Solibri

tool for checking model quality and accessibility and operational safety

Training material

Solibri Inc.

Funded by the European Union

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Innovate UK

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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.

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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Who can apply?

Solibri products, resources and rules are utilized by several segments in the industry, all those who need to use the data of the project. The Solibri pilot focus is on possibilities for authorities.

Anywhere	Office	Site
Facility Management & Owner	Project Management	Site Management
Engineering (MEP, Structural, Automation)	Architects	Engineering (MEP, Structural, Automation)
	Engineering (MEP, Structural, Automation)	
	Design coordination	
	Quality assurance	
	BIM Coordinators	BIM Coordinators
Construction	Construction	Construction
	Quantities & Costs	Quantities & Costs
Authorities	Authorities	

What does Solibri offer to a user?

Solibri offers a wide range of tools with easily customizable user interface and resources.

Solibri installer contains default resources, the tools you need in Solibri to run your quality assurance and to modify and adjust the tools according to users´ local needs.

All resources are examples which can be used as templates for user to configure to fit the best for their purposes

Rulesets

- pre-defined collection of generic checking examples for you to use
- typical rulesets for certain disciplines and tasks

- **Rule templates and libraries**
  - Individual rules with parameter tables for you to use and configure
- **Classifications**
  - basic examples of building element classifications, some already related to example rules
- **Information Takeoffs**
  - examples of simple Information takeoff definitions and their reporting templates (excel spreadsheets)

- **Concept of role** is to create collections of these resources for certain tasks, several examples provided
- **Sample files** to try out and experiment the software

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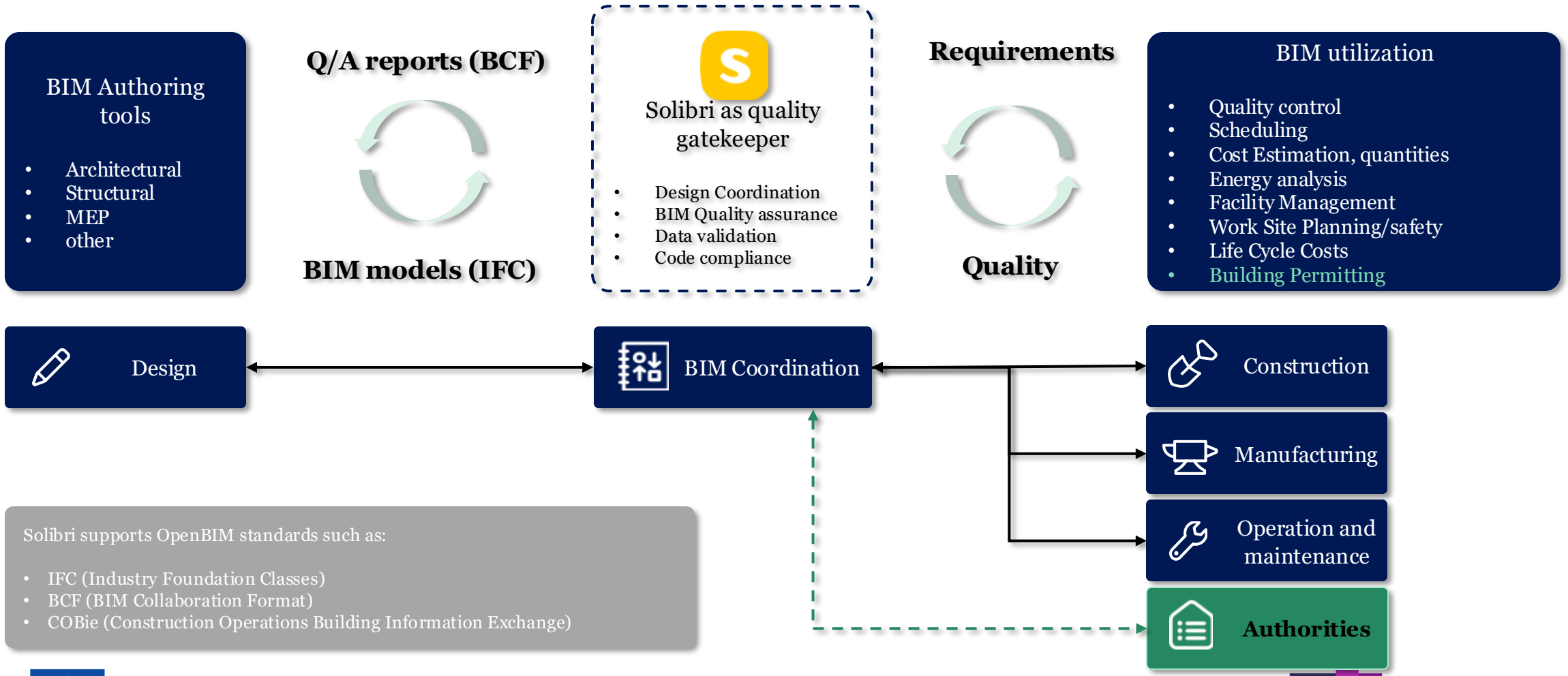
From data to making decisions

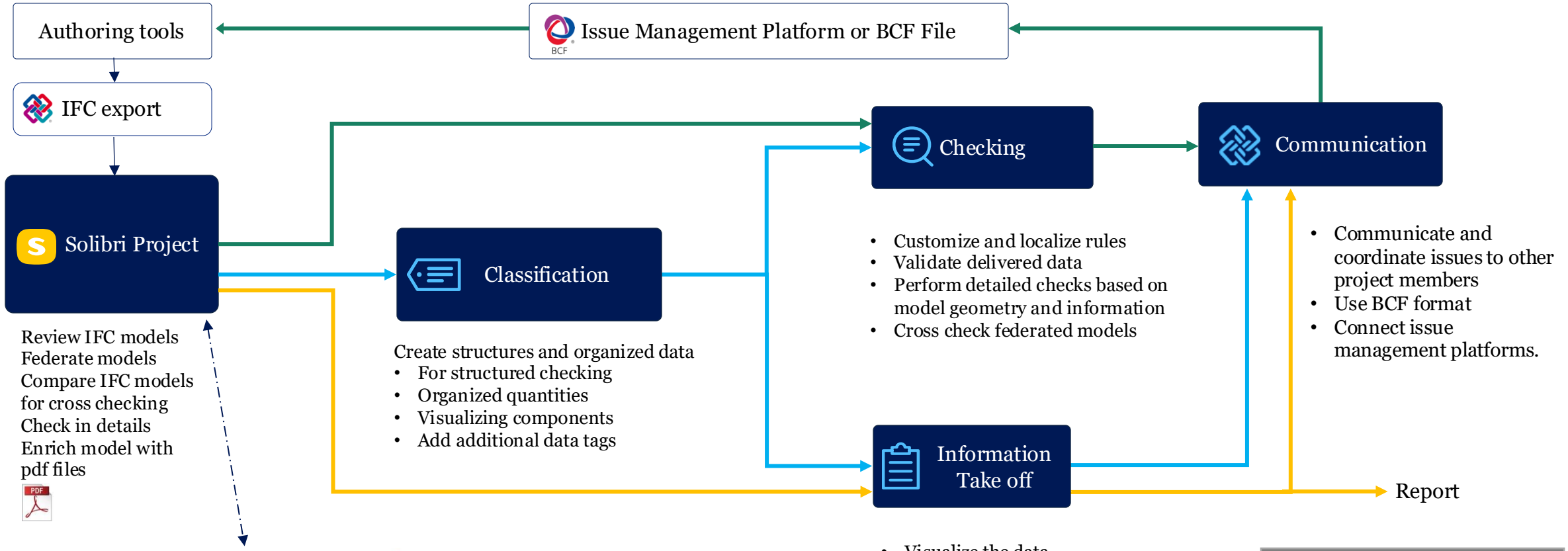


Content

Solibri rule-based checking process options

- Solibri Office desktop vs CaaS checking process
- Solibri Office desktop rule creation process vs BCRL based process

Solibri workflows



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Solibri Office - Checking process

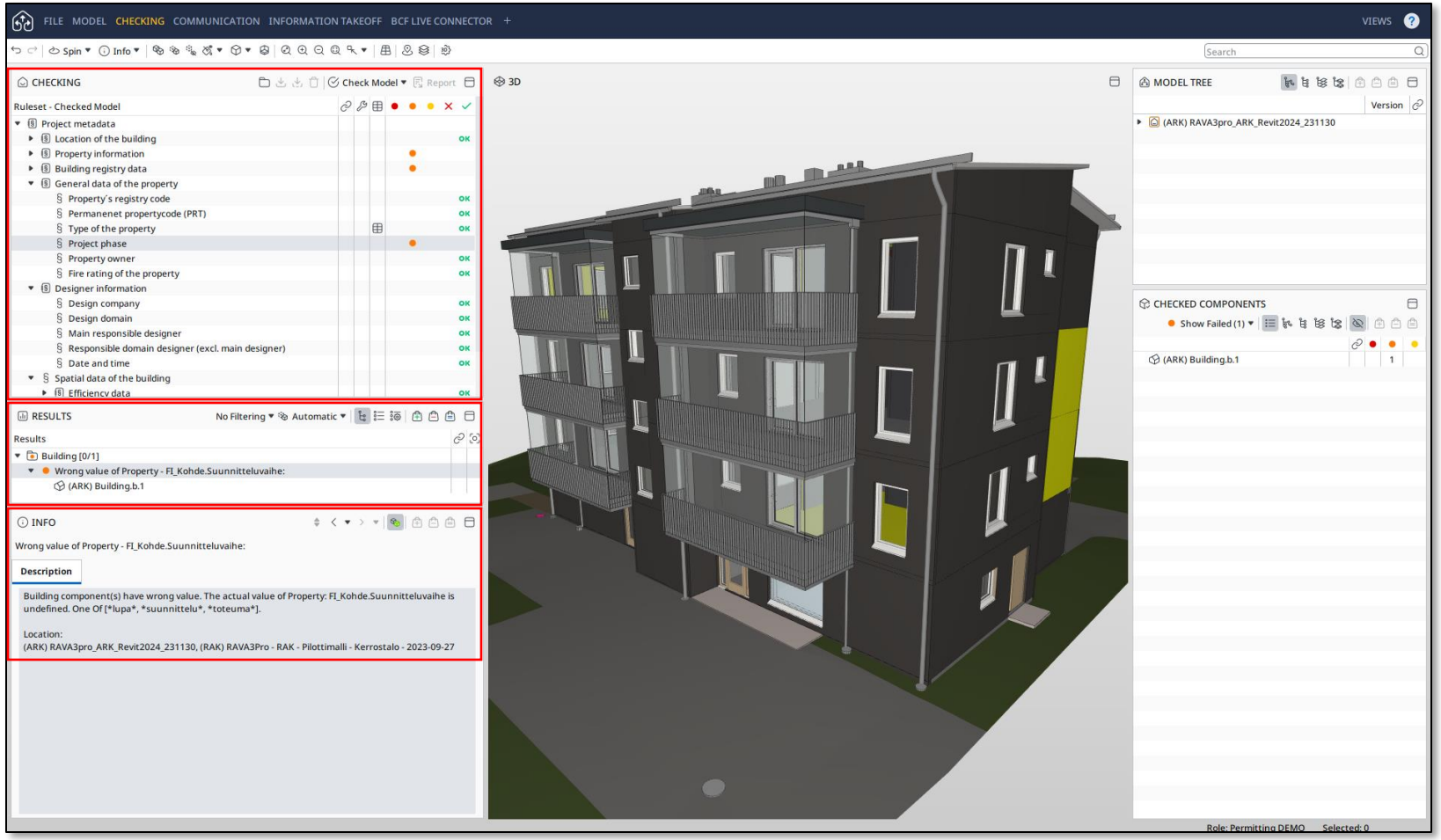
Checking process for permitting

The rulesets which are used for checking at permitting process are stored in Solibri extension. This extension must be downloaded and activated in every desktop. When user enters the checking layout the Role "Rakentamislupa" (=building permitting) must be activated to be able to access the rules.

Once checking is run, the ruleset gives the results in form of "traffic lights" indicating the severity of the result.

User must browse through the results one-by-one and analyze the feedback info with 3D visualization, to decide if the issue is relevant and requires changes.

Solibri has the classification tool to create specific classifications. Finnish RAVA3 project has defined the classification to be done in design according to IFC 4.0 to ensure automated process without any user input to checked material.



Solibri Office – Issue management

User must fill in the issue details table manually.

The purpose of this feature is to allow users to communicate and exchange feedback and instructions how to solve the issue.

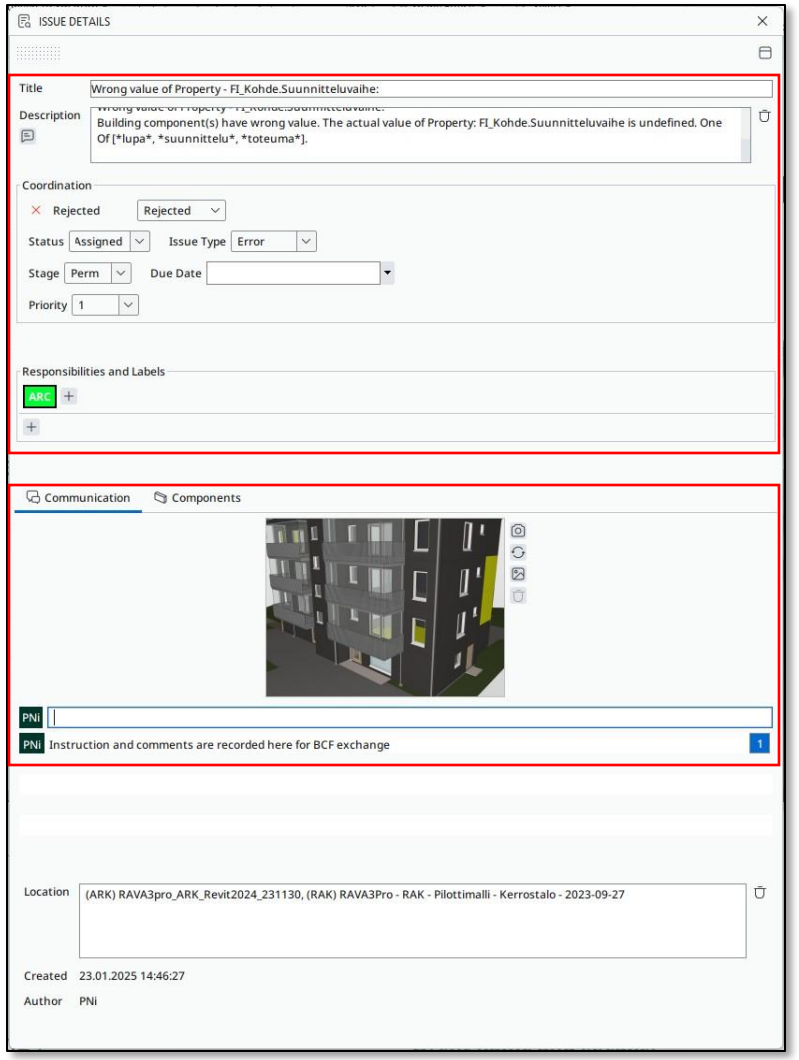
When issue is created, it is considered as "Rejected" - an error. The issue generated with title and description based on the rule name and description. User must ensure these details are correct and understandable.

Issue handler can change the decision, leave the comment and reason for accepting or ignoring the issue. Issue type is referring to BCF server-based communication details.

Using other details with responsibilities and labels, an issue can be coordinated to right responsible person or team and define area or other key word to address the issue correctly.

An issue contains 3D visualization of the issue, a snapshot picture of the issued elements. Rule specifies the building elements that cause the issue and lists them in Components tab.

Location details contain model and floor data, which can be edited and enhanced if necessary.



Solibri Office – Communicating Issues

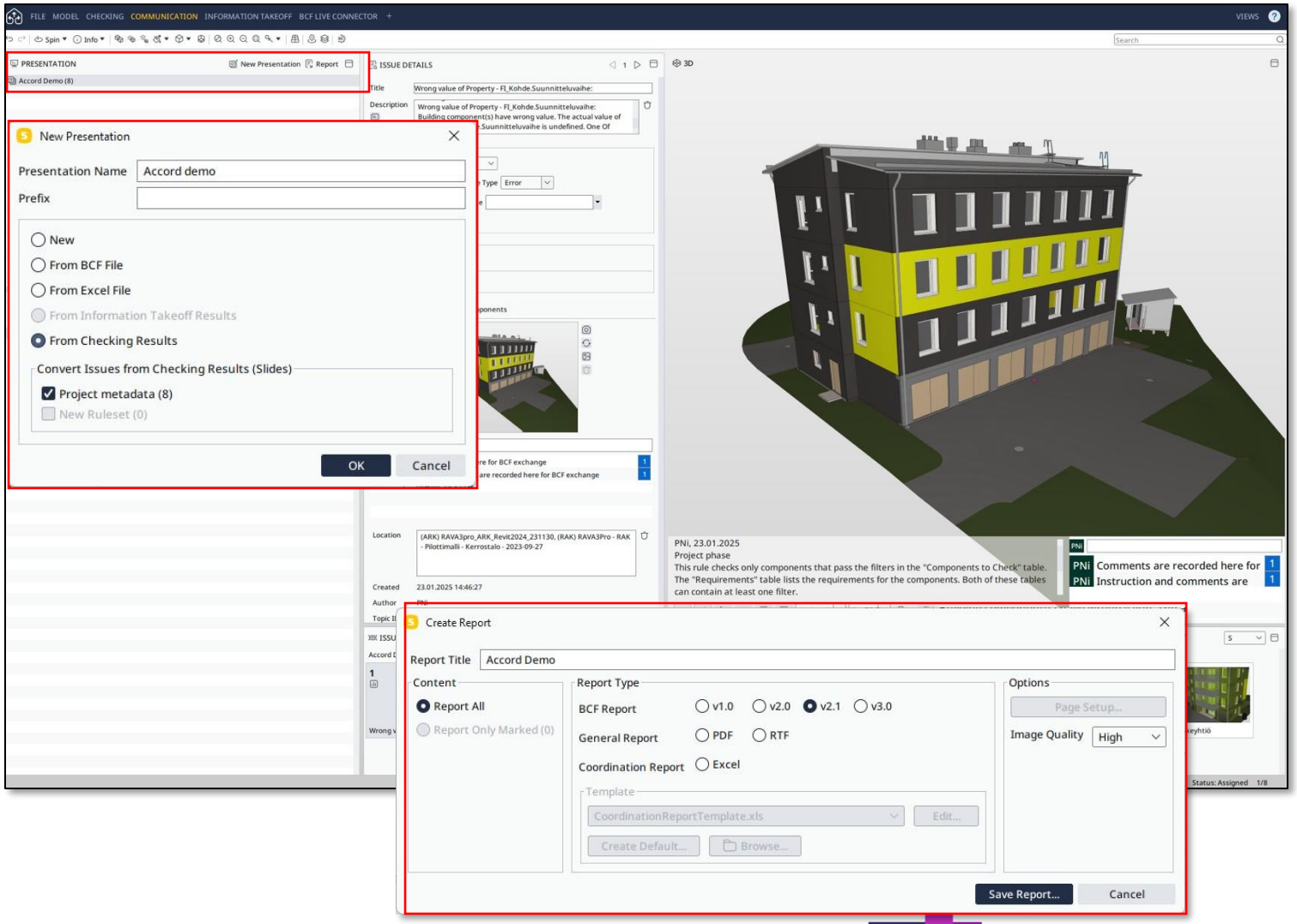
Handled and analyzed results which are generated into issues, must be communicated between the permission applicant, authority and the designers.

In communication layout these issues are collected as "Presentations", a logical collections of issues to be solved. The presentation is converted based on the issues created from checking rules.

User can browse and edit the issues in the communication view. Also choosing a selection of communicated issues for reporting is possible.

Issues are reported typically in BCF format (a standardized format) to ensure the uniformity and security of the issue details. Report send only the issue details to the recipients.

BCF file is saved into mutually agreed way and delivered to other stakeholders to evaluate the findings.



Solibri Office – Reviewing BCF file

BCF file can be opened in most of the authoring and BIM tools such as Solibri.

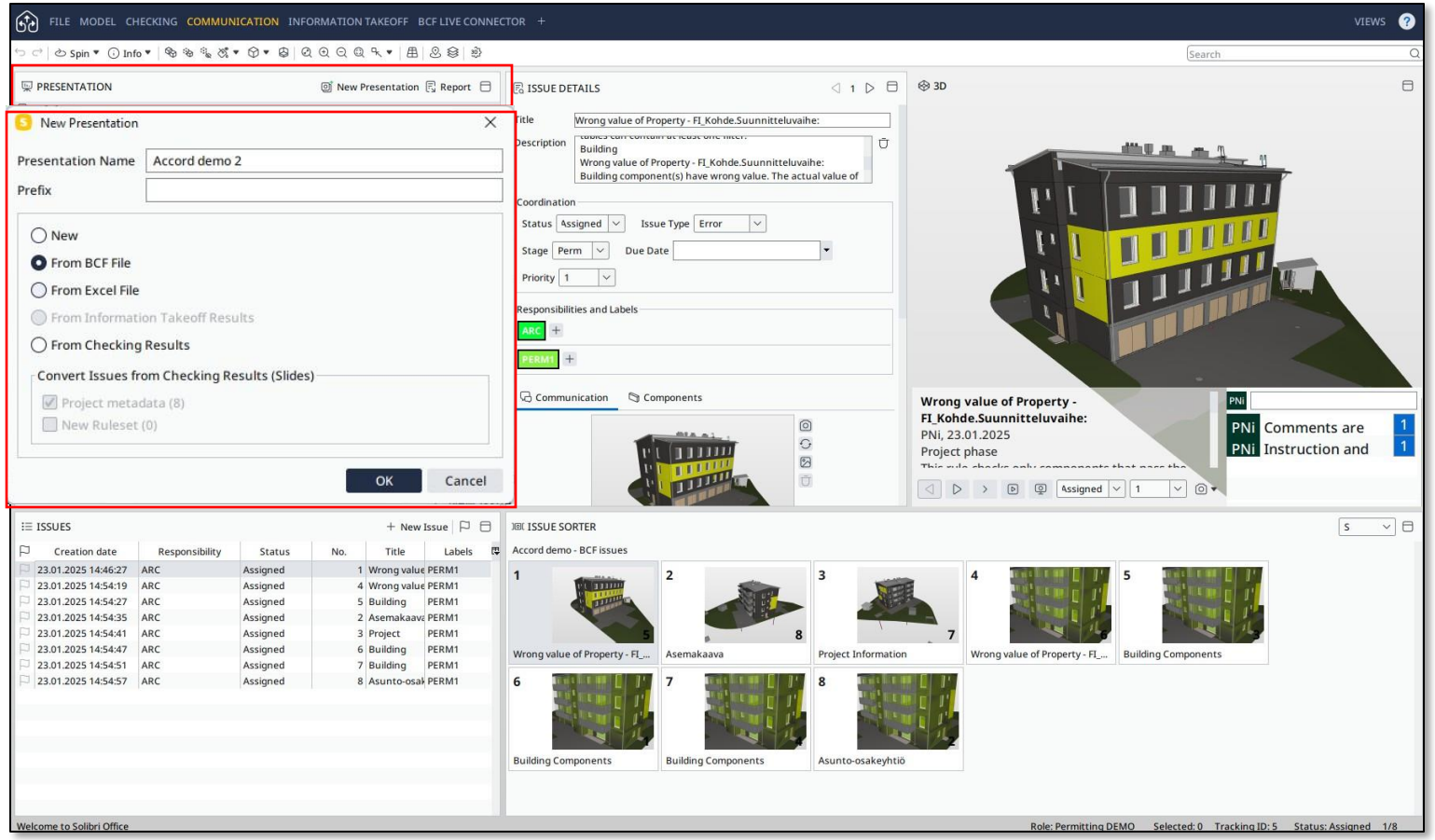
BCF file is a bundle of issues with their details like GUID, which links the issued components to the authoring tool format.

In Solibri user must have the same ifc file and create a presentation converted from the BCF file.

User can edit the native design file, make the changes and send an updated IFC file for new checking.

In Solibri users can comment and agree on the solution for this issue.

BCF file is exchanged between stakeholders as many times as it requires o solve the issue.



Solibri Rule creation process

Current Solibri desktop process

Analyzing regulations

Analyzing textual regulations to rules:
- Find applicability cases
- Selecting suitable templates
- Breakdown the regulation to executable steps in Solibri rules

No alpha numeric content to measure or validate -> No rule

IFC Mapping

Mapping the target building elements to
IFC classification
IFC standard properties

No IFC equivalent
- Custom properties
- Custom classifications
- IDS

Definitions

Rule parametrizing:
Identifying the target, setting the filters
Defining required IFC property sets and properties with allowed values

Optional solutions:
- IDS checking
- New rule development

Testing

Testing of the rules with example models

Creating Rulesets

Creating logical ruleset structure for checking

New BCRL based process

Conversion to BCRL

Regulation is converted to standardized BCRL language representation using specialized markup tools

Term implementation

BCRL Terms that are not yet implemented in Solibri are implemented. The implementations are tested with sample ifc files

Conversion

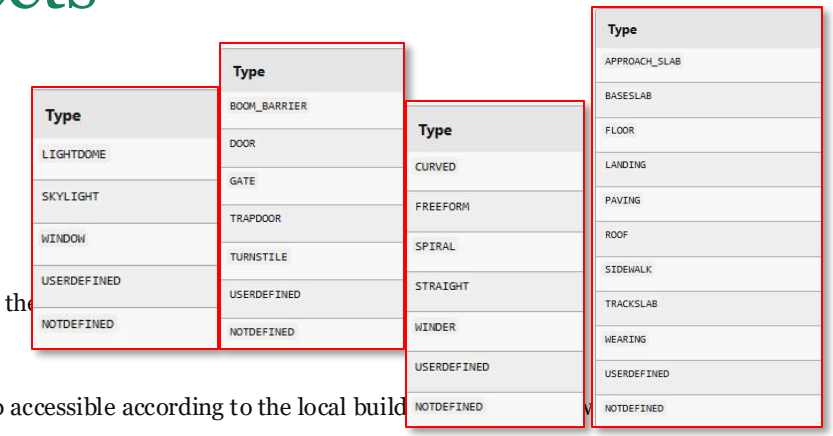
BCRL file is converted to Solibri ruleset

Testing

Testing of the rules with example models

For more details: ACCORD_D2.2_BCO_Ontology_and_Rules_Format.pdf

Prerequisites for checked objects



These are common prerequisites for identifying the checking objects WHAT?

BUILDING ELEMENTS *with* *IfcSlabTypeEnum* – This enumeration defines the available *predefined* types of the element

WHAT KIND OF ELEMENTS? Pset_ComponentCommon

IsExternal – Indication whether the element is designed for use in the exterior (TRUE) or not (FALSE). If (TRUE) it is an external element and faces the

LoadBearing- Indicates whether the object is intended to carry loads (TRUE) or not (FALSE).

HandicapAccessible – Indication that this element is designed to be accessible by the handicapped. Set to (TRUE) if this object is rated as handicap accessible according to the local build giving according to the requirements of the national building code.

FireExit – Indication whether this object is designed to serve as an exit in the case of fire (TRUE) or not (FALSE). Here it defines an exit door in accordance to the national building code.

FireRating – Fire rating for this object. It is given according to the national fire safety classification.

Compartmentation - Indication whether the object is designed to serve as a fire compartmentation (TRUE) or not (FALSE).

ThermalTransmittance – Thermal transmittance coefficient (U-Value) of an element, within the direction of the thermal flow (including all materials). (For envelope only)

AcousticRating– Acoustic rating for elements. It is provided according to the national building code. It indicates the sound transmission resistance of this object by an index ratio (instead of providing full sound absorption values).

Status - Status of the element, predominately used in renovation or retrofitting projects. The status can be assigned to as "New" - element designed as new addition, "Existing" - element exists and remains, "Demolish" - element existed but is to be demolished, "Temporary" - element will exists only temporary (like a temporary support structure).

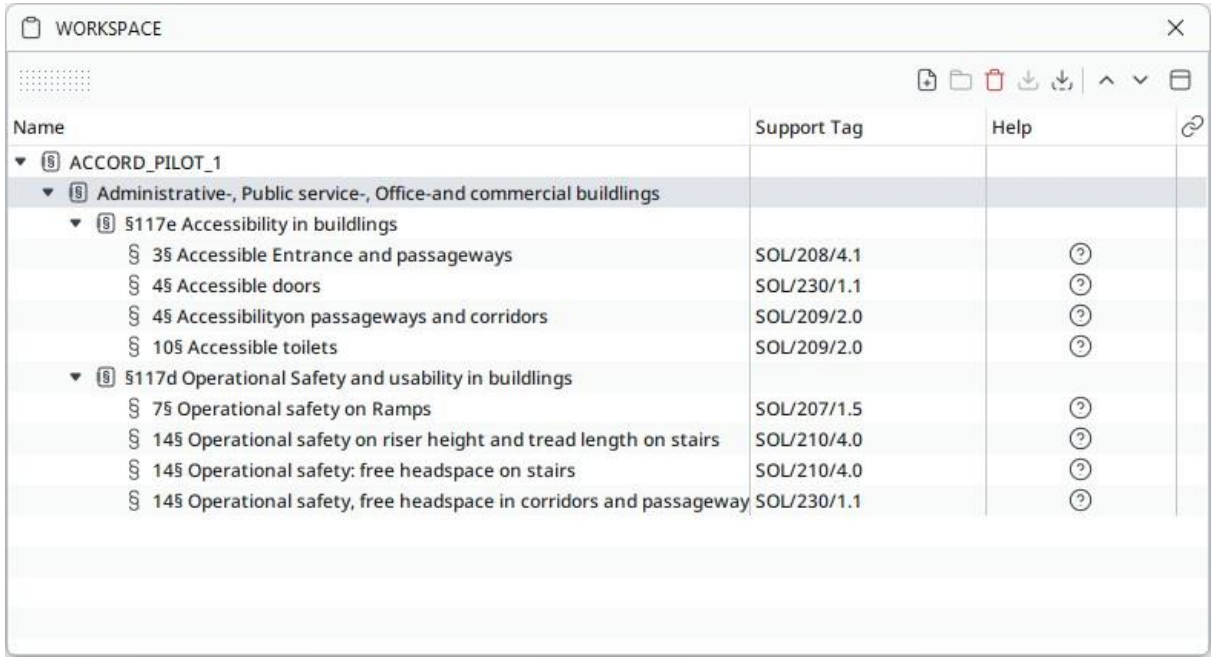
WHERE? SPACES AND ZONES

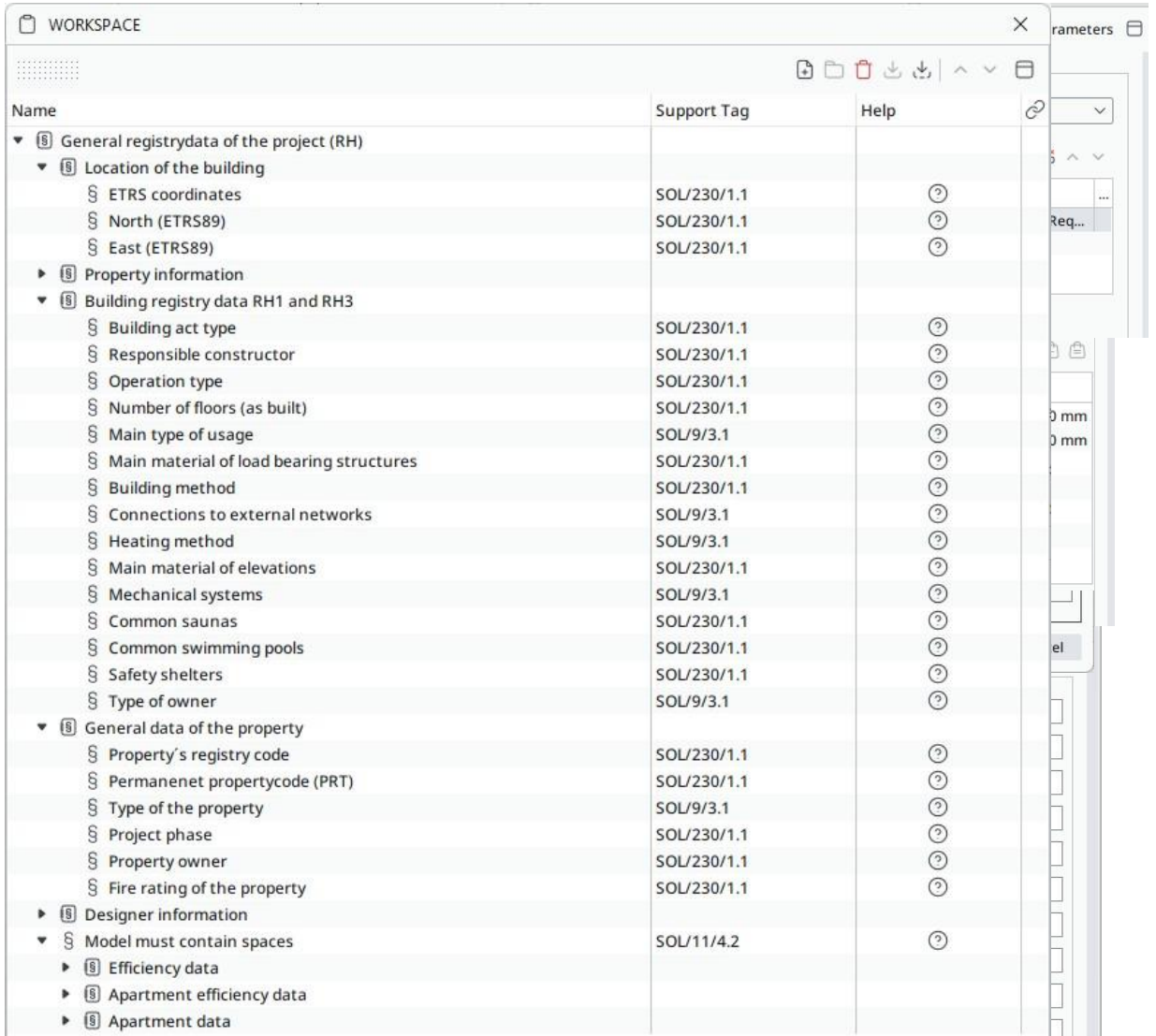
Pset_SpaceOccupancyRequirements

OccupationalType – Occupancy type for this object. It is defined according to the presiding national building code.

See more details: RAVA3Pro National development for automated building permitting

Rule definitions in Finnish pilots for ACCORD

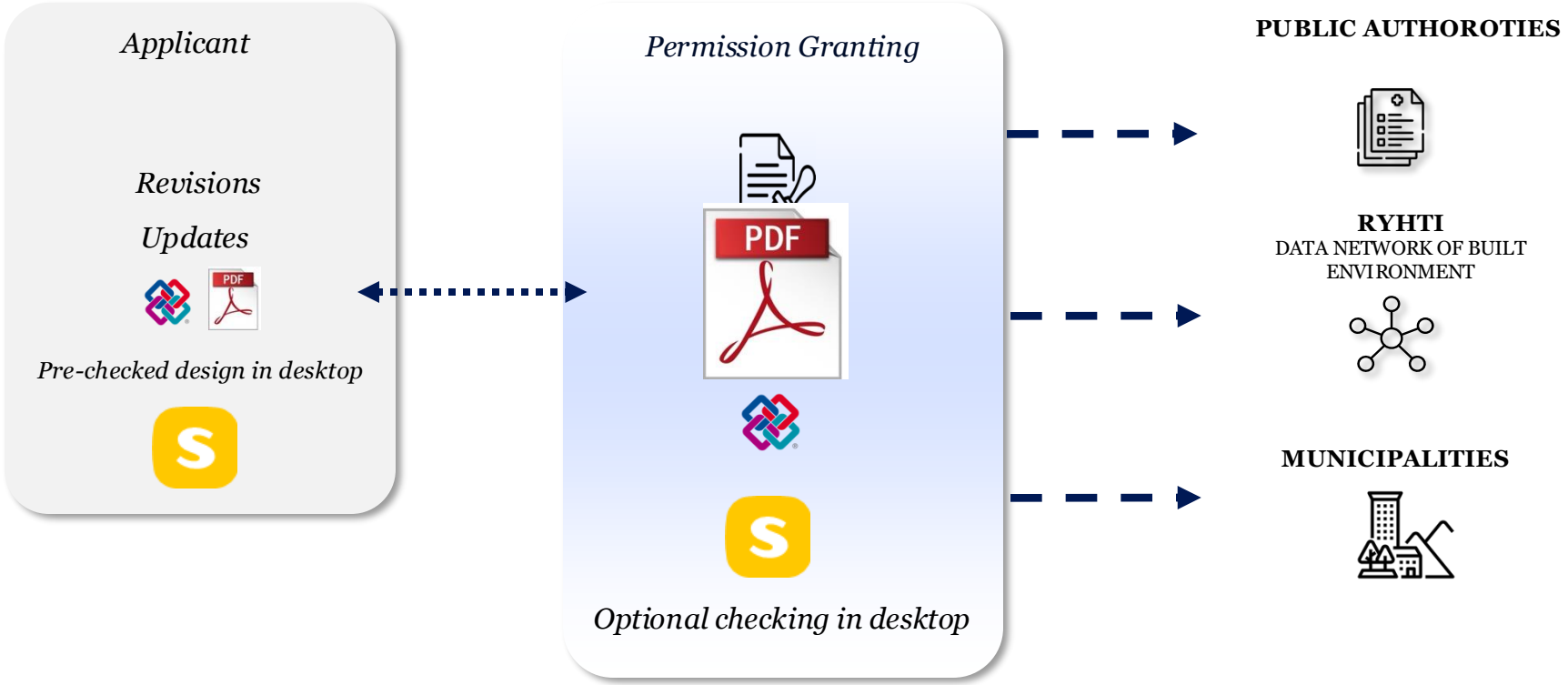




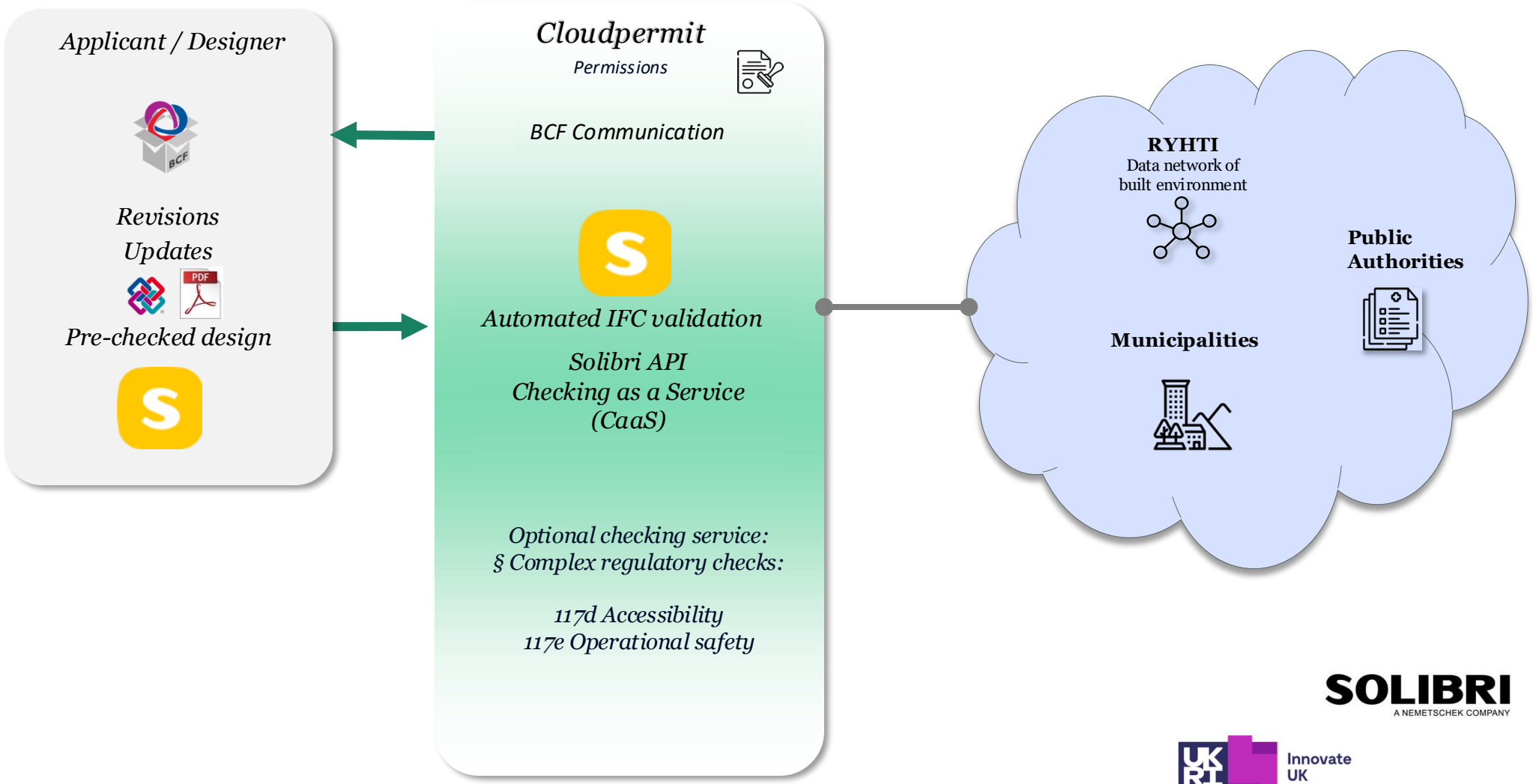
Examples clauses seen here are according to
Finnish Building act
§ 34/117e Operational safety
§ 35/117d Accessibility

14 February 2025

Non-automated submission process



Solibri CaaS – Checking as a Service
(Finnish pilot)



Solibri desktop vs CaaS (Finnish pilot with Cloudpermit)

Solibri Office Desktop checking

Applicant

- User needs a desktop license
- A skilled Solibri user can check their model themselves
- Applicant can run checks in quick cycles

Authority

- User needs a desktop license
- A skilled Solibri user can check their model themselves
- The BCF file must be delivered via email or uploaded to a shared data storage

✓ Author of the ruleset can do the rule configuration

✓ User can do decisions and ignore irrelevant issues

✓ Issues are can be filtered and categorized by their severity

✓ User can edit, create and add content to an issue

Solibri CaaS checking

Applicant & Authority

✓ User has access to permitting portal project

✓ User has basic level skills to use the portal

✓ Applicant uploads the ifc file to permitting portal

✓ File is automatically checked for data and BIM compliance

✓ Checking results are instantly available

✓ Checking results can be commented in the portal

✓ Authorities can communicate by creating a BCF file

✓ Applicant can open the BCF file in their authoring tool and submit a new version of IFC file

✓ Applicant can run additional checks anytime necessary

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Thank you!

Pia Nitz

Solibri Inc

Senior BIM Specialist

pia.nitz@solibri.com

Pasi Paasiala

Principal Software Architect

Solibri Inc

pasi.Paasiala@solibri.com

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Partners

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