

Using BIM to support airport assetmanagement by using an 3D Urban view

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Agenda

- **Collaboration with Main Contractors**
- **Schiphol Common Data Environment model (CDE)**
- **Processing 3D BIM data from Main Contractors to CDE**
- **Building 3D Basemodel based on existing BIM files**
- **Live Demo?!**
- **Q&A**

Changes to physical world!

SCHIPHOL IS GROWING

Perform today. Create tomorrow.

■ **Upgrades from Piers D to G**
To be completed by 2021.

■ **Landside infrastructural adjustments**
To be completed by 2019.

■ **A temporary departure hall**
Till 2019.

■ **Terminal, corridor and baggage basement**
To be completed in 2023.

■ **Pier, ramp and temporary corridor**
To be completed in 2019.

■ **KLM cargo building 1**
To be demolished in 2025.

■ **P2**
To be demolished in 2017.

■ **Schiphol Plaza, Jan Dellaertplein, the railway station and bus depot**
To be completed by 2025.

■ **P XXL**
Decision to be made early 2017.

■ **P1 extra level**
To be completed in 2019.

■ **P1 expansion**
To be completed in 2017.

Schiphol is powering full steam-ahead. And there is a lot of work to be done in a relatively small area which is in constant use.

We're adopting the same pioneering spirit as our founding fathers in order to build a bright future. Our motto is: Perform today. Create tomorrow.

All Projects and Maintenance is done by our Main Contractors

Changes in Collaboration with our Main Contractors (MC's)

- Schiphol has focus on Directing the Airport not on maintenance
- The Maincontractors are responsible for asset- and data maintenance
- Schiphol is responsible for the “What” the MC for the “How”, based on Performance Oriented KPI's
- Data changes in MC's asset databases should be directly available in the Schiphol Central Data Environment.
- All Geo asset data is delivered in 2D and 3D



Why all data in 3D?

- The maincontractors are planning and designing assets in 3D
- Converting 3D geometry to 2D reduce data quality
- When new (building) projects starts, Schiphol has to deliver the As-Is data
- 3D data is a lot easier to use then complex 2D Cad drawings, even for managers ;)

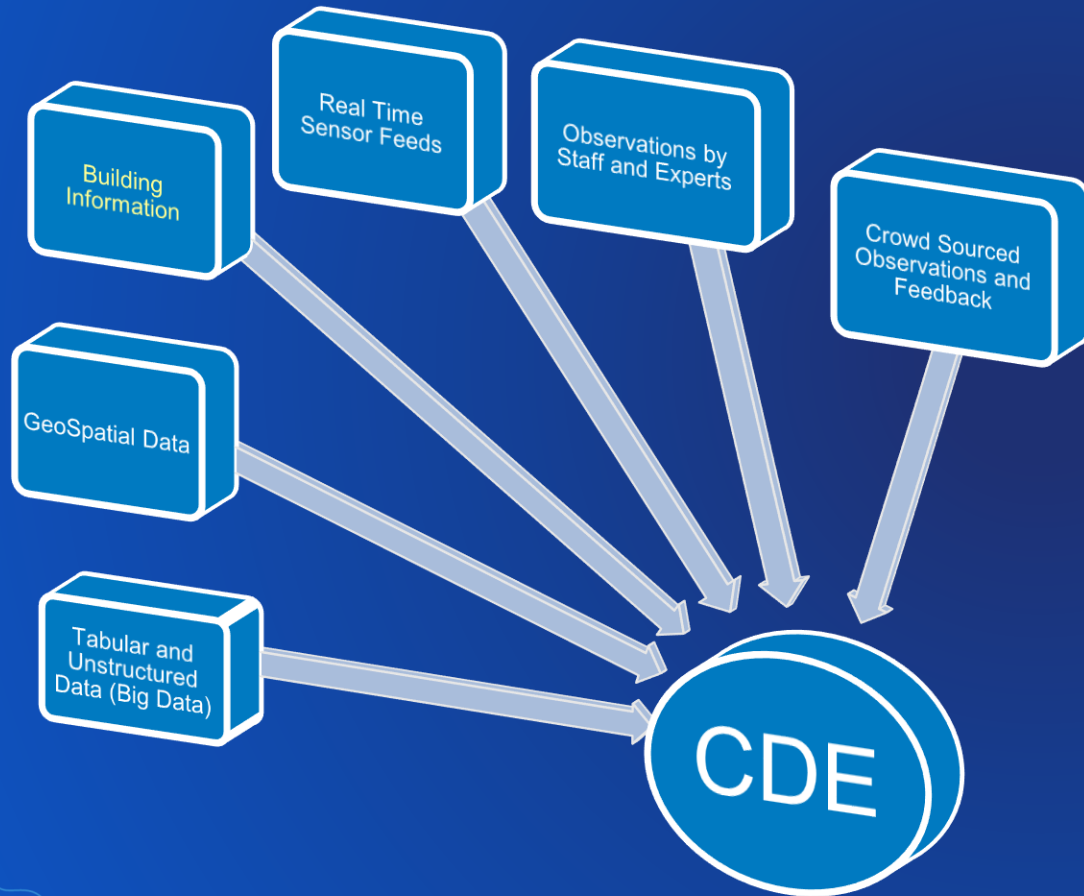
Schiphol BIM/3D vision

- All assets should have a detailed BIM/3D representation to be able to make an urban view of Schiphol.
- The Schiphol urban 3D view should be able to perform as a dashboard for most asset management process.
- Changes to the Schiphol urban view should be an automatic process via standardized interfaces to our contractors.
- The Schiphol urban view should be able to use attribute data from other systems.
- The Schiphol urban view should be able to display real-time asset data.



Smart Airport

Schiphol Geo information as “Digital Asset Twin”

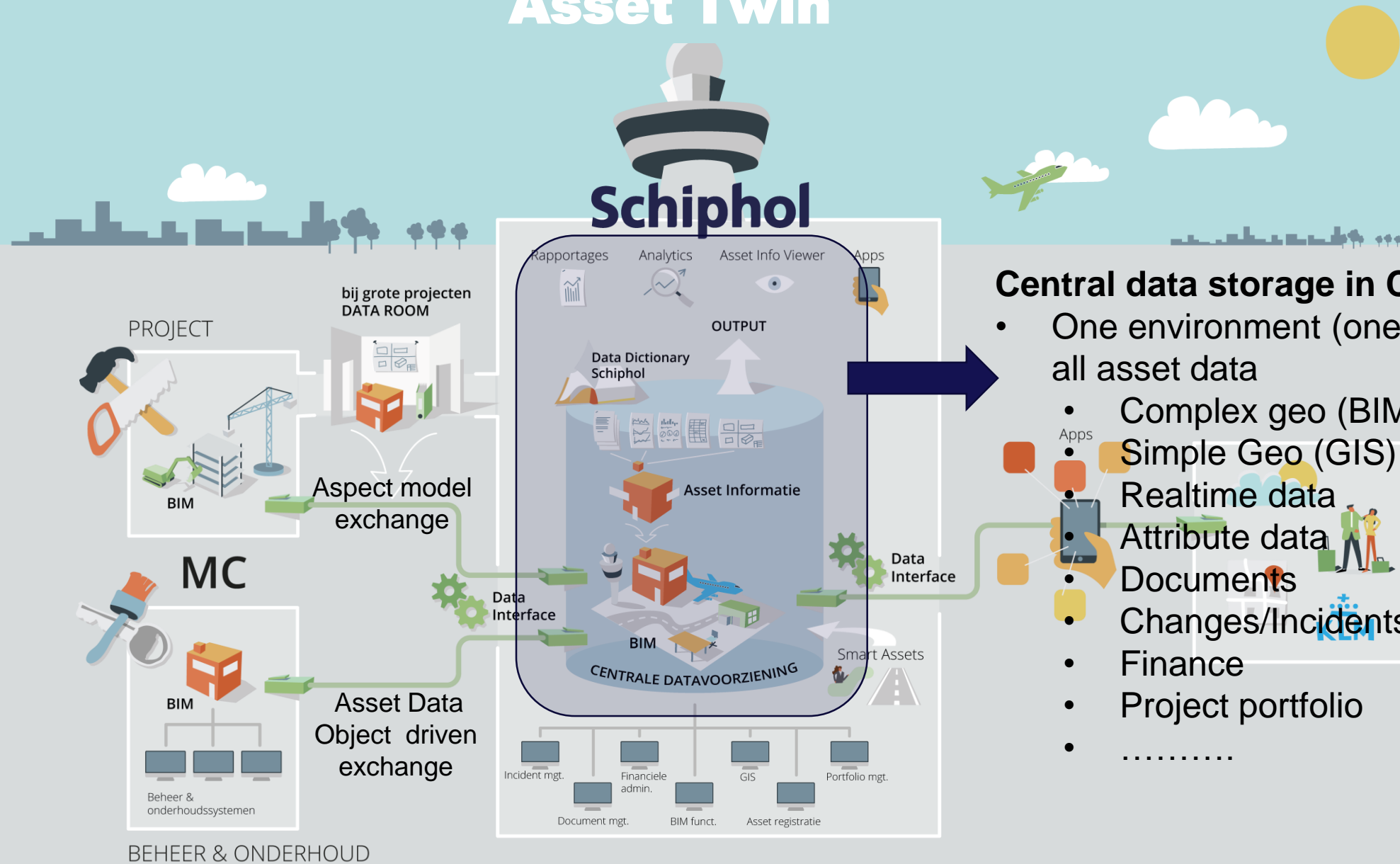


AKA: Digital asset Twin

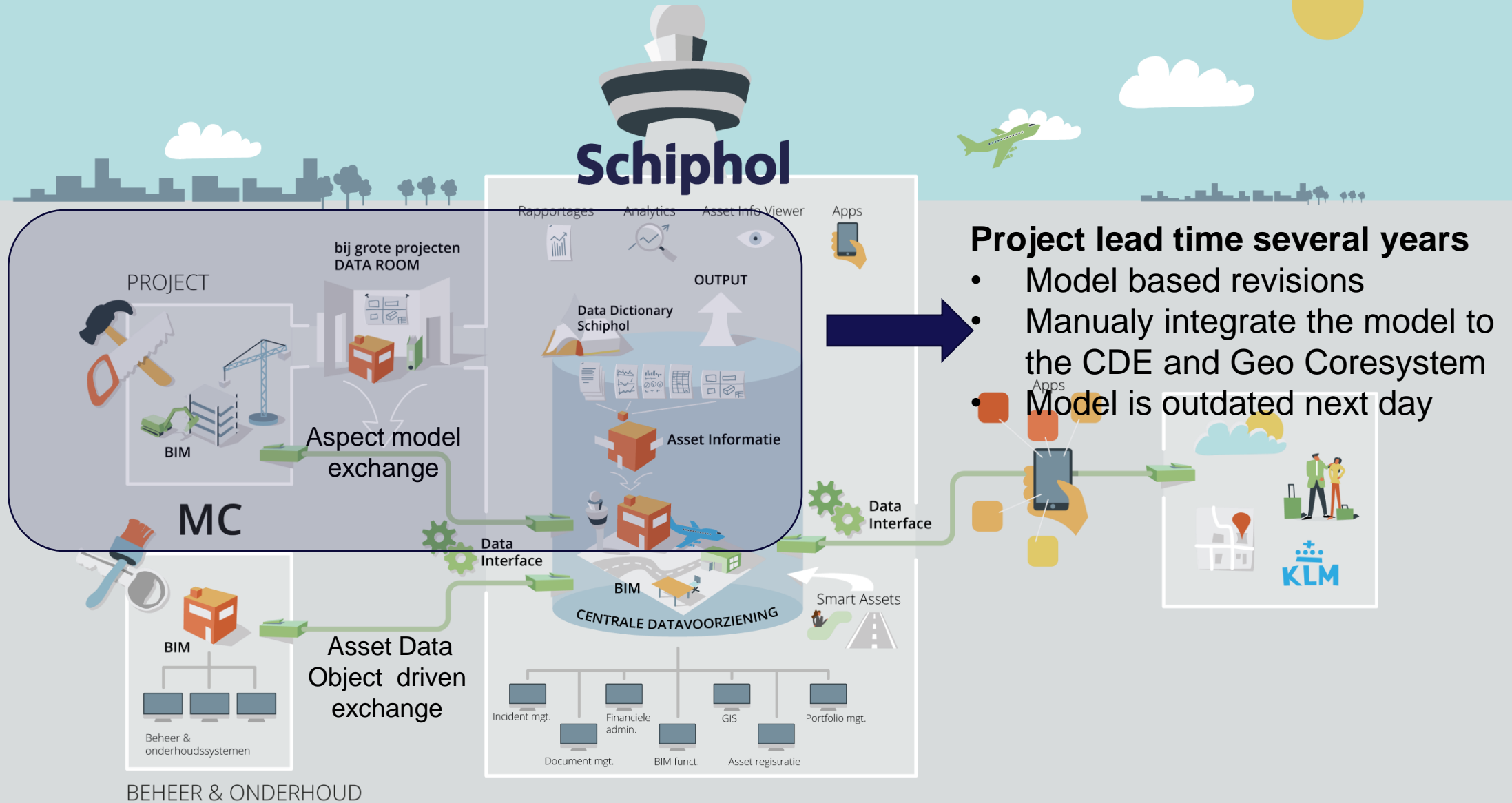
Asset management is the coordinated activity of an organization to realize value of assets (ISO 55000)

Smart assets can interact with their environment via internet. It sends and receives data & commands from and to e.g. other smart assets, systems, people. A smart asset can influence its environment and the other way around and create value by (better) insights

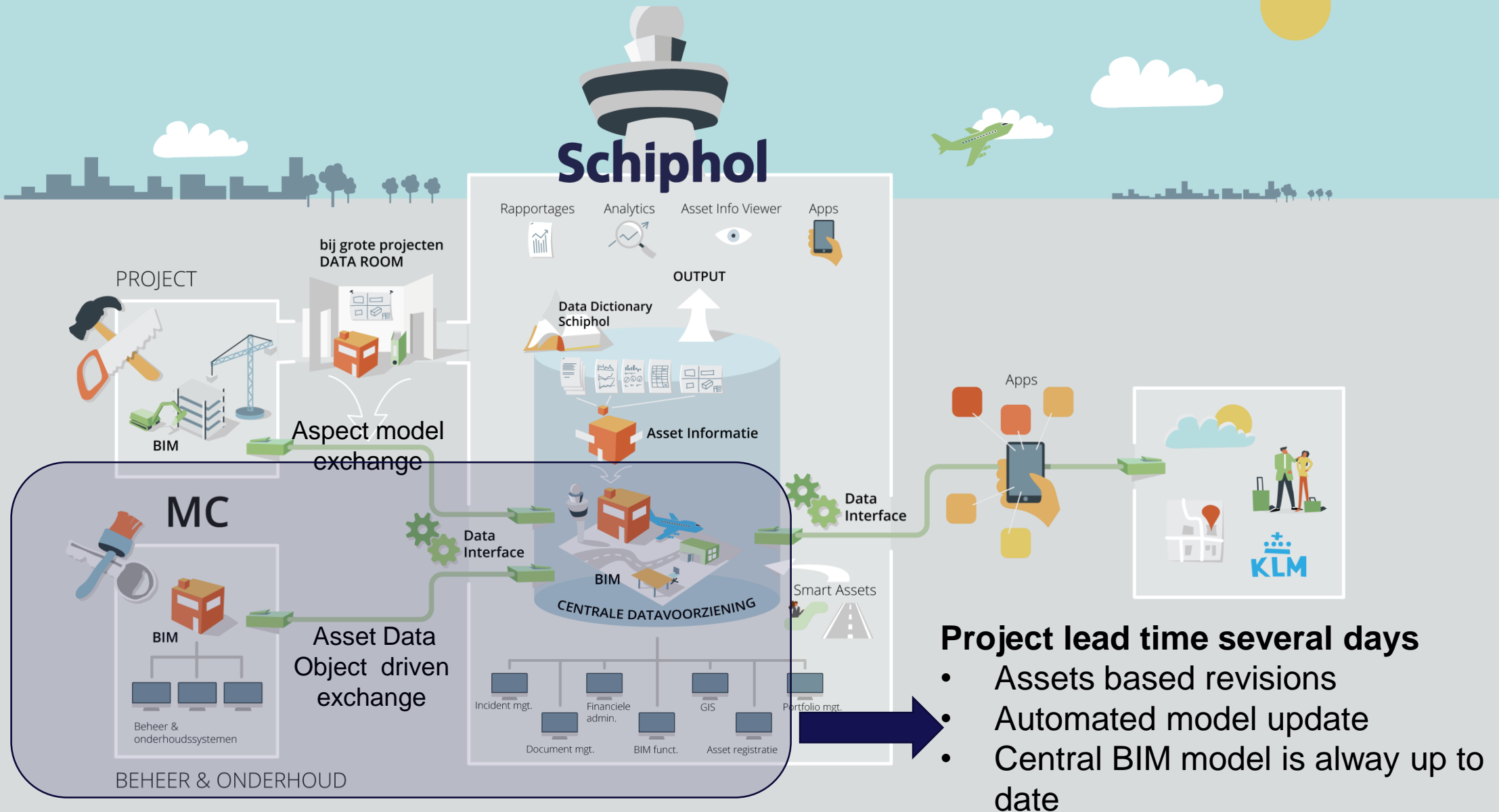
Common Data environment (CDE) as Digital Asset Twin



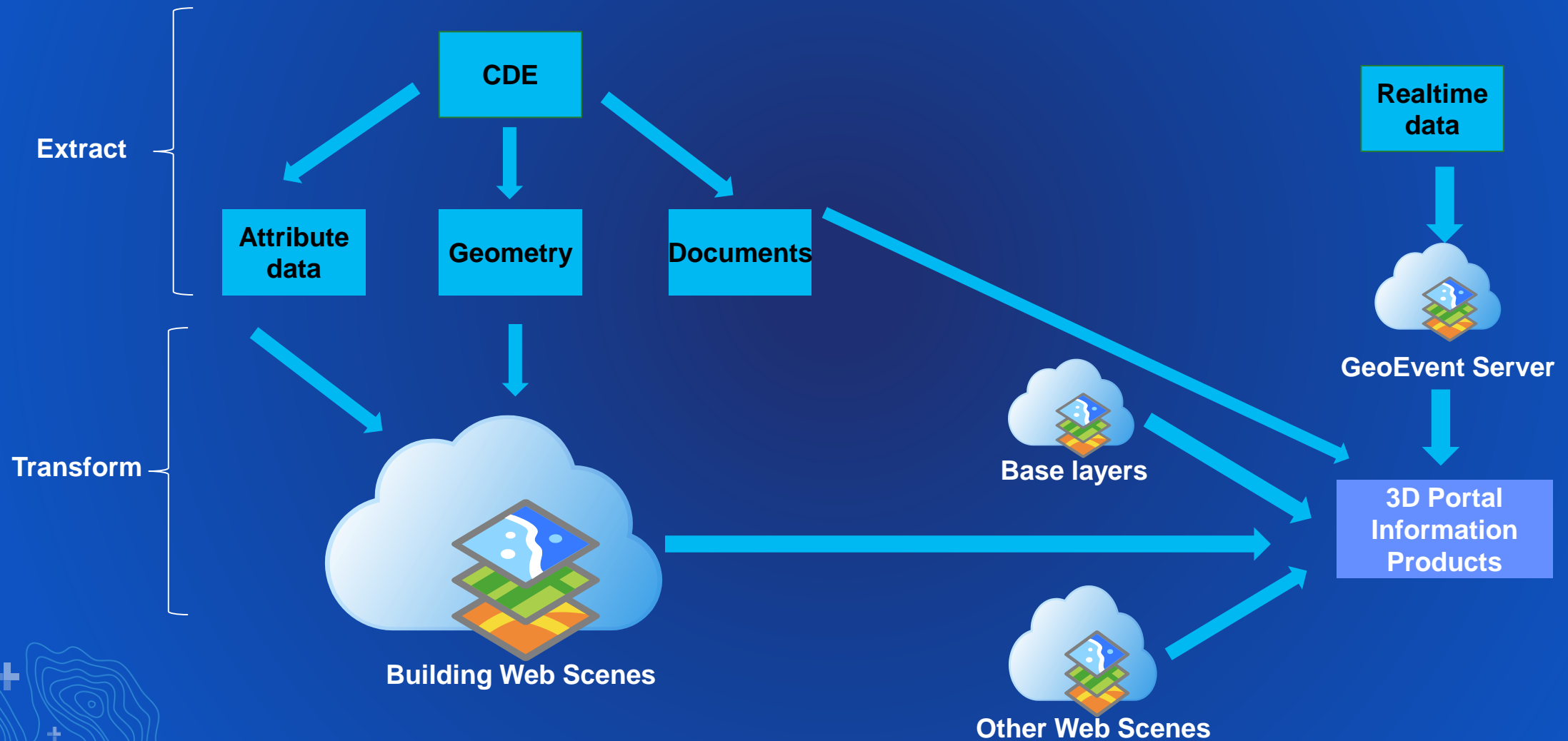
BIM Project data proces



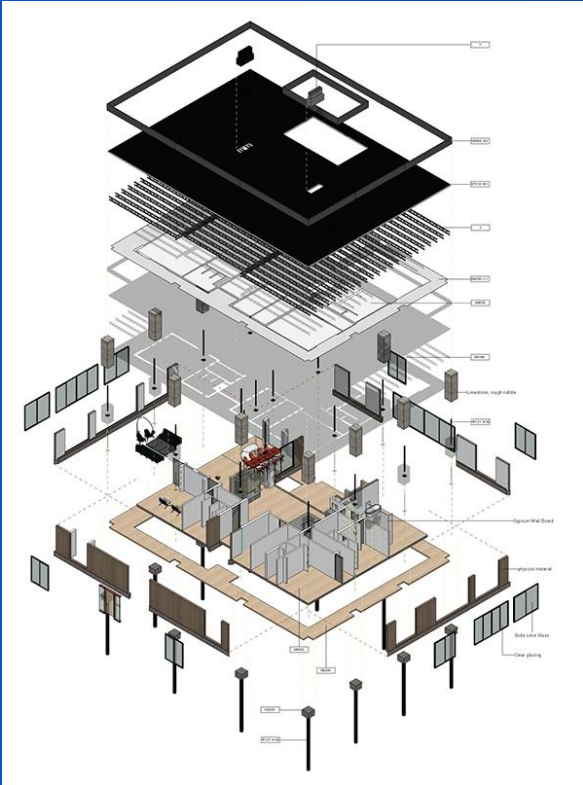
BIM maintenance data proces



Building 3D Information products



BIM to CDE Proces

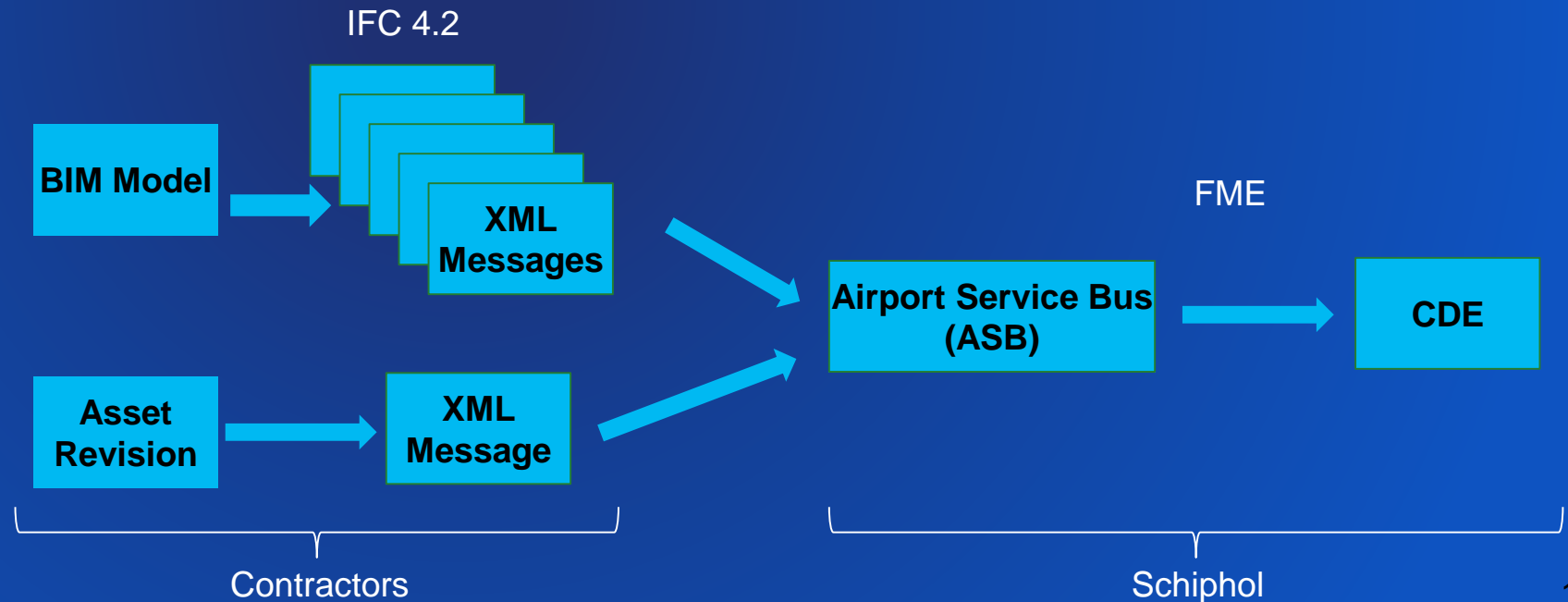


The project BIM model is delivered to Schiphol and stored in the CDE as separate objects with unique ID's

- The ID's are unique over all Schiphol's information systems.

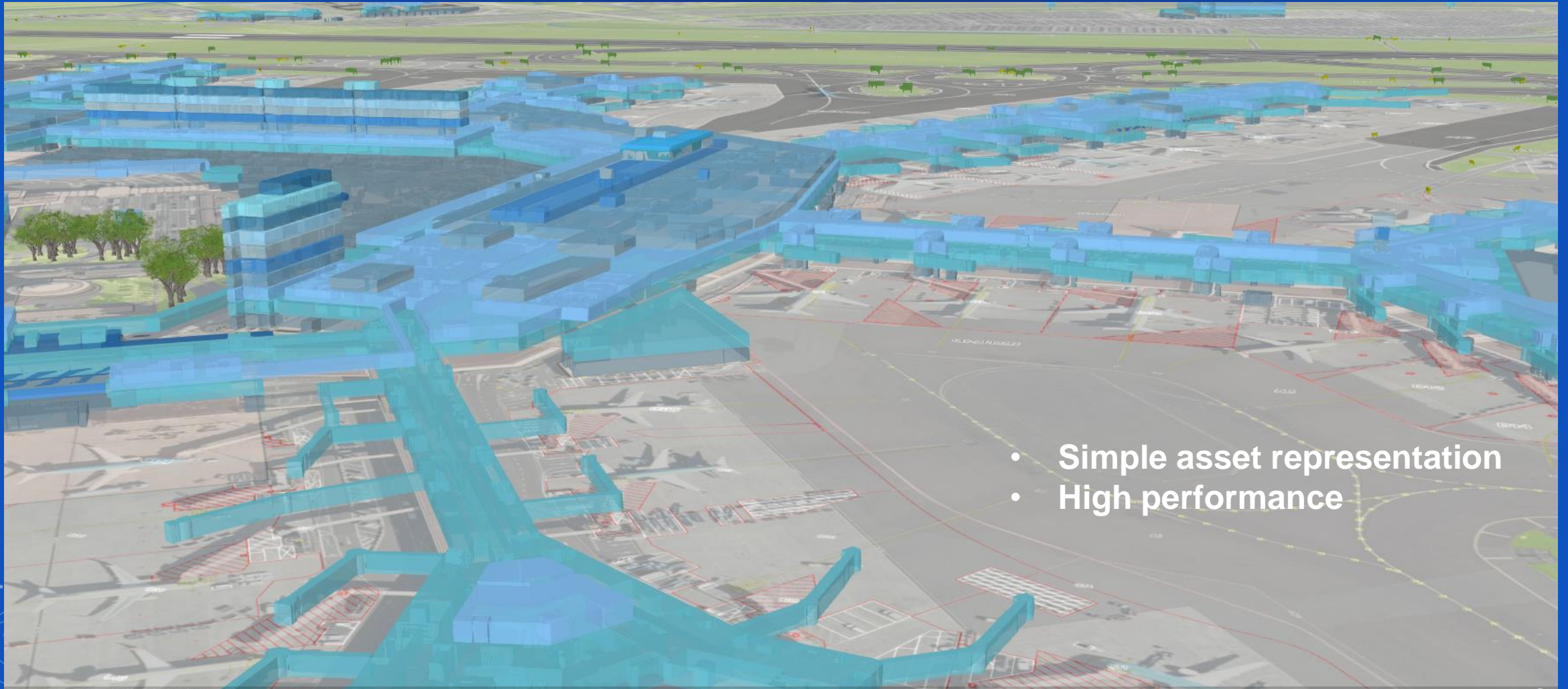
After a revision on an asset only the attributes (including geometry) of that is asset is processed in the CDE.

- The geometry (and other attributes) in the CDE is replaced by the new geometry.



Example Information Products

LOD1 Jellycubes, generated From 2D Floorplans



- Simple asset representation
- High performance

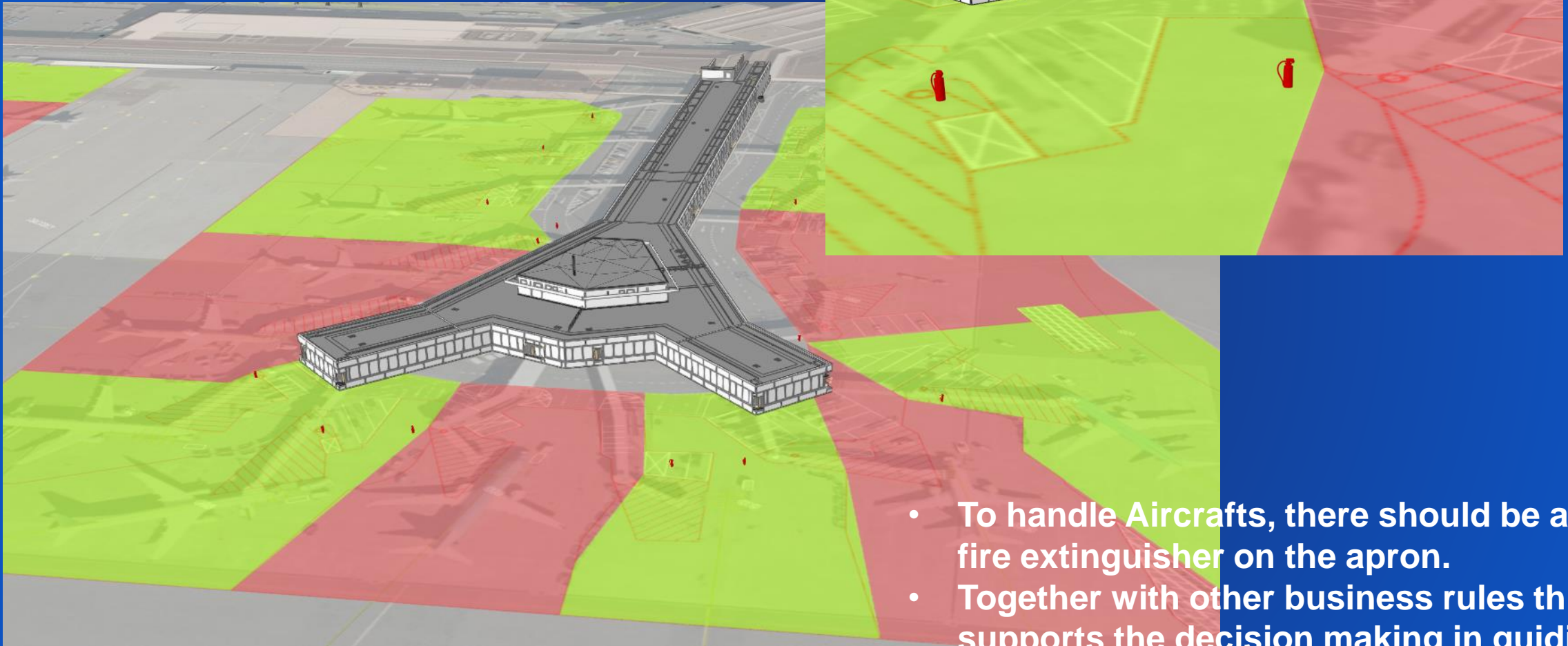
Example Information Products

3D BIM model with Realtime Airplane positioning



- Realtime Aircraft positions
- Flight detail information

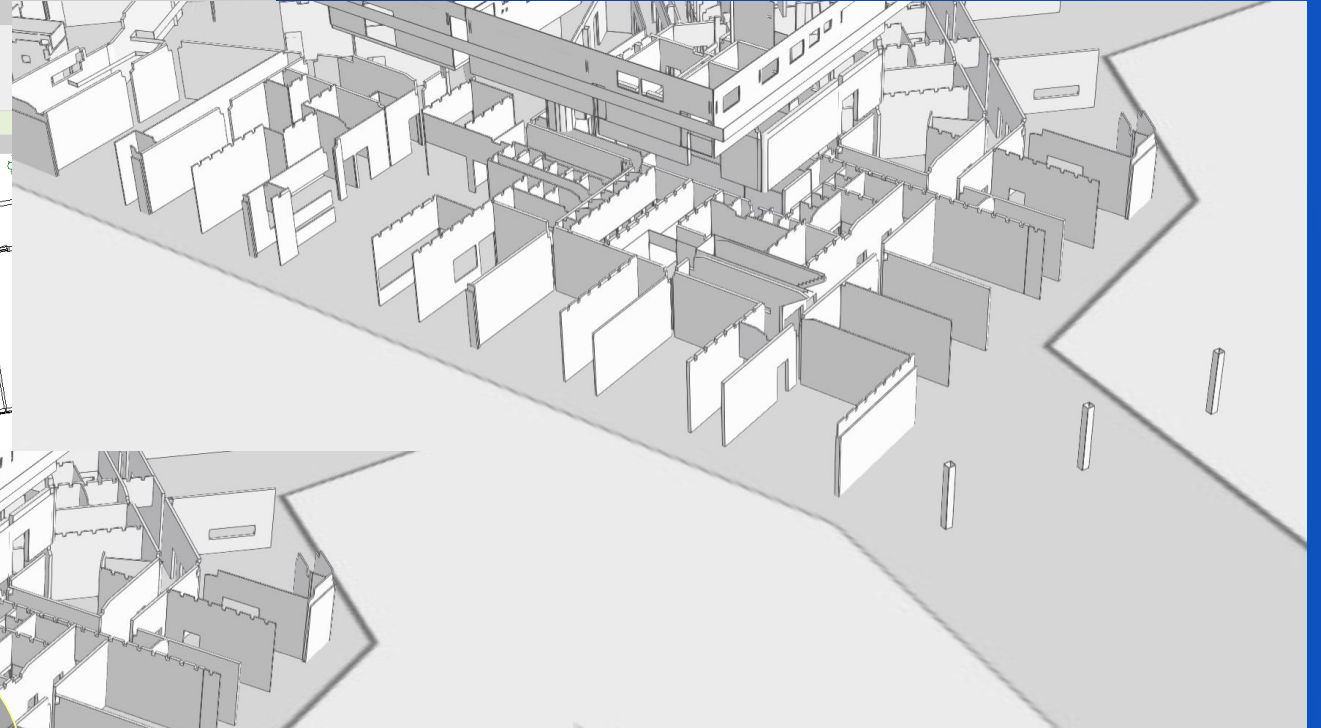
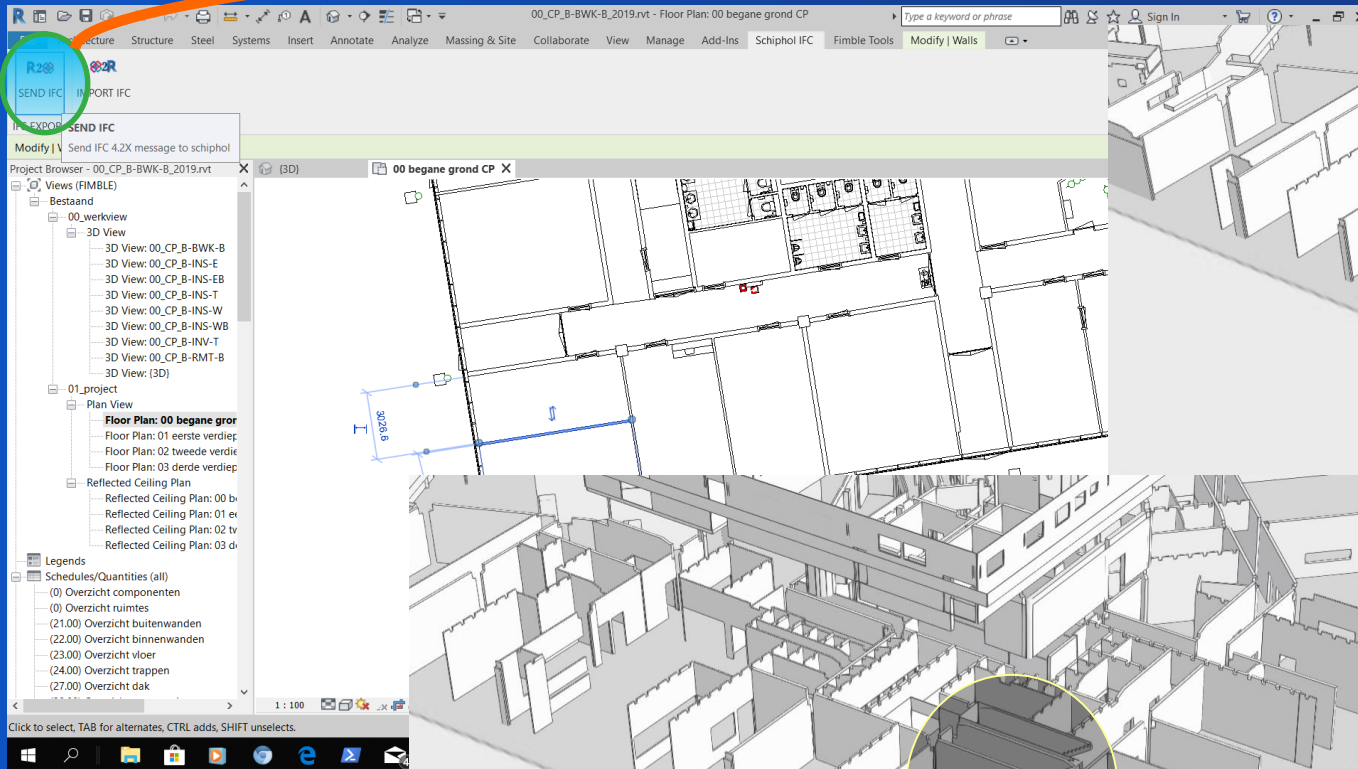
Example Information Products 3D and Geofencing



- To handle Aircrafts, there should be a fire extinguisher on the apron.
- Together with other business rules this supports the decision making in guiding a plane to a gate.

From Revit to CDE

Via “Send IFC” the wall’s geometry is placed on the Airport Service Bus and processed in the CDE.

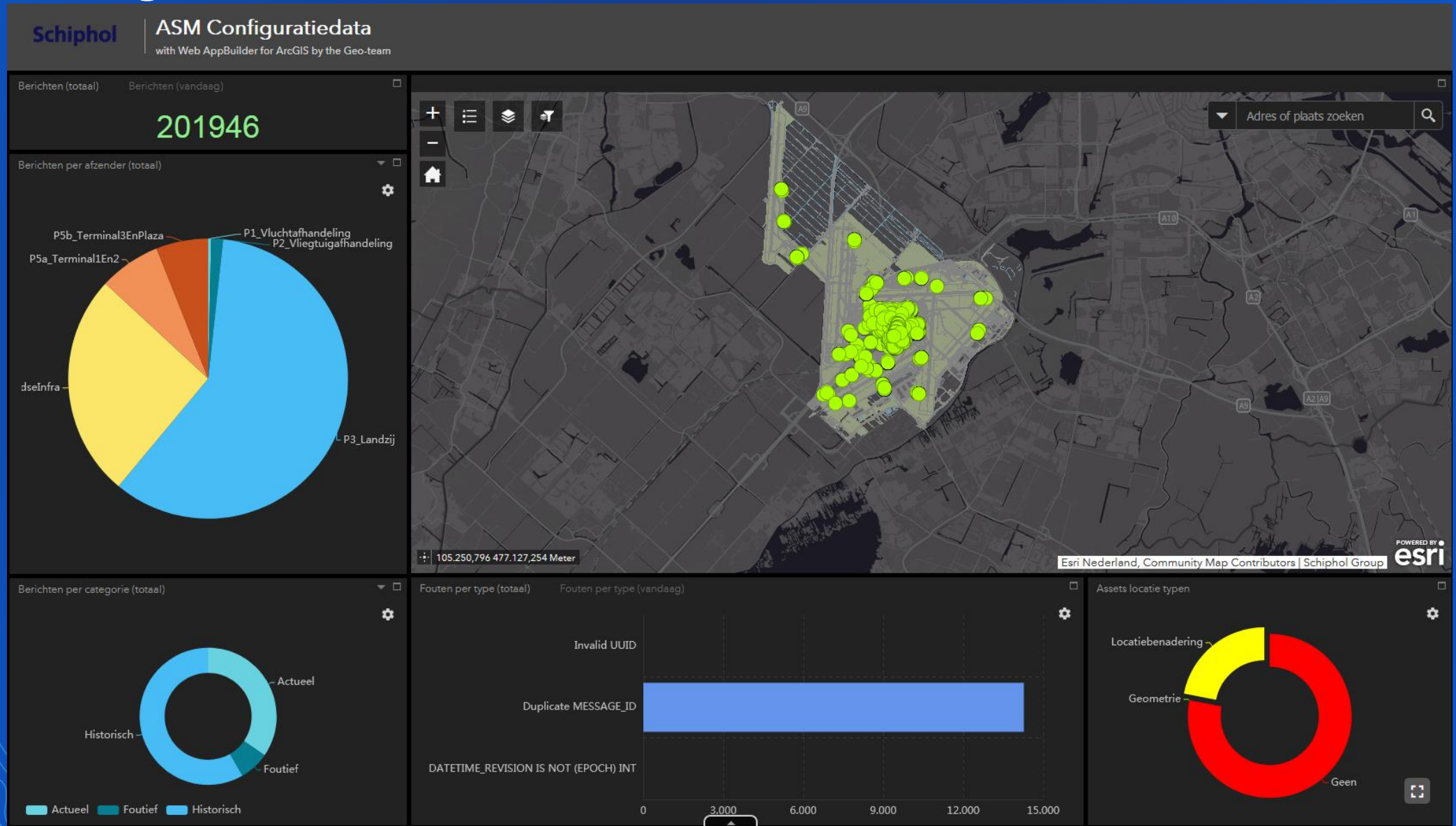


Old model in 3D Webscene.

3D model is automatic update from the ETL process

MC has made an update (new wall)

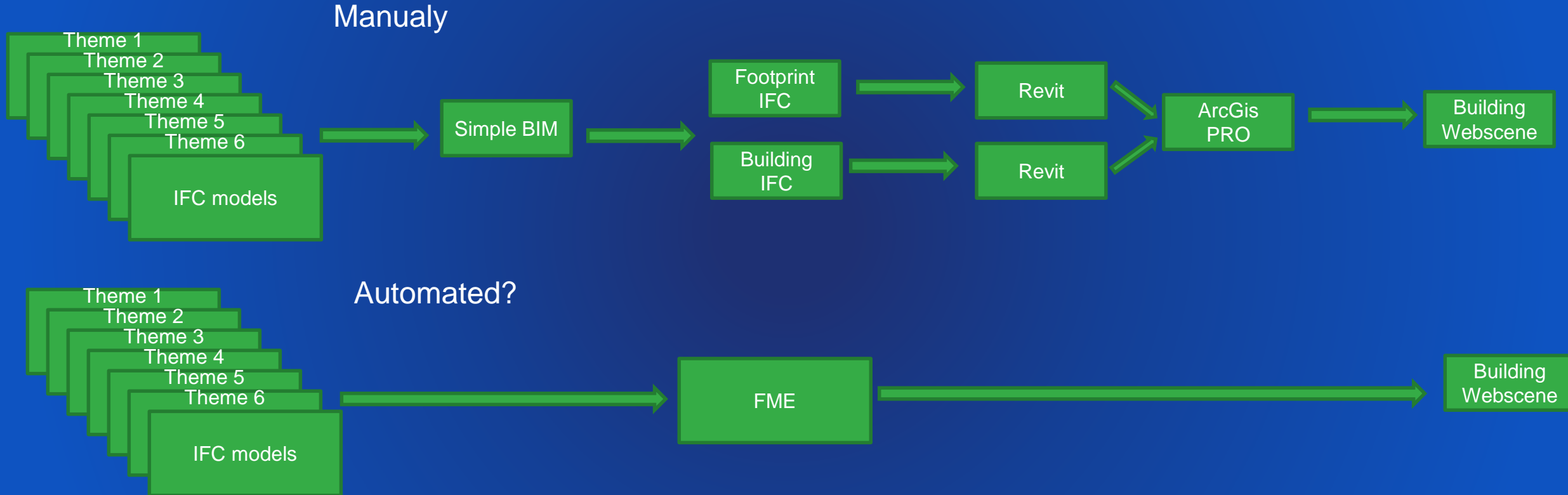
XML Message dashboard



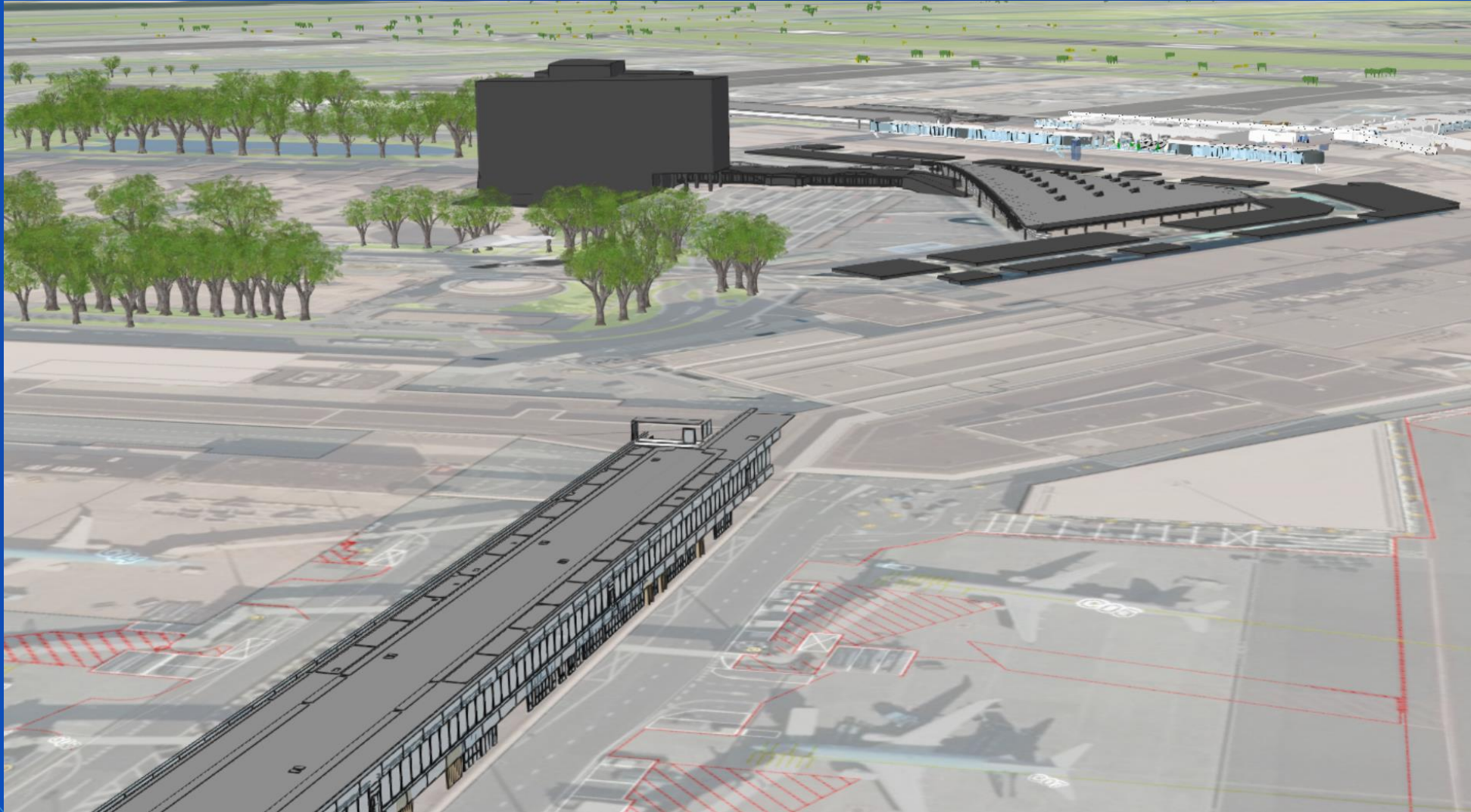
However....

- It takes a long time before the MC's has delivered all 3D geometries.
- Is it possible to use the data we already have to a 3D Urban view?
 - We have a lot of BIM models in IFC format
 - We have the floorplans of all Schiphol buildings

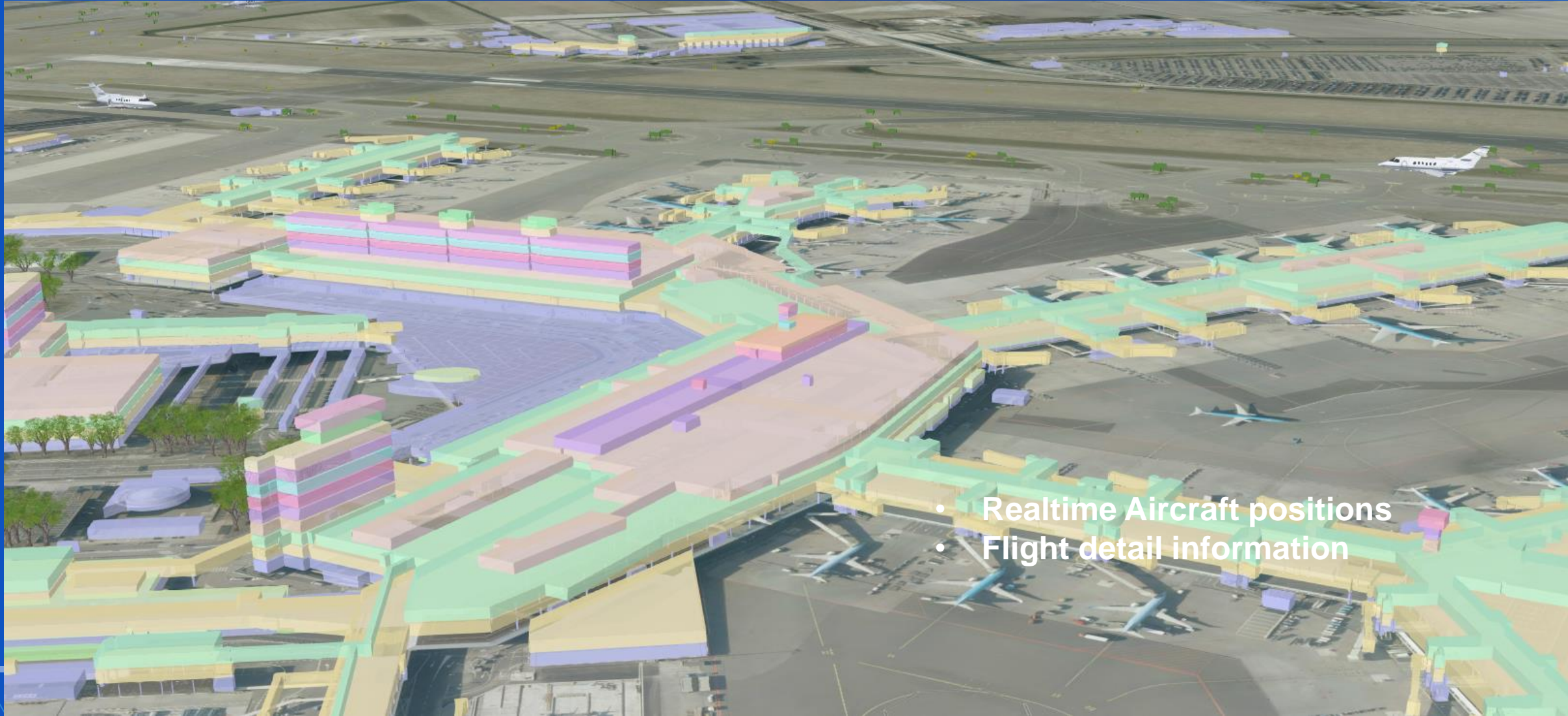
Proces existing BIM Models



Some processed BIM models



LOD1 3D model based on floor plans.

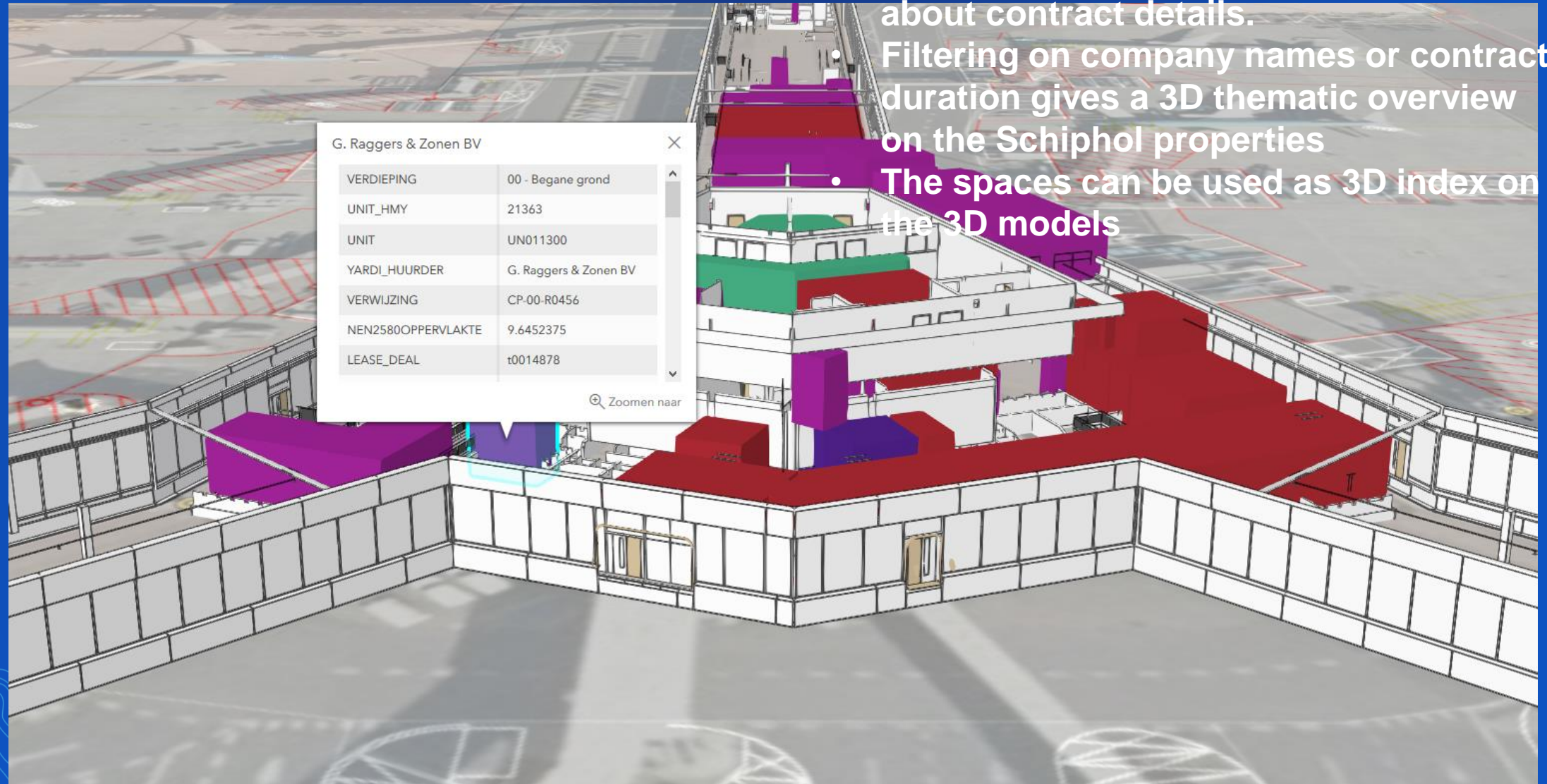


- Realtime Aircraft positions
- Flight detail information

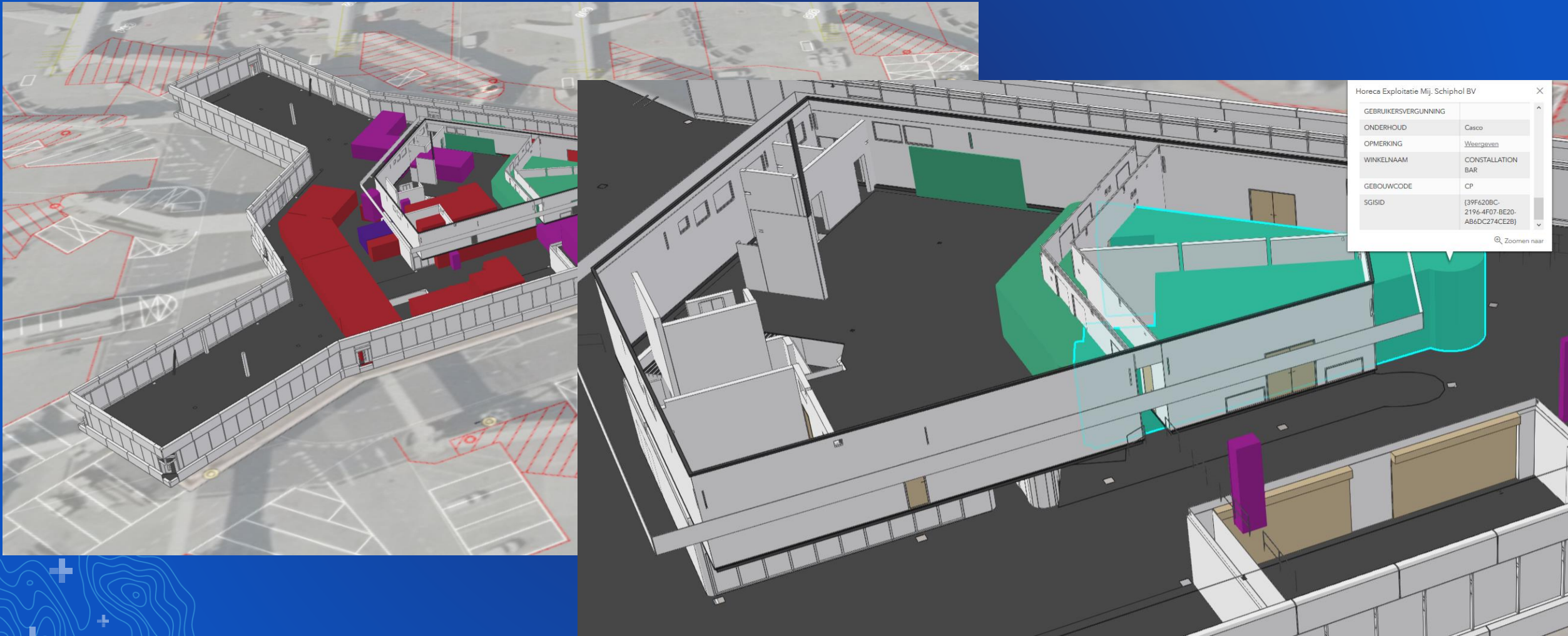
Example Information Products

3D and space rental

- A connection to Schiphol Property management system gives information about contract details.
- Filtering on company names or contract duration gives a 3D thematic overview on the Schiphol properties
- The spaces can be used as 3D index on the 3D models



Combining “intelligent” Floorplan data with “non intelligent” BIM models



Problems to Solve

- Transforming IFC data to 3D Building Web Scenes is time consuming
- Old BIM/IFC models have (mostly) no Geo reference
- 3D Modells are overlapping
- Great volumes temporary realtime data causes the SQL server to crash
- All BIM theme layers are stored in one Building Scene Layer
- No IFC interface, focus is on Revit
- The Building Web Scenes have limited functionality to build complex information products.

Resume: Schiphol BIM/3D vision

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Thank You!

Q&A?

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