

Building the Digital Twin

**OpenBIM-driven
Quality Management
in Complex Projects –
from Design
Coordination to
Facility Operations**

FORMITAS

Driving digital construction



25+

Years in business

55+
Employee
s

500+

**BIM and digitalization
projects implemented**

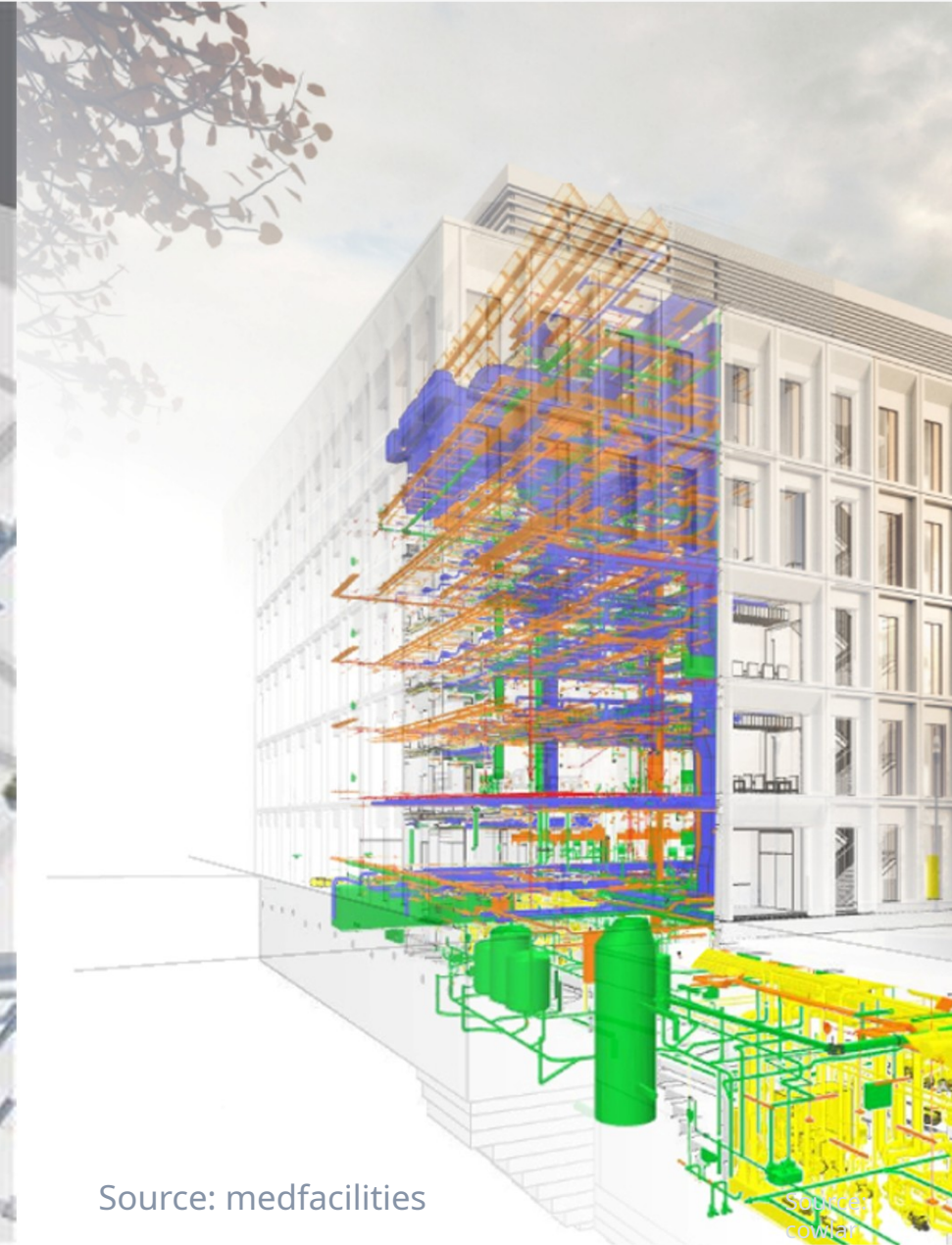
Locations

- Aachen (Headquarters)
- Berlin
- Cologne
- Erlangen
- Athens



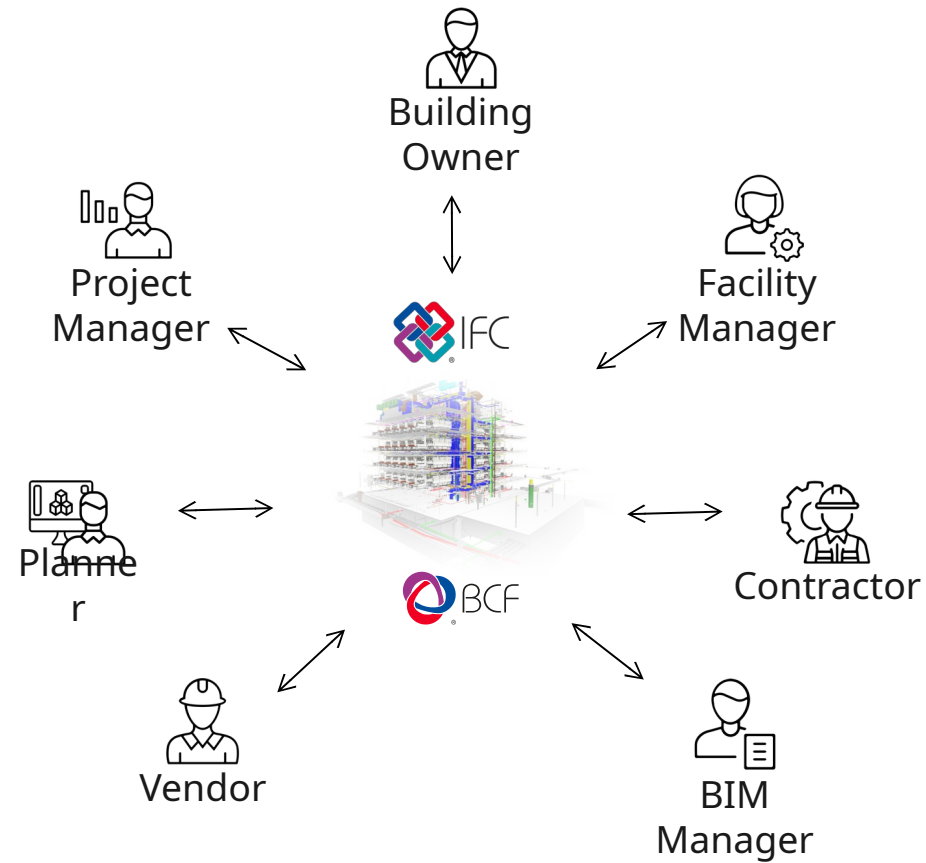
The first building in North Rhine-Westfalia, Germany, to run on its model, and it's a lab.

- Center for Metabolic Research (METABOL)
- New laboratory building
- NRW's first model-based building operation
- OpenBIM from design to operations



Source: medfacilities

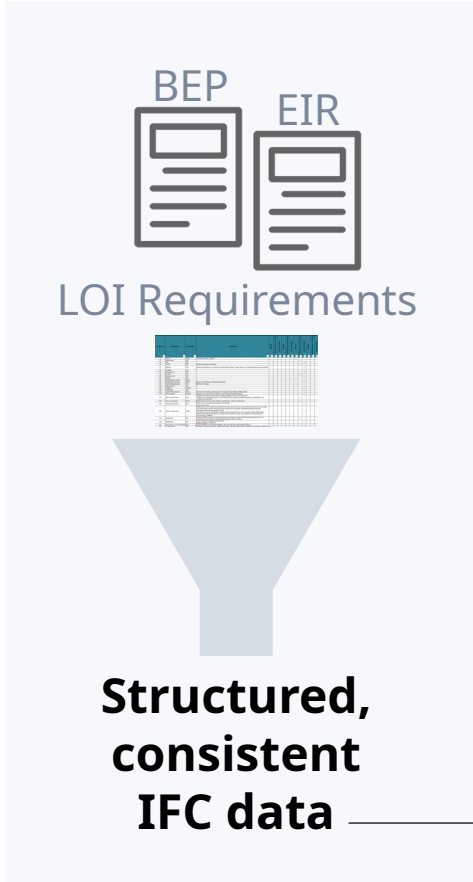
OPEN BIM WAS
NOT JUST A
PHASE – IT WAS
THE WHOLE
PROJECT



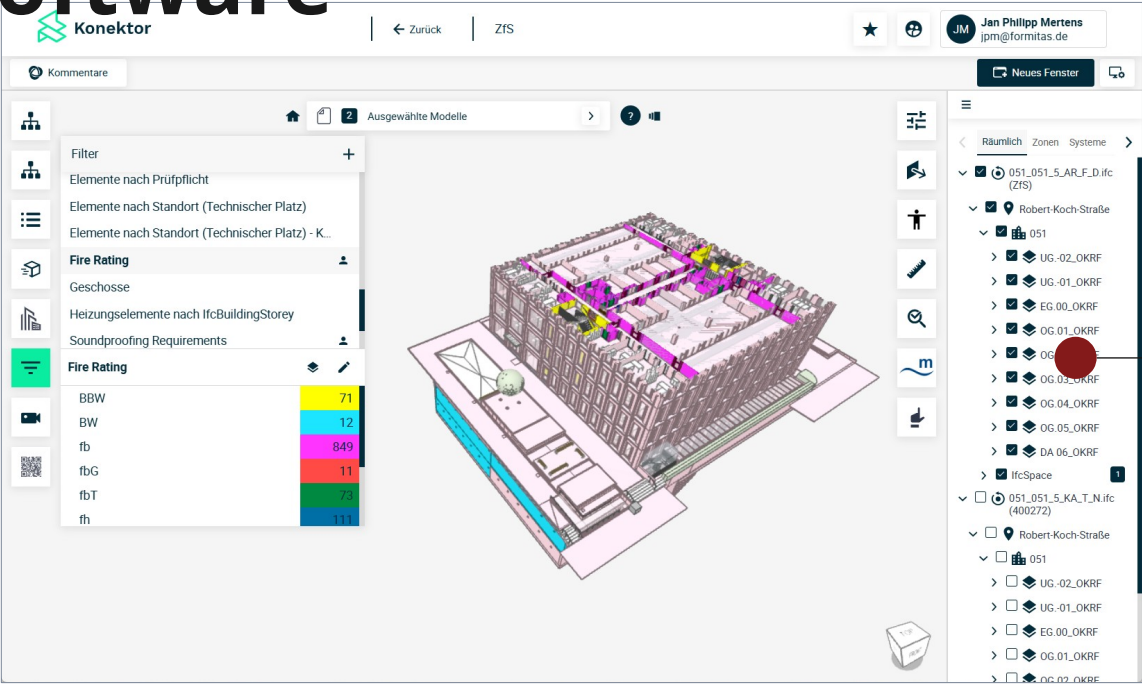
OpenBIM throughout the entire
lifecycle



Quality isn't modeled in, it's specified before anyone opens the software



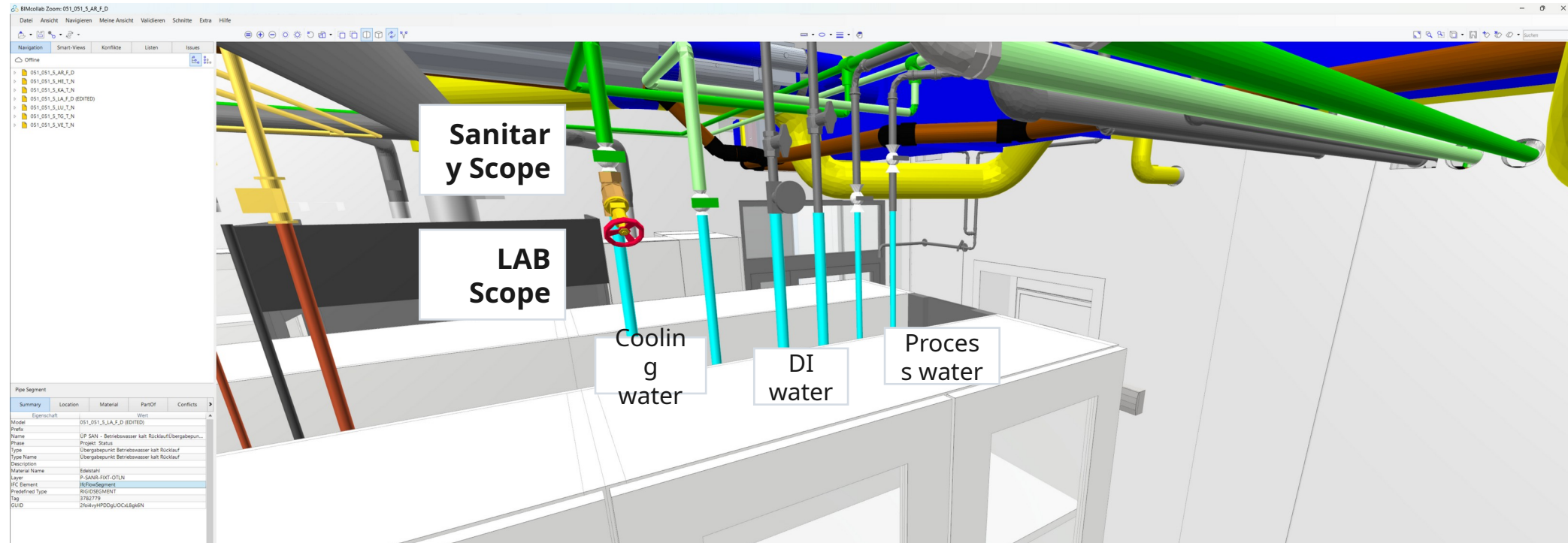
FORMITAS



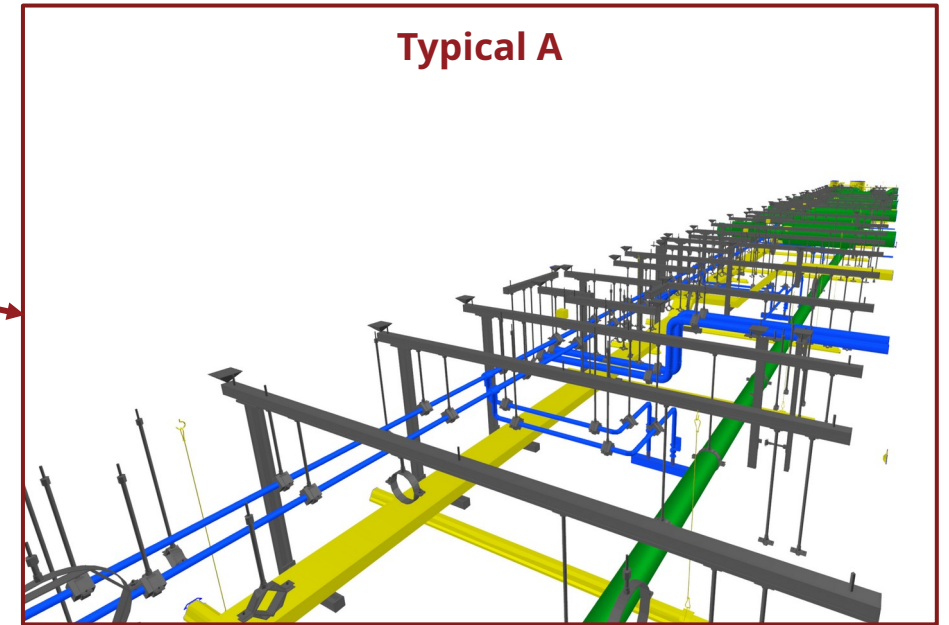
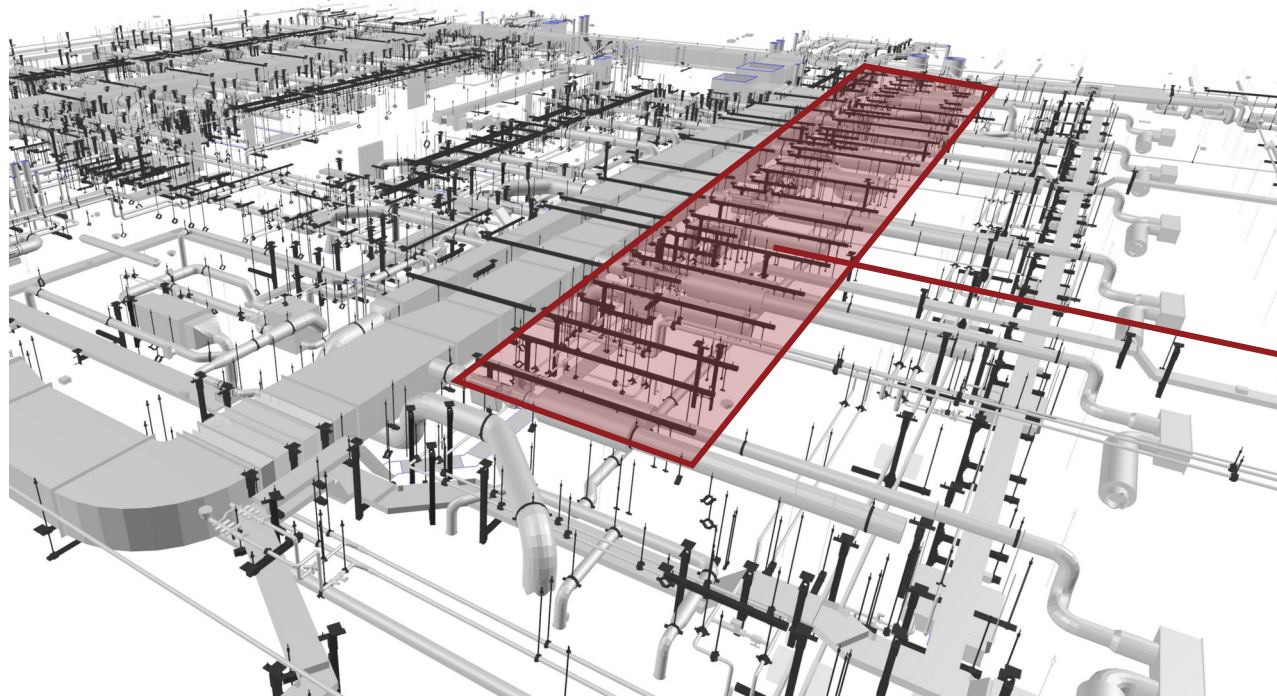
Consistent IFC structure

The specs made visible					
Fire Rating		Soundproofing Requirements		System Type	
BBW	71	32dB	149	DOMESTICCOLDWATER	13545
BW	12	34dB	210	DOMESTICHOTWATER	6
fb	849	37dB	109	ELECTRICAL	36
fbG	11	42dB	51	HEATING	28741
fbT	73	44dB	326	NOTDEFINED	160
fh	111	45dB	735	SEWAGE	4422

Interfaces were solved in the model, not on site



The fastening vendor joined the model, and complexity became typicals



1. Fastening vendor integrated in coordination process

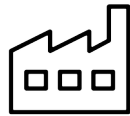
2. Layout aligned to combined supports

3. Typical identified → prefabrication

What the model promised, the site delivered



Anchor points drilled
from model data



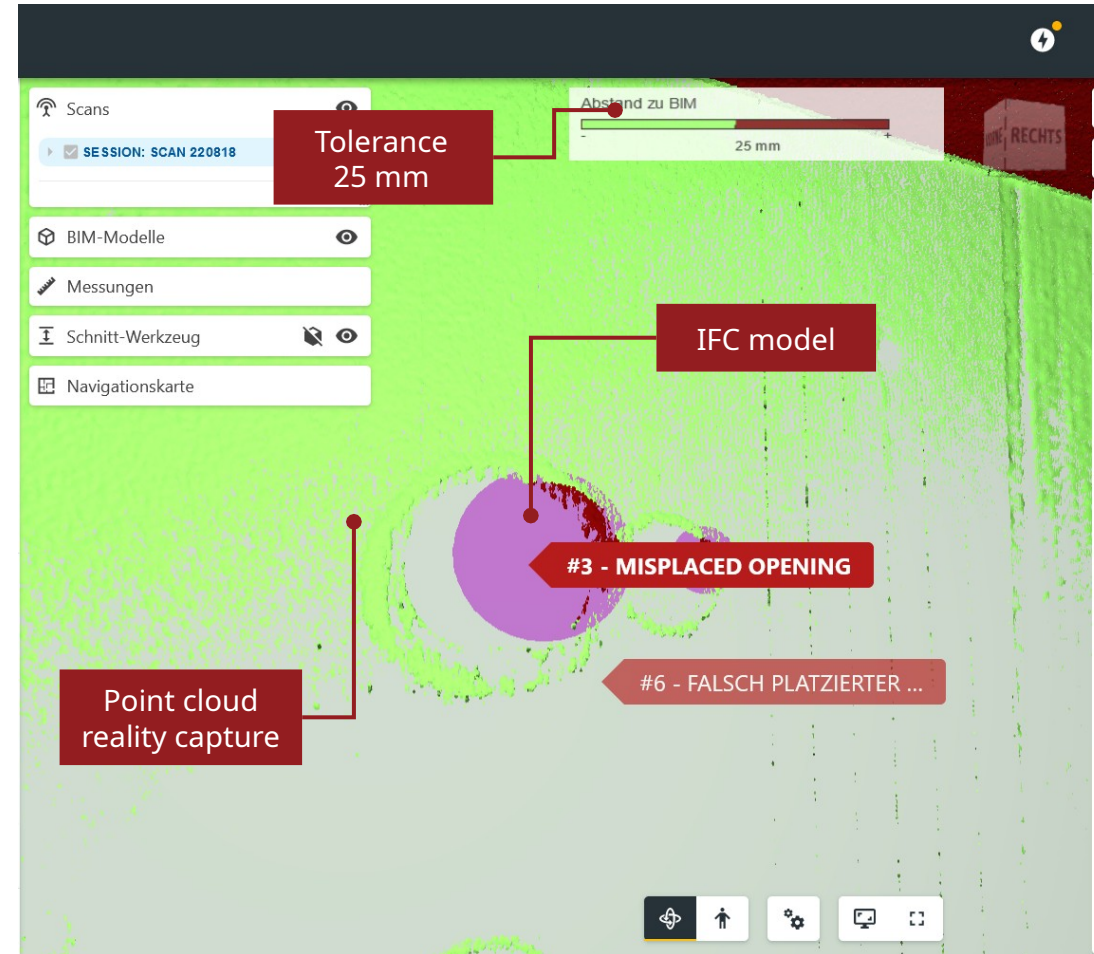
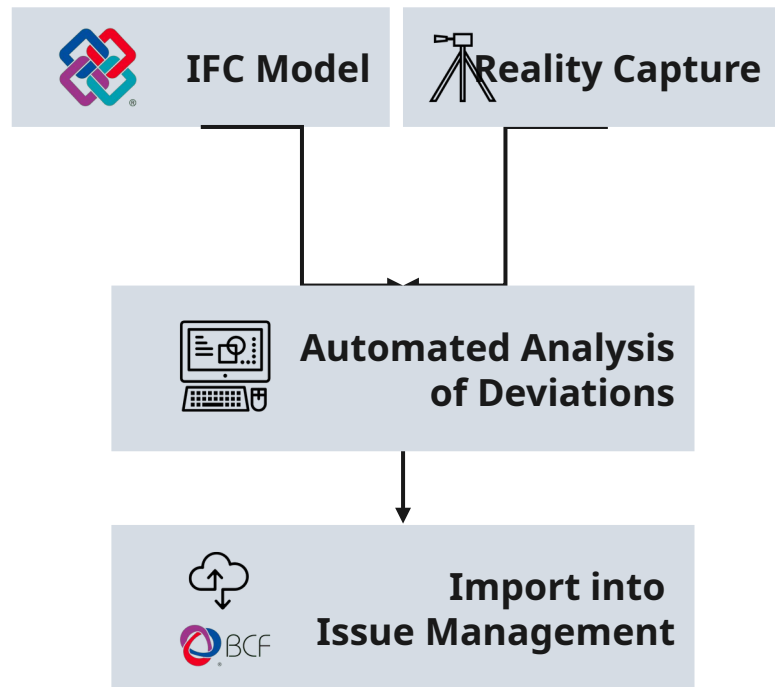
Prefabricated off site,
mounted on site



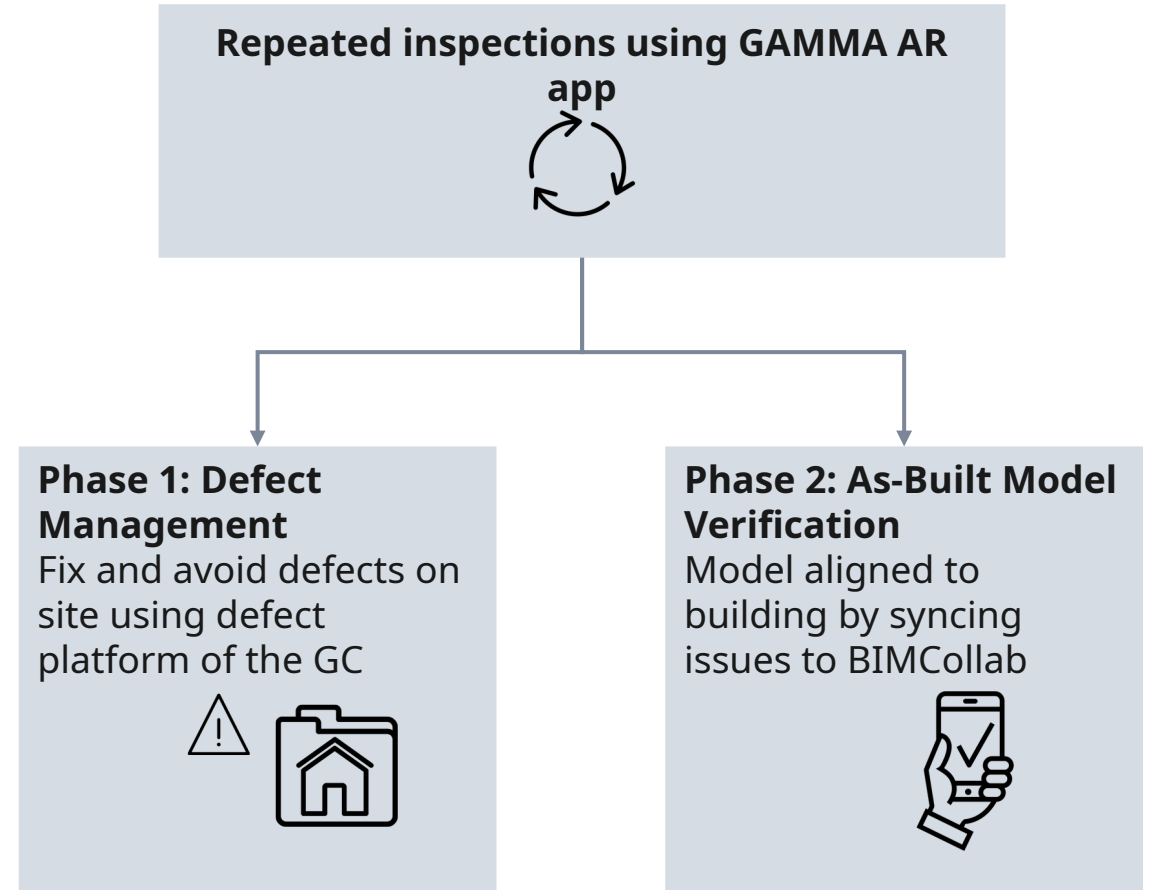
Precise MEP installed
right the first time

Source: medfacilities

Reality checked against IFC: errors caught before the next trade builds on them

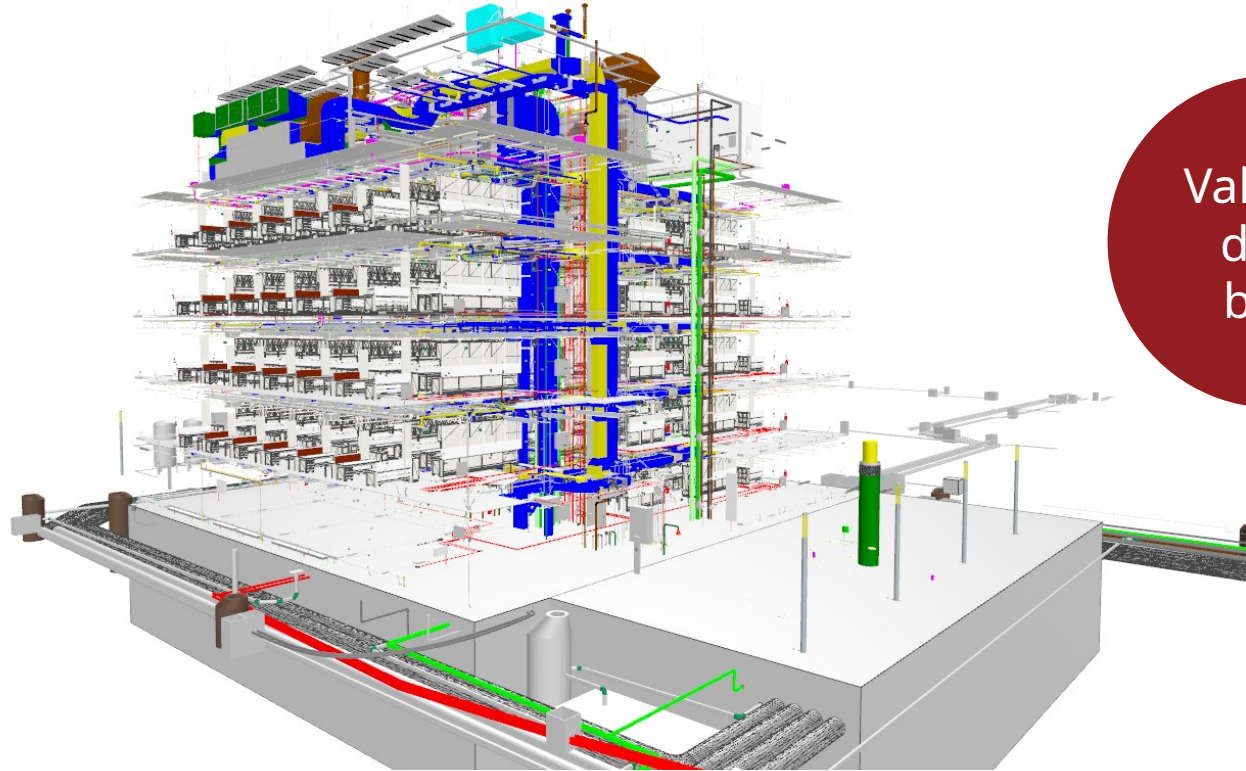


Defects fixed on site, after which the model is aligned



Source: medfacilities

Most projects hand over folders. This time it was a twin.



Validate
d as-
built

Typical Handover

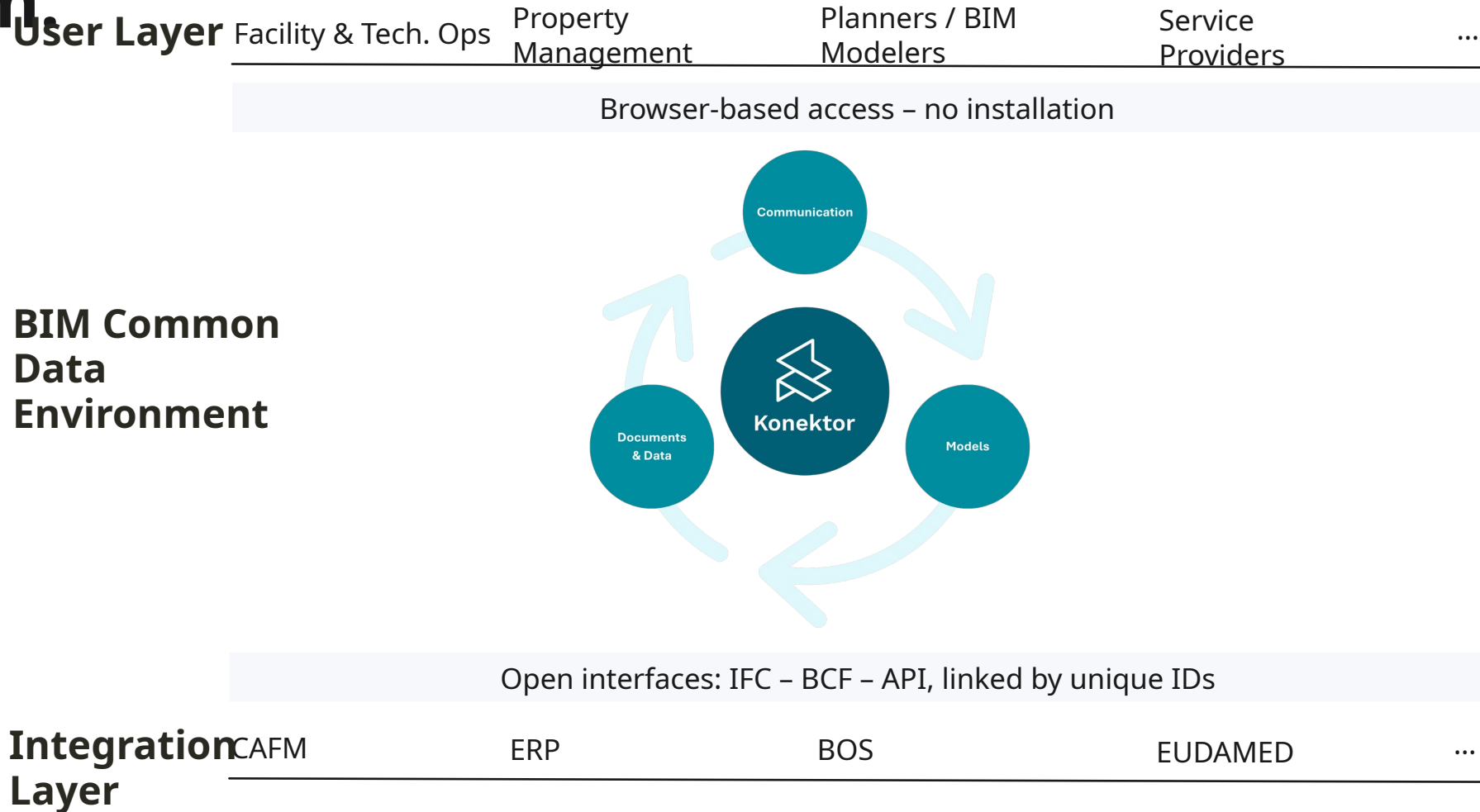
Static documentation outdated
day 1 of operation



METABOL Handover

Live, connected model verified
via AR + Pointclouds

We didn't replace the clinic's systems, we connected them.



Every element, all parameters - one click away in any browser

The screenshot displays the Konektor software interface. At the top, the Konektor logo is on the left, and navigation links for 'Back' and 'ZfS' are in the center. On the right, there's a user profile for Jan Philipp Mertens (jpm@formitas.de) and a 'New window' button. Below the navigation bar, there's a 'Comments' section. The main area features a 3D model of a building with a blue and yellow overlay. To the left of the model is a 'Filter' sidebar with a list of levels: -1.UG, -2.UG, 0.EG (highlighted with a red circle '1.'), 1.OG, 2.OG, 3.OG, 4.OG, and 0.EG. To the right of the model is a 'Properties' sidebar with a search bar and a list of properties: Bezeichnung (TROX - RN 80-KVR-7456881), Eigentümer (Universitätsklinikum Köln AöR), Equipmentnummer (30051129), Errichter (MD HSL Köln), Gewährleistungsende (2029), Gewährleistungsgeber (nesseler bau gmbh), and Hersteller (Trox). Below the 3D model is a 'Lists' section with a table titled '439-BSK_Brandschutzklappen'. The table has columns: Menge, Klasse, Standort, BSK-Nummer, Hersteller, Hersteller-Typ, Seriennummer, and Brandschutzklappen. The table contains five rows of data. A red circle '2.' is placed over the second row. At the bottom right, there's a red circle '3.' next to the 'Properties' sidebar. The bottom of the interface shows 'Seite 1 von 5' and '(50 Zeilen pro Seite)'.

1. Filter

2. Smart List: Every fire prevention stop, listed and inspection-ready

3. Client Pset: The clinic's own parameter standard

Menge	Klasse	Standort	BSK-Nummer	Hersteller	Hersteller-Typ	Seriennummer	Brandschutzklappen	
> (1)	439-BSK_Brandschutz...	439-BSK_Brandschutz...	051-E1-901b	BSK1.1.02	Trox	FK2-EU/DE/900X400...	DoP/FK2-EU/DE/002	thermoelektrisch
> (1)	439-BSK_Brandschutz...	439-BSK_Brandschutz...	051-E0-906	BSK3.0.14	Trox	FKRS-EU/DE/160/TQ2...	DoP/FKRS-EU/DE/004	thermoelektrisch
> (1)	439-BSK_Brandschutz...	439-BSK_Brandschutz...	051-E2-901a	BSK3.2.03	Trox	FKRS-EU/DE/100/TQ2...	DoP/FKRS-EU/DE/004	thermoelektrisch
> (1)	439-BSK_Brandschutz...	439-BSK_Brandschutz...	051-E5-002	BSK1.5.03	Trox	FK2-EU/DE/1200X800...	DoP/FK2-EU/DE/002	thermoelektrisch
> (1)	439-BSK_Brandschutz...	439-BSK_Brandschutz...	051-E0-906	BSK1.0.03	Trox	FK2-EU/DE/900X400...	DoP/FK2-EU/DE/002	thermoelektrisch

Scan the room, click the unit and open its data sheet in seconds

The screenshot displays the Konektor software interface, which is used for managing building assets. The interface is divided into several sections:

- Left Panel:** A sidebar with a QR scanner icon and a list of rooms. The selected room is "Raum EG.019" under "ZfS (Geb. 51)".
- 3D View:** A 3D model of a room with various HVAC units. A red circle labeled "1." is placed over the QR scanner icon, and a red circle labeled "2." is placed over a selected HVAC unit.
- Properties Panel:** A panel on the right showing the properties of the selected unit. It includes a search bar, a list of properties, and a red circle labeled "3." next to the "Equipmentnummer" (30045494).
- Technical Documents Panel:** A panel on the far right showing a linked technical document titled "Cassette- & HyCassette-Geko". A red circle labeled "4." is placed over the document cover, which features an image of the HVAC unit.

The "Properties" panel lists the following data:

Property	Value
Umluftkühlerart	GCC1.HW0.SE5.11456465
Peet_Uniklinik	
Baugahr	2024
Bemerkung	N.A.
Betriebsstatus	N.A.
Bezeichnung	Umluftkühler
Eigentümer	Universitätsklinikum Köln AöR
Equipmentnummer	30045494
Errichter	MD HSL Köln
Gewährleistungsende	2029
Gewährleistungsgeber	nessler bau gmbh
Hersteller	Fläkt
Hersteller-Typ	HyCassette-Geko GCC1.HW0.SE5
Inbetriebnahme Datum	30.05.2024
Klasse	434-UKG_Umluftkühler
Kälteleistung [kW]	2.1
Letzter Prüfungstermin	9999
Prüfintervall	9999
Prüfpflicht	false
Seriennummer	660132_036
Standort	051-E3-021
rechn. Lebensdauer	20
rechn. Lebensende	2044
technischer Zustand	mangelfrei
voraus. Lebensende	2050

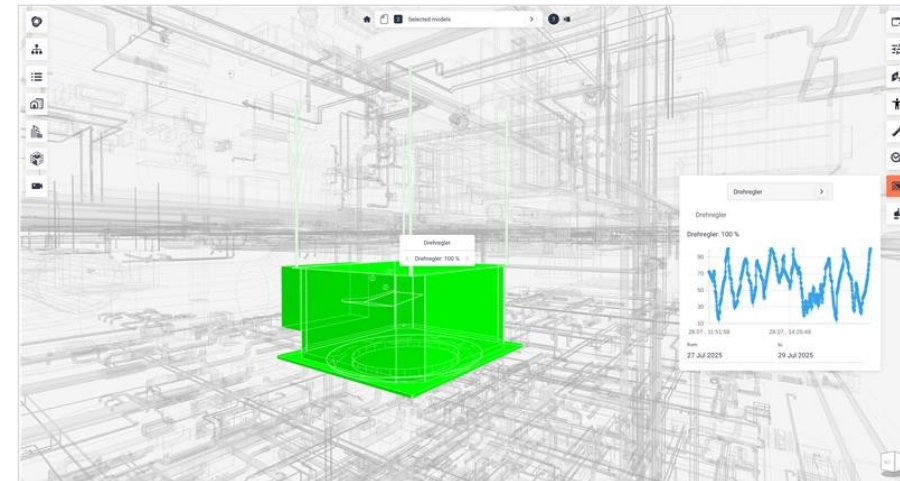
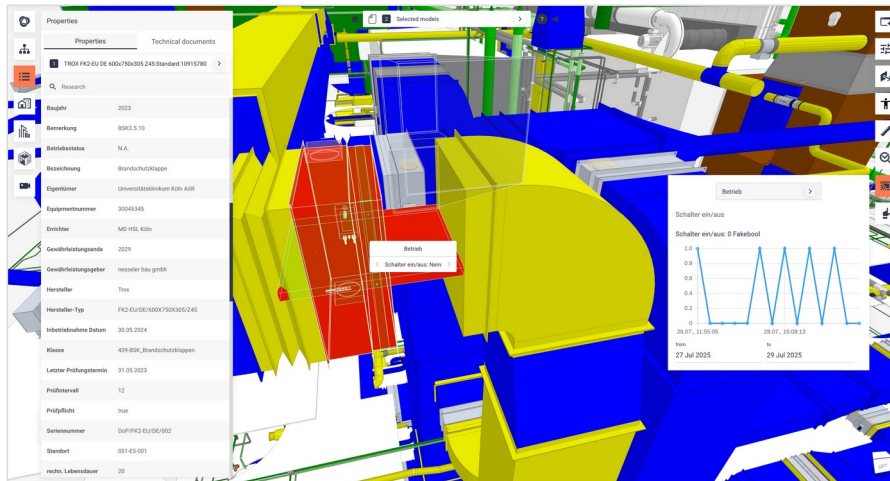
1. Scan room

2. Locate & select element

3. Asset data incl. ID (Equipment No.)

4. Linked docs

Live BMS data, located in the exact element it belongs



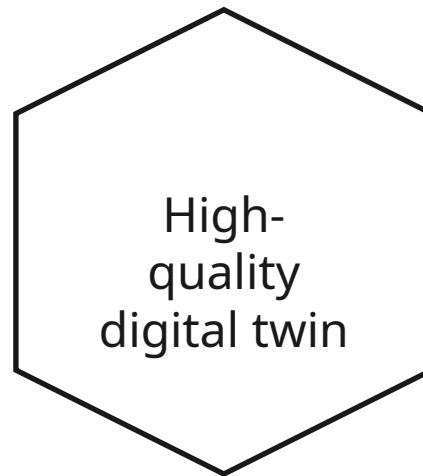
Source: medfacilities



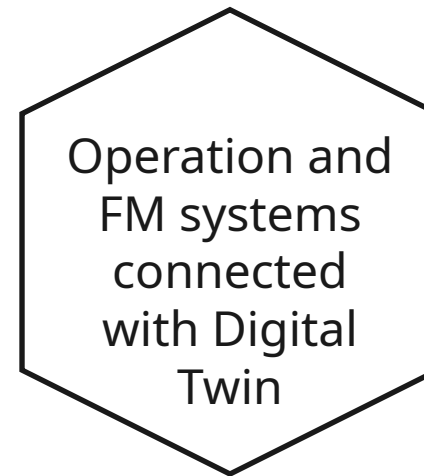
From design coordination to facility operations – continuous, IFC-based, seamless



Every stakeholder in
the model



Definition of
operations data before
planning starts



Connect, don't replace

COMING SOON

BIM basic course with buildingSMART certificate

eLearning

Official training provider



FORMITAS

FORMITAS

Let's connect.

 www.formitas.de/el

 jpm@formitas.de

 LinkedIn

Jan Philipp Mertens
Head of Athens Office
Building Information Modeling



BACKUP

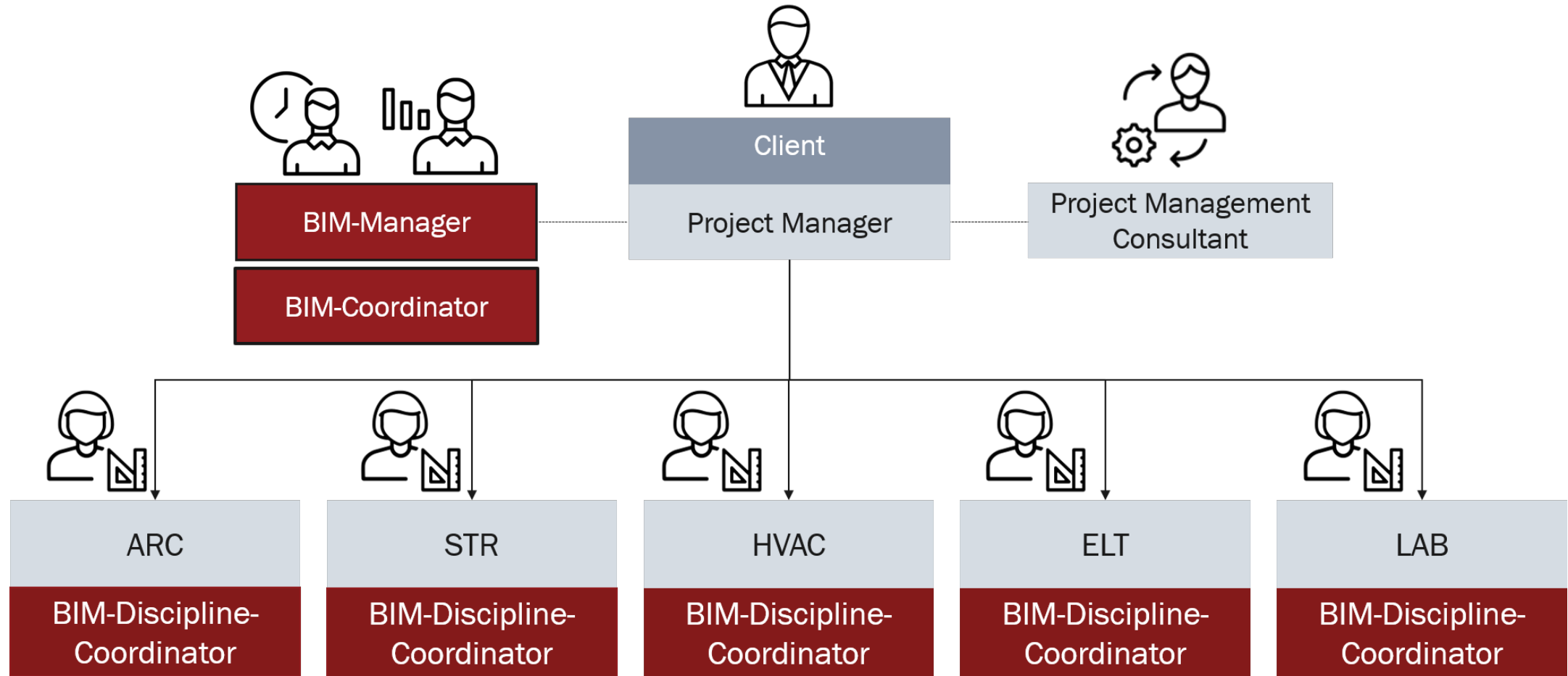


BIM ANALYSIS

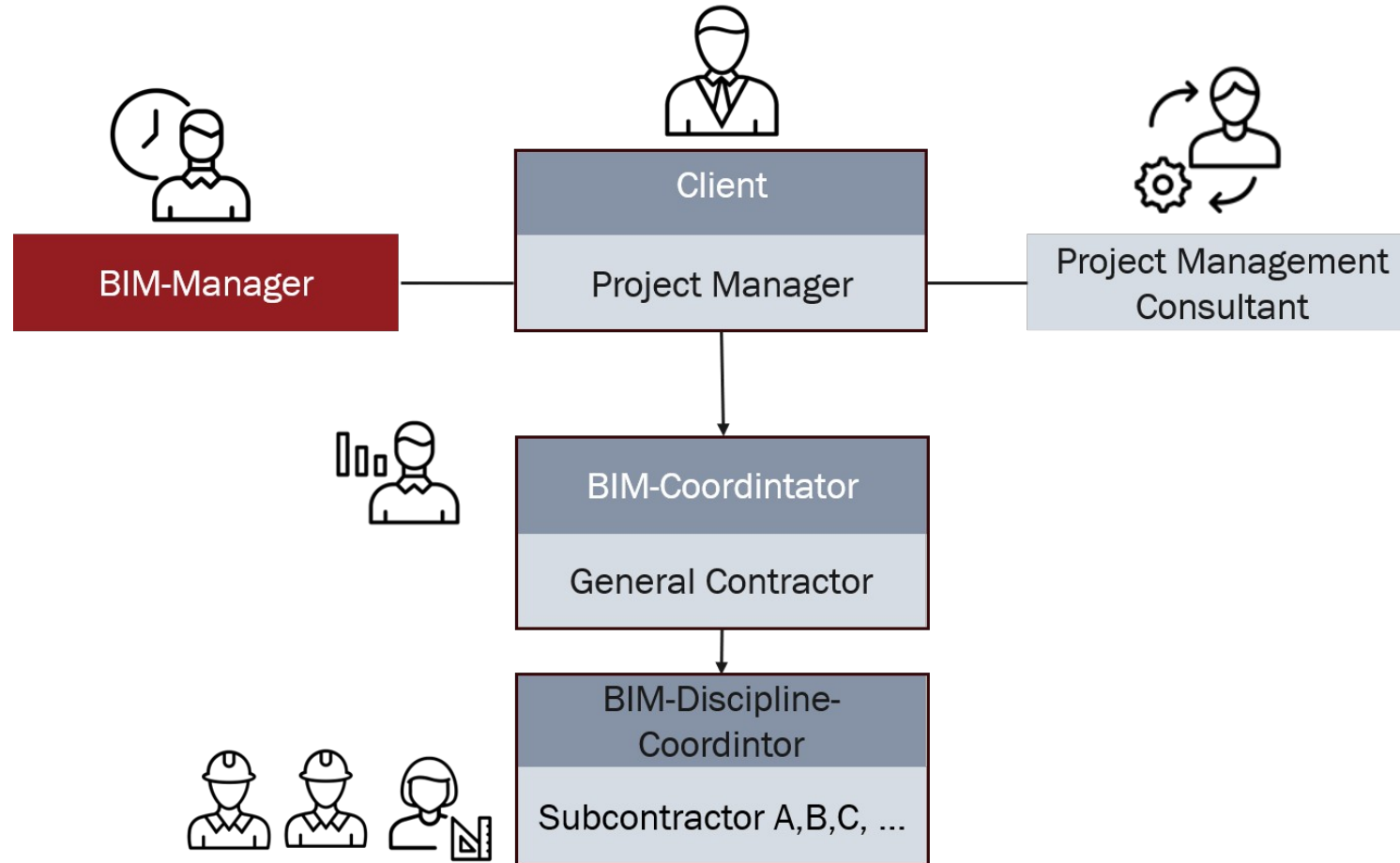
BIM EXECUTION PLANNING



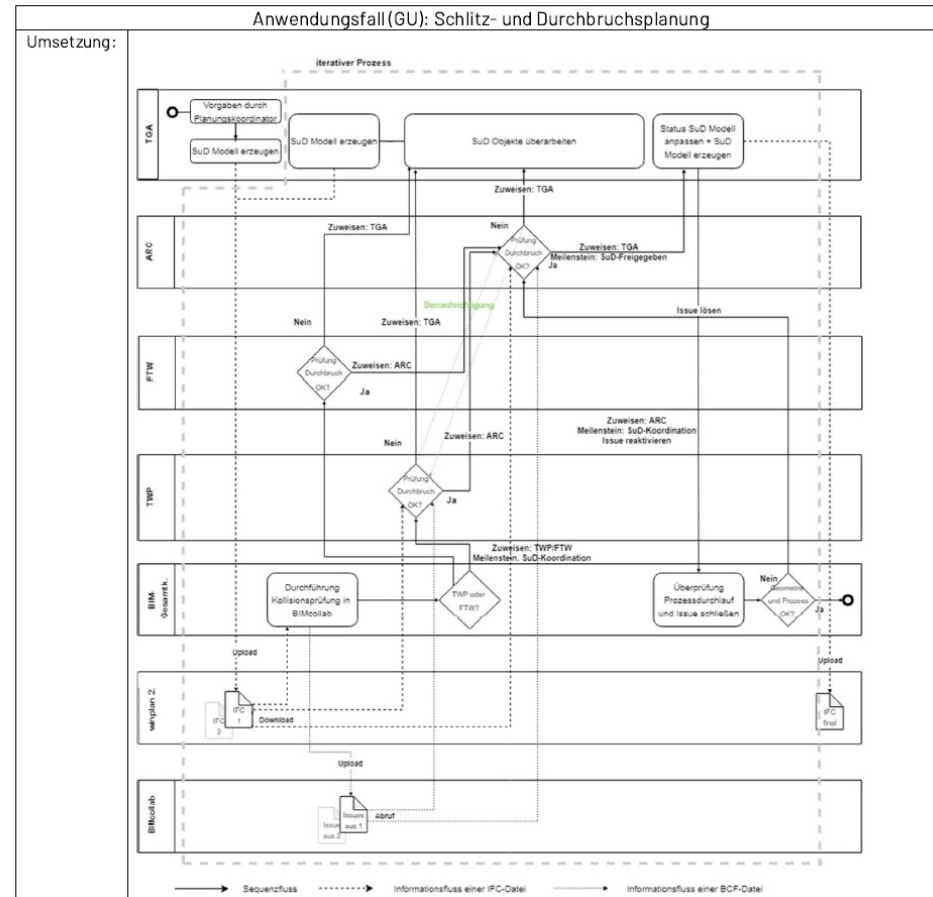
Project organization – design phase



Project organization – construction phase



Project organization – construction phase



Live data from operator's ERP system

Konektor | Back | ZFS - Laborgebäude

Comments

Properties

Properties Technical documents

Raum: 1965077

Search

Peet_Uniklinik

Baugahr: 2024

Bemerkung: N.A.

Bezeichnung: Raum

DIN 277 Fläche: NUF 2

Eigentümer: Universitätsklinikum Köln AG

Errichter: N.A.

Gebäudenummer: 051

Gewährleistungsende: 2029

Gewährleistunggeber: Nesselau bau gmbh

Hersteller: N.A.

Hersteller-Typ: N.A.

Klasse: 000-Räume

Kostenstellennummer/Bezeichnung: 999999

Lichte Höhe: 3.4

RNA Nummer/Bezeichnung: 211

Robbauhöhe: 3.74

Standort: 051-E4-029, Büro E

Technischer Platz: 051-E4-029

Versorgungs-, bzw. Wirkbereich: N.A.

Zugänglichkeit: N.A.

Selected models

051-E4-029

All (21)

HSD Files (21)

Form Responses (0)

Search

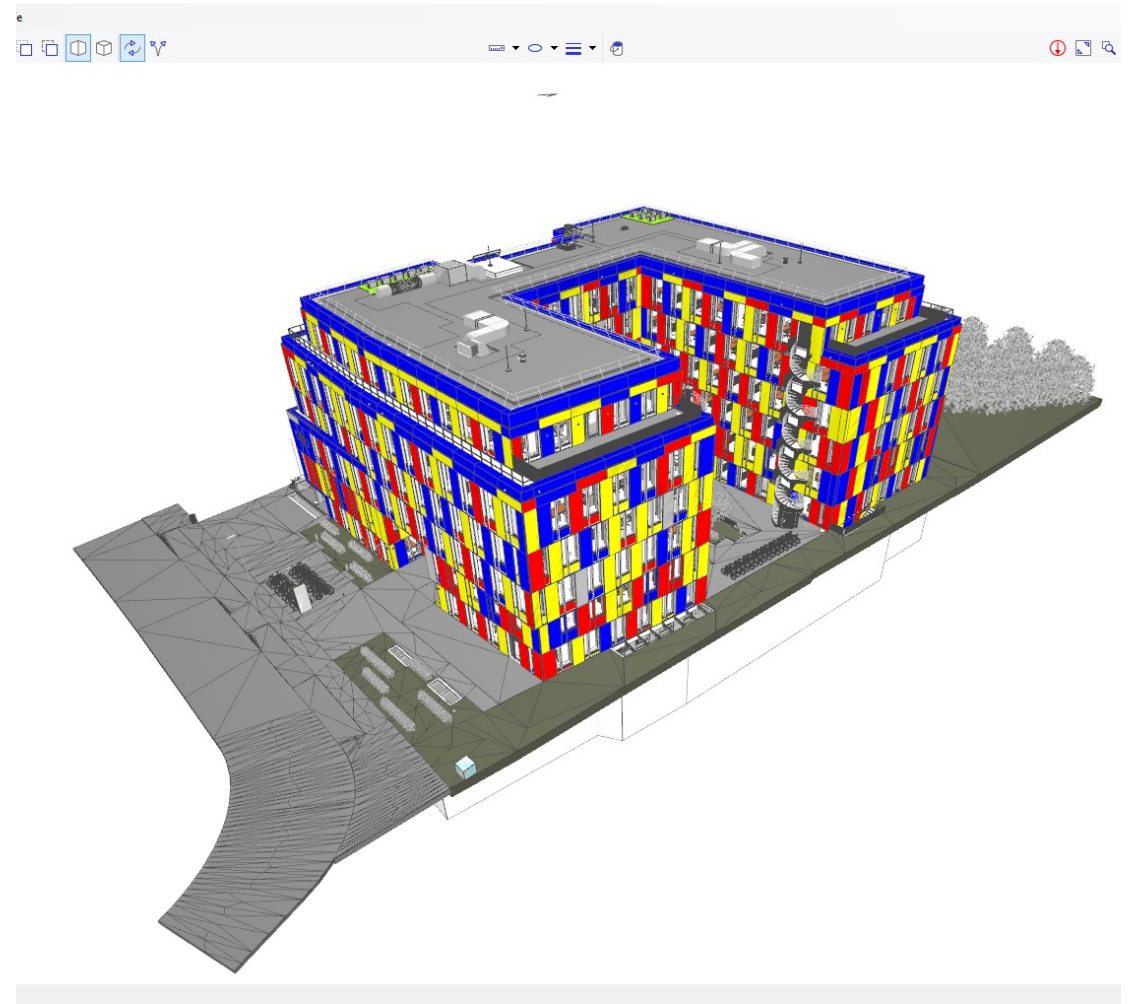
Type	Name	Standort	Category	Date	actions
HSD	Originalliste 240822_051-ZFS-Türliste.xlsx	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Email Viten Blanko ID's.pdf	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Blanko Türliste ZFS.xlsx	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Originalliste 240822_051-ZFS-Türliste.xlsx	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Email Viten Blanko ID's.pdf	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Blanko Türliste ZFS.xlsx	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Originalliste 240822_051-ZFS-Türliste.xlsx	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Email Viten Blanko ID's.pdf	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Blanko Türliste ZFS.xlsx	051-E4-029	Erfassung	-	📍 ⓘ
HSD	Originalliste 240822_051-ZFS-Türliste.xlsx	051-E4-029	Erfassung	-	📍 ⓘ

1-10 / 21

Quality Assurance

Three-Step Approach

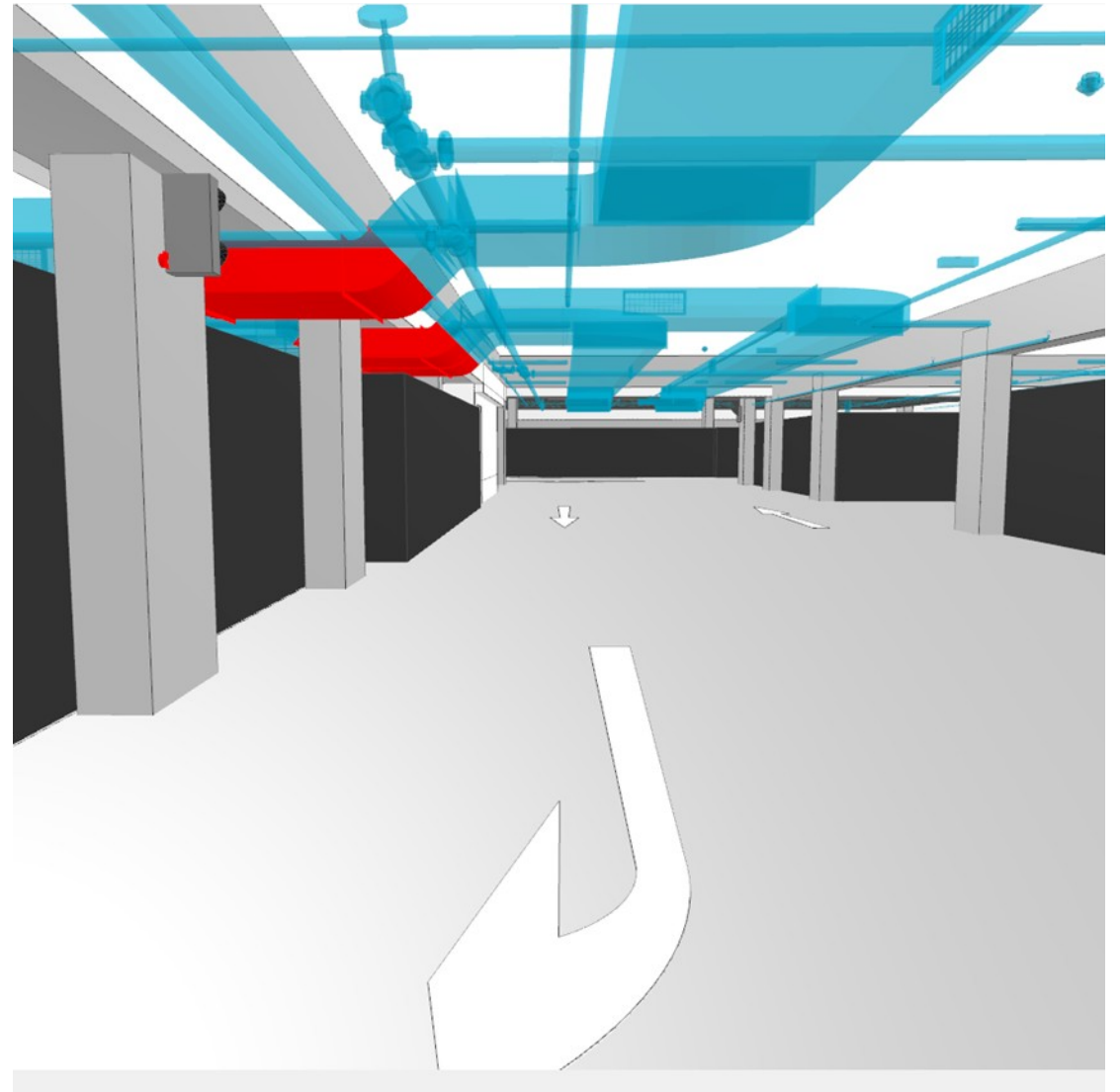
- Discipline model quality control
- Coordination model quality control
- BIM Management quality control



BIMcollab ZOOM

Smart Views:

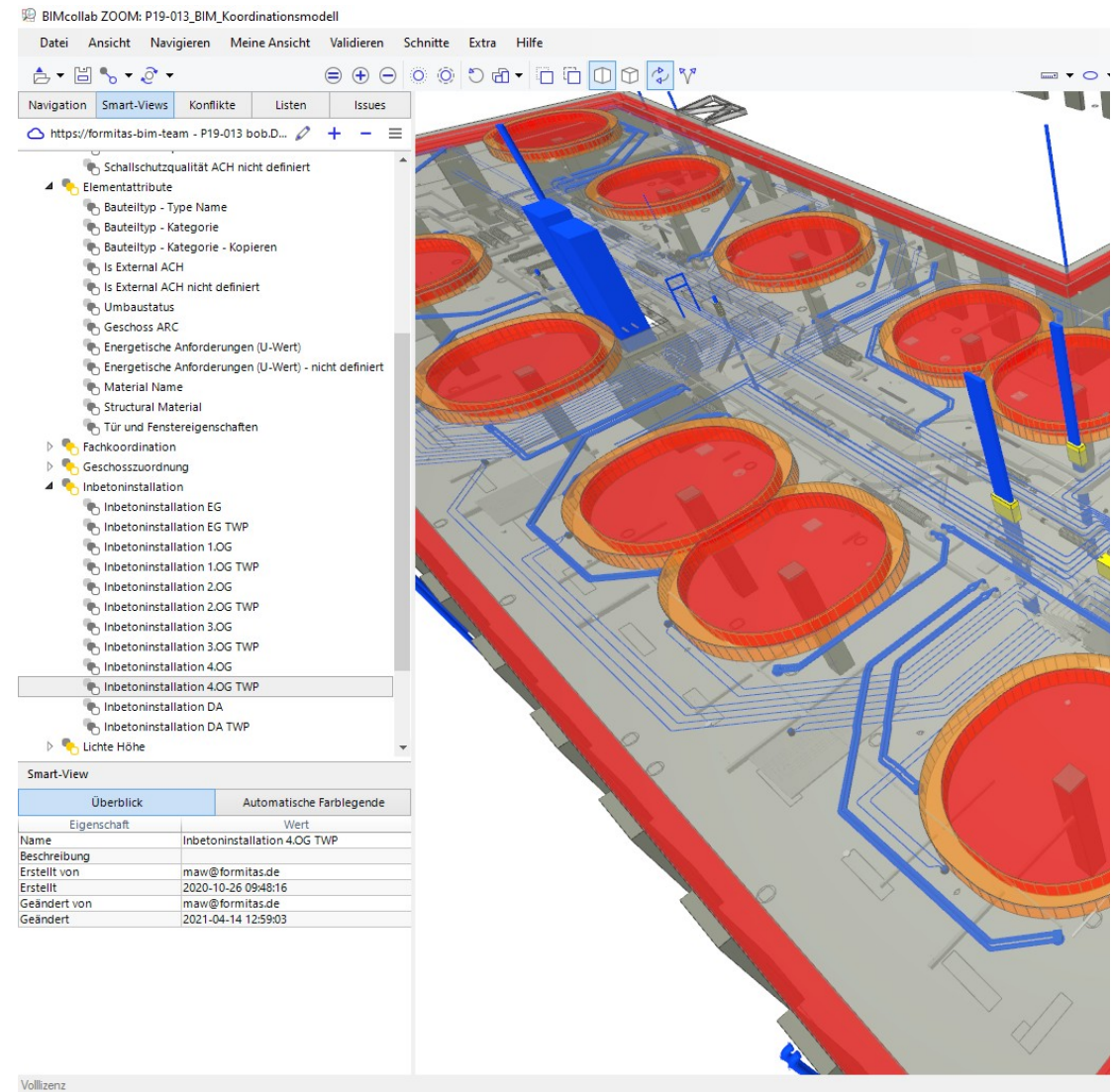
- Clear height required by MEP
- Keeping restricted zones in the structural framework clear of MEP
- Attribute check
- Quick and easy views of the model, e.g.: "What is inside and what is outside the suspended ceiling?"



BIMcollab ZOOM

Smart Views:

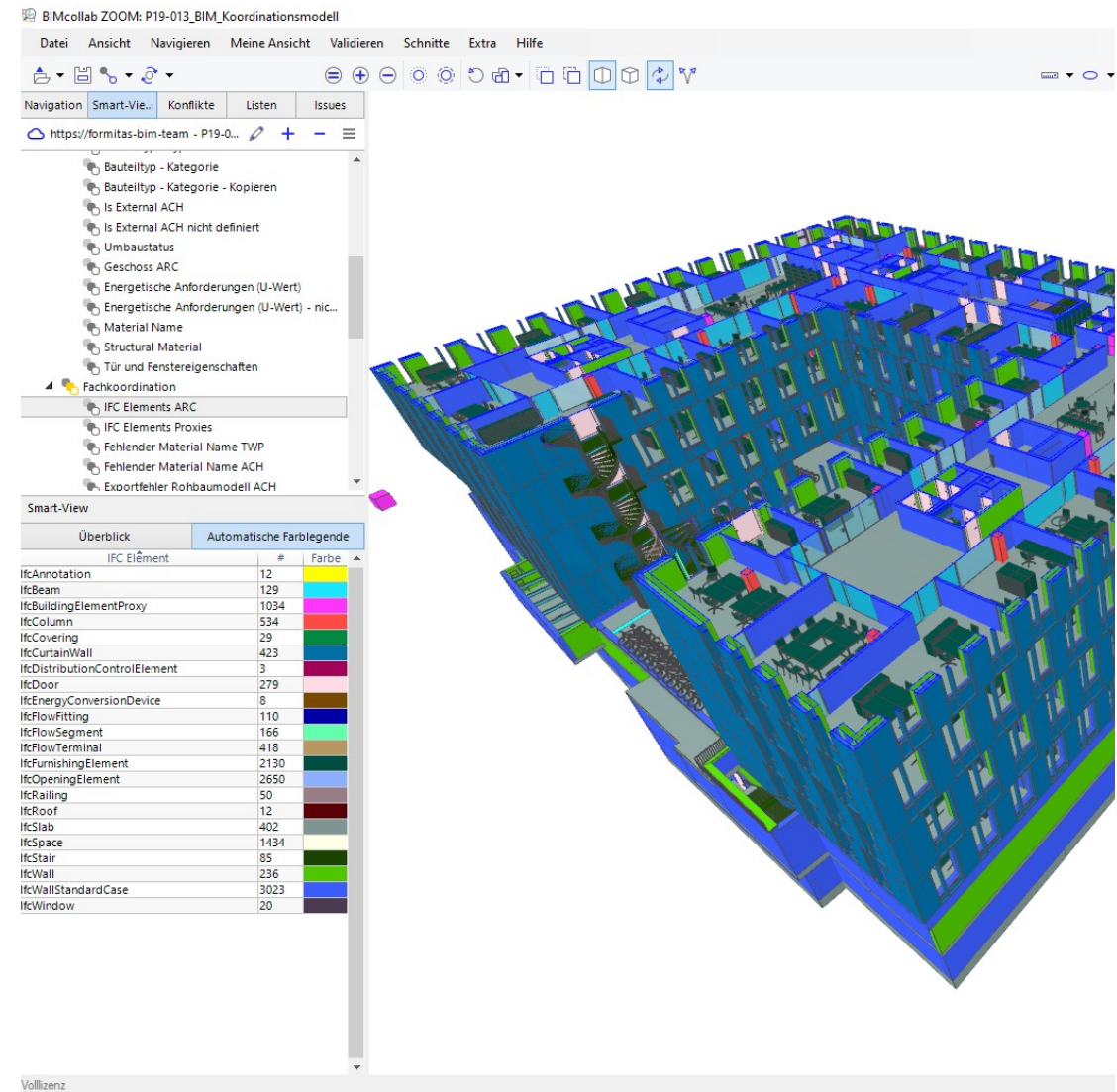
- Clear height required by MEP
- **Keeping restricted zones in the structural framework clear of MEP**
- Attribute check
- Quick and easy views of the model, e.g.: "What is inside and what is outside the suspended ceiling?"



BIMcollab ZOOM

Smart Views:

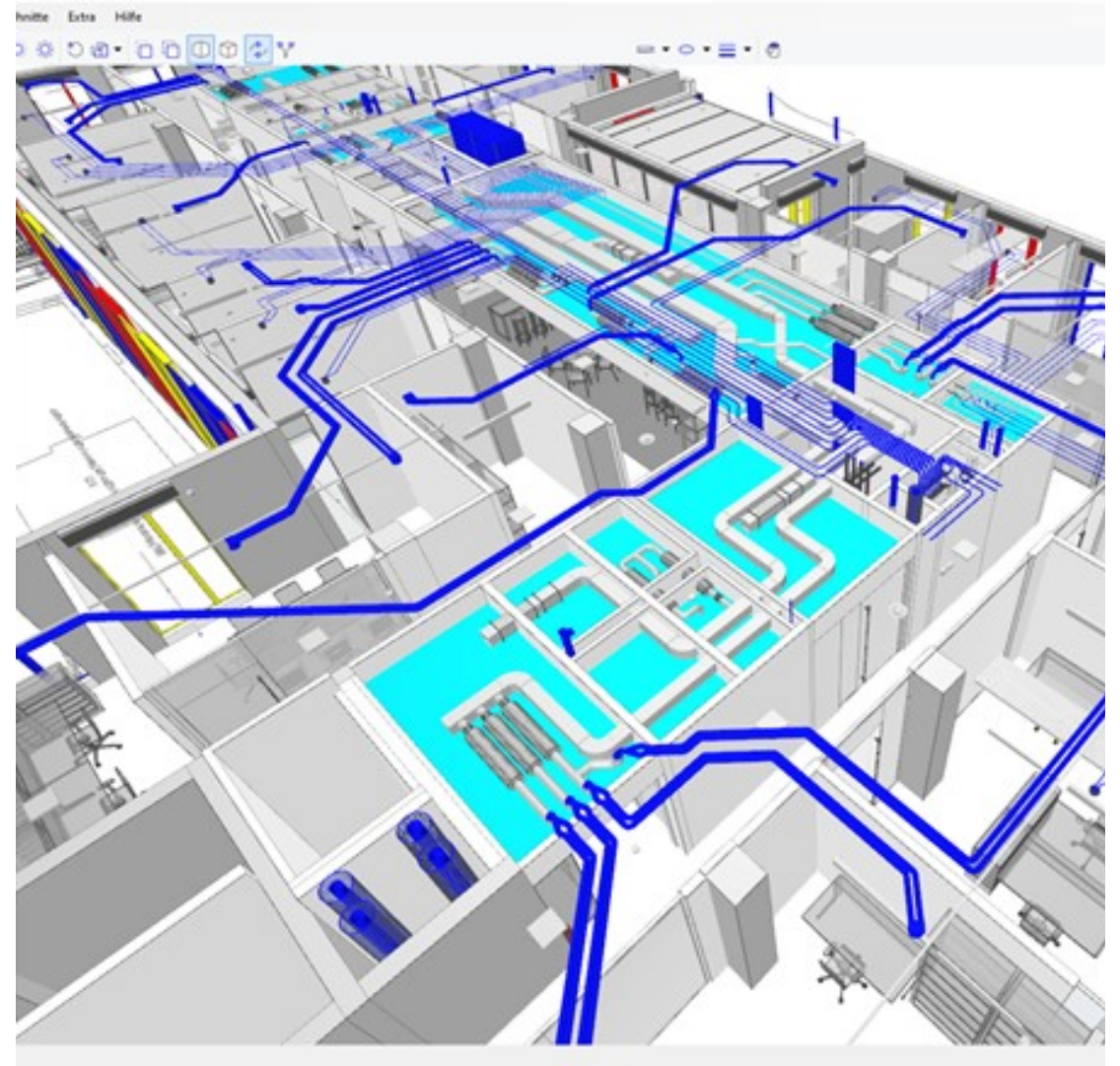
- Clear height required by MEP
- Keeping restricted zones in the structural framework clear of MEP
- **Attribute check**
- Quick and easy views of the model, e.g.: "What is inside and what is outside the suspended ceiling?"



BIMcollab ZOOM

Smart Views:

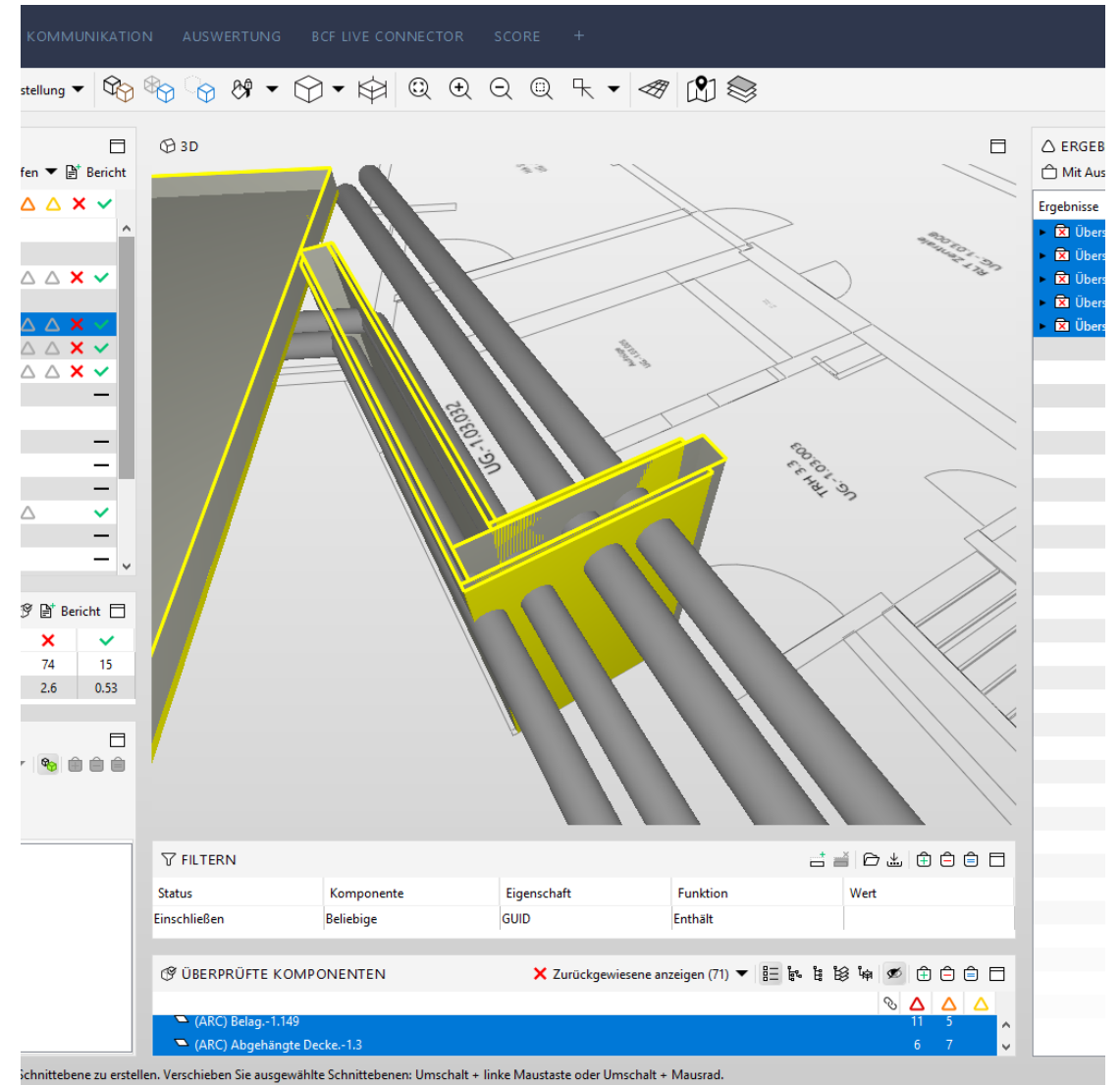
- Clear height required by MEP
- Keeping restricted zones in the structural framework clear of MEP
- Attribute check
- Quick and easy views of the model, e.g.: "What is inside and what is outside the suspended ceiling?"



Solibri

Collision Checks

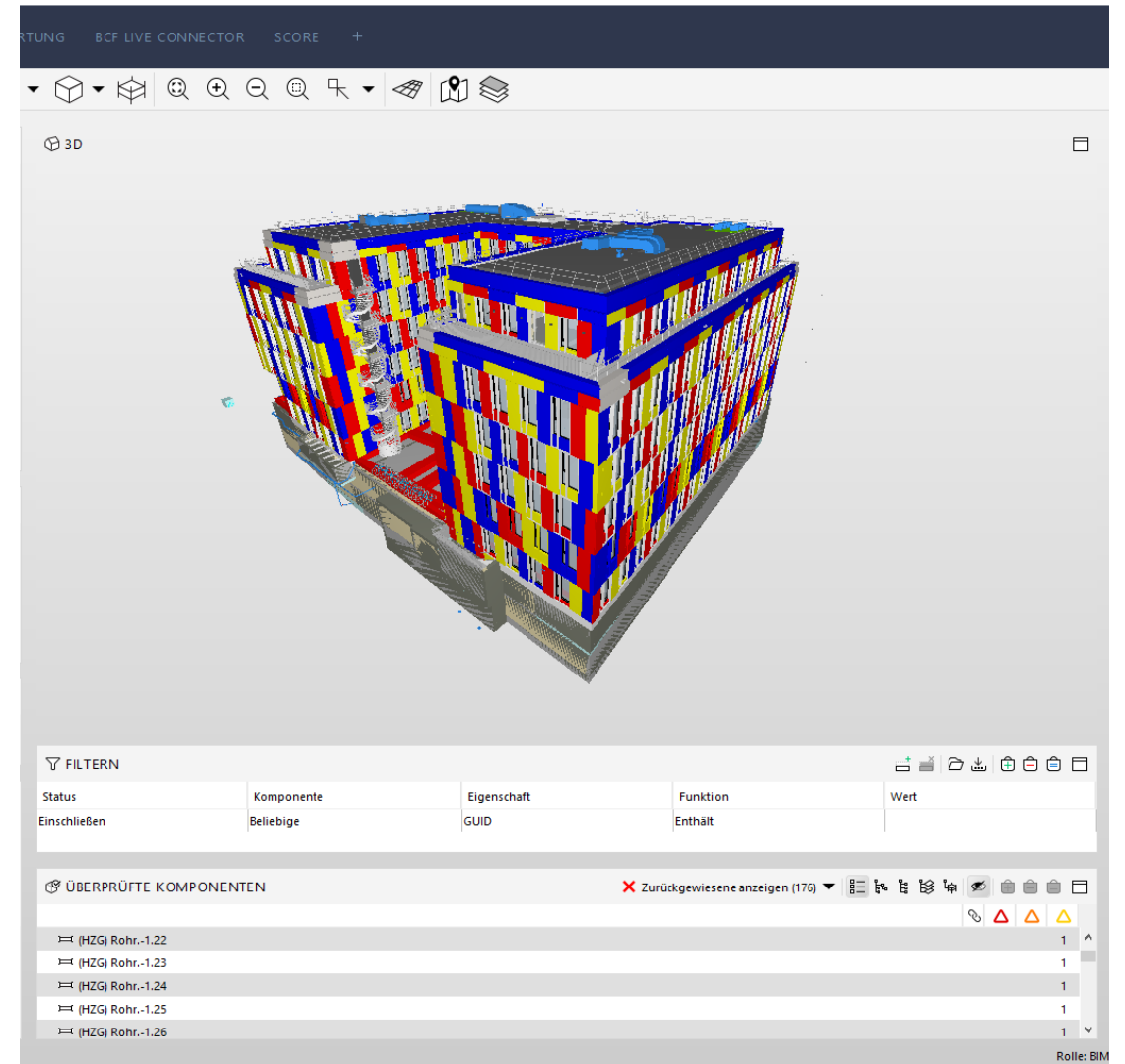
- **MEP versus MEP**
- MEP versus ARC (Structural and Fit-out Work, taking Provision For Voids into account)
- Building Code Checks



Solibri

Collision Checks

- MEP versus MEP
- MEP versus ARC (Structural and Fit-out Work, taking Provision For Voids into account)
- Building Code Checks



Solibri

Collision Checks

- MEP versus MEP
- MEP versus ARC (Structural and Fit-out Work, taking Provision For Voids into account)
- **Building Code Checks**

