Games technology in asset construction and management

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Introduction

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Games technology in construction?

1. Low-cost methods for modelling existing assets
2. Digital twins and the V-process
3. The value of semantic models for data integration
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Digital Twins

Digital Twins are virtual copies of real world existing or planned assets or spaces.

Example: Verbund GmbH, Austria
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!

Example: WorldInsight, DB Systel GmbH, S11
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

Example: WorldInsight, DB Systel GmbH, Hannover Hbf.
Video: [https://www.dropbox.com/s/cxha4rnw0qltm1g/WOI_Hbf%20Hannover.mp4?dl=0](https://www.dropbox.com/s/cxha4rnw0qltm1g/WOI_Hbf%20Hannover.mp4?dl=0)
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
We use normal photographs as our main input data.

3D modeling is a semi-automated process based on our ToolChain, an “assembly line” of algorithms for processing the input data.

First of all we produce a master photography and use the principles of descriptive geometry to produce a 3D model.

Then our algorithms detect patterns, vectors and objects in the digital model.

These objects are replaced by corresponding items from our vast object library. This is a key step, because a) it ensures that the dataset remains small and b) it generates semantic models.
What do you think was the processing time to produce this model of Milan Central Station?

~ 1 week
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.

Example: WorldInsight, DB Systel GmbH, Exploding Switch
Video: https://www.dropbox.com/s/kaklxe2xmi335yc/TLL_Exploding%20switch%20%28White%29.mp4?dl=0
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Linear construction process

Strategic Planning | Brief | Design and Build | Maintain | Operate | Service | Socio-economic

HOA / HOAI / VOB / ....

Standardised Processes – Level 2 (Convergence)

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The Systems Engineering “V-Process”
An example for a user acceptance test on a train configurator

Example: WorldInsight, DB Systel GmbH, Advanced Train Lab
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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
Data Integration
GeoConnect+ SYSTEM ARCHITECTURE

Presentation Layer
Service + Application Layer
CDE, Simulation, Model, Data and Engineering Layer
Data Bus Layer
Web Services Transport Layer
External Data Source Layer
SECURITY, PROVENANCE, ACCESS CONTROL & AUDIT

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Implementation Example – HS2

Example: HS2 BIM Visualisation Hub, GeoConnect+
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Example: WorldInsight, DB Systel GmbH, Berlin Central Station
Vielen Dank für Ihre Aufmerksamkeit.

Bei Rückfragen stehen wir Ihnen gerne zur Verfügung:
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