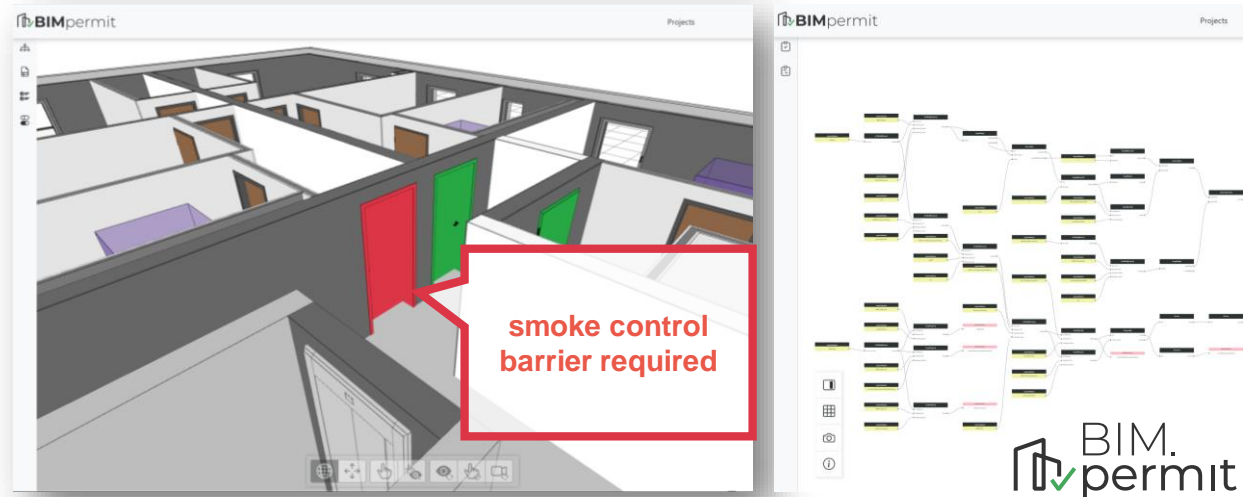


Case studies for BIM-based building permits in Germany

RUB

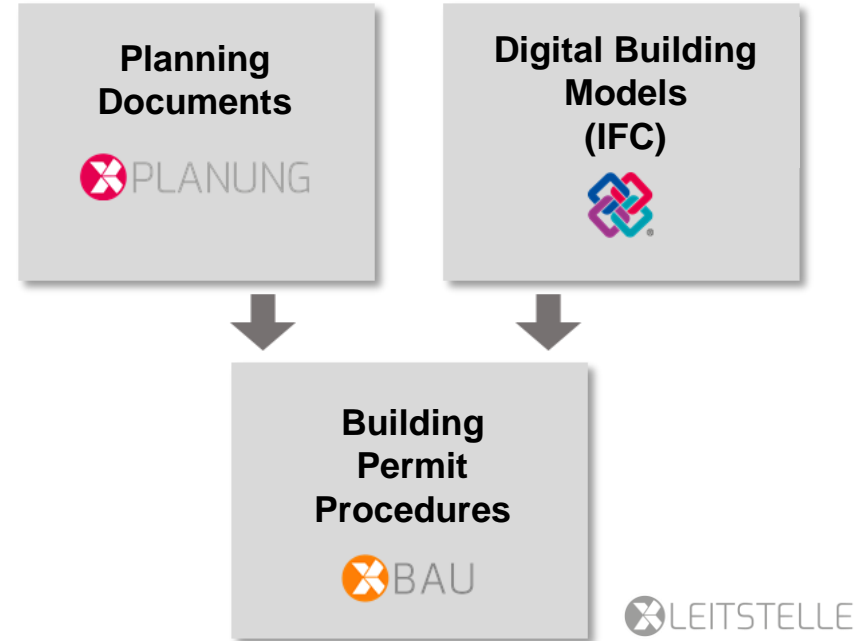


RUHR-UNIVERSITÄT BOCHUM

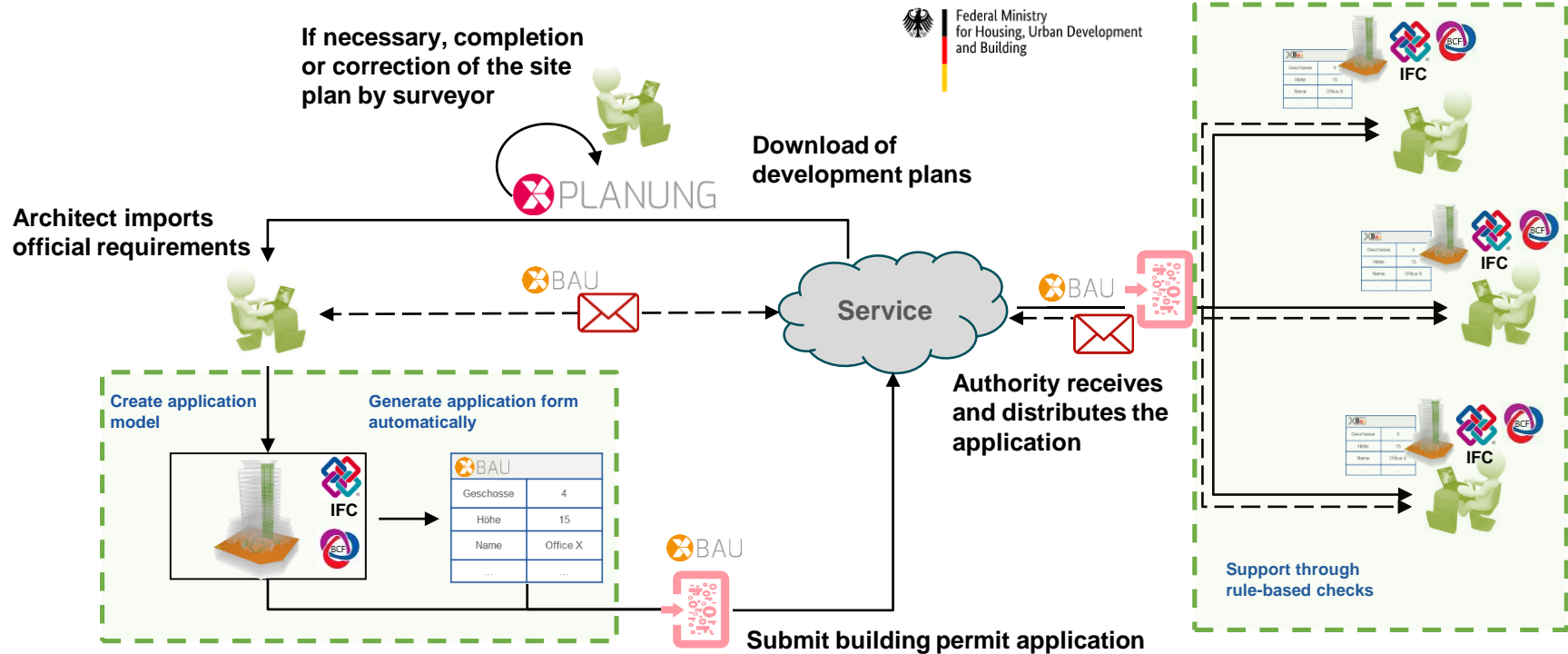
Prof. Dr.-Ing. Markus König, André Vonthron, M.Sc. (VSK software)

Standards for digital building permits

- **XBau** is a standard for the digital exchange of building permit application data
 - supports the communication using standardized messages
 - enables transparent documentation
 - BIM-ready (IFC, BCF)
- **XPlanung** is a standard for the digital exchange of planning documents
 - regional planning
 - urban development planning
 - landscape planning

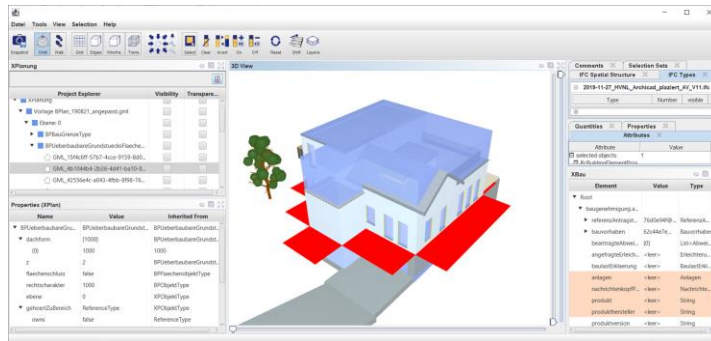


BIM-based building permit procedure

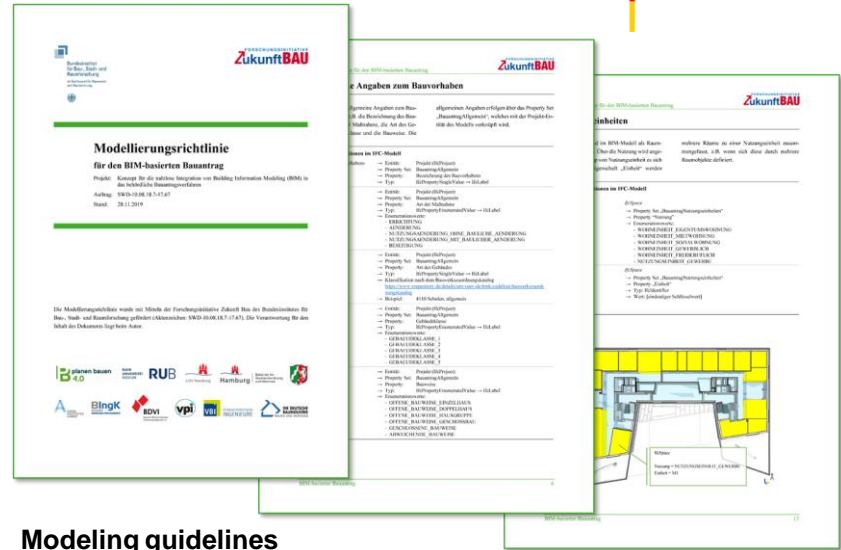


Digital building regulations

- Digital foundations must be created for model-based checking
 - modeling guidelines
 - machine-readable rules
 - documentation of results (BCF)



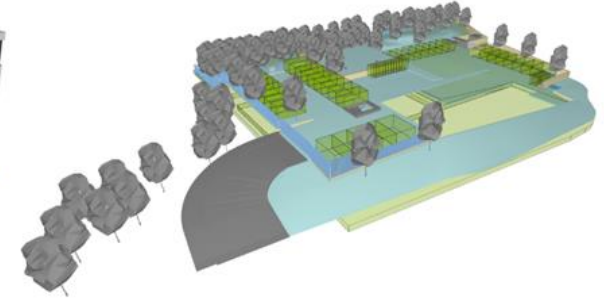
Checking of clearance areas



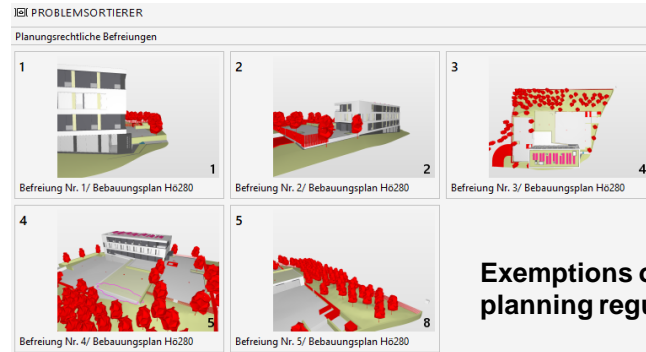
Modeling guidelines

First BIM-based building permit in Germany, NRW

- Company headquarter of Louis Opländer Heizungs- und Klimatechnik GmbH, Dortmund, Germany
 - IFC models for the building and outdoor facilities
 - consideration of local regulations (e.g. parking spaces)
 - application for deviations and exemptions using BCF
 - Semi-automatic and manual checking using standard tools



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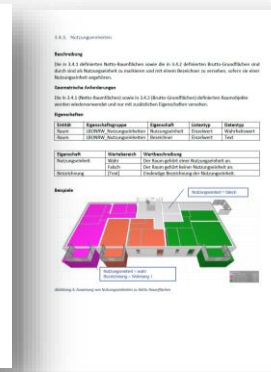
LOUIS OPLÄNDER
Innovative Gebäudetechnik

Digitizing of the German standard building regulation

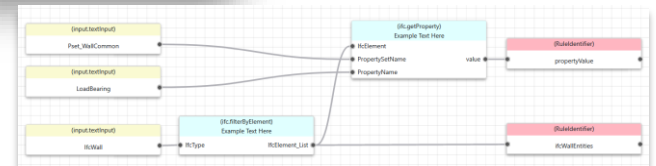
- German standard building regulation defines a uniform framework for the federal states
- Modeling guidelines and checking rules were developed together with representatives of the federal states
- An open data format for checking rules was proposed
- Suggestions for revision with regard to a smart standard were submitted
- Results are currently being evaluated in cooperation with buildingSMART Germany



Modeling guidelines



Open rule checking language (OpenBimRL)

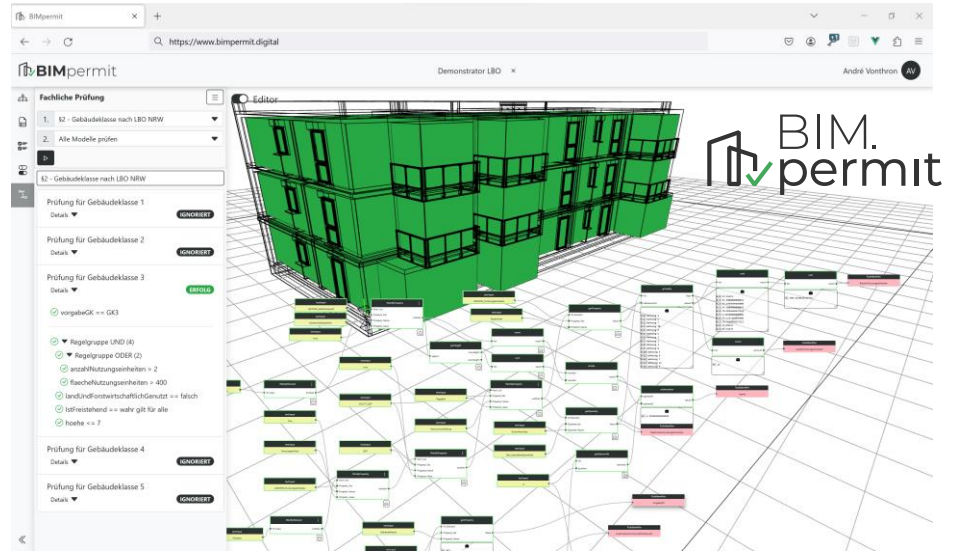


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<!--:Rule label="95b77643-f6bb-4312-b2f1-195f093c402f" operator="all" operator="equals" operator2="quantitativeCheckOffTreadwidth" operator3="true"/-->  
</!--:Rule-->  
</!--:ModelSubCheck-->  
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</!--:ResultSet-->  
</!--:ModelCheck-->
```



Preliminary checking of applications, City of Bochum

- Extension of modeling guidelines and testing rules based on the standard building regulations
 - state building regulations of North Rhine-Westphalia
 - special regulations of the city of Bochum
- Development of an online checking tool for architects
 - conformity and completeness of IFC models
 - Pre-checking of building regulations before submitting



Checking the building class (e.g. high-rise building with special fire safety requirements)

Lessons learned

- Fundamental procedures (**XBau**) and standards (**XPlanung, IFC, BCF**) are available
- Standardized and easy-to-use modeling guidelines are necessary
- Checking rules must be transparently defined together with building regulations
- For easy access, online tools should be available for pre-checking
- **Currently, there is no standard for the definition of technical checking rules**

