How to automate building permitting with BIM

Education Starter pack for Municipalities and Governments

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Innovate UK

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Introduction

E-learning material (starter pack) with a practical approach to help all stakeholders in different regions to set up digital permit checking using BIM in their organization.

The most important stakeholder is the municipality or government who needs to start implementing BIM-based permit checking. Without the proactive approach from the reviewing body there is little incentive for other stakeholders like architects and software developers to invest in BIM-based permitting. That is why we first develop the starter pack for municipalities/governments and later on extend it to also include relevant supplemental material for other stakeholders.

Target audience: municipality/government officials, not BIM-specialist/technical experts

What? How?

- Simple, easy to understand learning materials
- Presentation slides + video webinars on ACCORD website
- Includes links to more detailed and in-depth materials

Content of the Starter Pack

WHY use BIM?	WHAT to Check?	HOW to Check?	Do It!
• What are the benefits and value proposition? • Intro and basics of BIM • Why openBIM is important? • What are the key standards for describing requirement (IDS, IFC etc.) • Why you need BIM requirements	• How the process works? • Review legislation and laws • What are you checking? What can be automated? • Identify high value-add checks • What additional BIM requirements are needed?	• How to interpret rules to machine readable format? Do it simple, manually at first. • What kind of software solutions are available? • Additional sources of data for context (digital twins, public data registries)	• Get the industry and key stakeholders involved • Keep in mind that it is an agile process • Communication, communication, communication • Examples from specific countries • Try it practically with available tools/demos

WHY use BIM?

Benefits and value proposition

Why use BIM?

	Contents	Learning outcomes
	Building Permits	Understand the current challenges in building permitting.
	Transformation pathway	Describe the different maturity levels.
REMEMBER	Benefits of BIM based permitting	Explain the benefits of BIM based permitting.
	Intro and basics of BIM	Define BIM and its benefits.
UNDERSTAND	What is openBIM?	Define what is openBIM.
	Why openBIM is important?	Identify the benefits of openBIM.
	What are the key standards & solutions for defining, communicating and validating requirement (IDS, IFC etc.)	Identify and understand the purpose of IFC, IDS, bSDD and BCF.
	More resources	

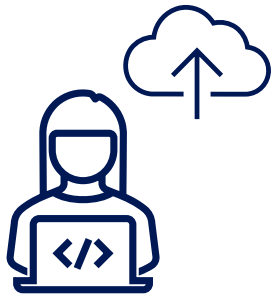
Building Permits

- **Why we need them?** - To ensure safety, legality, quality and efficient resource use in construction
- A **key process** in the building lifecycle
- But they are **expensive, time-consuming, complex**
- Current solution is to use brute force in the form of extra money and manpower
- Is there a better way?

Transformation pathway

Paper or PDF exchange

Manual review



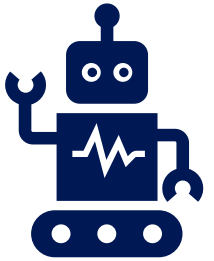
Online service, manual review

Current practice in many European countries

IFC openBIM

Semi-automated compliance checking

Finland and Estonia showing the way



BIM&GIS integrated

Automated compliance checking

Machine interpretable regulations

Future

Benefits of BIM-based permitting

SPEED

Automated permit checking makes the validation process faster by reducing the time spent on compliance review

QUALITY

Machine executable checks reduce errors and make sure that designs meet minimum standards.

TRANSPARENCY

Algorithmic checks reduce ambiguity and make it crystal clear what and how is being checked.

Information management

Under digital ways of working, information is managed using newer and more effective approaches. When information is expected to be exchanged, the recipient of the information provides a description of what they will need, and what format it is expected to take.

These expectations are communicated through a set of documents known collectively as "**information requirements**". These information requirements specify "what" is expected and "how" it will be delivered. In many cases, they also describe the purpose of the information. This can help when evaluating different options to allow professionals to choose solutions that are best suited for the purpose.

Data standards

Why are common data standards so important?

SAME INTERPRETATION

How do you call that floor piece in a staircase? It is part of a stair? Or a floor? It makes a difference when budgeting!

AUTOMATIC PROCESSING

Because data agreements are standardized, computers can automatically process it.

COMPARISON AND LEARNING

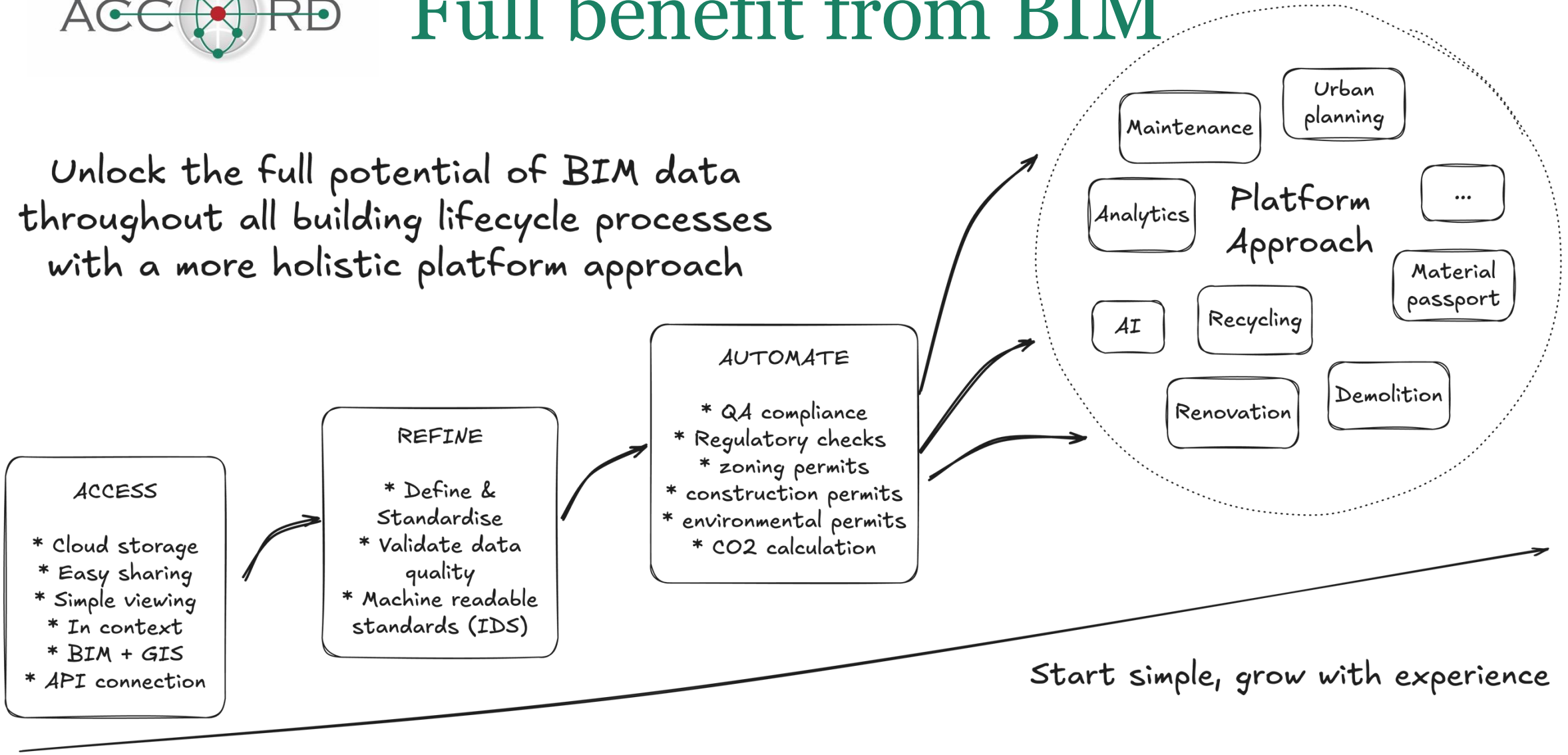
Analyze the data over multiple projects to be able to learn and improve your workflows and deliverables

What is BIM?

Building Information Modelling, or BIM for short, is the process of using digital tools to design, analyze, approve, and document the creation and utilization of a built asset and is an integral component of digitalized information management processes. BIM works by having professionals use standardized processes and approaches that are based on industry best practices.

Full benefit from BIM

Unlock the full potential of BIM data throughout all building lifecycle processes with a more holistic platform approach



Full benefit from BIM

ACCESS → REFINE → AUTOMATE → PLATFORM

Start with a simple but impactful integration of IFC models in a **cloud-based environment**.

This will provide easy access to all BIM models across different departments and stakeholders, improving collaboration and transparency.

This also allows BIM data (IFC) to be integrated with GIS data (CityGML) to create a more holistic urban city model.

The next step in this phased approach would involve defining clear and simple **BIM requirements** using the **IDS standard**.

This would allow structured data delivery and validation of building models based on predefined requirements, which ensures that the data adheres to specific quality standards and is delivered consistently.

When BIM data is accessible and verified then you can take a much bigger leap in efficiency by implementing **automated BIM-based compliance checks**.

This will help ensure that planning and building permits comply with local regulations, city-specific standards, and other requirements, significantly improving the efficiency of project approvals and building management processes.

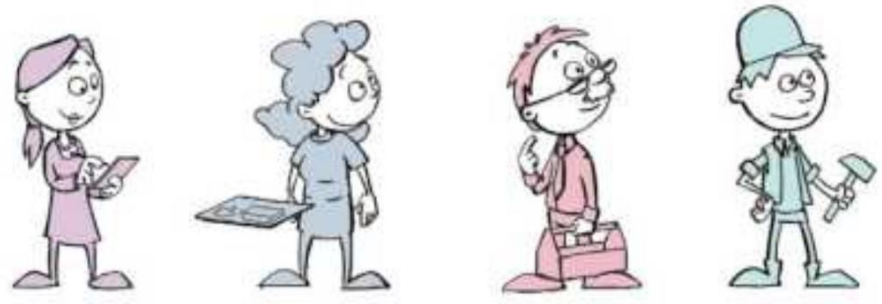
To further streamline access to data you should adopt a holistic **self-service platform approach.**

This decentralized approach would allow for more efficient collaboration and reduced dependence on any specific department in an organization.

Ultimately you should think of it as an organizational management tool that aligns users with the overarching strategy for efficient and transparent data management.

What is openBIM?

openBIM is a **collaborative process** that is inclusive of all participants, promoting **interoperability** to benefit projects and assets throughout their lifecycle. It is based on open standards and workflows that allow different stakeholders to share their data with any BIM compatible software. This collaborative approach, defined by buildingSMART International (bSI) aims to improve the quality of buildings and infrastructure projects and assets.



What openBIM does for you - bSI video

Why openBIM?

An open standard is a standard that is openly accessible and usable by anyone!

TO OPEN IT!

An open definition of a data standard allows everyone to interpret the data. Being able to always have the guarantee to access your data makes it the only real option for archiving.

COLLABORATION

Not one organization defines how data are exchanged; the definition is collaborative, and consensus based.

CONTROL

You can swap tools at any point you like. You won't be held hostage by a vendor. You control your own workflows, now and in the future.

open Standards

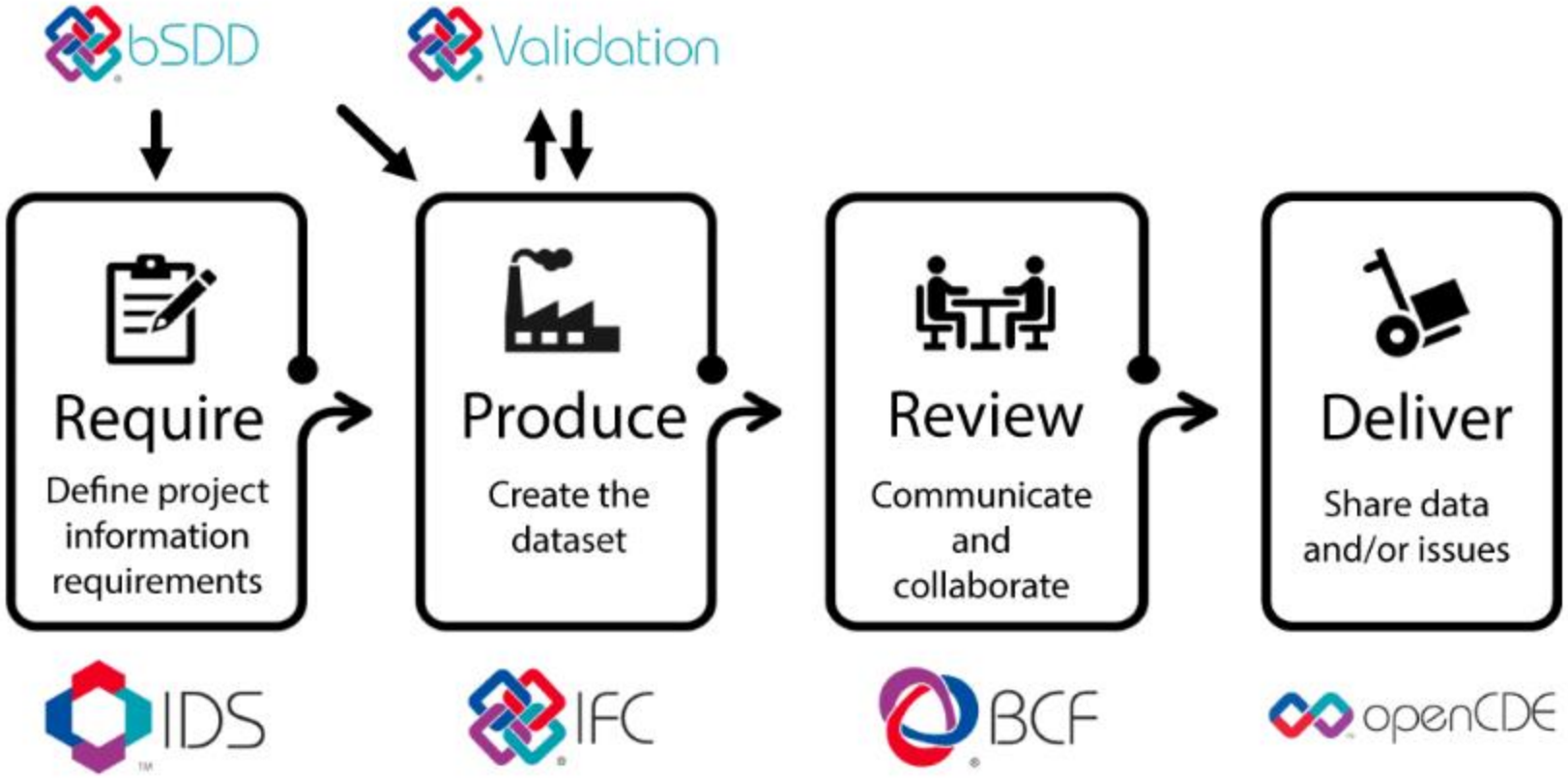
Open Standards ≠ Open Source Code

You should not confuse ”open standards” with “open source code”. Public clients often focus too much on the requirement of “open source code” when developing or implementing e-services. Although this sounds like a reasonable thing to do with public money, it can be counterproductive due to potential security vulnerabilities, maintenance challenges, hidden costs, compatibility issues, and the need for specialized expertise. The key is not “open source code” but **OPEN STANDARDS!**

By using open standards you support an open competitive software market where you have the freedom to choose the best tools for the job without any fear of vendor lock-in or lost data.

openBIM Workflow

openBIM Workflow is a set of high-level process maps, combining the different bSI solutions & standards. The four parts of the openBIM workflows (Define requirements for IFC, Author IFC, Extend IFC and Validate IFC) encourage and support the adoption of the openBIM framework.



openBIM Workflow

Watch the YouTube video from buildingSMART International explaining the openBIM workflow:

How to define, communicate and validate your requirements

IFC – Industry Foundation Classes

Industry Foundation Classes (IFC) is an open international standard defining semantics and structure for Building Information Modeling (BIM) data. The standard comprises standardised declarations and properties for elements that are necessary to describe assets and their associated technical equipment over their entire life cycle.

IFC specifies concepts, a data schema and a file format. It is standardised in ISO 16739–1

Learn more

IDS – Information Delivery Specification

Information Delivery Specification (IDS) is a standard for defining information requirements in a computer interpretable form. It allows for automatic compliance checking of IFC models, that increases quality control and fidelity of data. IDS also aids the efficient delivery of the data, by setting the expectations and providing clear guidelines of what needs to be exchanged. A user of IDS can specify how objects, classifications, materials, properties, and even values should be delivered in an IFC model.

Learn more

How to define, communicate and validate your requirements

bSDD – buildingSMART solution for data dictionaries

The buildingSMART Solution for Data Dictionaries (bSDD) is a collection of interconnected data dictionaries with definitions of terms to describe the built environment. The service is provided by buildingSMART for free, to enable easy access from all software solutions.

The content is published by independent organisations, spanning international classifications, national standards and company-specific agreements.

Learn more

BCF – BIM Collaboration Format

BIM Collaboration Format (BCF) is a standard communication protocol for efficient issue management and coordination on BIM projects. BCF is used to simplify the exchange of information during the work process between different software products (based on the IFC exchange format), thus enabling traceable communication of problems or changes.

The goal is to transfer the relevant information and not the entire model.

Learn more

How to define, communicate and validate your requirements

openCDE

The openCDE initiative is a portfolio of API standards that includes Foundation API, BIM Collaboration Format (BCF) API, Documents API, and Dictionary API.

Learn more

Validation - IFC Validation Service

The IFC Validation Service is a free, online platform for validating IFC files, developed by buildingSMART – with the help of software vendors and bSI projects.

Given an IFC file, this provides a conformity check for such file against the IFC standard (schema and specification).

Learn more

openBIM Workflow Enablers

Select your **Software**:

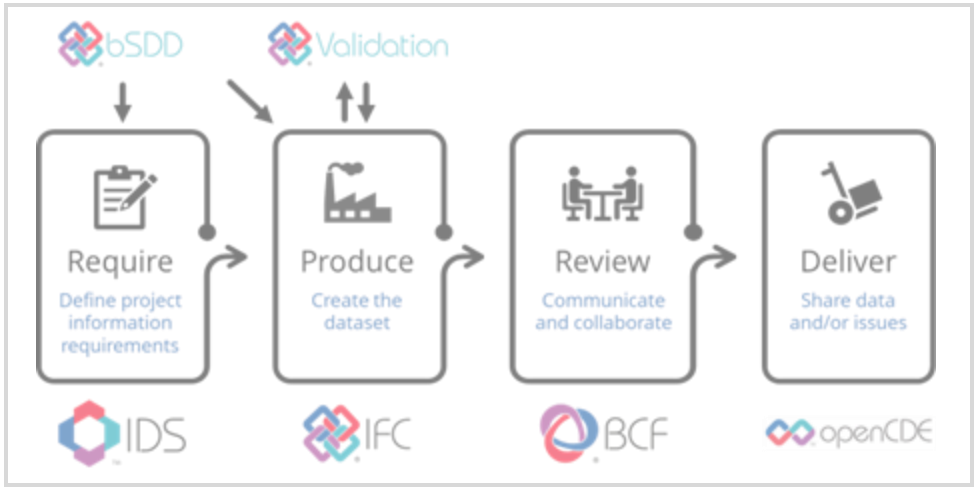
buildingSMART Software Certification

A platform for Consistent and reliable implementations of buildingSMART standards for software vendors and applications throughout the global marketplace.
Learn more

Learn from **experience**:

UCM

Share your use-cases and best practices on our use-case Management tool.
Learn more



Align your **Processes**:

buildingSMART Accelerator Program

It is designed to support organizations and industry bodies in accelerating the adoption of openBIM.
Learn more

Develop your **Workforce**:

buildingSMART Professional Certification

Internationally recognized program that validates professionals' digital construction skills and knowledge to advance digital transformation in the built environment
Learn more

UKRI Innovate UK

openBIM Training

Global training and certification in openBIM, catering for all levels of expertise > https://education.buildingsmart.org/

Entry level introduces open standards and openBIM concepts in a simple, clear and straight forward manner. It is aimed at working professionals and students in the built asset industry who have little or no experience with openBIM.

Foundation level training helps building asset owners, designers, consultants, builders and project managers understand the opportunities collaboration within a virtual, openBIM environment offers.

Management level addresses needs of those who must competently, confidently, and productively manage open standards empowered projects without necessarily mastering hands-on production skills.

Practitioner level serves professionals engaged with the delivery of openBIM (in planning, construction and/or operations), who possess considerable theoretical and technical knowledge, as well as some practical project experience.

More resources

- BuildingSMART International - 'Entry level Training'
- buildingSMART - More technical learning content can be found in this 'handbook', with specific sections on the bSI standards and services
- ACCORD - Landscape review and analysis of the current adoption of the concept of digitalisation of building permitting and compliance checking (Survey pages 33-45)
- EUBIM - Handbook for the Introduction of Building Information Modelling by the European Public Sector *(several languages)*

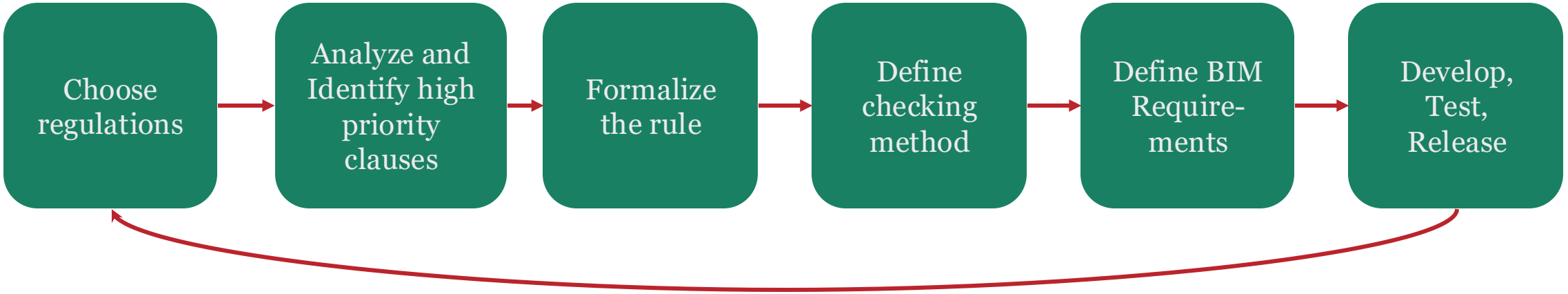
WHAT to Check?

Regulations and data requirements

What to check and how to develop checks from requirements?

	Contents	Learning outcomes
REMEMBER	Review legislation and laws.	
UNDERSTAND	What are you checking?	
APPLY	What can be automated?	
ANALYSE	Identify high value-add checks?	
EVALUATE	What additional BIM requirements are needed?	
CREATE		

The Process of Developing BIM-based Permit Checking



NB! Create **requirements** out of the need!
Not the **need** based on requirements.

Analyze Regulatory Clauses

Regulations are written by humans for humans with lots of room for interpretation. Therefore, it is difficult (sometimes impossible) to automate the conversion into a checking algorithm. Humans need to analyze and agree on an interpretation for the rule.

Here are a few simple examples of how the process of analyzing the legal clause into a check algorithm looks like:

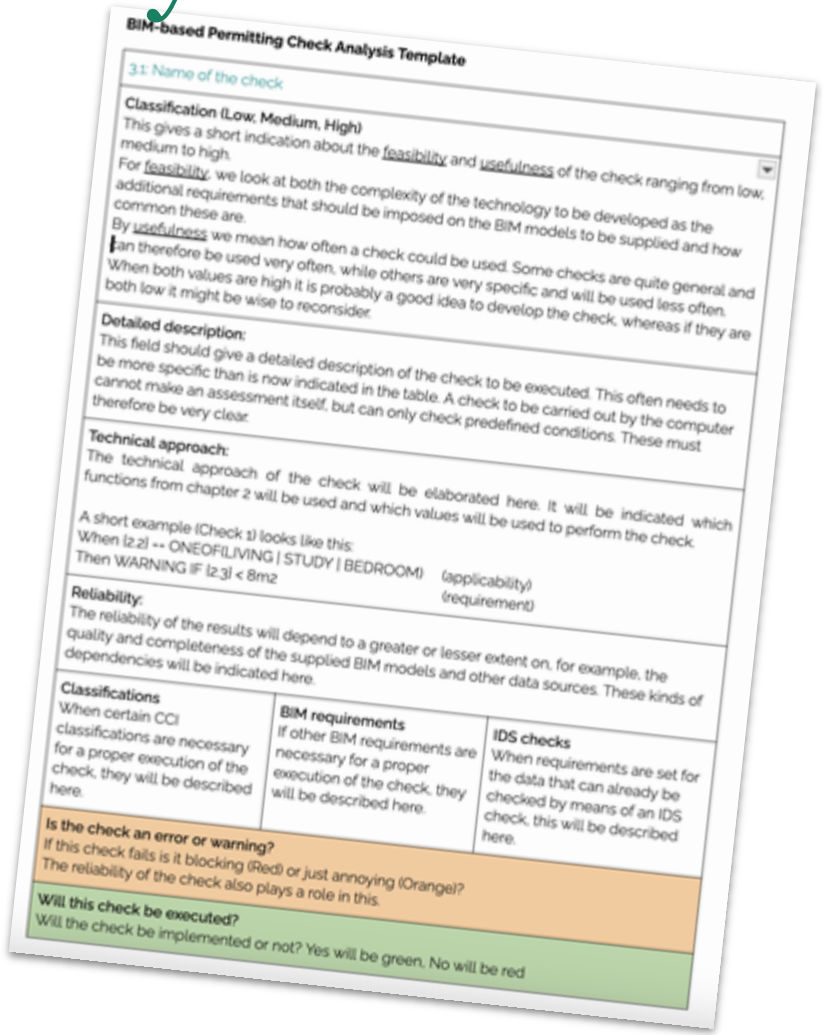
Type	Regulation	IFC requirements	Check algorithm	Comments
Accessibility	The height of each living room, study and bedroom in the dwelling is at least 2.5 m, in the case of a dwelling with one apartment at least 2.3 m.	Spaces (**ifcSpace**) need to be defined and classified accordingly	Select all IfcSpace, the calculated height should be at least **2300mm**	All IfcSpace is selected. If objects other than rooms, i.e. apartment spaces, or buildingstorey spaces, are also modeled as IfcSpace these will be checked as well.
Safety	The building has the required number of firesafety doors.	Doors and exits need to be properly identified with property "**FireExit**"	Select all IfcDoors. Doors with property '**FireExit**' from '**Pset_DoorCommon**' is **true**, will be colored green (succes). Doors with property '**FireExit**' from 'Pset_DoorCommon' is **false** will be colored yellow. Door without the property are errors.	It is difficult to find generic attributes available in all IFC models. Common propertysets (in this case Pset_DoorCommon) are recommended to look at. In this case, also a distinction is made between the property value (true or false)

Analyze Regulatory Clauses

It is recommended to identify and select high-value checks that can be easily implemented. For this, you can also use a template to structure the results and define:

- General Description
- Feasibility / usefulness
- Technical description
- Reliability
- BIM requirements
- Classifications
- IDS
- Yes or No

[Example FUI template](#) (Google Docs)



BIM-based Permitting Check Analysis Template

3.1: Name of the check

Classification (Low, Medium, High)
This gives a short indication about the feasibility and usefulness of the check ranging from low, medium to high.
For feasibility: we look at both the complexity of the technology to be developed as the additional requirements that should be imposed on the BIM models to be supplied and how common these are.
By usefulness we mean how often a check could be used. Some checks are quite general and can therefore be used very often, while others are very specific and will be used less often. When both values are high it is probably a good idea to develop the check, whereas if they are both low it might be wise to reconsider.

Detailed description:
This field should give a detailed description of the check to be executed. This often needs to be more specific than is now indicated in the table. A check to be carried out by the computer cannot make an assessment itself, but can only check predefined conditions. These must therefore be very clear.

Technical approach:
The technical approach of the check will be elaborated here. It will be indicated which functions from chapter 2 will be used and which values will be used to perform the check.

A short example (Check 1) looks like this:
When [2.2] == ONEOF(LIVING | STUDY | BEDROOM) (applicability)
Then WARNING IF [2.3] < 8m2 (requirement)

Reliability:
The reliability of the results will depend to a greater or lesser extent on, for example, the quality and completeness of the supplied BIM models and other data sources. These kinds of dependencies will be indicated here.

Classifications	BIM requirements	IDS checks
When certain CCI classifications are necessary for a proper execution of the check, they will be described here.	If other BIM requirements are necessary for a proper execution of the check, they will be described here.	When requirements are set for the data that can already be checked by means of an IDS check, this will be described here.

Is the check an error or warning?
If this check fails is it blocking (Red) or just annoying (Orange)?
The reliability of the check also plays a role in this.

Will this check be executed?
Will the check be implemented or not? Yes will be green, No will be red

ACCORD Formalization Process 1/2

In the ACCORD project we also developed a more technical way to analyze regulation and convert it into a machine-readable algorithm called the "**ACCORD Formalization Process**". Here is an example clause from Finland:

Passageway leading to a building
There shall be an easily noticeable passageway with a width of at least 1,200 millimetres and a smooth, hard and non-slippery surface that leads to the building from the boundary of the plot or building site and from the space and area that serve the use of the building . The gradient of the passageway located in an outdoor space may not exceed five per cent If there are steps on the passageway , there shall also be a ramp or a permanently installed device intended for lifting persons that is suitable for a user of a wheelchair and walking frame with wheels.
The provisions of this subsection do not apply to a detached house , semi-detached house or townhouse if providing an accessible passageway would be impossible considering the site and elevation differences .
The ramp referred to in subsection 1 above shall be easily noticeable and straight with a smooth, hard and non-slippery surface, width of at least 900 millimetres and, if the ramp is not connected to a fixed structure , a protective edge of at least 50 millimetres in height. There shall be a horizontal landing with a length of at least 1,500 millimetres at the lower and upper end of the ramp . The gradient of the ramp may not exceed five per cent . However, if the elevation difference is no more than 1,000 millimetres , the ramp may not have a gradient of more than eight per cent . In that case, the elevation difference of a continuous ramp may not be more than 500 millimetres , after which there shall be a horizontal intermediate landing with a length of at least 2,000 millimetres . However, in an outdoor area the ramp may have a gradient of more than five per cent only if it can be kept in a condition comparable with that of an indoor ramp. Provisions on railings, handrails and other arrangements intended to prevent falling down and misstepping are laid down by decree issued under section 117d, subsection 2 of the Land Use and Building Act .
If parking spaces are provided for a building, an adequate number of them , but at least one , shall be intended for the use of a person with mobility and functional impairment. Such a parking space shall have a width of at least 3,600 millimetres and a length of at least 5,000 millimetres and be marked with the International Symbol of Access. The provisions of this subsection do not apply to a detached house, semi-detached house or townhouse.

Application of ACCORD Formalization Process on next slide

ACCORD Formalization Process 2/2

The legal text is structured using the RASE method and colored to indicate different elements of the algorithm. Check out the video "ACCORD Digitisation Methodology" to learn about the ACCORD formalization process in more detail.

Passageway leading to a building

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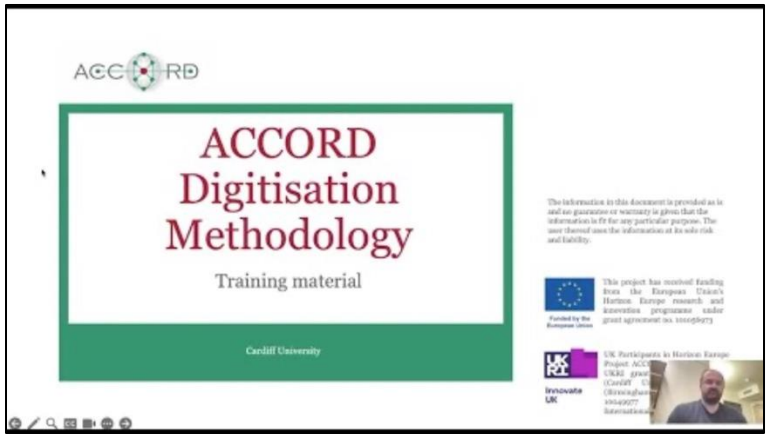


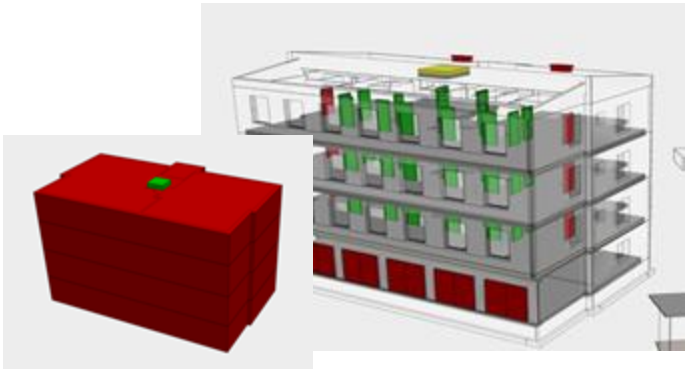
Define the Requirements (IDS)

The requirements for the checking rules should be defined in a machine-readable way using the IDS standard. Below is an example:

IFC requirements (Example, Finland)

- IfcDoor has PsetDoorCommon with IsExternal attribute (3.1, 3.2)
- IfcDoor has PsetDoorCommon with HandicapAccessible attribute (3.1, 3.2, 4.1)
- IfcSpace has Pset_SpaceOccupancyRequirements with OccupancyType attribute
- (min 1 space)
- Not all doors have HandicapAccessible
- Not all spaces have OccupancyType

IDS



Video Link >

```
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Define checking method

Once you have identified the high-value checks and their IFC requirements then you can choose the appropriate technical method to perform the checks themselves.

This could be:

- Using an automated BIM-based checking solution like Solibri or Clearly.BIM
- Manual Assessment using any BIM viewer
- Developing your own code checking solution

Currently there is no standard for defining the executable check code in software and you have to rely on the solutions used by the software vendor.

What to Keep in Mind?

- **Choose the right checks** for a successful implementation. Start with feasible checks look out for ambiguous and vague terms such as “main entrance”, - keep in mind the goal of flexibility → scalability & it is not always possible to translate existing legislation one-on-one into a conclusive check

- Keep the **information requirements as simple and clear as possible** to make it feasible. The more complex these requirements are, the more possibilities arise to interpret them.

- When configuring the checks and the accompanying information requirements, make sure to do this with a small **multi-disciplinary team** of a least a permit issuer, a legal expert and a technical expert. Only this way a proper translation of a regulation to an automated check and minimal and realistic requirements will occur

- Research Paper: https://itc.scix.net/pdfs/w78-2024-paper_37.pdf

BIM Information reliability consequences for digital permit checking

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Keywords: Building Information Modelling, Automated Building Compliance Checking, Digital Building Permit Checking, Information Requirements, BIM Information Reliability.

Abstract

Building Information Modelling (BIM) is a driving force for automated building permit checking. There is a consensus among the industry that the use of open data standards is crucial to this process. The Industry Foundation Classes (IFC) open data standard provides a good base for automated permit checking worldwide. It has a large semantic definition of classes (objects/entities) that is supported by almost all software tools in the architecture, engineering, and construction (AEC) domain. The use of IFC has technically been proven to be useful and efficient for digital building permit checking. BIM modelling, according to data requirements in IFC, is a crucial factor in achieving trusted results. However, there are many examples where the delivered IFC datasets are inconsistent or have missing information, leading to unreliable results from automated code compliance checks. For example, providing values for properties inconsistent with the geometry representation can lead to a false positive result in a digital building permit check. The lack of sufficient information can result in checks not being executed or executed resulting in an incorrect result during the digital permit checking procedures. Therefore, this paper explores measures to improve the information reliability of BIM

More resources

- ACCORD – Deliverable 2.4 Documentation package - Rules toolset, deep learning, NPL. A tool for assisting domain experts in the process of rule formalization. (T 2.3)
- ACCORD - Building compliance ontology - technology neutral format describing rules in building codes. (T2.2)
- FUI - FUI template for identifying legislative text
- Finnish RAVA3Pro project outcomes

HOW to Check?

Tools and process

How to check in the process?

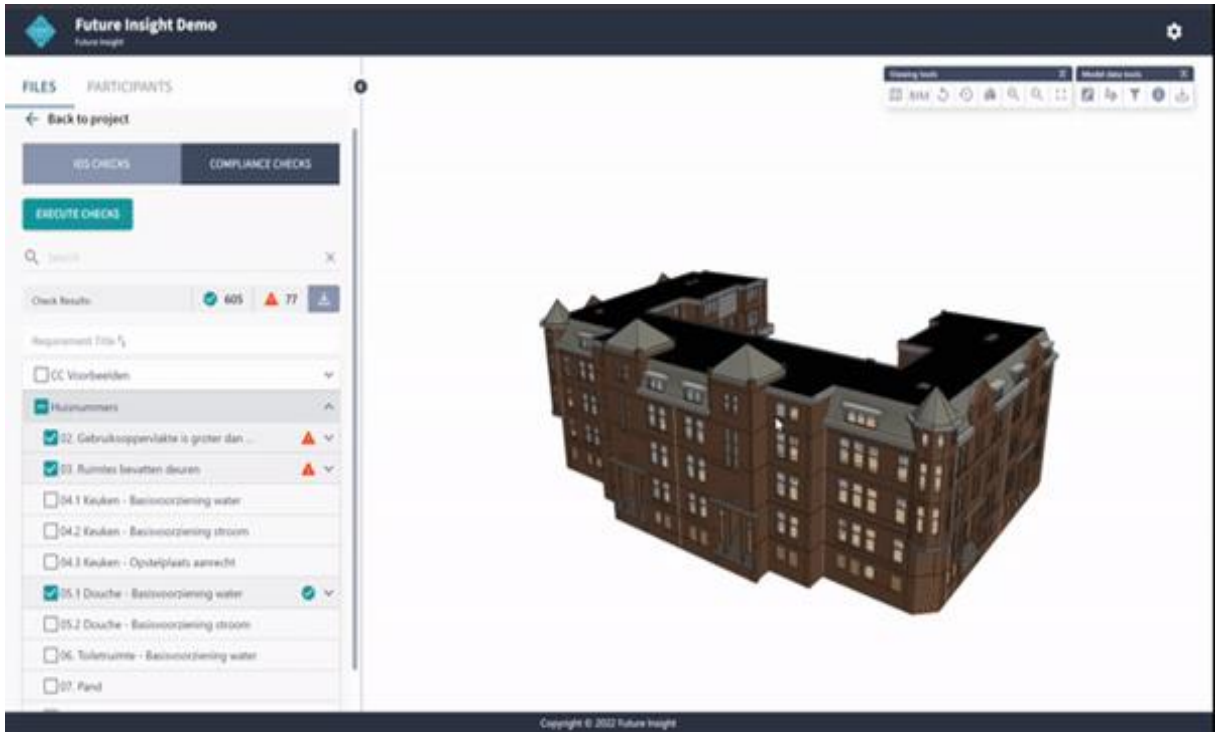
Contents	Learning outcomes
How to interpret rules to machine readable format?	
What kind of software solutions are available? ○ Clearly.BIM ○ Solibri	
Open source or not?	
Additional sources of data for context (digital twins, registries…)	

Software (Clearly.BIM)

What is Clearly.BIM?

User-friendly online solution for viewing, saving and sharing BIM models. Distinctive features:

- Automatic BIM model check: Automatically check BIM models for compliance with permit requirements.
- Integrate map layers: Add various map layers to the Clearly.BIM environment.
- 3D Digital Twin visualization: View BIM models in a 3D Digital Twin environment.
- BIM conversion: Convert BIM models to various formats, including CityGML.
- Simple export options: Export BIM models effortlessly.
- OpenAPI
- https://www.futureinsight.nl/



Estonian Example

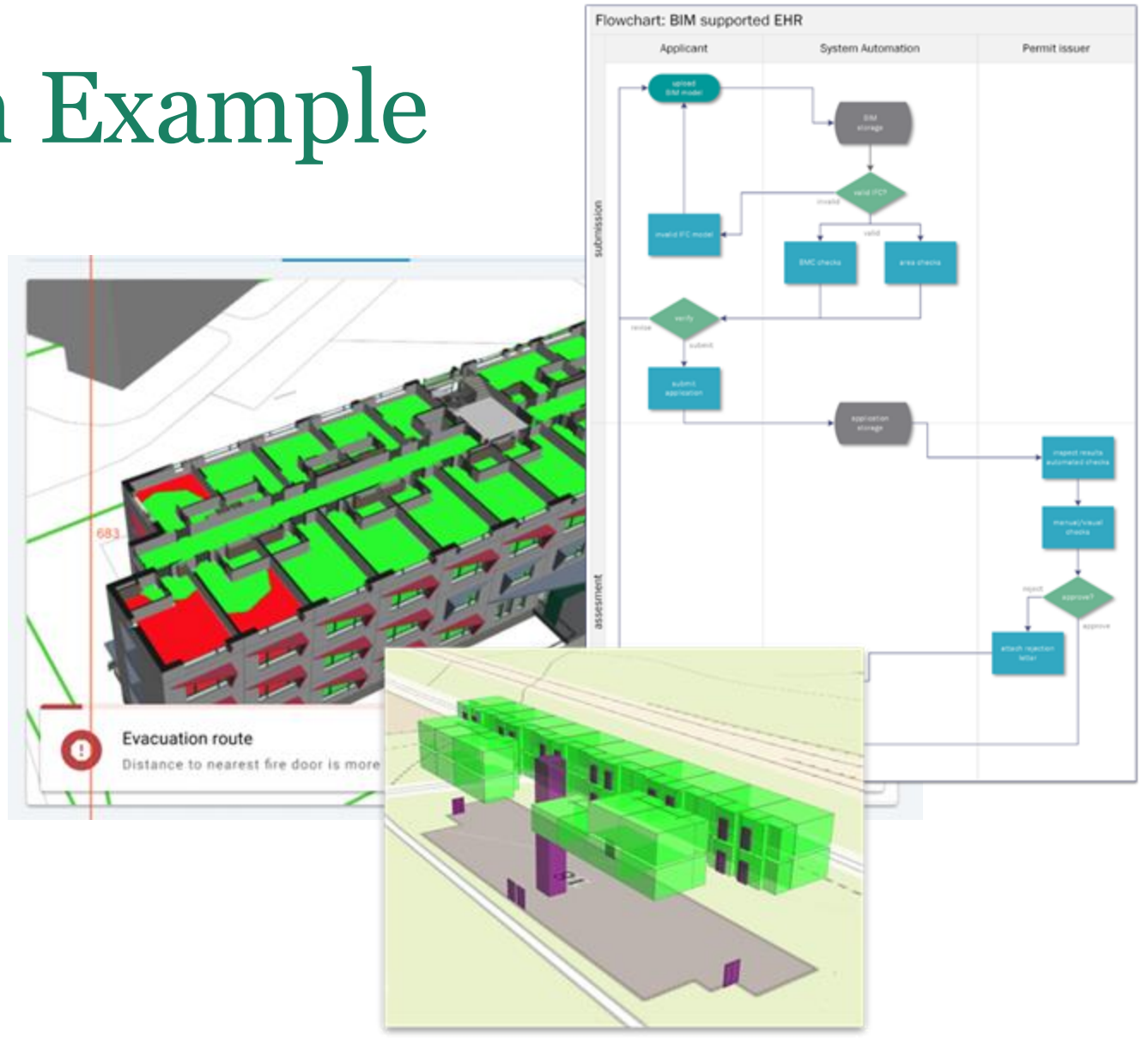
Integrated in National Building Registry

- Live since 02-2024
- Self-service platform
- Used by all municipalities in Estonia
- Integrated with 3D Digital Twin.

47 automatic checks based on various laws and regulations

- R85 requirements for housing
- R97 requirements for construction design
- R28 needs of persons with disabilities
- EhS building design specifications
- R62 requirements for expert audit of building design documentation
- R17 fire safety & water supply requirements

https://eehitus.ee/bim-based-building-permit-process/

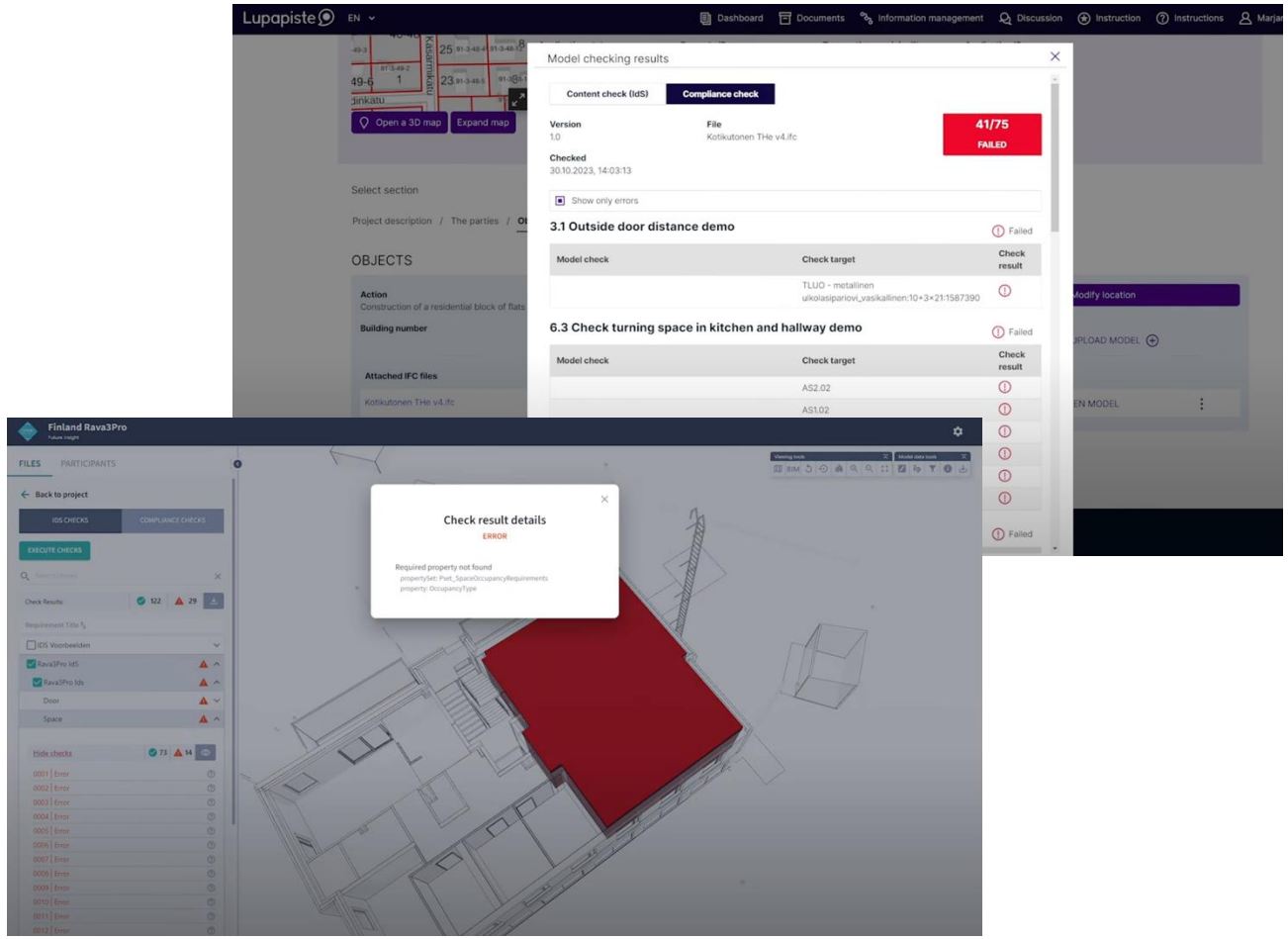


Finland Example (Rava3Pro)

POC-level implementation for integrated BIM-based permit check service: automatic vs manual

- POC-level implementation for integrated BIM-based permit check service: automatic vs manual
- Cloudpermit - Future Insight collaboration
- Nation-wide vs municipality, 23 municipalities involved
- Starting with simple accessibility checks, working towards more complicated IFC-checking rules. Working step by step towards an optimal solution.

http://www.rava3pro.fi/
https://youtu.be/wxri0rfX_1c?si=DpwkH_k31grX1EXR



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Solibri overview

Solibri, a Part of Nemetschek Group is a quality assurance tool for AECO industry.

Solibri is IFC file-based software, where user can do visual reviews of singular ifc file or federated model.

User can run rulebased checks of data validation, logical functions and geometry-based checks and combine these rule templates into sophisticated logical quality control processes throughout the whole building process

User can define customized resources like rules based on their current preferences

Software can be used as a desktop product or integrated service on platforms like Cloudpermit

2024 : 14.6M hours of usage and 3.2 B issues were detected

Solibri Anywhere

for viewing the digital information
Free.
Equipped.
Connected.

Solibri Site

for producing and sharing digital information on-site.

Adapted.
Actionable.
Accessible.

Solibri Office

The core product for checking and collabo-ration, from design to build.

Complete.
Coordinated.
Quality-proved.

Solibri Enterprise

Customized licensing solution for maximum scalability in large projects.

Large builds.
Multiple users.
End-to-end workflow.

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In which use cases it can be applied?

CONSTRUCTION

- ✓ Visualization of plans and visual checking
- ✓ Calculate quantities with information takeoffs
- ✓ Use classification and information takeoffs to plan installation order and schedule
- ✓ Use rule-based checking to ensure you meet requirements
- ✓ Collaboration with other stakeholders

ENGINEERING

- ✓ Visualization of plans and visual checking
- ✓ Calculate quantities with information takeoffs
- ✓ Use classification and information takeoffs to plan installation order and schedule
- ✓ Use rule-based checking to ensure you meet requirements
- ✓ Collaboration with other stakeholders

ARCHITECTURAL

- ✓ Checking and ensuring the quality of your design
- ✓ Visualization
- ✓ Communicate and coordinate your design and results of the checks with others
- ✓ Use rule-based checking to ensure you meet requirements
- ✓ Collaboration between other stakeholders

BIM MANAGEMENT

- ✓ Merging models of different disciplines
- ✓ Validate requirements with rule-based checking
- ✓ Communicate and coordinate your design and results of the checks with others
- ✓ Get the most out of model data with validation, classification and information takeoffs
- ✓ Create your own rule parameters based on project needs

AUTHORITY

- ✓ Review the project visually
- ✓ Validate requirements with rule-based checking
- ✓ Automatically run rulebased checks
- ✓ Communicate your design and results of the checks with others
- ✓ Merging models of different disciplines

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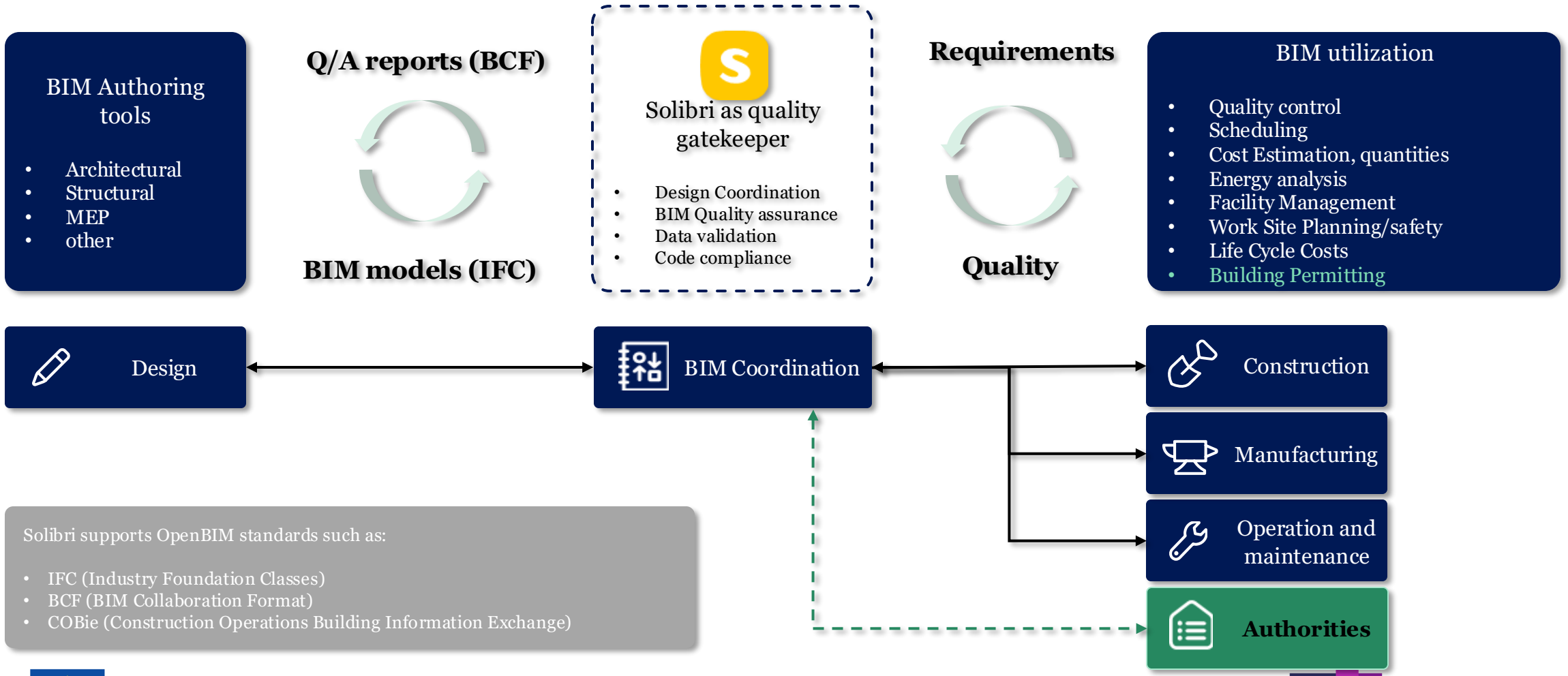
From data to making decisions



Solibri supports OpenBIM standards such as:

- IFC (Industry Foundation Classes)
- BCF (BIM Collaboration Format)
- COBie (Construction Operations Building Information Exchange)

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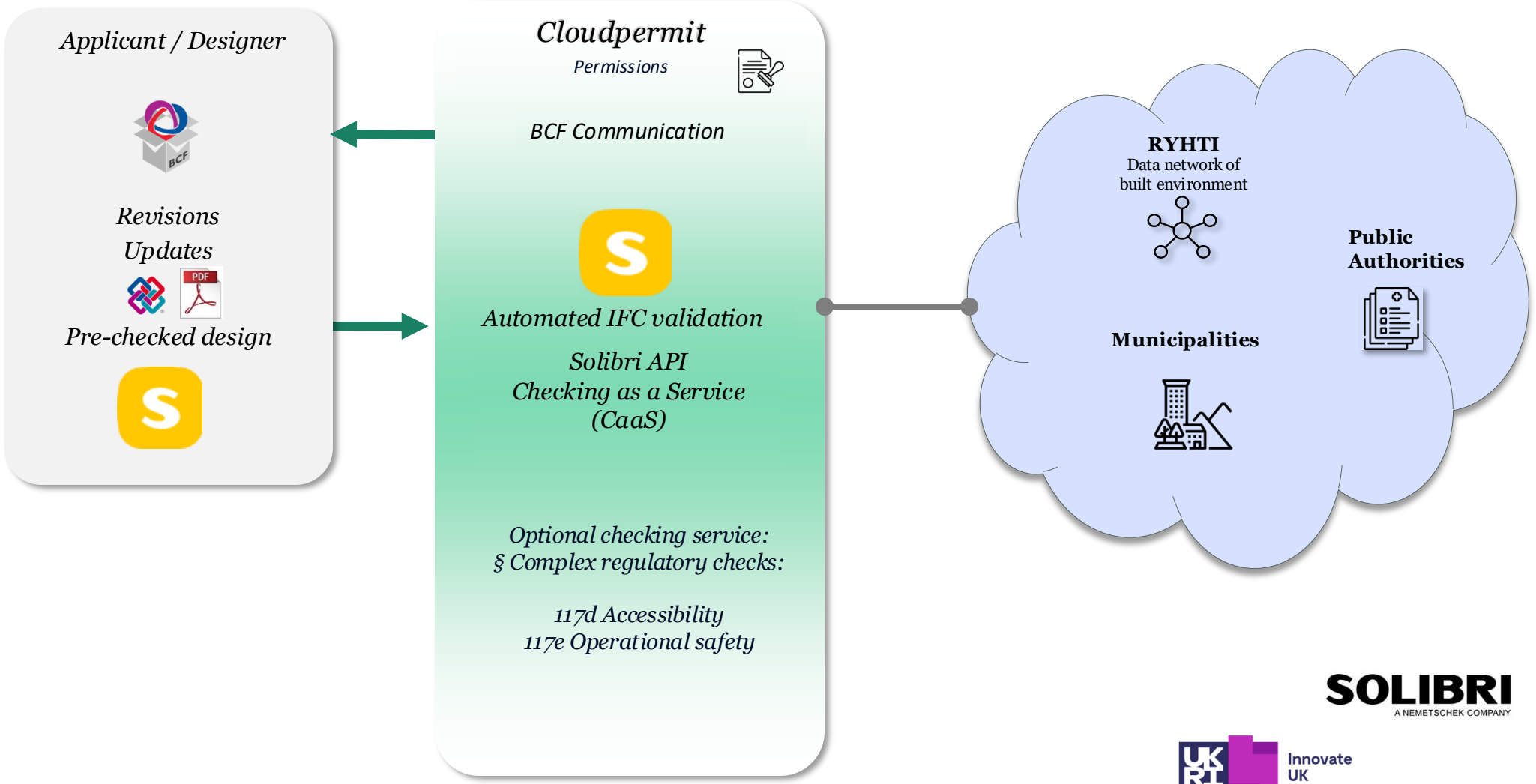
Solibri CaaS – Checking as a Service
(Finnish pilot)



SOLIBRI
A NEMETSCHEK COMPANY

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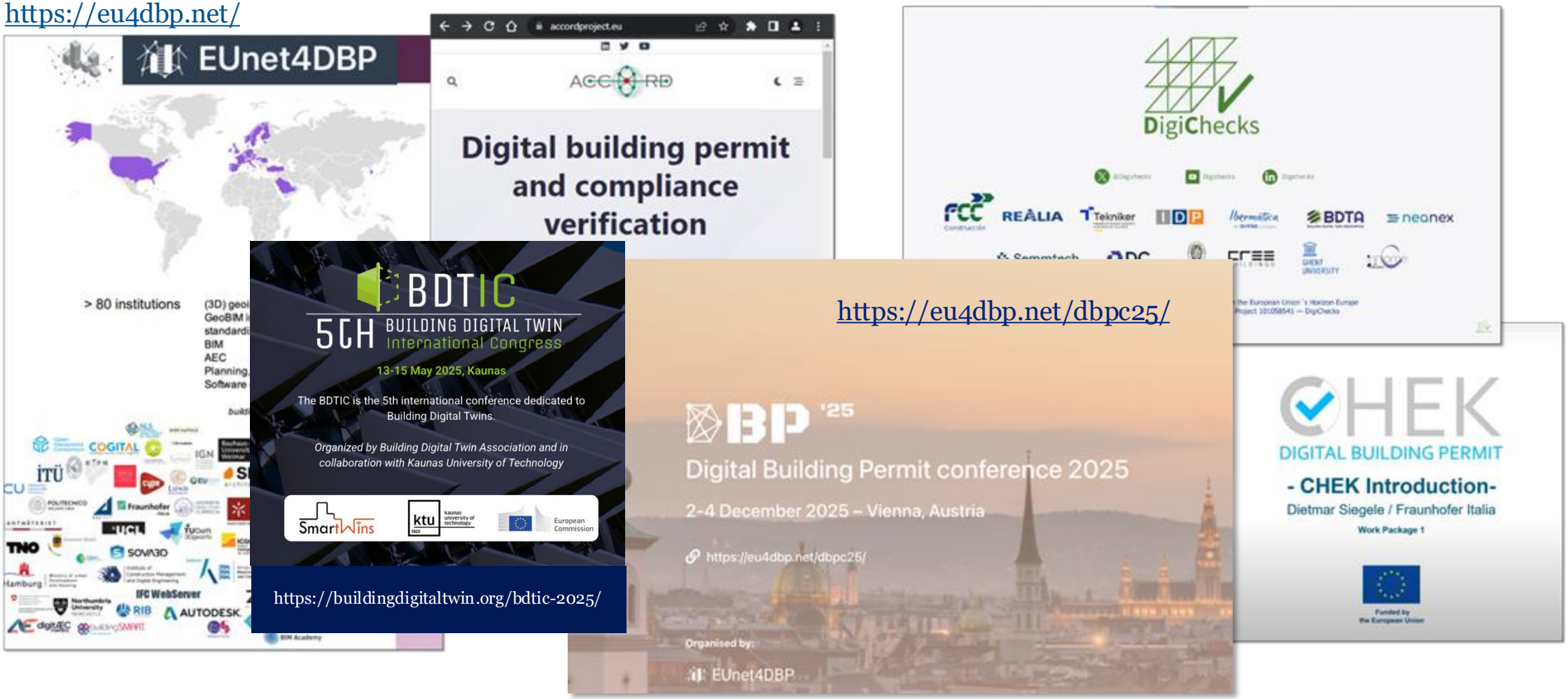
Knowledge Sharing

https://eu4dbp.net/



More resources

- ACCORD - Deliverable 4.4 - Solution developed including ACCORD building compliance checking components
- FUI - FUI template for identifying legislative text
- Secondary Building Act (Finland) – more specific guideline for BIM requirements
- ACCORD - Newsletter #3 Software solutions for building permitting and compliance
- ACCORD – Digital Building Permit Ontology Released
- ACCORD - Building Compliance in Digitalised Ecosystem
- OGC Rainbow?

Do It!

Examples to help you get started on your way

Do it!

Contents	Learning outcomes
Get the industry and key stakeholders involved	
Keep in mind that it is an agile process Communication…	
Examples from specific countries	
Try it practically with available tools/demos	
Who are the points of contact?	

Implementation

WP5.1 - Best practices Digital Building permitting

Guide how to use the Digital Twin as a mechanism to get requirements from

This guide provides extensive information on theoretical and practical aspects of obtaining standard city models using 3D information, and how this information can help to obtain planning data.

The main audience for this guide is **architects and data analysts** who will be working with 3D models. However, **urban project managers and managers** can also benefit from this guide.

This Guide is as result of the **ACCORD project** is a Horizon Europe-funded initiative by the European Union. Its main goal is **to automate building permit and compliance processes using Building Information Modeling (BIM) and other data sources**. ACCORD is developing a Semantic Framework, which will be showcased in five real-life construction projects across Europe, specifically in Finland, Estonia, Germany, the UK, and Spain.

This framework includes **semantic interoperability, a rule formalization tool, and integrated microservices for building permit verification and compliance**. The focus is on improving efficiency and reducing errors in permit processes through a semi-automated workflow that incorporates many manual steps of the building permit process.

Building blocks for digital twins (OGC)

https://www.youtube.com/watch?v=OqMko40ju4Y

WP5.1 - Best practices Digital Building permitting

buildingSMART Data Dictionary (bSDD)

Managing the content of bSDD	https://technical.buildingsmart.org/services/bsdd/manage/
Data structure of bSDD	https://technical.buildingsmart.org/services/bsdd/data-structure/
Referencing bSDD in IDS and IFC	https://technical.buildingsmart.org/services/bsdd/referencing-bsdd-in-ids-and-ifc/

How to use IFC for permit checking.

https://www.youtube.com/watch?v=9DesL1ZypjU&t=1s

Exchanging checking results using BCF

https://www.sciencedirect.com/science/article/pii/S092658052100548 3?via%3Dihub

Standardized set of IDS checks to check data quality

https://github.com/buildingSMART/IDS/tree/development/Documentation

JUST START!

- Technology and standards are ready!
- Start piloting and implementing, today… it will take time
- Use international OPEN standards
- Be bold and agile!
- Prepare to fail, but fail fast! :)

More resources

- ACCORD - WP5 demos
- ACCORD - WP5.1 - Best practices Digital Building permitting
- RAVA3Pro learnings
- Aarni videos of RAVA3Pro
- Estonia implementation learnings
- ACCORD participants + additional groups KiraHUB, EUnet4DBP

Thank you!

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Partners

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