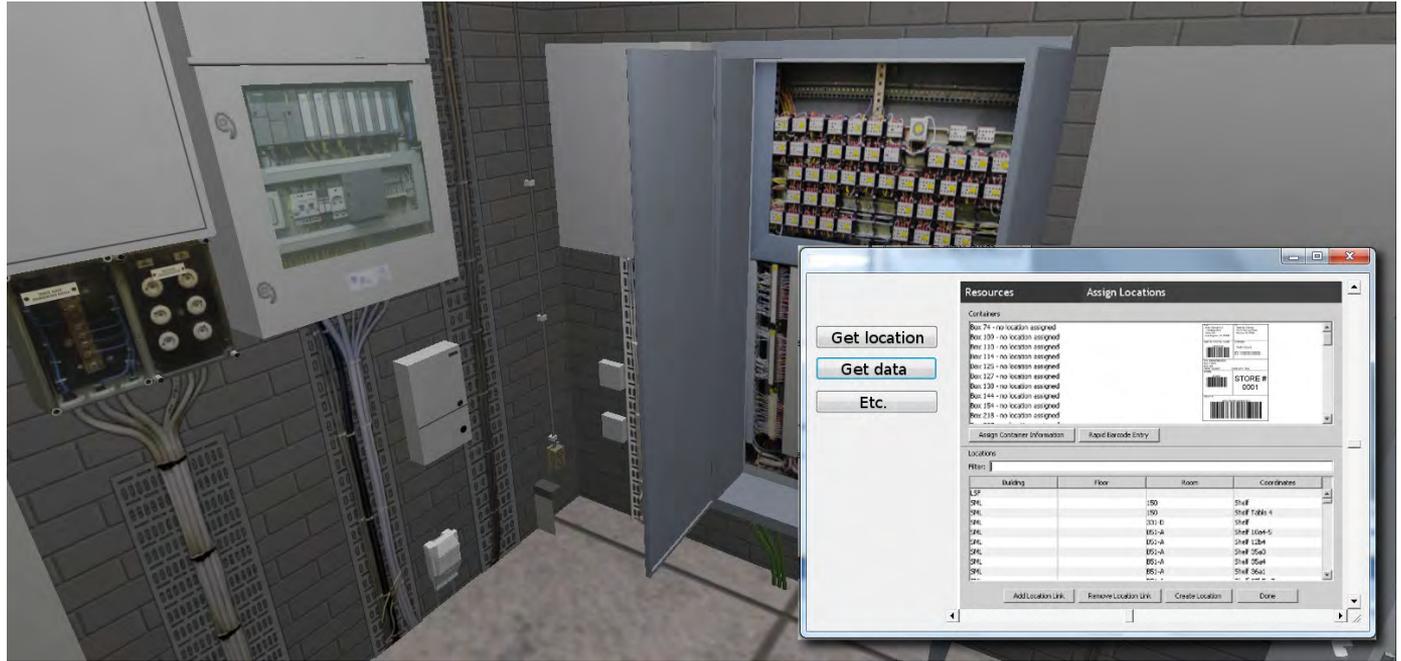
- Ability to find key information
- Models, maps, drawings and data all in different places
- No common open standards
- Information is often poor or of unknown quality
- Unknown security measures
- Need to use complex unfamiliar systems to access information
- Lack of integration limits good understanding
- Information doesn't often get to those who need it



3D Models as the backbone for data integration



There is no better place to store information than a 3D model..





Semantic Models – SAP Connection

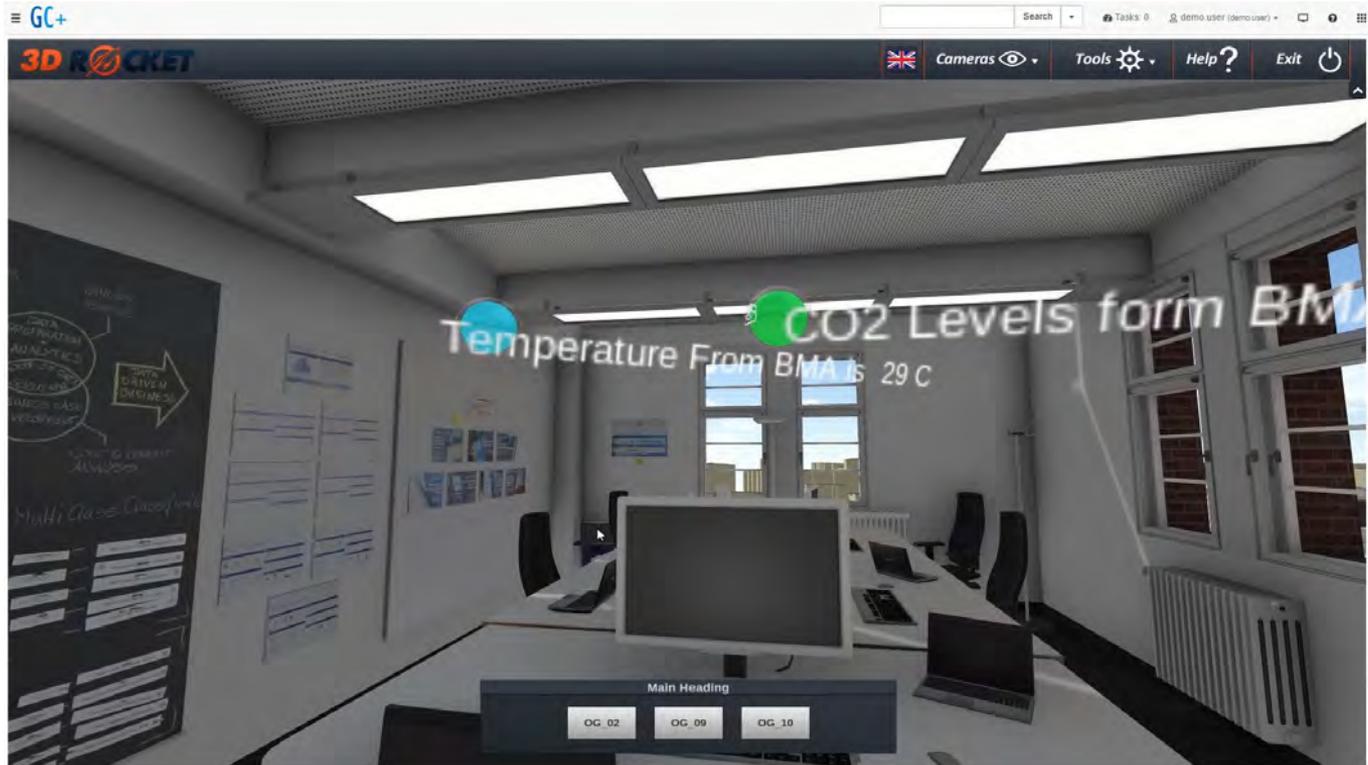
The structure of the digital twins is mapped to the leading information system – in most cases SAP or any other commercial system



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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