

buildingSMART International (2022)

376-TECHNOLOGY Technology Solution using openBIM

Mirella Hilgenkamp



ZengVkPb

Entrant details

Role or Job Title on the Project | CCO

Employer

Future Insight
Zwolle, the Netherlands

Employer Role | Technology or Software Development Company

Are you or your employer a member of buildingSMART? | No

Entry details

Entry Details

By checking this box I understand and acknowledge that this awards program is to assess information about openBIM, and that openBIM is not only about the use of solutions. |

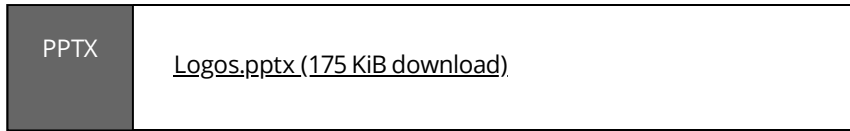
openBIM is about setting up an environment where every party in a team can work in the optimal way ("how they prefer") without putting limitations on others.

It is about freedom to take control over your data and workflows, while keeping that freedom for others as well. Full use of open standards is not mandatory for this mission.

Website | <https://eehitus.ee/timeline-post/bim-based-building-permit-process/>

Location
The Netherlands, Zwolle

Submitting Party and Stakeholder Logos (compiled into one .ppt/pptx file for upload)



Entry Description

An online permit check based on BIM models? Yes, it can be done! We proved it for the Ministry of Economic Affairs and Communications of Estonia. A platform which can be used by both the applicant for a permit and the operator and which provides them with an enormous potential saving and quality improvement.

2 years ago we built the first prove of concept and now it's really implemented nation wide in Estonia. Making it available for all civil servants.

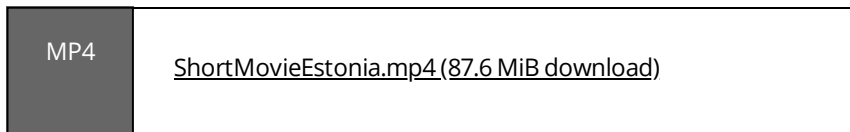
What stage of completion is the entry content representing? | MVP

Stakeholder Statements

Project developer: We want to start using the online checking service as soon as possible. We think it will make the process much more transparent and thus fast and we will detect potential issues much earlier in the process ourselves.

Permit issuer: With the central BIM checking service we can finally start with working in an easy and accessible way. The BIM 'promise' has been floating around for so long, but now we can finally really start doing it.

Upload a 2 minute video to show the scope of the entry.



Technology Solution Description

The goal of this project was to create a BIM based building permit checking service within the Building Registry for the Estonian government.

We created a web-based microservice architecture that uses both - rule-based and preferably algorithm-based approach, which lead to an easy to use, flexible and scalable BIM checking service within the national Building Registry.

In Estonia BIM is an integral part of the e-construction strategy to create more efficient public services and to provide open access to public data related to the built environment. This project is one of the first steps in this strategy and will help implement BIM in organisations and increase efficiency of public services related to construction. In the longer term the project will increase the use of BIM and construction digitisation in Estonia, which ultimately will lead to the reduction of building lifecycle costs. Also the efficiency and quality of public services related to the building lifecycle will improve.

Given the innovative nature of the project and the many external dependencies, the project was approached in an agile way.

Estonia will thus be one of the first countries in the world to have a country-wide BIM service at its disposal as an aid in permit processing. In this way, everyone involved can get used to the use of BIM and the benefits of using BIM are already being reaped.

Because BIM will be used more widely in the work processes, knowledge and support will increase. It will be possible, step by step, to work towards a possibly fully automatic BIM-based permit process in the future.

What underlying technology are you using for your solution?

The following preconditions were the foundation for creating this product:

1 The product must operate on the basis of open standards. Open standards that enable interoperability and communication between the various components of the system architecture. IFC should be used for the BIM data, according to the international ISO standard 16739: 2017 which is widely supported and often used as a standard.

City GML should be used for the 3D Digital Twin in accordance with the ISO TC211 components. This is also a standard which is widely supported and used, as it is an international OGC standard which models all characteristics of the built environment. The solution also supports the ISO 19152: 2012 LADM implementation.

In order to enable a scalable and easy use, it concerns a web-based solution with a simple user interface.

Data storage and transfer is based on online databases. Open API's and web services. The product is in principle scalable, flexible, both vertically and horizontally. This makes it possible to deploy it throughout the Netherlands on a very large scale and very widely. By using open standards the system can easily exchange data with other databases and systems.

These preconditions are a standard fact of every project and of all of the Future Insight activities. Also for the BBIM based building permit checking service.

We will include a rough sketch of the technical infrastructure.

openBIM methods used

- ✓ IFC 2x3
- ✓ IFC 4
- ✓ bSDD
- ✓ BCF
- ✓ IDS

Were there other open data standards used other than those listed above?

citygml, 3D Tiles, CCI

Similar or Comparable Solutions on the market today

There are, of course, all kinds of viewers and repositories available. To date, however, we have not seen an ecosystem as open and scalable as we envisioned.

What added value does your solution give?

BIM models are increasingly becoming the norm rather than the exception among contractors, developers and architects. Governments already receive various formats of BIM models, however, the usability and accessibility is not obvious. A missed opportunity, because these models and the data in them have great potential for digitizing and improving processes in the lifecycle of objects and buildings. With Clearly.BIM, we help organizations to utilize that potential!

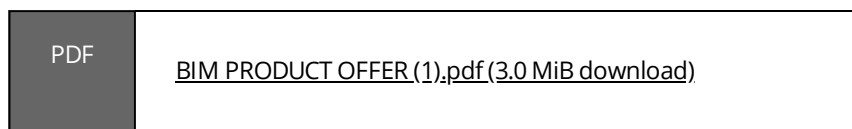
We offer a user-friendly online solution to review IFC files with the ability to share it internally and externally and store it in a central database. Clearly.Bim can perform quality checks based on ILS and is able to do an automated permit check based on 5 criteria. We also offer the possibility to link relevant information to BIM models and can provide insight into zoning plans and cadastral maps in the project environment. We can show this and more in 2D sections or floor plans, but also visualize it in a 3D Digital Twin environment.

We offer a solution based on open standards which, partly thanks to the API connection, makes BIM models accessible and sustainable for all kinds of applications and everyone within the organization.

Results In Practice

The service is currently being implemented nationwide within Estonia, allowing access to the service for all users for whom BIM design is relevant within Estonia. Both within the government and applicants for permits such as architects and project developers.

Example Use



What is the accessibility of your solution?

Since it is a web-based solution that is built using open APIs and international open standards, it is highly scalable and replicable. The service is now being made available nationwide within Estonia and the same web-based basic technology is now also being used in projects in the Netherlands, Germany, Hong Kong and the United States.

What are next steps and future developments of your solution?

A first online out of the box version of the service has now been developed, with which everyone can quickly and easily get started.

In addition, the technology is currently being embedded in a broader open urban ecosystem according to the European open smart city standards. This makes it even easier to combine with all kinds of other types of data and apps, making all kinds of new applications possible. Matters such as privacy, ethics, identity and access management and governance are also included from the design stage in close collaboration with government authorities.

This ecosystem will also be part of the Horizon Europe Accord project in which various parties from the industry, Building Smart International and the OGC will collaborate on an open standard for BIM based permit checking.

What is potentially possible in the future?

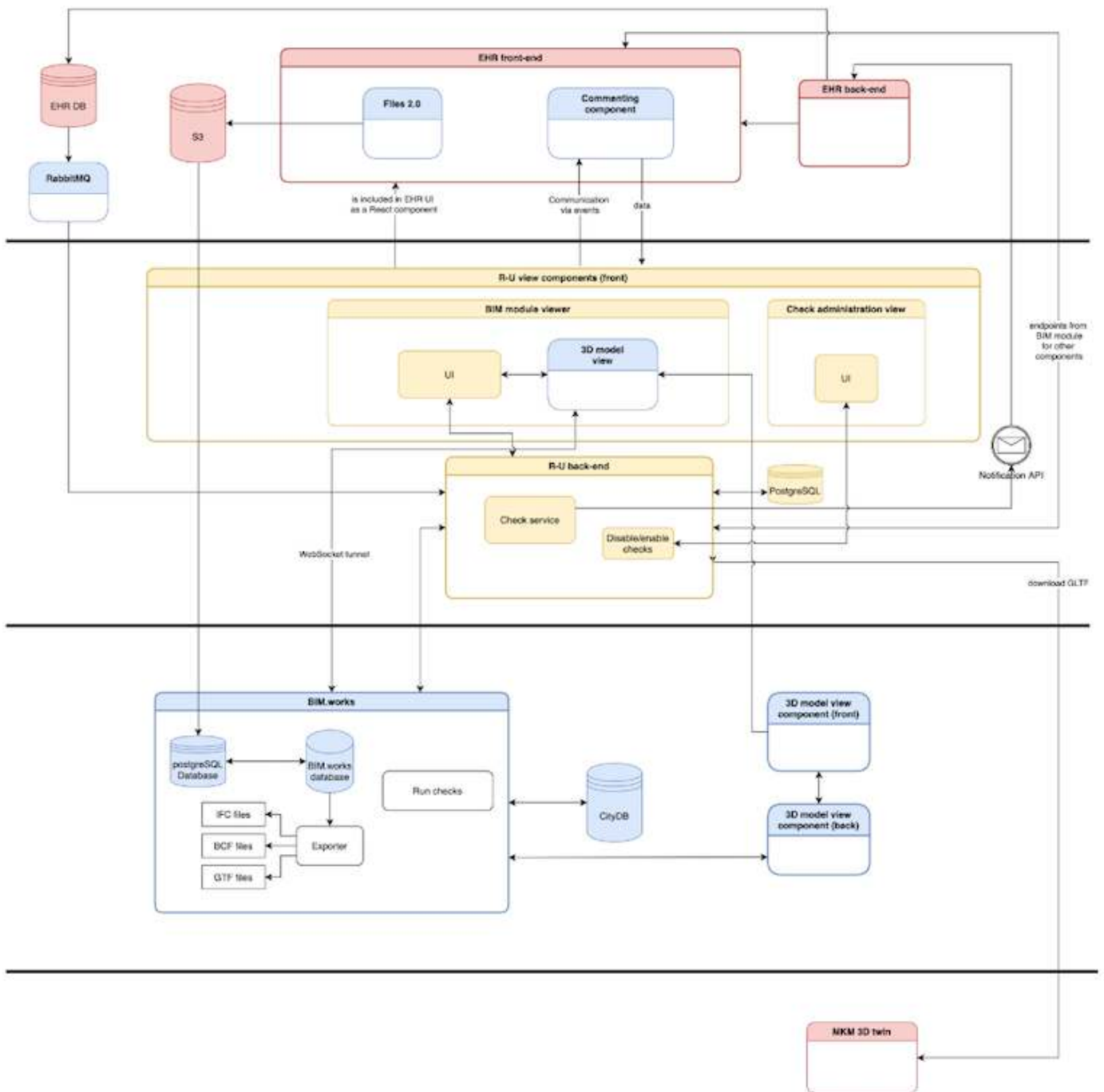
Embedding in the online open urban ecosystem (a system of systems), in which privacy and ownership are guaranteed, will make it possible to use the BIM models integrally across processes and organizations in all kinds of places in the life cycle. Think not only of assessment, but also of participation, 3D Land Registry, energy analyses, materials passport, etc.

Make the case for why your solution should win.

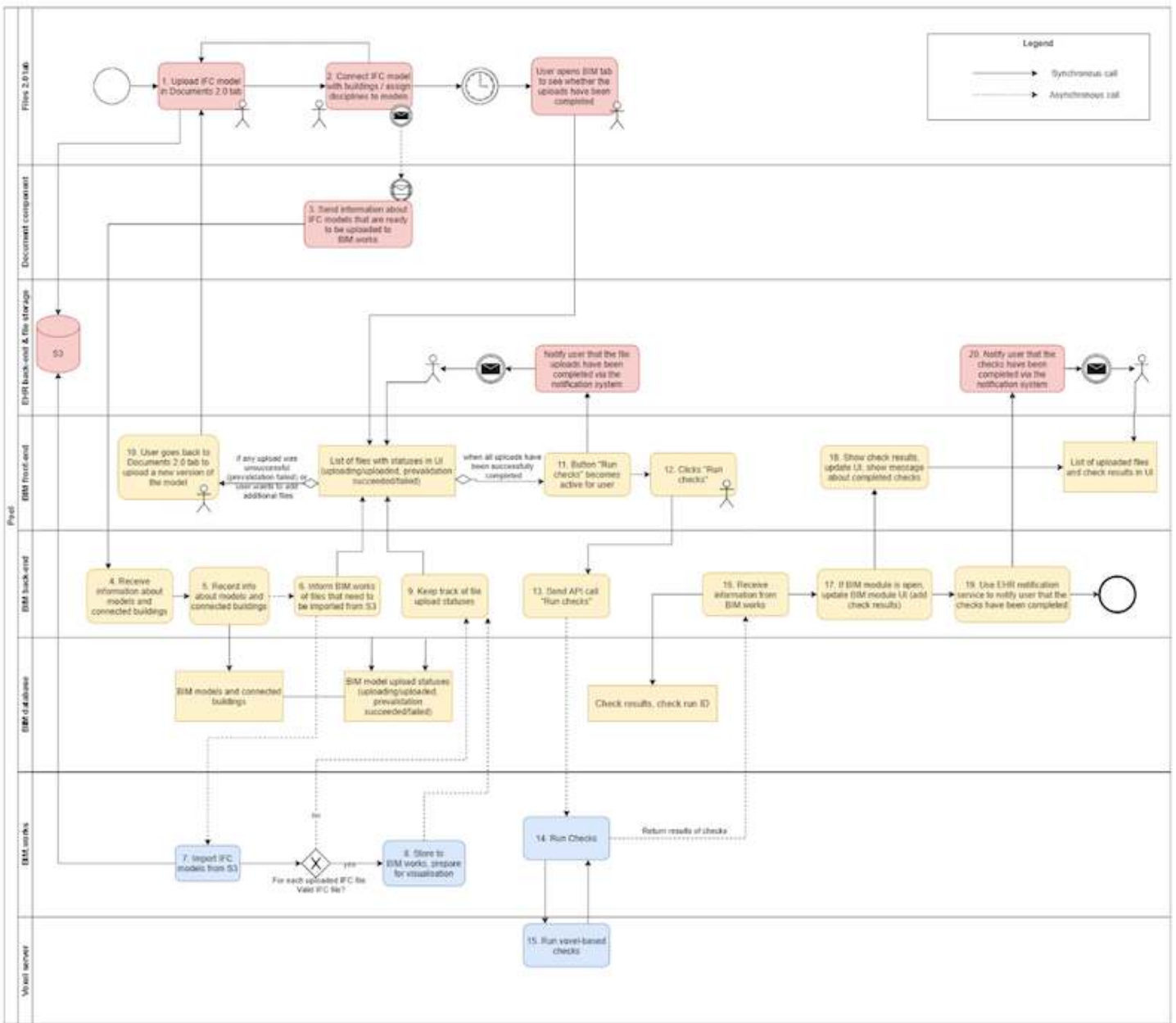
By using modern online web techniques, open standards and database, it is possible to configure very simple web applications for all kinds of less technical stakeholders in the process. As a result, BIM techniques will now also become accessible to people who are not yet aware of the existence.

openBIM Evidence

Software Ecosystem Map



Process Maps



openBIM Data Metrics Summary

XLSX	openBIM Data Metrics Summ... (5 KiB download)
------	---

Additional openBIM Supporting Evidence

PDF	sdlat.et.en.pdf (6.7 MiB download)
-----	--

Lessons Learned

The online openBIM basic technology is now available. There are certainly still some things that need to be improved, but for really successful deployment, the organizational integration and availability of other (geo) information is especially necessary. Adapting legislation and procedures is crucial to the implementation of BIM on a large scale. to succeed in governments.

"We were able to identify where we need openBIM to develop further."

Developments such as IDS and bsDD have started, but are still relatively young. As a result, they have not yet been applied in this project, but they are ultimately necessary for better scalability.

Upload .ifc file(s) or other technical files to support validation of the research results.

https://devkluster.ehr.ee/ui/ehr/bim_demo/bim

Use Cases

BIM Uses formed an integral part to how the project was delivered | ✓

I agree to be contacted for more information about the project BIM uses outside of this awards program. | ✓

Documentation on use case(s) as a single file upload

PDF	Baltic Geospatial Confere... (13.5 MiB download)
-----	--

Log in to awards.buildingsmart.org to see complete entry attachments.



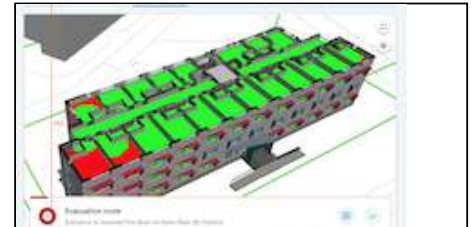
Type of attachment
Image

[Bim Model Dash...](#) 871 KiB



Type of attachment
Image

[3.jpg](#) 165 KiB



Type of attachment
Image

[6.png](#) 136 KiB



Type of attachment
Image

[7.png](#) 82 KiB



Type of attachment
Image

[17.png](#) 4.6 MiB



Type of attachment
Image

[18.png](#) 2.6 MiB



Type of attachment
Image



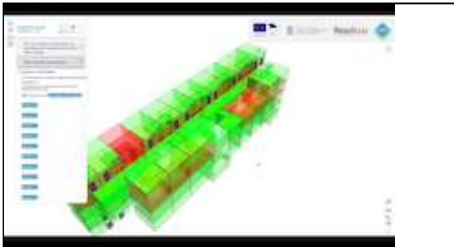
Type of attachment
Image



Type of attachment
Image

12.png

3.3 MiB



Type of attachment
Image

13.png

2.4 MiB



Type of attachment
Image

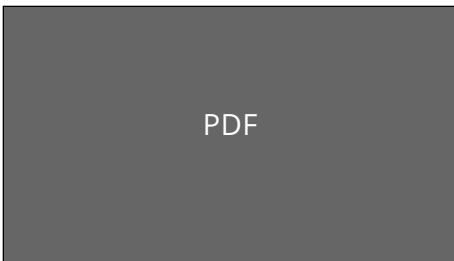
SF4-Prototype-s... 138 KiB



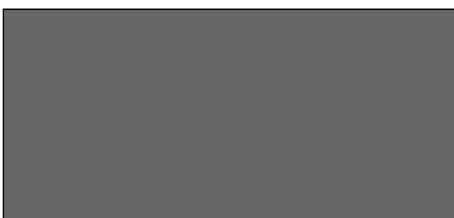
Type of attachment
Image

1.jpg

119 KiB



BIM-module Arc... 1.8 MiB



10.png

1.4 MiB



Type of attachment
Image

15.png

2.6 MiB



Type of attachment
Image

8.png

111 KiB



Type of attachment
Image

4.jpg

85 KiB



14.png

2.4 MiB



Type of attachment
Image

16.png

1.4 MiB



Type of attachment
Image

2.jpg

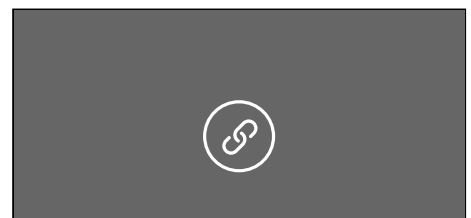
201 KiB



Type of attachment
Image

5.jpg

145 KiB



Attachment name
https://www.youtube.co...

Attachment name
https://www.youtube.co...

Attachment name
https://drive.google.com...

